This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world’s books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that’s often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book’s long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ Make non-commercial use of the files We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ Refrain from automated querying Do not send automated queries of any sort to Google’s system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ Maintain attribution The Google “watermark” you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ Keep it legal Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can’t offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book’s appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google’s mission is to organize the world’s information and to make it universally accessible and useful. Google Book Search helps readers discover the world’s books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at http://books.google.com/
The Penny Cyclopaedia of the Society for the Diffusion of ...
Society for the Diffusion of Useful Knowledge
COMMITTEE

Chairman—The Right Hon. LORD BROUGHAM, P.R.S. Member of the National Institute of France.

Vice-Chairman—JOHN WOOD, Esq.

Treasurer—WILLIAM TOOKES, Esq., P.R.S.


Francis Basset, Esq., F.R.S. and R.A.S., Editor of the Weekly #'Chronicle.'

G. Burrows, M.D.

Peter Stafford Carey, Esq., A.M.

William Coulson, Esq.

A. R. Davis, Esq., P.R.S.

H. T. Diez, Esq., P.R.S.

The Right Hon. Lord Drax.

Samuel Duckworth, Esq., M.P.

N. F. Duppa, Esq.

The Right Rev. the Bishop of Durham, D.D.

Sir Henry Ellis, Pito., L.B. Bela-Mus.

T. F. Ellis, Esq., A.M., F.R.A.S.

John Ewbank, M.D., F.R.S.

George Evans, Esq., M.P.

Thomas Falconer, Esq., P.R.S.

William Babbage, Esq., F.R.S.

J. C. Biggins, Esq., F.R.S.

D. H. Birkbeck, Esq., F.R.S.

J. C. Biggins, Esq., F.R.S.

R. J. Blundell, Esq., F.R.S.

W. H. Blyth, Esq.

R. J. Blyth, Esq., F.R.S.

H. B. Howe, Esq., P.R.S.

J. W. How, Esq., P.R.S.

The Right Hon. Lord Nugent.

Wm. Smith O'Brien, Esq., P.R.S.

The Right Hon. Sir Henry Parry, Bt., M.P.

Richard Quinot, Esq.

W. H. Hare, Esq., P.R.S.

Edward Holdway, Esq., A.M.

The Right Hon. Lord John Russell, M.P.

Sir J. A. C. S. B., F.R.S., P.R.A.

John Smith, Esq., M.P.

The Right Hon. Earl Spencer.

John Taylor, Esq., F.R.S.

Dr. A. T. Thomson, F.R.S.

Thomas Waldo, Esq.

H. Waymouth, Esq.

J. Whitley, Esq., A.M., F.R.S.

The Hon. John Wrottesley, A.R.S., F.R.S.

Thomas Wyse, Esq., M.P.

J. A. Yates, Esq., M.P.

LOCAL COMMITTEES.

Darby—Joseph Strutt, Esq., M.P.

Edward Strutt, Esq., M.P.

Davenport and Stonehouse—John Oke, Esq., Norman, Esq.

Lt. Col. C. Hamilton Smith, F.R.S.

Dudley—T. Troubridge, Esq., R.R., F.R.A.S.

Edinburgh—Sir C. Bell, Bt., F.R.S. & L., and E.

Kew—J. W. Wedgwood, Esq.

Leeds—J. Tyrrell, Esq.

John Hillard, Esq., Kosner, Esq.

James Lond, Esq., M.P.

George Long, Esq., A.M.

A. T. Makin, Esq., A.M.

James Murray, Esq., M.P.

R. J. Murchison, Esq., F.R.S.

G. Mann, Esq., A.M.

J. L. G. Mann, Esq., F.R.S.

G. T. Mann, Esq., Secretary.

Cambridge—Rev. James Bowstead, M.A.


Rev. Dr. Duckworth, M.A., F.R.S.

Rev. Prof. Sykes, M.A., F.R.S.

Rev. Dr. Shepherd.

London Act. &c.—W. Currie, Esq., Ch.

London Act. &c,—W. Currie, Esq., Ch.

Dr. W. H. Wedgwood, Esq., Treasurer.

Dr. H. Wedgwood, Esq.

Lancashire—C. P. Thomas, Esq.

Manchester Act.—G. W. Wood, Esq., Ch.

Bennett Heywood, Esq., Treasurer.

T. V. Whinstanley, Esq., Hon. Sec.

Sir G. Phillips, Bart., M.P.

Rev. W. Turner, Esq.

T. W. Wedgwood, Esq., F.G.S.

Newport Island of Wight—Dr. Clarke, Esq.

James Lowther, Esq., A.M.

R. C. Kirkpatrick, Esq.

Newport Island of Wight—Dr. Clarke, Esq.

R. C. Kirkpatrick, Esq.

R. C. Kirkpatrick, Esq.

R. C. Kirkpatrick, Esq.

R. C. Kirkpatrick, Esq.

R. C. Kirkpatrick, Esq.

The Right Hon. Lord Nugent.

Wm. Smith O'Brien, Esq., P.R.S.

The Right Hon. Sir Henry Parry, Bt., M.P.

Richard Quinot, Esq.

W. H. Hare, Esq., P.R.S.

Edward Holdway, Esq., A.M.

The Right Hon. Lord John Russell, M.P.

Sir J. A. C. S. B., F.R.S., P.R.A.

John Smith, Esq., M.P.

The Right Hon. Earl Spencer.

John Taylor, Esq., F.R.S.

Dr. A. T. Thomson, F.R.S.

Thomas Waldo, Esq.

H. Waymouth, Esq.

J. Whitley, Esq., A.M., F.R.S.

The Hon. John Wrottesley, A.R.S., F.R.S.

Thomas Wyse, Esq., M.P.

J. A. Yates, Esq., M.P.

London: Printed by William Gowers and Son, Stamford Street.
THE PENNY CYCLOPAEDIA

OF

THE SOCIETY FOR THE DIFFUSION OF

USEFUL KNOWLEDGE.

HADLEY, JOHN, the reputed inventor of the sextant which bears his name, became a Fellow of the Royal Society in 1717, and died February 15, 1744. He was author of several useful papers, which appear in the Transactions of the Society, from vol. 32 to vol. 39. He was also upon intimate terms with Sir Isaac Newton, from whom it is supposed he borrowed, without acknowledgment, the idea of the sextant. It is now generally believed that Newton and Godfrey were the original and independent inventors of that instrument. (Gow.) HADLEY pointed out the instrument in the "Philosophical Transactions" for 1731; but Newton, previous to his death in 1727, had given a description of the instrument to Dr. Halley, by whom it was, for some unknown reason, suppressed, though it was communicated to the Royal Society in the year 1742, after Halley's death, by his executor, Mr. Jones. (Hutton's Dictionary, 1813; Herschel's Astronomy, p. 102; and Trans. of the American Society, vol. i., p. 21. Appendix.)

HADRAMAUT. [Arabia.]

HADRIANUS, AELIUS, son of Aelius Hadrianus. After, a cousin of Trajan, and a native of Hatria Picena, but of Spanish descent, and of Domitilla Paulina of Cadiz, was born at Rome, in January, A.D. 76. He was left an orphan at ten years of age, under the guardianship of Trajan and of Tatianus, a Roman knight. He made great progress in literature, especially in the study of Greek. In the reign of Domitian he served as commander of an auxiliary legion in Messenia. Trajan gave him his niece Sabina in marriage, and he accompanied the emperor in his Dacian and Eastern campaigns. When Trajan died at Salins, in Cilicia, in August, 117, Hadrian, whom he had left in charge of the army in Syria, was proclaimed emperor by the soldiers at Antioch, and he wrote to the senate, requesting their confirmation. Piautina, Trajan's widow, favoured his views by pretending that Trajan on his death-bed had appointed him his successor, and for this service Hadrian showed his gratitude to Piautina to the end of her life. The fact of Hadrian being adopted by Trajan a year before his death has been asserted by some writers and denied by others. His election being confirmed by the senate, Hadrian, after withdrawing the troops from the countries east of the Euphrates and making peace with the Parthians and the Armenians, set off for Rome, where he assumed the comitahus in the following year (A.D. 118) with T. Fuscus Sabinus. He refused to appropriate to himself the triumph which had been destined for Trajan, and he caused the insignia of the deceased emperor to be carried in the triumph: according to Spasticus he himself carried it. He remitted all the arrears due to the public treasury by individuals in Rome and the rest of Italy, and all that was due from the provinces for sixteen years past: and he burnt in the Forum of Trajan the schedules of the debts, which are said to have amounted to several millions sterling. Medals were struck on this occasion with the figure of Hadrian holding a torch and setting fire to the heap, and the legend "He enriches the whole world." In the following year Hadrian was consul again with Rusticus; and hearing that the Sarmatians and the Roxolani had made an irruption into Illyricum, he repaired to Moesia, defeated the invaders, obliged them to recross the Danube, and to sue for peace. He appointed Marcius Turbo governor of Pannonia and Dacia. From his camp in the Illyricum he wrote to the senate, accusing of high treason four senators of consular families, who were ordered for immediate execution. Other persons were arrested and put to death as accomplices in the alleged conspiracy, and a general alarm spread at Rome, when Hadrian hurried back and affected to blame the precipitancy of the senate. He compelled Tatianus, his former guardian, whom he had made prefect of the Praetorian soldiers, and who had abused his power, and had advised the proclamations, to resign his office. The year after, Titus Aurelius Fulvius, afterwards the Emperor Antonius Pius, was made consul; and in the same year Hadrian began his travels through the various parts of the empire, which may be said to have occupied, with few interruptions, the remainder of his reign, a period of about eighteen years. We have memorials of his travels in numerous medals, struck in the various provinces on the occasion of his visit, which form an interesting series. An Italian medalist, Manzaburba Bragga, has put these medals in order and illustrated them. Hadrian began with Campania, where he distributed sums of money to the poor of the various towns which he visited. Indeed liberality in this respect was one of the most conspicuous qualities of this emperor. He next went to Gaul, where he visited all the principal towns and fortresses; from thence he proceeded to Germany, where the best legions of the empire were stationed, and he remained a considerable time among them for the purpose of restoring the discipline, which had become relaxed. He himself set the example by living as a soldier among the soldiers. Hadrian was not fond of pomp or show, and he went about with as little state as possible. He drew up a series of military constitutions or laws, which remained long in use after his time, and are quoted by Vegetius. He attached to every cohort a certain number of builders, masons, and other workmen.

In the following year, in the consulship of Annius Verus, grandson of Marcus Aurelius, he left Germany, and returned to Gaul, from whence he passed into Britain, where he is said by Spartianus to have reformed many abuses. Although Hadrian did not live on very good terms with his wife Sabina, he punished those who presumed to fall in respect to the empress; among others Sustennus Tranquillus, the biographer, who was Hadrian's epistolographer, or secretary, whom he dismissed, as well as Clorus, the prefect of the Praetorium. While in Britain he constructed a rampart of earth, extending from the Solway Firth to the German Ocean near the mouth of the Tyne, a little to the south of the

P. C., No. 724.

Vol. XII. 9
HAD

more substantial wall afterwards raised by Severus. On his return to Gaul, Hadrian built a magnificent palace at Nimes for Plautius, Trajan's widow. He then pro-
cceeded into Spain, and spent some time at Tarraco (Tarragona), where he held a general assembly of the deputies of the various provinces of Spain, and settled several disputes and complaints. While walking in the palace garden at Tarraco a slave attempted to kill him. The emperor par-
ried the blow, and consigned the assassin to his guards, but on hearing that the man was insane, he ordered him to be taken and examined. The physical examination re-
turned to Rome in the consulsip of Aulus Aviola and Cornelius Pansa, a.d. 122; but he left it again soon after, and the next year we find him at Athens, a city to which he was much attached. He ordered the erection of the Corinthian temple, which had damaged the town of Euseus, and the construc-
tion and repairation of various edifices. From thence he went to Syria, and had a conference with the king of the Parthians, when peace was confirmed between the two em-
pires. The year following he visited various parts of Asia Minor, and after building temples and other edifices at Niconedia, Cyzium, Nicea, and other towns, he sailed to the islands of the Egean Sea, and returned to spend the winter at Athens, where he was initiated in the Eleusinian mysteries, presided at the public games, and showed many marks of favour to the Athenians. He next went to Sicily, and ascended the summit of Etna to see the sun rise. He returned to Italy, and took the consulship of C. Julius Verus and Aulus Bibulus, a.d. 126, and we know nothing of his move-
ments for the two following years. He appears to have been at Rome in the year 125, under the consulsip of Ju-
venalis Bassus and C. Iulius Caelius, where he is mentioned in a violent edict, which had destroyed the towns of Niconedia and Nicea in Bithynia, and others, he ordered them to be rebuilt at his own expense, for which he is styled on some medals the Roman benefactor. In the same year he was set off for Africa, where he distinguished himself, as he had done on his previous travels, by his munificence. Plautius hav-
ing died meantime, Hadrian returned to Rome, and cele-
brated a public ceremony, in which he was seated, and
had her name re-
men among the gods. In the following year, 130, he
raised a magnificent temple in honour of Venus and Rome, some remains of which are still seen near the arch of Titus. The plan of the building was made by Roman architects, and
celebrated Gre-
cian architect, for his opinion. Apollodorus observed that
the building appeared too low for the size of the statues of Venus and Rome, which were intended to be placed thereon; and which it would appear in the represented scene,
as Apollodorus remarked that those divinities, when once
within, could not stand upright or walk out of the temple, if
they should take a fancy to do so. Hadrian, stung at this shame, and in whose name his arch was erected, is added
some writers that he afterwards ordered him to be put to
death on some frivolous presence. In that year Hadrian
set off again for the East. He visited Cappadocia, where he
held a conference with several kings or chiefs of the
Caucasian tribes, the Abazi, Zidretes, &c., whom he sent back laden with presents. Even the Bactrians sent an em-
bassy to propose an alliance with Rome. He next proceeded to the Parthian and Egypt, in which last country he remained two years. While he was in Egypt,
and under the consulsip of L. Cenamontius Pontianus and An-
tonius Rufinus, a.d. 131, the priest Saint Iulius came out, by
his order, the Perpetual Edict, which may be considered as the first general code of Roman law published by authority.

There is a letter of Hadrian, written from Alexandria, to Servianus, his brother-in-law, in which he describes the state of the different sects, Jews, Christians, Samaritans, &c., who were very numerous in that country; he says that they all adored but one god, namely, their own interest. He also notices as an important thing that he never considered it appropriate for anybody, even for himself, to be blind, followed some trade or occupation; a circumstance which probably struck him by the habitual idle-
ness of the people of Rome. He restored the palace and museum of Alexandria, and held disputationes with the
learned men there. About this time his favourite Antinous died; some say he drowned himself in the Nile, and Had-
rian disgraced himself by the apotheosis and other absurd
honours which he paid to his memory. He next went to Cyrene, where he is said to have killed a large lion.

Hadrian was an expert sportsman, and is said to have killed
many wild beasts in his travels. Under the consulsip of Iulius and Sisenna, a.d. 133, Hadrian repaired to Syria,
from whence he set off for Thrace and Macedonia, and
lastly stopped at Athens. The insurrection of the Jews of Palestine under Barcoebas raged about this time. They
took Jerusalem, and spent two years, but the emperor was obliged to send for his best general, Julius Severus, who
was in Britain, to assume the direction of the war against them, which lasted about three years. [BARCOE-
BAE.] Among the various edifices erected at Athens, there was a tem-
ple which he called Alia Capitolina, and he peopled it with a
Roman colony, forbidding by an edict all Jews from setting
their feet within it. The Christians, who were still con-
formed with the Jews by the Romans, were included in the prohibition. Hadrian did not permit the Jews to reside at Athens, and in the festivals of Bacchus he ap-
ppeared in the dress of an archon, and distributed money
and corn to the people. He greatly embellished that city,
a district of which was called by the name of Hadriano-
polis [Athens.] He also completed the temple of Jupiter
Olympicus, which had been commenced a long time before.
He returned to Rome under the consulsip of Lopereus
Pontianus and Rufus Aquilius, a.d. 135, where he re-
ceived the visit of Phraamanes, king of Iberia, who came
to answer several complaints laid against him by Vologeses,
kings of Armenia. An exchange of rich presents took place,
and Hadrian ordered the Baths of the young emperor to be
rebuilt and brought to him by his visitor. Soon after, falling ill, he
thought of choosing a successor, and he fixed his choice
upon L. Aurelius Ceionius Commodus Verus, whom he adopted as his son. On the 18th of June, A.d. 138,
the year Hadrian retired to the neighbourhood of Tiber, where he built a magnificent villa, many remains of which are still existing, and which
remain as last representations of the wonders of nature, and of
art which had been seen in his travels. This edifice seems
to have soured his naturally suspicious temper, and
he condemned several individuals to death, among others his brother-in-law Servianus, a man far advanced in age.
Zelius Verus, the young emperor, died in the same year:
he was appointed as Caesar, Hadrian now fixed his choice upon Titus Aurelius Antoninus, on condition that he should adopt Lu-
cius Verus, son of Zelius Verus. After some deliberation
Antoninus accepted the proposal, and the duality of
adoption was solemnised with the usual ceremonies in February,
137. Sabina, Hadrian's consort, died about this time, and
was numbered among the gods. Hadrian still finding his
illness increasing, and still raged over Syria, and Hadrian
the prescriptions of his physicians, he began to eat and drink
according to his pleasure. Seeing his end approach, he
composed some lines addressed to his soul, which show his
doubts and fears concerning another existence:


"Annulam regalium blanditiae
Hisper coronae corporis," &c.

He died in July, A.d. 138, in his sixty-third year, and the
throne was occupied by his two sons.

In his personal character Hadrian had many valuable qualities, tarnished by some vices. As emperor, his reign
may upon the whole be considered a happy one for the
empire, which enjoyed almost uninterrupted peace. Less
warlike than Trajan, he made himself respected by foreign
nations without having occasion to resort to arms. His
extensive travels form an important epoch in the history of
the Roman empire, for the various regions which they
visited, while he corrected many abuses of provincial administra-
tion, and thus cemented the union between Rome and its
vast dependencies. He used to say that an emperor ought
to be like a father to the various parts of the empire, and that
he would not receive anything left him by will when the
testator had children. Hadrian gave no power to his liber-
t, and punished those about him who boasted of their influence
over the people, the only care he took for the purification of
the people's manners, and the improvement of commerce, and an enemy to pomp and parade. If he
be numbered one of the best emperors, he certainly must be
reckoned among the bad. He had an extraordinary
memory; was a good orator, grammarian, poet, and mu-
sician; was acquainted with mathematics and medicine.
and delighted in the company of learned men; he was also a great friend to the arts of sculpture and architecture. He was the first emperor who let his beard grow—in order, it is said, to conceal some blushing in his face.

The busts, statues, and medals of Hadrian are very numerous, and all bear striking resemblance to each other in the character of the countenance. There is a full-length statue of him and two busts in the Townley Gallery, British Museum.

**Hæmatemesis** (from αἷμα, blood, and λίθος, to vomit), a bleeding from or into the stomach. [Hæmorrhage.]

**Hæmatocèle** (from αἷμα, blood, and κέλαιον, a tumour), an effusion of blood into the serous cavity.

**Hæmatops** (a name given by Mr. Gould to a genus of birds inhabiting Van Diemen's Land and New South Wales, and thus characterized by him in 'Zool. Proc.' for 1836 (Dec. 27.).

**Bill** shorter than the head, slightly curved, without any denticle at the apex, rather compressed. *Nautalis* longitudinal, and covered by an operculum; no bristles at the gap. *Wings* moderate, first quill short, third and fourth nearly equal and longest. *Tail* moderate, equal or slightly forked. *Tarsi* moderate, the rather strong *hallux* and *claw* equaling the middle *tarsus* and *claw*; *external tarsus* equal in length. Enlarged spots or marks (nervi sanguinolenti) above the eyes.

Mr. Gould recorded two species, *Hæmatops baldiocris*, 6½ inches in length (Van Diemen's Land), and *H. gularis*, 6 inches long (New South Wales).

These were among the specimens from which drawings had been taken for the first part of Mr. Gould's new work on the Birds of Australia. The name, in sound, comes rather near to *Hæmatopus*.

**Hæmatopus. [Oyster-Catcher]**

**Hæmatornis. [Falconidae, vol. x., p. 174.]**

**Hæmatoxylon Campechianum** (Logwood), a tree native of Campeachy, but cultivated also in Jamaica. The finest wood is the produce of the former place. The bark and albumen being removed, there is within a dark red coarse-fibered duramen, having a violet-like colour, and a taste at first sweetish, afterwards astringent. It dyes the saliva violet-coloured, and produces a similar change on many of the other secretions. Specific gravity 1:057. Ten pounds of wood yield 16-18 ounces of extract. Its chief constituents are volatile oil, resinous or fatty matter, and a principle termed *hæmatoxylamine*, which is occasionally found in the wood in the form of crystals.

Logwood acts as a mild astringent in haemorrhages or increased secretion, and in some forms of diarrhoea it often effects a cure where more powerful astringents fail. (See Abercrombie on Diseases of the Stomach, &c.) It may be exhibited in the form of infusion or of extract: the former is preferable. Logwood is also used extensively in the arts, especially for dyeing. It gives the peculiar colour to the paper in which sugar-loaves are always wrapped.

**Hæmaturia** (from αἷμα, blood, and χῦς, urine), vomiting of bloody urine. [Hæmorhage; Kidneys, Diseases of.]

**Hæmocharisis. [Leeches.]

**Hæmodoraces. Under this name Dr. Robert Brown proposed, in the year 1816, to separate from the natural order Iridaceae, the genera Hæmodorum, Conostylis, Anigozanthos, Philoboearya, Dilaria, Lanaria, Heritiera, and Wachendorfia.**

He remarked that they are abundantly different, especially in being hexandrous, or in having the stamens, if only three in number, stationed opposite the petals, and in having the anthers opening on the side next the stigma; the habit was moreover different. This distinguished botanist mentioned in connection with his new order, without actually adding it, Xiphidium. The latter genus has more recently been introduced along with Hagenbachia as an umbellifer member, notwithstanding its having a superior ovary. All the species have equitant leaves, and perennials fistulous roots or bulb-like corms; there is also a general appearance of wood upon their flowers, in some cases to such an extent as to bury all the outer surface. The order may be considered a connecting link between Iridaceae and Liliaceae. One species, Dilaria Heritieri, yields a dyeing matter in its rhizome.

**Hæmopis. [Leeches.]

**Hæmoptysis** (from αἷμα, blood, and πτύειν, to spit), a spitting or coughing of blood. [Hæmorhage; Lungs, Diseases of; Phthisis Pulmonalis.]

**Hæmorrhage** (from αἷμα, blood, and ῥηγγος, to break). The most common cause of haemorrhage is external violence, by which the vessels of a part are divided, and the blood escapes from their cavities. When an artery of some calibre is wounded, a bright scarlet stream of blood is propelled to a distance proportioned to the size of the vessel, in a current continuous, yet increased in force at intervals corresponding with the pulsations of the heart. This is called a jetting stream. If a vein of some size be divided, a stream of dark crimson blood is projected in a perfectly continuous and equable current, and with less force than from an artery of the same calibre, in consequence of the loss of power which the blood sustains in its passage through the minute capillary vessels. In wounds in which no vessel
of more than a line in diameter has been divided, the blood flows in a constant more or less rapid oozing, but is not pro-
er iced to any distance from the body; and when it issues from bo h kinds of vessels at once, and in equal quantities, its colour is intermediate between those peculiar to each of those vessels. The same mixture of the two kinds of blood may sometimes, when a number of small vessels of both kinds, and a large one of either kind, are simultaneously divided, make it difficult, from the colour alone, to which kind the blood belongs; for the operation becomes imperceptible if the arterial blood be long detained in the tissues, for then it assumes a venous colour.

When a large artery, as one of the main trunks of the limb, is wounded, the blood runs out, and the artery seems to burst, with a perceptible impetuosity that life is often destroyed almost instan-
taneously. The quantity of blood lost however, and the rapidity with which death ensues, will depend in some mea-
sure on the freedom of exit which the blood finds after issuing from the wounded vessel, as well as on the mode in which it is wounded. If there be a free external aperture, no obstacle is presented to its flow, and death speedily fol-
lows; if, on the contrary, the aperture be small, as in a punctured wound, the blood can escape but slowly, and is liable to congeal in the passage, so as partially to block it up and render it still more narrow. If again the artery he wounded through an extant aperture, the wound cuts into the tissues around, and be thus partly covered, so that the hama-
rage will be retarded. If it be cut longitudinally, the blood will flow much less rapidly than if the wound be transverse, because the arterial gush much less effectively be placed on the wound be not cleanly made, if the edges be rough and torn, as by a gun-shot, no blood at all will flow, at least for some time. None of these circumstances however is likely to do more than retard the fatal conclusion of a wound of a large artery; unless immediate assistance be given.

When an arterial branch of the second magnitude, as one of the primary divisions of the main trunks in the leg or fore-
arm, is wounded, the flow of blood is at first profuse, and a large quantity is lost; but after some time it ceases from extreme exhaustion, and then the heart ceasing to act the blood no longer flows, but begins to congeal both within and around the vessel, whose extremities contract, and further causes, in a short time, the blood to be prevented from passing, however, as soon as the patient recovers from his exhaustion, and the heart regains some of its power, the slight obstacles formed during the fainting are forced away, and the hemorrhage recommences and continues until the patient is again exhausted. Thus by a succession of hemorrhages and of temporary staunchings, he may at last be destroyed by extreme debility. From arteries of smaller size, as those at the elbow joint, the blood flows in a rapid stream, but after a few minutes, if they are exposed to the cold air, they retractor; their orifice contract and close, and the bleeding altogether ceases, without much danger of returning. From those which have been wounded by a gun-shot, it is much more slow, for the blood is prevented by the valves from flowing from that part of the vein which is be-

between the heart and the orifice, and in the part which is beyond the orifice it has only the force of that in the smaller arteries. Hence it is seldom immediately fatal, and when the patient becomes faint the edges of the vessel fall together, instead of remaining open as those of arteries. Thus a coug-

ulum forms within and round them, and, except from the largest trunks, prevents any further flow. Other cases in which bleeding takes place from large vessels are those in which they are burst by sudden efforts, as sometimes happens in the spine, especially when it or the heart is diseased; those in blue veins, unless immediately checked, or those in transiently, but not previously diseased veins, as those of vein burst or ulcerate; those in which ulceration, whether in internal or external organs, spreads from surrounding parts, and at last (though they always resist for a long time) begins to weaken, is also to be reckoned among the cases common from ulcerated surfaces, and from various vascular morbid growths, probably depends on rupture of even the most delicate vessels which they contain; and the same delicacy of structure, though not peculiar to them, with their greater liability to disease and degeneration as they advance in age, may be assigned for many cases of hemorrhage in the more vascular parts of the brain producing apoplexy.

But bleeding to a great extent may take place without vessels burst; sometimes the blood rushes from the extremities to the heart, and may be seized upon and absorbed by the lungs, the abdomen, or the stomach, as the vessels may be, and if the blood be of the proper character it is thus easily permit hemorrhages, but are less capable of effecting those changes which are necessary for arresting them, and on these conditions the majority of the hemorrhages termed hemorrhage by exhalation, from the idea that the vessels which in health are traversed only by the fluids of the organs or secretions, now per-
mit the passage of the blood. The only instances in which the blood has been seen flowing in those cases are those extremely rare cases of hemorrhage from the skin, the face, hands, feet. In these cases, the blood flows by itself; if this operation is averted away from the wound, but at others quite pale, their vessels having been completely emptied; when ressed, small clots of blood like grains of sand sometimes ooz out of the surface; as a taking place from the conjunctiva, of the nose, produce to those cases.

The circumstances of those hemorrhages take place are various. In some cases they arise from disten-
sion of the vessels in consequence of some local excitement, either with or without increased activity of the circulation in the region affected; in other cases, the blood has been admitted in consequence of the general state of the patient, of the circumstances of the group of the body, the freedom of the blood-vessels, the tranquility of the patient, of the external expos, thus cases are probably the blood does pass through the vessels which naturally are permeated by the secretions, though the minute details of neither process are yet wholly explicable. It cannot however be certain that the minute blood-vessels are not ruptured, for neither the apoplexies nor the catticases in them could be in any way visible.

The circumstance of those hemorrhages take place are various. In some cases they arise from disten-
sion of the vessels in consequence of some local excitement, either with or without increased activity of the circulation in the region affected; in other cases, the blood has been admitted in consequence of the general state of the patient, of the circumstances of the group of the body, the freedom of the blood-vessels, the tranquility of the patient, of the external expos, thus cases are probably the blood does pass through the vessels which naturally are permeated by the secretions, though the minute details of neither process are yet wholly explicable. It cannot however be certain that the minute blood-vessels are not ruptured, for neither the apoplexies nor the catticases in them could be in any way visible.
passive must be supposed to depend. Such are especially those from the nose, rectum, and other organs, which occur in persons of weak habit, and which may be distinguished from the others by being placed on both sides of the opening of the vessels.

Lastly, there are cases in which the hemorrhages that take place, often coincidently from several organs, may be proper to depend on an accumulation of blood within the body that has not yet terminated. Such are those that occur in scurvy, in which the blood, when drawn from a vein, does not separate, as in health, into a firm coagulum and a clear serum, but settles into a loose jelly-like mass, which is not of a natural nature. Such too are probably the petechial and other effusions of blood in fever.

Hemorrhages by exhalation may take place habitually or occasionally, when they are so little that they escape notice, mony the blood flows from the nose or rectum, more rarely from the lungs or stomach, or even from the skin. They are sometimes periodical; and when occurring in men, have seemed to favour the idea of a periodic action of the system in the male sex as in the female, and the more so as the menstrual evacuation, when suppressed in the latter, is not unfrequently compensated for by hemorrhage from some other organ. Most of the cases of spontaneous bleeding from the skin are of this class, and in other instances the blood has flowed at regular periods from the gums, the breasts, umbilicus, axilliae, or kidneys, but most frequently from the stomach or lungs. Similar vicarious hemorrhages occur in men, which are more frequent.

When the hemorrhage is supposed to have taken place, or when it has been suppressed, or when an old ulcer has been suddenly sealed. Of the means of arresting Hemorrhages.—When an hemorrhage is bounded, unless death rapidly follow, a natural process takes place by which further bleeding may be prevented. If completely divided, both extremities retract into the sheath of cellular tissue in which they lie, so that a considerable interval is produced between them and the loose or rigid walls, into which the blood as it flows infiltrates, and coagulating, tends to fill it up and obstruct the vessel. The open mouths of the artery also external to those from the vessels, as it closely against or just above their extremities. As the stream of blood is thus checked by the narrowing and closure of its canal, at the same time that by the faintness induced by the previous loss of the heart is weakened and its power of circulation retarded, it begins to coagulate within the vessel itself, till its tube is nearly filled by a clot adhering loosely to its walls. Further changes then ensue; the divided vessel and the part around become inflamed; coagulating lymph is effused from the newly formed plug, and it becomes a matter, and the vessel itself, till at length its tube is rendered impervious from the point of division up to the first branch given off from it, and is at last converted into a solid cord, closely connected with the substance of the excised around it. If the artery be only partially divided, the same effects follow; though, if the cut be extensive transversely, with less certainty, because retraction cannot take place, and the internal coagulum, if formed, is washed away by the stream which still partly passes along the vessel. The natural cessation of hemorrhages from veins is effected in the same manner, but far more easily, for the valves prevent any bleeding from them, and they have no vessels near the mouth of the wound, and not a kind of gagging open, fall together, and soon become adherent.

But in the human subject it is only in the very small arteries that the hemorrhage can be sufficiently expected to terminate thus naturally and by various artificial means of checking bleeding from the larger can be arrested by an intervention. The simplest of these is pressure: if the finger be placed with moderate firmness over the mouth of a small vessel, or the vessel a mere wire or two, on removing it the orifice will be found closed, and more blood will flow. Pressure is also especially useful when a number of small arteries are bleeding together, with a constant oozing rather than a jet of blood, in such cases, when the edges of the wound are brought together, a compression should be laid on, and bandaged firmly and steadily over them. The same means, or a tourniquet applied a short distance above the wound, so as to compress the trunk of the artery, may be useful by lessening the force and volume of the current, and thus permitting the natural processes to take place undisturbed. But if these means be insufficient, the artery must be tied; if it be completely divided, ligatures must be placed on both sides of the opening, for, from the numerous communications of the arteries, when the main current is checked, another in a retrograde direction is always established, and if the stump of the ligature is not merely to prevent mechanically the flow of blood from the opened vessel. When a fine cord is drawn tightly round an artery, something is felt to give a yield of the vessel, the arteries from the stump, without its inner and middle membranous coats are found cleanly cut through as with a knife, while the outer coat remains entire. When the ligature is left on, it embraces this outer surface, which after a considerable period completely prevents further bleeding. The blood thus becoming stagnant coagulates in the lower part of the vessel and adheres to its walls; these at the same time inflame, coagulating lymph is diffused from their cut edges, and soon becomes organized, at last, as in the natural process, completely fills up the canal of the vessel, while the part constricted by the ligature ulcerates and gives way, permitting the cord to become drawn out and form six to eighteen days.

Previous to the general use of the ligature, introduced by Ambrose Paré in the sixteenth century, numbers were means for checking hemorrhages, then so frequently fatal, were resorted to by surgeons, under the names of styptics, astrin- gents, and tinctures, &c. The commonest of these means were the stumps of amputated limbs stop to the bleeding, which it is probable the eschar thus formed would generally affect. At present however the use of the actual cautery is nearly abolished in this country; it is only occasionally used in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known. Cold air or ice are the next in order of efficiency, and are nearly as useful as the cautery in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known. Cold air or ice are the next in order of efficiency, and are nearly as useful as the cautery in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known. Cold air or ice are the next in order of efficiency, and are nearly as useful as the cautery in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known. Cold air or ice are the next in order of efficiency, and are nearly as useful as the cautery in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known. Cold air or ice are the next in order of efficiency, and are nearly as useful as the cautery in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known. Cold air or ice are the next in order of efficiency, and are nearly as useful as the cautery in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known. Cold air or ice are the next in order of efficiency, and are nearly as useful as the cautery in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known. Cold air or ice are the next in order of efficiency, and are nearly as useful as the cautery in the few cases where, from peculiarity of situation, the vessel can neither be tied nor compressed, and for such cases it is certainly the most effectual styptic known.
HAFIZ, MOHAMMED SHEMS EDDIN, a celebrated Persian poet, was born at Shiraz, at the beginning of the fourteenth century. Whether the Christianization of his family, which took place from his earliest years he received a lettered education; and paid great attention to the study of religion and Mussulman jurisprudence. He afterwards cultivated poetry, and became so celebrated that the Sultan of Persia invited him to court. Hafiz however appears to have remained in his native town the greater part of his life. His Persian biographers relate an interview he had with the celebrated Tamerlane (Amcenitates, 301); and Franklin (Observations on a Tour from Bengal to Persia, pp. 90-7) gives us an account of another monument erected to his memory in more modern times. The poems of Hafiz, like those of Anacreon, celebrate the pleasures of love and wine; they have always been greatly admired in Persia; though many Mohammedans have condemned them for their irreligious and licentious tendency. The admirers of Hafiz, on the other hand, contend that his poems are not to be understood in a literal, but in a figurative sense; and that they express in emblematical language the love of the creature to the Creator. The sect of the Sufis, who interpret the poems of Hafiz in this manner, possess many similar poems. They maintain that by the name of Hafiz he is meant devotion, by perfume the hope of divine favour, and some have gone so far as to compose a dictionary of words in the language of the Sufis (see Sir W. Jones, 'On the Mystical Poetry of the Persians and Hindus,' Asiatic Researches, v. 3). But we are not sure that any of the poems of Hafiz ought to be interpreted in this manner. Sir W. Jones, who was a great advocate for such a mode of interpretation, remarks, in the essay referred to above, 'It has been made a question whether the poems of Hafiz must be taken in a literal or figurative sense; but the question does not admit of a general and direct answer; for even the most enthusiastic of his commentators allow the possibility of both. It is thought that the author ought to have distinguished them, instead of mixing the proflane with the divine, by a childish arrangement according to the alphabetical order of the rhymes' (p. 172-3). We are aware that a great number of Europeans who have had a great number of Sufi commentators, such as Shurí, Seid Ali, Lamei, Sururi, and Shemei; but the most celebrated are the Turkish commentators Feridun and Sudi. The poems of Hafiz were arranged after his death, by Seid Kásem Anvári, and were entitled the 'Diván.' The 'Diván' contains, according to the best MSS., 271 odes, called 'Haftahs,' which were the original Persian 'Haftahs.' Calcutta, 1 vol. fol., 1791; this edition contains only 567 gazelles, and 7 cassidhe, or elegies. Rewuski published a few of the odes with a Latin translation and the commentary of Sudi, under the title of 'Specimen Poeseos Aiasitiae,' sive 'Hafizi,' Calcutta, 1785. Several of the odes are inserted in Sir W. Jones's 'Commentarii Poeseos Aiasitiae,' 2 vols., and 'Neu Arabische Anthologie,' 8vo, Leip., 1791; Ousley's 'Persian Miscellanies,' 2 vols., London, 1806, and Richardson's translation of the odes in English translation and paraphrase, chiefly from the Specimen Poeseos Aiasitiae of Baron Rewuski, Lond., 1774.-Nott, 'Select Odes of Hafiz translated into English verse,' 4to Lond., 1787; Hindley, 'Persian Lyric, or scattered poems from the Dihvan-Hafiz,' 4to, Lond., 1806. Further particulars concerning the life and writings of Hafiz are given in the life prefixed to the Calcutta edition of his poems; in the biography of Duulet Sháh, in Wilken's Christianitaten, 2 vols., Leip., 1806, and in the Notice et Extraits des MSS. de la Bibliothèque du Roi; in the article 'Hafiz' in the Biographie Universelle, by Lavalleau; and the same article in Ebers and Grüber's Encyclopädie der orientalischen Alterthümer. HAGGAII (1 Chr. 26:12). 'Ayáyán,' one of the twelve minor Hebrew prophets. We know nothing concerning the place or time of his birth. The pseudo-Ephraim, in his Lives of the Prophets, states that he was born at Babylon; and according to the Rabbis he was a member of the Great Synagogue. The date of Haggai's prophecy is fixed by himself (1:13), and by Ezra 5:1, in the second year of the reign of Darius Hystaspis (n. c. 519). We learn from Ezra that the Jews, who returned to their native country in the first year of the reign of Cyrus, commenced building the temple, but after a short period of prosperity they were attacked by their neighbours of Samaria, till the second year of the reign of Darius Hystaspis, when the building was again continued in consequence of the exhortations of Haggai and Zechariah. The prophecy of Haggai may be divided into four parts: in the first, the prophet urges the people to continue building the temple, by the promise that God would bless them in their undertaking, and that their previous neglect had been the cause of the drought and bad seasons which they had experienced (1:1); in the second, he encourages them by the promise that this second temple should surpass the first in glory; this prophecy is supposed by many to have been fulfilled by Christ entering the temple (ii. 1—9); in the third, he promises the people that when they had begun to build the temple (ii. 10—15); and in the fourth, he foretells the prosperity of Zerubbabel, governor of Judah (ii. 20—23). Zerubbabel is considered by many commentators to be a type of the Messiah; and he is supposed to relate to the glory of the Messiah's kingdom. The canonical authority of this book has never been disputed. It is quoted by the author of the Epistle to the Hebrews, xii. 26; and compare Hag. ii. 6, 7, 22. The prophecy of Habakkuk is written in a dull and prosaic style, and bears traces of having been composed in a late period of Hebrew literature. It possesses none of that vigour and sublimity which distinguish the works of most of the Hebrew prophets who lived before the Babylonian captivity. The Septuagint, Vulgate, and Syriac versions of the Old Testament completely follow the 146th, 147th, and 148th Psalms to Haggai and Zechariah. (Eichhorn, Einleitung in das Alte Testament, iv. 422—427; Augusti, Einleitung in das Alte Testament, p. 314—34: Robinson in Schol. in Job ii. 6—23). Zerubbabel is considered by many commentators to be a type of the Messiah; and he is supposed to relate to the glory of the Messiah's kingdom. The canonical authority of this book has never been disputed. It is quoted by the author of the Epistle to the Hebrews, xii. 26; and compare Hag. ii. 6, 7, 22. The prophecy of Habakkuk is written in a dull and prosaic style, and bears traces of having been composed in a late period of Hebrew literature. It possesses none of that vigour and sublimity which distinguish the works of most of the Hebrew prophets who lived before the Babylonian captivity.
A dry soil, which is rather more elevated than the surrounding country, so that the air is tolerably pure and healthful. Many of the streets are planted with rows of trees and paved with coloured bricks. The finest parts of the town are the Voorhout and the Vvyerberg, of which the latter, with a fine avenue of trees and a walk on one side, and on the other a large meadow, bounded by Louis Bonaparte, in which the two chambers of the States-General now hold their sittings, and in which there are many public offices; the palaces of the Prince of Orange and Prince Frederick; the Butcher's Hall, which contains pictures; and lastly, with very fine paintings; the cannon-foundry, erected in 1668; the theatres, and the state-prison. Among the churches are three Dutch Reformed, and the French church, formerly Reformed, now Roman Catholic. The Portuguese and German Jews have large synagogues, and the Lutherans, Presbyterians, Remonstrants, and Jansenists have chapels. There are likewise numerous charitable and scientific institutions, and fine private collections. On one side of the town there is a canal constantly covered with vessels, and on the other a fine wood of oaks called the Bosch, in which is the country-palace of the royal family, resembling a guthouze in the sixteenth century. A number of picturesque and extensive gardens laid out in a less stiff and formal manner than the usual Dutch style. There are numerous elegant villas in the environs, and on the west of the town is the extensive well-forested Mount of Sart, containing about 700 houses, and which has become, especially of late years, much frequented for its sea-bathing. Between that and the Hague is a fine avenue of oaks, beeches, and limes.

The Hague seems to have owed its origin to a hunting-seat of the counts of Holland in the wood (Haag), which however so early as 1260 became a palace, round which many other houses were soon erected. In the sixteenth century the town became the capital of the States-General of the States of Holland, the Stadtholder, and the foreign ambassadors. In the course of the seventeenth century it was gradually enlarged, and at the commencement of the eighteenth was the centre of the most important diplomatic negotiations. [Annuaire, Queen of England; George I.]

The prosperity of the Hague was very materially injured by the Revolution in 1787, and afterwards by the occupation of the Dutch ports, the General, the great public offices, &c., to Utrecht and Amsterdam: the return of the Prince of Orange in 1813, who was most enthusiastically welcomed by the inhabitants, restored it to its former splendour. The population, which had greatly decreased, and was reduced by the occupation of the country to 42,000 inhabitants, and in 1837, 54,000. The Hague never having been either a commercial or a manufacturing town, the inhabitants have not the mercantile habits of the generality of their countrymen. (N. G. Van Kampen, Staat-en- aardrijkskundige Beschrijving van het Koninkrijk der Nederlanden; Stein, Handbuch.)

HAINES, LORD. [DALYMALLE] HAINAIN, an island situated in the Chinese Sea, opposite the southern extremity of the province of Quan-tong, or Canton, to which it is annexed, and from which it is divided by the channel of the Junks, a straight only 13 or 16 miles wide at the most. The greatest length is 41° 15' N. lat., and 108° 50' and 111° E. long., and encloses the gulf of Tonquin on the east. Its length from south-west to north-east may be about 260 miles, and its average breadth perpendicular may be estimated at about 80 miles, or an area of 20,000 square miles, or nearly the double of Sicily.

The interior of the island is occupied by an extensive mountain-range, called Ta Utshi Shan, or the Great Utshi range: from this source issue a great number of offshoots, which towards the south-east descend into the sea, but are separated from the southern and north-western shore by a level tract of considerable width. These plains, which are of great fertility and well cultivated, yield annually two or three crops of rice and other grains, the small rivers which descend from the mountain-region are used for irrigating this tract. Sweet potatoes form the principal food of the people, though they cultivate fruits, sugar-cane, tobacco, indigo, and cotton on a large scale.

But the extensive forests which cover the sides of the mountains form the principal wealth of the island. Besides different kinds of timber-trees, these forests produce sandal-wood, hristalletto, ebony, rosewood, and many other kinds, which are used as dye-woods, or for furniture. Wax is gathered in large quantities. An insect called Petalathung produces a white wax, from which candles are made at Khiung-tsheou, and exported to other parts of China. The climate of the island is not very hot, being exposed to the wind which blows over a large expanse of sea: fogs and heavy dews are frequent, and many winters are without snow. The coast is frequently laid waste by hurricanes, which are peculiar to the ocean that surrounds the island.

According to the census of 1823 Hainan was inhabited by 983,725 persons, not only by the Chinese government, but in the South-eastern part by the tribes which are subject to the Chinese, and have adopted the Chinese language, but they speak a different language, though they use the Chinese characters. They are very industrious husbandmen. There are some very populous towns in this island. Khiung-tsheou, the capital, situated at its northern extremity on the channel of the Junks, is said to have 200,000 inhabitants; and Kei Kheou-so, where the governor resides, is said to contain as many. Some others have 50,000 or 90,000 inhabitants each. (Du Halde, History of China; Klaproth's Description de l'Inde, vol. iv.; and Captain Purefoy's Diary of a Journey to the Coast of Hainain, in 'Asiat. Journ., vol. xx.)

HAINAULT (in Flemish, Henegouwen), a province of Belgium, bounded on the west by the rivers Aa and the Rhine, on the north by the province of Limburg and South Brabant; on the east by Namur, on the south by France, and on the west by Flanders. Hainault lies between 49° 38' and 50° 48' N. lat., and between 3° 17' and 5° 13'E.; its greatest length from east to west is about 200 miles, and its breadth is 24 miles, and its area is 372,133,490 square miles (English), thus divided:—

<table>
<thead>
<tr>
<th>Description</th>
<th>Area (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivated</td>
<td>285,178</td>
</tr>
<tr>
<td>Uncultivated</td>
<td>34,671</td>
</tr>
<tr>
<td>Woods</td>
<td>61,832</td>
</tr>
<tr>
<td>Towns &amp; Buildings</td>
<td>3,569</td>
</tr>
<tr>
<td>Rivers &amp; Canals</td>
<td>1,165</td>
</tr>
<tr>
<td>Roads &amp; Paths</td>
<td>8,268</td>
</tr>
</tbody>
</table>

| Total         | 372,133    |

The province does not contain any mountains, but is hilly towards the south. It is well watered, the Sambre, the Dender, the Haine, from which the province derives its name, the Trouille, and the Scarpe. The Sambre enters the province from France, near to its confluence with the Scharpe at Comité, and flows to the north-west to join the Scarpe at Comité; then it goes north-east, and after crossing the delta of the Scarpe, it forms the boundary-line between Hainault and West Flanders, and quits the province at Escanaffles, its north-western extremity. The Sambre also enters the province from France, near Meuse, flows north-west to Charleroy, and soon after enters Namur. The Dender rises within the province at Herkies, flows north-east to Ath, and then north-north-west, quitting Hainault at Grammont. The Haine is formed by three brooks which rise in the commune of Anderlues, a little to the west of Charleroy; it flows from east to west, near to Mons, and falls into the Schelde at Comité. The Trouille rises at Grandremy, near the confluence of the Sambre and Scarpe; it then flows to north-west, and leaves it again almost immediately, flows then north-north-west to Mons, and falls into the Haine near Jemeppe.

The soil of the province is for the most part fertile. The armament of Tournai is the most active, and that of Charleroy the least so. The chief agricultural productions are wheat, rye, oats, winter barley, potatoes, beans, rape, flax, and hemp; tobacco and chervil are cultivated in some parts. Much of the land near the rivers, where irrigation can be conveniently made, is laid out in rice. In other parts there are vineyards, and vines are cultivated. Hainault is divided into three arrondissements, Mons, Tournay, and Charleroy; and contains 21 towns and 424 communes. It is divided in two manufacturing and commercial divisions: the greater part of the province round Tournay, and in the north-western part of the province. The manufacture is chiefly woollen, and the chief towns are Binch, Braine-le-Compte, Charleroy, Châtelet, Chèvres, Chimay, Enguin, Fontaine l'Eveque, Gosselies, Lossines, Leuze, Mons, the capital of the province, Péruwelz, Reux, St. Ghislain, Soginies, Thuin, and Tournay. [Arras; Beaup-
most; Birch; Charleroi; Mons; Tourna--

Antwerp is a small town, with 1922 inhabitants, on the right bank of the Scheldel, and on the high road from Mons to Tourna-

ny about 4 miles south-east from Tourna.

Some lime-

stone quarries and some large breweries are situated there.

Braine-le-Comte, about 4 miles north-east from Soignies, contains 4216 inhabitants; it stands on the high road from Brussels to Mons. This town consists of some cotton-mills, brewing, and other manufactories. It is a small town, about 4 miles east from Charleroi, with 2555 inhabi-

nats. Cotton and woolen manufactures, pottery, salt-refining, brewing, and tanning are carried on in this town. In a small town with 3000 inhabitants, stand 24 miles north-west from Ath. Flax-spinning and linen-weaving occupy a great number of hands, and there are in the town several breweries and oil-mills. Chimay has 3500 inhabitants, and it stands 28 miles south-east from Charleroi, and 32 miles south-east from Mons; it contains a college and four schools. A great part of the working-class in this town are employed either in the iron-works or in procuring coal for their use: the proximity of the place to the coal-mines is a drawback to trade coal can be carried on.

Enghien, 12 miles east-north-east from Ath, and 8 miles north from Soignies, contains 3739 inhabitants. The town is built on the side of a hill; it is regularly laid out and contains a palace, a church, and a hospital. The castle and park of Enghien were built and formed in 1712, by Duke Leopold of Arenberg. The castle was destroyed at the close of last century; the park, which is surrounded with much taste, and contains the groups of statuary, is said to have served as the model for the gardens at Versailles. Fontaine l'Évêque, 6 miles east from Charleroi and 16 miles east from Mons, contains 2499 inhabitants. Nail-making, salt-refining, and the manufacture of iron, which stood on the banks of the Rillé, is carried on in this town. Gosselies, a town with 4240 inhabit-

ants, is about 3 miles north from Charleroi; great part of the malo inhabitants are employed in the coal-mines. It stands 28 miles south-east from Mons.

Lossines, a small town with 4922 inhabi-

nats, is 74 miles north of Ath; it is so surrounded by the Dender as almost to form an island. This is a place of much trade. The quarries furnish a great quantity of paving-stone, and the town contains some stone for building. The other chief branches of trade are coal, oil, and vegetable oil. Leuze has 5386 inhabitants, many of whom are employed in the cotton and woolen manufactures. A consider-

able number of persons are also employed in preparing and market and small wares. The town is 10 miles east from Tourna;

ny the high road from Brussels to Little passes through it. Peruwelz, on the road between Charleroi and Mons, contains 11511 inhabitants, about 11 miles south-east from Tourna.

ny is a town of 6598 inhabitants, who are principally occupied in manufacturing hosiery goods, cotton and woolen cloth, and leather. A considerable trade was formerly carried on for the export of alum, prepared from alumino-

schistus found on the spot; but since the discovery of the method of chemical composition this salt from its com-

ponents by a cheap and easy process, this branch of industry has ceased at Peruwels.

Rouffy is a small town containing 2410 inhabitants, situated 8 miles north-east from Mons.

The castle of Rouffy is a very ancient building, the prin-

cipal façade of which was rebuilt in 1760 in a very hand-

some style; the gardens and grounds are extensive, and laid out in the English style. There are not any manu-

factures and but little trade is carried on in this town.

St. Ghislain, 7 miles west from Mons, is a small town on the river Haine, and contains 5398 inhabitants. Standing in the middle of the coal district, various manufactures which depend for their prosecution upon an abundance of cheap fuel have been established; among these may be mentioned salt-refining, soap-making, and brewing. The town stands on the high road from Mons to Tourna.

Soignies, a well-built town on the Senne, is situated 10 miles north-east from Mons, and contains 6513 inhabitants. Many of the houses are large and hands-

ome. The town is surrounded by a wall, about 6 miles in circumference, forming 1150, and are now crumbling through age. The church of St. Vincent is said to be the oldest building in the province.

There is a college within the town, which in 1857 contained about 260 students. There are many religious and charitable establishments in Soignies, and it is said that 2200 of the inhabitants are regular pensioners; among the two-thirds of the population are in an indigent condition. The chief means of employment is afforded by some limestone quarries, whence considerable supplies of building-stone are procured.

Thuin, on the Sancre, is 10 miles south-east from Charleroi, and contains 2682 inhabi-

nats. An iron-work established at this place produces 1100 tons per annum: there is but little other trade.

Bossu, 7 miles west from Mons, stands on the Haine. This is a considerable village, containing a church, a chapel, and two schools, with 1860 inhabitants. In 1857, there was 2887, many of whom are employed in raising coal or burning lime.

Courcelles, 5 miles north-west from Charle-

roy, contains 2226 inhabitants, whose principal employment is in the coal-mines. In 1857, there was 2887 inhabit-

ants.

Dour, a large borough, 8 miles south-west from Mons, has a population of 5484 inhabitants, many of whom find em-

ployment in the productive coal-mines of the district. there are also in the town 536 inhabitants.

Fortunoy, an inaccessible village, con-

taining 678 inhabitants, is 4 miles south-east of Tourna,

ny on the high road from that town to Mons. A battle was fought near Fontenoy in May, 1755, between the French under Marshal Saxe and the allies under the duke of Cumberland, in which the latter were defeated with the loss of 15,000 men.

Hornu, a village 5 miles west from Mons, is the seat of considerable coal-mines, giving employment to from 3000 to 4000 men. There are exposed in the cottages of the mines, which are built on a regular plan, and so arranged that the steam-engine which discharges water from the mines is also employed to dis-

tribute on the buildings, and has been established with great success. The town contains a magnificent church, with a considerable population.

There are accounted 12 steam-engines, whose united power is equal to that of 320 horses.

The village of Jemappes, on the high road from Mons to Charle-

ro-ny, contains 3222 inhabitants, and glass-blowing and the manufacture of iron is carried on. The place of 4667, is also the site of considerable coal-mines. This place is celebrated for the victory gained on 5th November, 1792, by the French over the Austrians, and which led the

enemies of 1740 to the conquest of Belgium. Jemeppe, to the south-east of Mons, contains 6528 inhabitants, many of whom are engaged in prosecuting various manufactures, among which glass-blowing, brewing, distilling, and tanning are the most considerable; many are also employed in coal-mining.

The number of persons accused and convicted before the courts of assize and the correctional tribunals in this province, during each of the four years from 1831 to 1834, was, according to official returns, as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Accused</th>
<th>Convicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1831</td>
<td>95</td>
<td>48</td>
</tr>
<tr>
<td>1832</td>
<td>35</td>
<td>13</td>
</tr>
<tr>
<td>1833</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>1834</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>

The great difference in the number accused before

the courts of assize in these years arose from 48 persons in 1831 and 77 persons in 1834 having been concerned in riots, the greater part of whom were acquitted. The only capital con-

dition occurred in 1834, when a man was found guilty of murder. In proportion to its population, Hainaut presented in the above year fewer delinquents than any other province of the kingdom; and it is deserving of remark, that, while the population of 1834 is 573 inhabitants, the proportion of students is greater also.

In 1831 there were 888 schools, giving instruction to 35,671 boys and 29,048 girls, being nearly 1 in 9 of the whole population.

For other data see Flanders Agriculture.
of the sheath of the hair, which is continued from the cuticle covering the surrounding skin. On the whole surface of this bulb the substance of the hair is secreted, and as each layer which is deposited pushes that previously formed forwards, the whole gradually advances along the sheath till it projects beyond the skin, and thence continues to grow free. In the early embryo the sheath or follicle in which the hair afterwards is alone seen, then a delicate vessel may be traced to its base, where a little black spot is soon formed, and this, as all the other parts increase, is gradually developed into a hair. Into each hair-follicle, as Gurlt has shown, there open the ducts of one or two little glands, by which the oily matter is secreted to lubricate the hair and keep it supple and firm, and where these are deficient the same seems to be performed by the follicle itself. The annexed cut will explain the general mode of formation of hairs, which, it may be observed, is effected in the same manner as that of horn, nail, and many other extra-vascular appendages of animal bodies, viz. by the deposition of successive layers of organic matter on the surface of an abundantly vascular tissue. Fig. 1 represents an oblique section of the pulp and lower part of the whisker of a lion, in the Hunterian Museum, in which a is the body of the hair, b the conical pulp, and c a blood-vein passing into and ramifying in it. Fig. 2 is a section of the skin of the upper lip of a lion, with part of a whisker completely forming, and another in progress of growth, from the same collection; a is the outer part of the hair-follicle, formed by a deep depression in the skin; b is its internal cuticular lining; c the contained hair; d the sheath containing the vessels and nerves passing to the base of the follicle and bulb of the hair. Fig. 3 is a section of the skin, containing a hair from the human scalp, from the figure by Gurlt, in Müller's 'Archiv für 1833': here a is the thin cuticle, b the cutis, c the subjacent fat, d the cellular tissue, in which the base of the hair follicle e is seen; f is the hair itself enlarged at its base, and g and h are the two sebaceous glands opening into the sheath. These views are of course all much magnified; indeed it is the component structures are so minute that part of the description is of necessity taken from the analogous structures in other animals.

Fig. 1.  
Fig. 2.  
Fig. 3.
ture better adapted for the external covering of the whole body, whose motions it is too light to impede, and to whose beauty it so remarkably contributes.

In chemical properties hair resembles horn, nails, &c. It is soluble in water at a very high temperature, as in the distillation of Papin's digester, leaving a large quantity of oil mixed with sulphuret of iron, and some sulphuretted hydrogen. It is this oil, with the sulphuret of iron, which gives the colour to the hair, and by whose absorption greyness is produced. The iron is most abundant in the darkest hair, and the dark phosphorus is the ingredient on which the action of the various black dyes for red or grey hair depends. These are all composed of some salt of silver or lead, which, mixed with some oil or tar, is applied in the form of a pomatum, insinuated itself into the hair, where it is decomposed and a black sulphuret of silver or lead is formed. Hair is soluble in alkaline and alkaline earths, and for this reason the depilatories in common use are chiefly composed of quick lime, which, when intimately mixed with the skin at the same time that it removes the hair. Hair contains a very small quantity of water, and when burnt leaves a large proportion of ashes, containing iron, manganese, and various salts of lime; it is owing to these properties that it is so much more durable, and has been found unaltered on mummies more than twenty centuries old. It has even been supposed to grow after death, but it is probable that, in the few authentic cases in which it has been stated, it was owing to the lengthening of the hair by the attraction of moisture from the body or surrounding atmosphere, and to the more rapid drying and contraction of the adjacent tissues.

Little need be said of the diseases of hairs. Possessing neither vessels nor nerves, except at their base, they are rarely altered except by the diseases of the skin itself. Their fall, as it is called, is in most animals annual, but in man seems to be unseasonable; except by accident, or after panic or in- lar diseases. The process by which it takes place is unknown, but is probably similar to that of the shedding of the quills of the porcupine, by the gradual approximation of the base of the follicle to the surface. Their hair is sometimes extraordinary rapid, is owing to deficient secretion of the colouring oil, and can only very rarely be remedied. When sufficient moisture is not supplied, they sometimes split at their points like bristles; at others they break at the side of the shaft, snapping off, and leaving a little fringed extremity to the stump. The most singular alteration however to which they are subject is that called the plen polonica, from its occurring almost exclusively in the farthest north, which, when it has done its work of destruction, does not leave a trace of the original hair. The latter, as a natural consequence, is usually converted into a thread, and is sometimes given into the hands of the conqueror.

HAI

HAK

HAJE, a name of a venomous serpent, Coluber Haje of Linnaeus. [NAJ.]
HAL

the mouth of the river Oby, and also travels through the empire of Russia, Georgia, Armenia, Bactria, Tartary, &c. The number of voyages discovered by the English by sea and land in the southern and southeastern parts of the globe; and the third, their discoveries in the New World of America. Hakluyt has inserted many curious documents, such as the chart of the Russian empire granted by the Czar of Russia, the Sultan, and others, to English merchants; tables of weights, coins, and distances of different countries, &c. Most of the voyages and discoveries contained in this collection were printed before 1615, but some of the newer voyages are a prior date. A new and improved edition, in 5 vols. 4to, was published in London 1609-12. Hakluyt published also or edited translations of several foreign narratives of travelers from Arabia, Africa, and America, and some curious, rare, and early voyages and histories of interesting discoveries, chiefly published by Hakluyt, or at his suggestion, but not included in his celebrated compilation, 4to, London, 1812. It contains among others La Brocquière's 'French Narrative of a Visit to Palestine,' in 1442-3; the 'Travels of Louis Vertomannus of Rome to Arabia, Persia, and the East Indies in 1502;' and 'Virginia richly valued by the Descendants of the mainland of Florida, her true neighbour, from the Spanish of Fernando de Soto.' Hakluyt died in 1616 and was buried in Westminster Abbey.

HALBERSTADT, an ancient bishopric, founded in the year 1003, was secularised by the treaty of Westphalia in 1648, and assigned, under the name of a principality, to Frederick, the great elector of Brandenburg, as a compensation for his Pomerania, which he was obliged to cede to Sweden. The city was afterwards belonging to Prussia, except that after the treaty of Tilsit it formed part of the ephemeral kingdom of Westphalia. The principality had a superficial area of about 600 square miles, with 13 large and small towns, 46 villages, and about 35,000 inhabitants, chiefly Lutherans. It is a level and fertile country. The four circles of the principality now form part of the government of Magdeburg, in the province of Saxony, and the name of Halberstadt is confined to one of those circles, about 50 square miles, and containing 29,000 inhabitants.

HALBERSTADT, the chief town of the circle, is pleasantly situated on the river Holzeme. It is an ancient city, said to have been founded by the Cherusci, though the actual date of its foundation is unknown. It became a bishop's see in 684. The most ancient part is the Dom Platz (Cathedral Square), formerly a castle. In 1179 the greater part of the town was burnt by Henry the Lion, Count of Brunswick, and in 1252 it was burnt by the Swedes. In the Thirty Years' War it made a brave resistance; in the Seven Years' War the French destroyed the gates and a large portion of the ramparts. In 1809 Duke William of Brunswick, brother of the bishop and by the way a Westphalian general under Count Wellingrode. In 1813 the Westphalian General Oehl, who was posted here with 20,000 men and 14 pieces of cannon, was suddenly attacked by the Russian General Cornieschek, who took 1,000 of his men and many officers prisoners. The streets of Halberstadt are for the most part long, broad, and tolerably straight. It has many good manufactures of various kinds, and a considerable trade. It is the seat of a high court of justice, and has many public institutions of note, such as the cathedral school, with a library of 5,000 volumes, a cabinet of natural history, and a collection of instruments; a gymnium, a seminary for schoolmasters, a literary society, and other excellent institutions. It is the burial place of the Lutheran churches, 2 Reformed, or Calvinist, 3 Roman Catholic churches, and a Jewish synagogue which is perhaps the handsomest in Germany. The most remarkable edifice in the town is the collegiate church (the cathedral), founded in 1013, and the cathedral dedicated to St. Stephen. Built in the Gothic style of the fifteenth century—it is 412 feet long, 72 wide, and 94 high inside, and has 32 altars. The city is noted for its manufactures as well as for its interesting antiquities and some paintings on glass. The number of the inhabitants is now about 17,000, of whom 13,000 or 1,000 are Roman Catholics, 450 Calvinists, and as many Jews. About half a mile from the city is the Spiegelberg, formerly the burial place of the bishops, where now lies the Spiegel, dean of the chapter, converted into a public promenade, or what the Germans call an English garden, and left a fund to keep it in order. Halberstadt is in 51° 53' 55' N. lat. and 11° 53' E. long. (Top. Stat. Handbuch, Vol. Furst; Stein, Handbuch; Huber, Lexicon.)
the law. In 1653, after having shown some hesitation as to accepting the dignity, he was made one of the judges of the Common Bench; resolving, after discussing his doubts with lawyers and divines, that as it was absolutely necessary to have justice and property kept up at all times, it was no sin to accept a commission from auators, to this his biogra-

pher Burnet goes on to add, 'if he made no declaration acknowledging their authority, which he never did.' This addition has given rise to much of the odium which has attached to Hale's memory in consequence of this apparent inconsistency; but credit can hardly be given to the state-

ment, for it is impossible to suppose that Hale, who was unquestionably an honest and sincere man, though perhaps weak in matters of conscience, was so obtuse that he could not possibly attempt to evade the evident con-

clusion, that acting as a judge under his commission was the most effectual and formal declaration he could make of his submission to Cromwell's authority. Some colour how-

ground is given to Burnet's imputation by Hale's subsequent conduct. After having discharged the duties of his office with consummate skill and strict impartiality, he suddenly, and without any apparent cause, affected to feel scruples of conscience, by acting as the judge of the civil cases, and refused to preside in the crown courts, though he still continued to administer the law in civil cases. This conduct was directly contrary to his reason for accepting the office of judge, and appearing on no just account. But Cromwell, Hale refused to act under a commission from the Protector Richard, alleging that he could no longer sit under such authority. He was a member of the parliament which passed the act, and was put forward as an exchequer in 1660, and knighted. In 1671 he was raised to the chief justiceship of the King's Bench, where he pres-

ided with honour to himself and advantage to the public till 1674, when he retired from the office of his own free will. He suffered considerably from repeated attacks of asthma, and died from dropsy on Christmas-day, 1676.

As a lawyer Hale's reputation is high, and his integrity is unimpeached; indeed his punctilious feelings were car-

ried to excess, as many anecdotes related by his biographers show.

The only spot upon his memory as a criminal judge is the notorious fact of his having condemned two wretched women for witchcraft, at the assizes at York St. Edmunds, in the year 1653. Hale in the course of the trial avowed himself a believer in witchcraft, and the jury found the prisoners guilty, notwithstanding many impartial bystanders who were present. No mercy was granted, and the prisoners were executed. An anecdote is mentioned by his biographers of having hastened the execution of a soldier found guilty of murder, for fear he should be reprieved; he was doing certainly overstepped the bounds of his duty as a judge.

Sir Mathew Hale was a voluminous writer, though none of his productions were printed during his life. His 'Plea of the Crown,' 'Life of Law,' and other treatises connected with the law, have been published since his death, and also several others upon scientific and religious subjects. His manuscripts, which he had collected at a very considerable expense, bequeathed to the Society of Lincoln's Inn, and he directed that they should not be lent out or printed, saying, 'As they are a treasure not fit for every man's view, nor is every man capable of making use of them, I would have nothing of these books printed,' and that 'as any of his books, or notes so great an extent of that society, might, on giving security, have one book at a time lent out to them by the society.'

A catalogue of the manuscripts was contained in his will, and a list of the contents of all his works is printed in Dr. William's 'Life of Hale'—recently published. His life has also been written by Burnet and Roscoe, and many anecdotes relating to him are detailed by that amusing go-between, or rather, in his 'Life of Hale,' though it should be observed that the author does not write in a very friendly spirit towards Hale. Notices of his life will also be found in the 4th vol. of the 'Biog.

Brit.'

Haleb (commonly but erroneously called Aleppo), the capital of a pashalik of Asiatic Turkey of the same name, is situated in the north part of Syria, in 35° 11' 32" N. lat.

(according to Niebuhr), and 37° 9' E. long. It is one of the largest and most important towns in Western Asia. Tavernier, in 1670, estimated the population at 258,000; D'A rieux, in 1683, at about 258,000; Russell, in the last century, at 233,000, of which 200,000 were Mohammedans, of whom 60,000 Christians, and 5,000 Jews. Volleny reduces the number to 100,000; but Rousseau, who lived for some time at Haleb as French consul, estimates it at 500,000. Rousseau also informs us that the town is built on four hills, one called Djebel ben Ali, on one of which there is a crowned castle; that it is surrounded by a stone wall, and has seven gates; that it contains 5 serais, or governor's palaces, 100 mosques, of which the most celebrated is that of Za-

naria; the chief town, Haleb, is a very grand city, not dif-

ficult, called Helawie, is supposed by Pococke to have been formerly a Christian church built by Helen, mother of Constantine; 10 or 12 public schools, 2 public libraries, 5 meechmns, or courts of justice, 60 baths, 100 coffee-houses, or 45 great bazaars, 31 khans, occupied principally by Franks or other strangers, 200 fountains, about 15 wells, or religious institutions, 1 mawla-khane, or college of der-

vishes, 5 Christian churches, and 400 houses. But the de-

population of the town has been great, by a fire which happened in August, 1822, and which destroyed almost two-thirds of the buildings. The population is a mixture of Turks, Arabs, Christians, and Jews. The chief of the Christian population is the Maronite, or Druze, an Armenian church; of these the Greeks are the most nu-

merous and the richest. The small river Koik runs along the west side of the town.

Before the year 1232 Haleb was supposed to possess 12,000 artisans, and was celebrated for its gold and silver lace, its manufactures of silk and cotton goods, shawls, &c.; but its prosperity was chiefly owing to its situation, which rendered it one of the greatest commercial cities be-

tween Europe and Asia. It carries on a great caravan trade with Bagdad, Persia, and the eastern parts of Asia. The goods destined for the European market are shipped from the port of Latarkia. Consuls from all the commercial states of Europe reside at Haleb.

The antient name of the town was Chaleb, or Chalybon, which was changed by Seleucus Nicator into Beraea. It continued to be called by that name until its conquest by the Arabs under Abu Obidah in 634, when its original antient name of Chaleb or Haleb was restored. It afterwards became the capital of an independent monarchy under the sultans of the race of Hamadan, under whose rule it ap-

pears to have enjoyed great prosperity. In the middle part of the tenth century Haleb was again united to the Greek empire by the conquests of Zimizes, emperor of Constantinople. During the crusades Haleb was subject to the Djebuke of Haleb, and was held by his descendants till 1299, and again in 1401 by Timur. It was afterwards annexed to the dominions of the Mameluk sultans of Egypt, but was conquered by Selim I., the Turkish sultan, and has never since then been subject to the sultans of Constantinople. It is at present however in the possession of the pasha of Egypt.

The pashalik of Aleppo is bounded on the west by the Mediterranean, on the east by the Euphrates, on the north by an imaginary line drawn from Scanderbon (the antient Alex-
dandria) on the coast to El Bir on the Euphrates, and on the south by another line drawn from Billis to the Mediterranean, passing by Murrah and the bridge of Shibger. The northern part is of the desert, which terminates under the name of Amanus, which is only a branch of Mount Taurus. The southern part is fertile and sandy; but the plains at the foot of the mountains are fertile, and afford rich pasturage. The numerous herds of the Kurds, which graze upon them during the greater part of the year. The inhabitants only cultivate the land in the mountainous districtis, which produce wheat and other sorts of corn. The cultivation of cotton is chiefly cultivated by the Kurds, which graze upon them during the greater part of the year. The inhabitants only cultivate the land in the mountainous districtis, which produce wheat and other sorts of corn. There are three great lakes, called the Lakes of the Arab and Kurds, which graze upon them during the greater part of the year. The heat of the climate is seldom oppressive, in consequence of the west winds which blow from the Mediterranean. The climate is healthful. The towns of Haleb and Alep are very subject to a disease, which first appears under the form of an eruption on the skin, and afterwards forms into a sort of boil; it dies away in about eight months from its appearance. Volleny and many other travelers
attribute the disease to the badness of the water which the inhabitants drink.

The pashalik of Hale is watered by the Euphrates, the Orontes, and the Koik. The Koik rises near Antamb in the north, and passing by Haleb, loses itself in a morass about 16 miles south of the city.

The pashaliks of Hale and other towns of any importance, with the exception of Haleb, Alexandria (Scanderoon) and Antioch, which were once so celebrated, are now of little importance.

The 'Pashalik de Hale' in *Fondgruben des Orient*, vol. IV, pp. 1-25, 93-97; Volney's *Voyage en Syrie et en Egypte*; Olivier's *Voyage dans les Pays d'Orient*; and of *Oehmken's* *Egypt*, vol. C. N. B. *Reisebeschreibung*, published at Hamburg in 1837, contains a ground-plan of Haleb, as it existed in 1766.

HALÉSTEPHEN, D.D., was born at Beckebourn, in Kent, September 7, 1767, entered Benet College, Cambridge, in 1766, was elected Fellow in 1762; and having taken holy orders, was presented about 1710 to the perpetual curacy of Teddington, near Twickenham, where, though he obtained other church preferment, he resolved to the end of his life. He was elected F.R.S. in 1717, and in 1733 was admitted a foreign associate of the Académie des Sciences, in place of Sir Hans Sloane. He died in 1761.

The operations of Haleb, as well as Cambridge, he applied himself diligently to physical researches, which continued to be his favourite pursuit through life. His first important publication was *Vegetable Statics, or an Account of some Statics in which a machine can exist*. It was then, as he has the honour of having made the first essays towards the modern discoveries in vegetable physiology. This work, which is still referred to for excellent evidence concerning many facts in vegetable physiology, obtained for him the highest reputation, being translated into French, Italian, Dutch, and German. *Homastatics*, a similar treatise on the circulation of the blood, followed in 1733. Dr. Haleb's genius was of a very practical turn: most of his papers were written to serve a useful purpose, and to some extent to be a direct application of science to daily use. They comprehend anatomical and surgical treatises, analyses of medicines, experiments on the preservation of provisions during long voyages, the distillation of salt water, and the like; with several sermons. Of all these labours the most brilliantly successful was his plan of ventilating prisons, the holds of ships, and other close and unhealthy places. Having bestowd great pains on this object, he procured, in 1749, the erection of one of his machines in the Savoy prison; and the benefit obtained is stated by Mr. Collisson to have been so great, 'that though 50 or 100 in a year often crowded the prison, only 15 were confined and 7 died annually in 1752 inclusive no more than four persons died, though in 1750 the number of prisoners was 240.' By the introduction of his system into the old gaol of Newgate the mortality was reduced in the prisoners from 7 to 16. In France it was extensively adopted with similar beneficial result in prisons, hospitals, ships of war, the preservation of corn in granaries, &c. Numerous papers of Dr. Haleb are printed in the *Phil. Trans.* A list of his works will be found in Watt's *Bibl. Britann.* (CHEMISTRY, p. 34; Memoir, by Peter Collisson, in the *Ann. Reg.*, 1764.)


HALÉFAX, a market-town and parish in the West Riding of the county of York, in the wapentake of Morley, with which it is contiguous, lying north-west of Wakefield, and now sends two members to parliament. The borough includes the town and townships of Halifax, Ovram, and Overden. It is about two miles long and one mile broad, and has 31,297 inhabitants, of whom 13000 occupy houses of 100, and upwards. The population of the town was, in 1831, 15,392. Halifax is 194 miles north-north-west from London, 17 miles west-south-west of Leeds, 22 miles north-east of Manchester, and 7 miles south-west of Bradford.

The parish is one of the largest in England, and includes the following 23 townships:— Barkisland, Elland-cum-Greetland, Kringden, Pudsey, Halifax, Hoptonstall, Hiperholme-cum-Brighouse, Langfield, Midgley, Norland, Ovenden, Northowram, Southowram, Rastrick, Rishworth, Shelf, Skircoat, Sowbery, Sroyland, Stainland, Stansfield, Wadsworth, Wainstalls, and Wakefield. These three townships, and two other townships of any importance, with the exception of Haleb, are all parochial chapels for ecclesiastical purposes. They comprise 75,740 acres, a population (in 1831) of 105,899 persons, and 23,169 houses. The united annual value of their lands and buildings is assessed at £13,740 5s. 9d., of which £1,400 is derived from small rents, £1,400 from the rents of the vicarial tithes, £1,400 from the tithes of Elland-cum-Greetland and Stainland, which townships were not parochial until 1759, when the tithes were divided between the vicarial tithes. In addition to the parish-church and two other churches in Halifax, and the three parochial chapels-of-ease of Elland and Hoptonstall, there is in this parish fourteen chapels-of-ease, supported chiefly by the inhabitants of the respective townships or the united chapels.

Halifax ranks next to Leeds and Bradford as a seat of the woollen and worsted manufactures. The town seems, on approaching it, to stand in a low valley, which is owing to the ranges of hills by which it is almost wholly surrounded; but it is in reality situated on the south-eastern declivity of an eminence which rises to a considerable height above the valley. The rivers Calder and Huddersfield Taff, flowing through the eastern parts of the town, and falls into the Calder. The scenery in the immediate vicinity of the town is of a highly interesting and beautiful character. The soil here, which in a mountainous district is of the finest quality, has been cultivated, has been brought from its original barrenness to a state of luxuriance by its proximity to the town. The situation of Halifax is well adapted for the purposes of the woollen and worsted manufactories, and the district is overhung by numerous hills of numerous brooks, so important as to stations the steam-engine, gave to Halifax those facilities in manufacturing which were early a source of wealth. Its situation with reference to Manchester and Leeds, and its inland navigation by means of the Rochdale Canal and the rivers Calder and Huddersfield, have considerably increased its importance as a seat of manufactures. The commencement of its woollen trade is traced to the time when the manufacturing Flemings sought refuge in England, in the reign of Henry VII., from persecution in their own country. Many of these foreigners are supposed to have settled here, though Halifax has manufactures long before this time. In an early period of the history of the woolen manufacture there was a peculiar local law designed to afford protection to clothiers from the depredations to which their goods were exposed during the night. The law provided that if any clothiers were invaded by robbers, or if any subject found himself guilty, all persons who stolp property of the value of thirteen-pence-halfpenny within the liberties or precincts of the forest of Hardwick. The felon was however to be deliberately and publicly tried by a jury consisting of the frith-burgers within the liberties, and they could only convict on three grounds, namely, if he were taken in the act of thefting, if the stolen goods were found on him, or on his own confession. On the first market-day following the day on which the theft was committed, the stone platform of which may still be seen on Gibbet Hill, and the execution was performed by means of an instrument in some respects similar to the guillotine. The scaffold or gibbet of Halifax Gibbet Hill, and the gibbet of Halifax, stood for many years, and was exercised for the protection of the clothiers, but it was also used for the protection of other felons. The original axo of this instrument is preserved at the gaol in Halifax.

The chief cloth clothiers present many of the worsted stuffs, including shallows, tammies, calamancoes, duroys, everlasting, moreens, shags, serges, merinoes; also bazzes, narrow and broad cloths, and kersomeseryes. Bourdains, canada, and other fabrics of the worsted are also manufactured, and the cotton-trade is carried on to a considerable extent. The Vale of Ripponden is celebrated for its blue cloth: it is said that the whole of the British navy is clothed from this small district. Of the twenty-three townships of which Halifax is com-
posed, nineteen are said to be manufacturing, and contain 141 mills in operation, which have an aggregate power of 2319 horses; 57 of them are cotton-mills, 35 woolen, 45 worsted, and 4 silk mills. They employ altogether 15,877 persons, of whom 5,578 are females. The Situation of the population is considerable, and considerable care is taken in making mill-machinery and woollen-cards. The manufacture of these cards gives occupation to numerous wire-workers and curriers. The wire-teeth of the cards are fixed in leather, and nearly 20,000 pieces are made every week at a very low rate of wages, in fixing the wires in the leather.

A weekly market is held on Saturday, chiefly for the sale of woollen cloth. The Piece Hall, which was erected in 1779 by the shipping and other owners, is a large quadrangular structure of stone, which cost 12,000l., and which occupies an area of 10,000 square yards of land, which were given for this purpose by Mrs. Caygill. It is 100 yards long and 91 yards broad; the centre is occupied by a grass-palace. It contains 315 apartments for the reception of goods, the quantity of which exposed for sale at one time is often of the value of 50,000l. The east side has three stories, being on a descent; the other sides only two. Each story is covered by a colonnade, with spacious walks round the whole square, having columns in the front opposite to the partitions of the rooms, each of which has a door, and ash-screen to the galleries. The simplicity and elegance of the design are very well sustained with the beauty of the building. It was erected from a design by Mr. Thomas Bradley, and is said to be fire-proof in every part except the roof.

The appearance of the town of Halifax is generally handsomely adorned by the buildings of stone; it is well lighted with gas, and supplied with soft water from reservoirs about a mile north-west of the town, which were opened about 1837. Under the act of 1823 for paving, cleaning, and otherwise improving the town, many great improvements have been effected by the widening of streets, the formation of drains, and the removal of unsightly buildings. The modern streets are spacious, and lined with good houses.

The great church of Halifax is a handsome and spacious edifice of pointed Gothic architecture, erected at different dates. It is said that the chancel is an addition to the original fabric, and that the tower was built by the munificence of the Lacy and Savile families. There are several monumental inscriptions worthy of notice in the chancel, one of which is to Archbishop Tillotson. Trinity Church is a handsome Grecian building, with Ionic pillars, and an elegant tower surmounted by a chalice. The chancel was built in 1735. St. James's Church, built in 1831, is in the Pseudo-Gothic style, with turrets at the west end. The other places of public worship in Halifax are the Catholic chapel, which was built with the help of the Independent Christians, two belonging to the Baptists, two of the Wesleyan Methodists, two of the new Connection Methodists, one of the Primitive Methodists, a Friends' meeting-house, and a Unitarian chapel. A general cemetery was formed in 1837 by the municipality. To the different denominations of worship Sunday-schools are attached, and the religious and charitable institutions of the town and county are liberally supported. The free grammar-school at Skircoat was established in 1828 by letters-patent of Queen Elizabeth: it is under the direction of twelve governors, chosen from the discreet and honest men of Halifax. Its property yields 1,817l. per annum, exclusive of the school-house, garden, and grounds, which is occupied by the masters of the six smaller school charities. Waterhouse's Charity, established in 1636, provides almshouses for twelve poor widows, a stipend for the lecturer at the parish church, small yearly stipends of certain charities within the town district, and various sums for other local purposes. The property of this trust has of late years greatly increased in value. The infirmary is a very noble building, which is just opened to the public; the first stone was laid in September, 1836. In Yorks, both city and country, are 20 hospitals, 6 almshouses, and 44 poor schools; 26 industries, and 19 public baths, which are all free to all persons. The public baths are all situated in a valley on the road to Huddersfield. They afford all the various accommodations of the most superior bathing establishments: attached to them is a large garden and a bowling-green. The literary institutions of Halifax are the Literary and Philosophical Society, which has an elegant hall and library, the Mechanics' Institute, which has a library of upwards of 1000 volumes; and the news-rooms, which also comprise a subscription library. There are also assembly-rooms and a theatre. Daniel De Foe resided here when he wrote 'Robinson Crusoe,' and Sir William Herschel was at one time organist of the Above-named Parish Church. In January, 1837, the parish of Halifax was formed into two unions for the administration of the poor-laws. The Halifax Union comprises nineteen townships, and the district of Denholme, which includes the parishes of the Heptonston and parochial chapelry, and the town and chapelry of Todmorden. For other interesting particulars respecting Halifax reference may be made to White's 'Gazetteer and Directory of the West Riding,' a laborious and useful work, whose accuracy we have had the opportunity to test and confirm.

(Communication from Yorkshire.)

HALIFAX. [Nova Scotia.]

HALIMINOSAURUS. [Glosauria, vol. xi., p. 186.]

HALIMEDA, a portion of the genus Corallina, Linn., for which Lamarck had used the name Flabellaris, is thus styled by Lamoignon. (Exposition Methodique des Genres.) The articulations are flat or compressed, rarely cylindrical, almost all of them on the axis throns, surrounded by a thin crenate substance.

HALIMUS. [Malgae.]

HALIOTIDE, HALIOTIS TRIB. OF FAMILY. The species belong to the tribe of Gastropods, commonly called 'Earth-shells,' or 'Sea-ears,' are more numerous than is generally supposed. Mr. Swainson, in his first series of ' Zoological Illustrations,' observes, when writing on the 'Small-bored Californian Earth-shell (Halitotta Californiana) (1820-21), that the definition given by conchologists up to that time were so imperfect that they had not left our knowledge of these shells nearly the same as in the time of Linnaeus. The species only are enumerated in Mr. Dilwyn's work; although thirty have fallen within my own observation during the last few months.'

Linnæus, who records the seven species known to him under the generic appellation of Halostis (Sea-ear), describes the animal as a slug (Limax) and the shell as ear-shaped and open (pusten) with a lateral hidden spine, and the disk longitudinally pierced with holes (portis). He places the genus between Nerita and Patella.

Cuvier, in the first edition of his ' Bégne Animal,' (1817), makes the Ormiers (Haliotus of Linnæus) the first genus of his sixth order of Gastropods, Scutibranchiata. [Gastero- poda, vol. x., p. 93.] He observes that it is the only genus of the order. It contains the earth-shells, these shells of that of the Ormiers is remarkable for the excessive amplitude of its aperture, its flatness and the smallness of the spine, which is seen from within. This form, he adds, has caused it to be compared to the ear of a quadruped; but Mr. Cuvier places the earth-shells in the following subgenera:—1. The Halitotta, properly so call'd (Haliotus of Lamarck). 2. The Padilla of Do Montfort. 3. The Stomatia of Lamarck. The Ormiers are immediately followed by the Coboconus (Capulus of Do Montfort—Patella Hungarica).

Lamarck ('Animaux sans Vertèbres,' 1817) arranges the genus Halostis, which is immediately preceded by Stomatia, as the last genus of his Macrostomes. The following is his definition of Halostis:—

'Earth-shell-shaped, most frequently flattened; with a very short spine, sometimes depressed, nearly lateral. Aperture very ample; the shell is always smooth. Dish pierced with holes disposed on a parallel line near the left-hand border, the last commencing with a notch.'

The same zoologist makes the following observations on the genus Stomatia, which consist of two or three species: it contains a very beautiful genus, rather numerous in species and remarkable for the singular form and the brilliant nacre of their shell. They have received the name of Sea-ears, because they in fact represent sufficiently well the form of the cartilage of the ear in man. The shell is oval-oblong, flattened in general, slightly spiral near one of its extremities, and furnished with a row of holes disposed on...
a curved line near the left-hand border and parallel to it. As the animal increases in growth, it forms for itself a new hole on the edge of the anterior part of the shell; this hole commences with a notch which serves to give a passage to the siphon of the animal, and is afterwards completed; when another is formed posteriorly. In its natural situation and when the animal crawls, this shell may be considered as a reversed basin with its convexity upwards. Its circumference is then considerably exceeded by the very inner part of the shell. On the third order of the anterior part of its body. Following the description of the Ormier (the animal of the Haliotis) given by Adanson, I had supposed that the branchiate of this animal were extended by the teeth of Gmelin's Haliotis, but I was undeceived me by showing me that they are hidden in a particular cavity. Haliotis therefore belongs to the family of Macrostomata. With regard to the tentacula, it has not perhaps really more than two. But as it is not uncommon (cases frequent) among the marine tracheopods to find the eyes each one upon a tube which springs at the external or posterior base of the tentacula, these tube-eyes are apparently more elongated here than elsewhere: in this case they are larger than the anterior ones. Lamarck records fifteen species, including Haliotis dubia.

Mr. Swainson ("Zool. Illust." 1st series) remarks that "the genus Padulus of Montfond (De Montfort) is evidently the Ormier of knowledge of the animal," appears to him an unnecessary distinction, for, such he observes, is the character of all young shells, and also of mature ones, whose outer surface is roughened. De Montfort (1810) gives the following generic characters for Padulus: Shell free, univalve, in the form of an ear, pierced with one or two holes; summit spiral, flattened, dorum; aperture subequilateral; left lip reflected and trenched; back covered with an epidermis, having a gutter in the middle and in the direction of the sipe. He gives as the type of the genus Padulus rufulnoculis, and proceeds nearly as follows: In all recent Padulus there is a tube-like gullet, the Sigaret, the Stomatia and the Haliotides, which we consider that we have been able to establish upon it a new genus. Sufficiently similar to the Haliotides by its general contour (l'ensemble de ses formes), it is a genus never less approximated to the Stomatia, inasmuch as it has very few holes; but it presents, more than almost any of these shells, a spiral gutter, hollow in the interior, elevated on the back, placed in the middle and carried in the direction of the sipe. This hollow, or gutter, is independent of the curved and serial line of holes, which are nearly all obliterated. The right lip is also more opened out (épaissi aussi d'ouverture); the opening is much longer. It is a gutter along the middle line towards the summit, and to the height of the sipe the interior offers an iridescent and undulated nacre. Externally it is of a brick-red, and the summit, in consequence of losing its exterior mucous and coloured coat, is nacreous. The back is finely striated and reticulated, and the successive periods of growth are very strongly marked there. There is no doubt that the obliteration of the holes of the Paduli are a consequence of the absence of some organs, with which the Haliotides must be eminently provided, and it is even probable that the single bore which notches their border serves during the life of these mollusks to lodge a fold of the border of the mantle, rolled into a tube and serving as the bed in which we shall find among many of the spiral mollusks.'

Considering the time at which De Montfort wrote, there is much good reasoning in this passage: it must be recollected that at that time he gave his description from a known, and it is probably not very unlike that of the ear-shell.

Dr. Leach (1814) adopted De Montfort's distinction and made a separate species of the genus Padulus, from the Royal Collected and described it as Haliotis (Ear-shell) distinguished from Haliotis (Ear-shell) by the irregular form of the outer edge or lip; the disk, he adds, has fewer perforations and the sipe is placed farther back. On the other hand, he states that he has given his description from a known, but it is probably not very unlike that of the ear-shell.

Mr. G. B. Sowerby (Genera of Recent and Fossil Shells, No. xiv.) observes, that with the exception of a few that are commonly known to collectors and Linneans as Imperforata Ear-shells, the genus Haliotis has not suffered any diastemations. 'An attempt,' continues Mr. Sowerby, has indeed been made by Montfort to separate from the genuine Haliotides two or three species under the name of Padulus, in which he has been followed by Leach, but as far as respects general adoption this attempt appears to have been as unsuccessful as it was unnecessary. Not so the separation of the Imperforata Haliotides, which are easily distinguished by wanting the row of perforations so very characteristic of the true Haliotis.'

The Ormier form the first family of Scutibranchiata, the first genus of the second family, and the third order of the third family of the second class of the Scutibranchiata, the third order of the third family of the second class of the Scutibranchiata. Leach, in his "System of Nature," gives the Ormier of de Blainville's arrangement (Manuel de Malacologie, 1825). The first genus of this family is Haliotis, divided into four sections, and including the genera Padulus and Stomatia. M. H. Mang (in Dictionnaire des Sromistes of Lamarck, Ormier of de Blainville, Aunformes of Latreille) as the first family of Scutibranchiata, Cuvier: but he makes it consist but of one genus, Haliotis; Linn. The genus Stomatia of Lamarck he places under the Sigaret of De Férussac, as well as the genus Stomatella of Lamarck, which he seems to consider as including the Padulus of De Montfort. The Sigaretas, in this arrangement, are made to form the 9th family of the Scutibranchiata of Cuvier.

In Cuvier's last edition of the Regne Animal (1830), the position and arrangement of the Ormier remains as in the first edition, with the exception that in the last edition the Scutibranchiata and the Scutibranchiata, Cuvier, have been separated from each other. In the present state of our information, it will perhaps be as well to select the arrangement proposed by Cuvier, and in great measure adopted by M. de Blainville, M. Rang, in his "Manual of Zoology," both of these genera (including Padulus), and Stomatia, says 'Animal unknown.'

Haliotis (properly so called; Haliotis, Lam.).

Animal.—One of the most ornamented of Gastropods. All round its foot to its mouth there is, at least in the most common species, a double membrane cut out into leaflets (feuillages) and furnished with a double row of filaments. On the outside of its long tentacles are two cylindrical pedicles for carrying the eyes. The mantle is deeply divided into the right side, a fold of water which has the outside of the holes in the shell, can, through this slit, penetrate into the branchial cavity; along its edges again are three or four filaments, which the animal also can cause to come out through these holes. The mouth is a short proboscis (Cuvier's description for all Gmelin's Haliotides, except H. imperforata and perversa).

Body oval, very much depressed, hardly spiral behind, provided with a large foot doubly fringed on its circumference. Head depressed; tentacles a little flattened, joined (connus) at the base; eyes carried on the summit of prismatic peduncles, situated on the external side of the tentacles. Mantle short, delicate; foot very large, oblong, furnished all round with a double row of footlets agreeably cut out and pinnated, with a number of perforations, from which the equal or equal pedinated branchiae, in a cavity open to the left, the muscle of attachment occupying the middle of the animal; vent (anus) opening into this cavity opposite the slit which forms its aperture to the right side of the shell.

In addition to the general account of the organization given by Cuvier, we refer the reader to No. 489 (Gallery) of the Biological Society of the Linnean Society of the Linnean Society of the Biological Society of the Physiological Series of preparations in the Museum of the Royal College of Surgeons. The specimen of the species is there prepared to show the stomach. The floor of the branchial cavity, the gills, and anus, are turned back, and the integument is removed from above the esophagus and first stomach. A bristle is passed through the esophagus, and another from the first to the second stomach. The latter cavity is imbedded in the liver, and receives the secretion of that gland by such wide orifices, that portions of the alimentary substances have entered the biliary ducts, which thus are not only red of any alimentary canals. (Catalogue, Gallery, Vol. I.)
**Halotis tabulata**

*a* animal and shell; *b* interior of shell.

> **Halotis tabulata.**

Shell nacreous, very much depressed, more or less oval, with a very small spire, very low, nearly posterior, and lateral; aperture as large as the shell, with continuous borders, the right border delicate and trenchant, the left flattened, enlarged and trenchant; a series of complete or incomplete holes, parallel to the left side, serving for the passage of the two pointed lobes of the mantle; a single large muscular impression, median, and oval. (De Blainville.)

These, the true Halotides, forming M. De Blainville's section A, consisting of species whose disk is rounded forwards and pierced with a series of holes, vary much in size and shape. The general form may be imagined from that of *Halotis tabulata*, the most common species, the size, shape, &c., of which is too well known to require description; and from *Halotis costata*; but there are some of the species from the warmer climates that are as large as or larger than the crown of a hat, and are absolutely dazzling from the splendid iridescence of their nacre. The shape too varies considerably. Thus we have among the comparatively small species a form very nearly round (*Halotis exocellata*), whilst *Halotis Astartea* is very much elongated. The effect of treating the shell of *Halotis* with acid, so as to deprive it more or less of its earthy material, and to exhibit the shape still retained after the removal of that earthy matter, will be seen in the specimens numbered 98, 98 A, 98 B, in the gallery of the same museum.

**Geographical Distribution.**—Both M. de Blainville and M. Rang state that species of *Halotis* exist in all the seas; the latter uses the expression 'elles sont très répandues dans toutes les mers,' but their limits seem not to go far beyond temperate climates. None appear to have been seen by our northern voyagers; and though *Halotis tuberculata* (which there can be little doubt is the *Empis levii*, by *vros e Pfizer* *dikainos logo*—the wild lopas, which some call the sea ear—of Aristotle, *Hist. Nat.* lib. iv. c. 4) is common at Guernsey and Jersey, and has been found—that is, the shell—on the south coast of Devonshire, we agree with Mr. Sowerby in thinking that, on the present evidence, this species cannot with propriety be considered a native of our own coasts though the dead shells are sometimes thrown up on our southern shores after violent storms.

**Habit.**—The *Halotides*, which are all marine and littoral, being without opercula, adhere, like the *Patellae*, by applying their under parts to the surface of the rocks. They are generally found near the water's edge, and, according to Lamarck, go during the fine summer nights to feed on the herbage which grows near the shore.

**Utility.**—Mr. Gray gives an article of food this genus is by no means to be despised. We have eaten *Halotis tuberculata*, and when served by a good cook it is tender and crisp. The large fleshy foot, if not properly managed, is apt to be tough. The people of Guernsey and Jersey ornament their fish loaves with the shells of large species, catching them frequently in quinzeaux order, and placing them so that their bright interior may catch the rays of the sun. We have often thought that some of the large and splendid intertropical species, whose exterior, after removing the outer coat, take a polish almost equalizing the natural brilliancy of the inside, might be converted into dishes for holding fruit: if mounted with good taste, their indescribable iridescence would materially add to the richness of an elegant table.

**B.** Species whose disk, besides the series of holes, is raised by a large parallel rib, hollowed interiorly, and whose anterior border is more or less irregular.

*Padolus*. (De Montfort.)

M. De Blainville refers to *Halotis canaliculata*, Lam., as the example. The figure in Knorr, referred to by Lamarck, is red externally, and has the elevated rib; but the shape of the shell is longer than that of *Padolus scalaris*, Leach, and of other *Padolus* which we have seen. The specimen recorded by Mr. Gray in the appendix to the 'Narrative of a Survey of the Intertropical and Western Coasts of Australia,' performed between the years 1818 and 1822, by Captain Phillip Parker King, R.N., F.R.S., &c., relates, and which Mr. Gray notices as the largest he ever saw, measured three inches and a half by two and a half. We have seen the shell, and never saw so large a specimen. Mr. Gray records it as *Padolus rubicans* of De Montfort, with the synonym of *Padolus scalaris*, Leach, and *Halotis tricostalis*, Lamark.

**Locality.**—Lamark, on the authority of M. Leschenault, says that his *Halotis tricostalis* inhabits the seas of Java. The fine specimen brought to England by Captain King was found upon Rottnest Island, on the west coast of New Holland, and is now in his cabinet. It has only three holes, the anterior ones, open. All those which are closed and those which are open, are very highly elevated, and so is the curved longitudinal rib. The left border externally is very much raised and nodulous, looking at first sight as if it had another row of holes which had been closed; but it was evidently always imperforate.

**C.** Species whose disk is not pierced, but hollowed longitudinally by a decurrent canal.

M. De Blainville gives as an example of his section C. *Halotis dubia* of Lamark. It will be clear to the observer that the animal protected by such shells as the two next, must exhibit some differences from that of a true *Halotis*.

**D.** Species whose disk is not pierced, but which offer the two gutters together, but approximated, so as to leave externally a decurrent rib between them.

*Stomatia*. (Lamarck.)

Cuvier, who says that the animal of *Stomatia* is much less ornamented than that of *Halotis*, is of opinion that this form connects the *Halotides* with certain Turbulences. Mr. G. Sowerby (Genera of Recent and Fossil Shells, No. xix.) observes that Lamark, in his observations upon *Stomatia*, tells us that in respect to their general form those shells appear to be nearly related to the *Stomatia*; and that they are principally distinguished by the transverse ridge and the elevated outer lip of the *Stomatia*. 

---

*Padolus rubicans*?
HAL

Upon a careful examination however of ten species, Mr. Sowerby was unable to discover any difference in the outer lip; and he remarks that Lamarck places among his Stromatellaceae one species, S. rubra, which has a nodular keel placed exactly in the same position as the transverse ridge, by which the latter characterises Stomatia; so that Mr. Sowerby double ruler and divides them, as he does not know to what genus has therefore united the two Lamarckian genera under the appellation Stomatia. He thus characterizes the genus thus reformed:—Shell pearly within, mostly coloured externally, and in its last state somewhat depressed. The spire, in most species, prominent, but not produced nor elongated; sometimes very small, marginal and inconstipated. Aperture mostly longitudinal, in some species oblique. Grows and ends with large spicules, often very large; its edges entire, united at the upper part, and scarcely modified or altered in form by any portion of the last volutions. Volutions from two to four. Muscular impression of two, solidly distinct, nearly marginal, and in the open part of the shell.

Mr. Sowerby goes on to state that Stomatia appears to be related to Halisotis, and is therefore rightly placed by Lamarck among his Macrostomata. One of its species is arranged by Linnaeus, he adds, as a Halisotis, under the name of Halisotis imperforata (Gmel.). Mr. Sowerby does not pretend to discuss the question of their resemblance to Lamarck's Turbinasites; but only observes that in general form it is a much larger species than either of Lamarck's Monodontes. The Stomatia, he states in conclusion, are marine, and he says that all the species he has seen were brought from the East Indies and New Holland.

Demosponge from a depth of seven fathoms, adhering to Melonegrine and corals.

Fossil Halisotidae.

Mr. G. B. Sowerby, speaking of the true Halisotidae, says that the existence of fossil species is very doubtful; but the only approach to it that he had ever seen, he adds, some incrustations taken up from the sea near the Cape of Good Hope. He states that he never saw a fossil species of Stomatia, as modified by him. M. de Blainville remarks, at the end of his work, that there are no fossil species of Stomatia, or other fossil species are known. Couvier, speaking of the true Halisotidae, observes that the genus Halisotis certainly has, though the fact has been disputed, its analogue among the fossils; and he refers to the 'Ann. des Sc. Nat.' t. xii., p. 45, f. 4, for a species (Hal. Phileberti) found in the calcareous of Montpellier, described by M. Marcel Serres. M. Rang, speaking of the same genus, says, 'Nous en possédons une ou deux foyers d'incrustation.' The second volume of the Dictionnaire Universel, reckons one species, H. tuberculata, as both living and fossil (tertiary), from Sicily. (Pliocene Period of Lyell) Of Stomatia M. Deshayes mentions no fossil species, but of Stomatia he records one fossil (tertiary) with an unknown locality.

Halisporgia. According to the structure and composition of the numerous species of sponges, they may be divided into genera. If, in accordance with the observations of Dr. R. Grant, we consider sponges in three groups, one bearing a horny tubular structure, another containing sclerotic spicules, a third containing siliceous spicule, we may adopt the three generic types, Spongia, Calcisponge, and Halisporgia, of Blainville.

Halisporgia is thus characterized:—Mass more or less rigid or friable, of irregular figure, porous, traversed by winding canals, which end in openings scattered over the surface. Also the spicules, partly orthosteuthal, supported by simple siliceous spicule.

The species exhibit various external forms, encrusting, branching, or foliaceous. Dr. Fleming includes them under the class of Halispongiae, a class which has never been defined with precision.

Halitherea, a genus of marino dibranchiate annelids belonging to the family Aphroditidae. [Dorsibranchiata; Six-Noses.]

Dr. O. B. Chamberlayne, EDWARD, an English lawyer and historian, was the son of John Halle of Northall in Shropshire, and was descended from Sir Francis Van Halle, K.C., in the time of Edward III, who was the son of Frederic de Hall of their arch, natural son Albert king of the Romans and archduke of Austria. He was born, at the close of the fifteenth century, in the parish of St. Mildred, London, and received the first part of his education at Eton school. In 1516 he became scholar of King's College, Cambridge, and continued there till he became a junior fellow; P. C. No. 769.

Afterwards, about 1518, when Cardinal Wolsey founded various lectures at Oxford, he removed to that university. Having entered at Gray's Inn, he was called to the bar, and became first one of the common sorrows, and subsequently under-sheriff of the city of London. In 1533 he was appointed summer-reader of Gray's Inn, and in 1540 was one of the judges of the Sheriff's Court. He died in 1547, and was buried in the church of St. Benet Sherhog, London.

Hall's Chronicle, entitled 'The Union of the two noble and illustrious families of the names of Hall, and Sackville,' was first printed by Bertbelette, in small f. o. in 1549. This edition is so very rare as to have been seen by scarcely any of our bibliographers. It was dedicated to King Henry VIII., and Sackville, head of the family, thus illustrates the hopes of his ancestors:—'This work is a most valuable possession of the family of Sackville, and was written by a scholar of the University of Cambridge, whose name is no. 1046. It used to be prefixed to its reprinted edition in the following year.'

Hall's Chronicle, entitled 'The Union of the two noble and illustrious families of the names of Hall, and Sackville,' was first printed by Bertbelette, in small f. o. in 1549. This edition is so very rare as to have been seen by scarcely any of our bibliographers. It was dedicated to King Henry VIII., and Sackville, head of the family, thus illustrates the hopes of his ancestors:—'This work is a most valuable possession of the family of Sackville, and was written by a scholar of the University of Cambridge, whose name is no. 1046. It used to be prefixed to its reprinted edition in the following year.'

HALL, JOSEPH, an eminent divine and prelate, was born July 1st, 1574, at Ashby-de-la-Zouch, in Leicestershire, and received his education at Pembroke College, Cambridge, of which in due time he was elected Fellow. Having taken orders and received some minor benefices in succession, he was made dean of Worcester in 1617; sent as a missionary to the English garrison at Dartmouth in 1618, appointed bishop of Exeter in 1627, and translated to Norwich in 1641. His professional zeal and earnest piety involved him in those jealous times in the charge of purifying the State, and he was frequently engaged in vexatious and vengeful attacks, he plainly told, to use his own words, 'I would cast up my rochet. I knew I right ways, and would not endure to live under undeserved suspicions.' In truth he was well attached to the church of which he was a member, and wrote strong in defence of his own, when the danger of the times became imminent. In November, 1641, having joined others of the bishops in a protest against all laws made during their forced absence from the Court, he was arrested on the 5th November and, after trial, was committed to the Tower, and only released on the following June, on giving bail for 5000l. In the next year the revenues of his bishopric were sequestered, and during the rest of his life he suffered much from poverty and harsh treatment, which has been noted in a piece called 'Hard Measure.' He removed in 1647 to Higham, near Norwich, and died there in 1656.

His numerous works fill several volumes in the old folio editions, and ten in the modern work. They are remarkably controversial, as will appear from the catalogue of Watts, and therefore of ephemeral popularity. His 'Contemplations' are of more personal and lasting interest, and esteemed for their language, criticism, and pietie: as also his 'Eneomichus, or Treatise on the Mode of walking with God,' a beautifull tract, translated into English in 1679. To the student of English manners his Satires entitled 'Virginiaramus,' in 6 books, are peculiarly valuable. They have been annealed in most of the rare, and are the subject of his 'Hist of Poetry,' first printed in Chalmers's 'British Poets.' He says of them, 'The Characters are delineated in strong and lively colouring, and their discriminations are touched with the utmost truth; and the graver and more precise finish of his writer is equally energetic and elegant. His chief fault is obscurity, arising from a remote phraseology, constrained combinations, unfamiliar ellipses, elliptical apophthegms, and ungraceful expressions.'

HALL, a town in the townsh., in Tyrol, with 4500 inhabitants, having a mint and other public establishments, and salt-works which produce about 300,000 cwt. of salt annually; the salt-works are situated near the Salzberg, 5000 feet high, which is ten miles distant.

Swabian Hall, in the circle of the Ixxt, and the county of Württemberg, has 6500 inhabitants, six churches, including the ancient Gothic church of St. Michael, a handsom town-hall, and salt-works, yielding 80,000 cwt. annually.

Vol. XII.—D
It was formerly a free imperial city, and annexed to Württemberg in 1802.

HALLÉ, in Saxony, on the Saale, a town in the district of Meißenberg, and the province of Saxony, in Prussia, the chief town of the circle of the Saale. It is celebrated chiefly for its saltpetre mines, which are worked by A. H. Fräncke (Fränck), and as the seat of the Frederick's university. It consists of three towns, viz., Halle itself with five suburbs, and Glausen, and Neumarkt, which have many schools of their own. The university was founded in 1694, and by a decree of the king of Prussia was united in 1717 with that of Wittenberg. It has always maintained a very high character, and has a number of scientific institutions connected with it, the gymnasium, the philosophical seminary, medical, surgical, and chemical institute for surgery, mid-wifery, &c., the anatomical theatre, the physical and chemical institute, the observatory, the mining institute, with a library of 50,000 volumes. The first professors having been divines of what the Germans call the Pietist party, the theological faculty had from its origin a very local character, and Halle has been the most opposite part of this party, which, notwithstanding its prejudices and peculiarities, has had a salutary influence on practical Christianity. A great change was however effected by Christian Von Wolff, who inspired the students with a taste for mathematics and philosophy; though, by the influence of the Pietist divines he was for a time exiled from the Prussian states, he, with his whole school, triumphed in the end. The university had attained its greatest splendour in the eighteenth century, when Napoleon dissolved it after the battle of Jena. The Westphalian government immediately re-established it, but it had only from 300 to 400 students, and in 1813 Napoleon again dissolved it. But it has since recovered, and is now 40 professors, and among them are some highly eminent names. There are several remarkable buildings, such as St. Mary's church, built in the Gothic style in the sixteenth century; St. Ulrich's church, built in 1329; that of St. Maurice, of the middle of the twelfth century; the cathedral, built in 1220-23; and the town-hall. The adjacent castle, called the Moritzburg, formerly the residence of the archbishops of Magdeburg, is reduced to a ruinous condition when the Seven Years' War, and only a wing now remains. Halle possesses many charitable institutions. There are numerous manufactories, but the most important are the salt-works, producing annually of salt about 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALMAR. The Abbots of Halmar, or Hallmar, were in the third century, and their history is not connected with their ecclesiastical institutions.

HALMER, in the diocese of Cologne, is a town in the district in 1094. The population of Hallmar is about 15,000, and of Glausen, &c., 24,000.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, in the diocese of Cologne, is a town in the district in 1094. The population of Hallmar is about 15,000, and of Glausen, &c., 24,000.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.

HALLÉ, or HALLEIN, in the circle of Salzburg, in Austria, with 5000 inhabitants, has extensive salt-works, which produce annually 450,000 cwt. of salt.
two—sensibility and irritability; the former seated in the brain and nerves, the latter in muscular fibre. In this he had indeed been partially anticipated by Glisson [Glisson], who perceived the necessity of admitting an inherent property in muscular fibre, by which its contraction take place under the influence of certain stimuli, but the laws of this property, and the distinction between it and elasticity, had never been at all clearly determined. Haller thus illustrated these properties by the intestine from which, as from the abdomen, or a muscle separated from the body, is irritable, for when pricked or otherwise stimulated, it contracts—yet it is not sensible; the nerves on the other hand are sensible but not irritable. All muscular fibres are sensible; to which they are distributed are thrown into action, they themselves do not exhibit the slightest motion. Hence irritability, he said, cannot be derived from the nerves, for it is impossible they should communicate what they do not possess themselves; but the attributing a sense power to some of the muscles as a necessary condition of their irritability, and supposed it to be conveyed to them during life from the brain through the nerves, and to govern their actions under the influence of certain undetermined laws. Proceeding to investigate further the laws of irritability, he found that it differed in intensity and permanency in different parts of the body. He found that it continued longest in the heart, and in the blood vessels and the diaphragm, and that it ceased soonest of all in the voluntary muscles, and by reference to this superior degree of irritability he explained the constant action of the heart and its fluctuations. He believed irritable tendons took each motion to the iris, and believed that the action of light upon it takes place through the medium of the retina, a view since proved to be perfectly correct. He supposed the artery, when dilated, could not suddenly contract of itself; and that the cellular tissue around them prevented any motion from taking place in them, and he explained the accumulation of blood in an inflamed part, partly by the contraction of the veins and partly by the diminution of blood supply from the arteries, to be produced by experiments that the tendons, the capsules of joints, the peristea, and the dura mater are entirely insensible, and that the pain which occurs in diseases of these parts ought to be referred to the effect of the nervi cutanei direct to and around them, and in these and some other tissues which he held to be destitute of irritability he admitted a force analogous to elasticity, by which they contracted slowly and in a manner altogether different from muscular tissue when either excited or exposed to cold, &c.

Such is a sketch of the great doctrine of irritability and sensibility on which Haller based all the phenomena of life, and around which he arranged all the facts of physiology known up to his time. From the first impulse to the study of the lives of life as a separate and exclusive science, and though in some parts erroneous, and in many insufficient, it still contained enough of truth to form a basis upon which useful knowledge of the highest value could be developed by experiments that the tendons, the capsules of joints, the peristea, and the dura mater are entirely insensible, and that the pain which occurs in diseases of these parts ought to be referred to the effect of the nervi cutanei direct to and around them, and in these and some other tissues which he held to be destitute of irritability he admitted a force analogous to elasticity, by which they contracted slowly and in a manner altogether different from muscular tissue when either excited or exposed to cold, &c.

Haller was fortunate in retaining the high honours which he deserved during his life-time. In 1739 he was appointed physician to the king of England. In 1743 he was elected a fellow of the Royal Society of London, and at different times subsequently a member of nearly all the learned societies of Europe. When George II visited Göttingen in 1748 he was ennobled by the emperor; he was invited by Frederick the Great to settle in Berlin, with a handsome salary, to which no duties were attached, and he was received in the best society in Berlin and at Utrecht. He enjoyed throughout his life the friendship and esteem of the most eminent of his contemporaries throughout Europe; and, as varied as his pursuits were, he acquired a style which in all writings was marked by clear and success. It would be impossible here to give a complete list of his original writings and compilations; few writers have ever been so voluminous and it is extraordinary that, amid all his personal and labours in these directions, he should have had opportunity for composition of so extensive a library as they alone would form. A large portion were probably formed from the accumulation of notes which he had made in following the lectures and the memoranda, invariably recording everything which appeared to him worthy of notice; a plan which, commenced, as we have seen, in childhood, he continued without intermission to the last years of his life. The following are his principal works:—

His Chief poetical production, "Variae Schweizerisches Gedichte," was published anonymously at Berne; afterwards two more editions of it were printed there, and four at Göttingen. Three editions of a French translation were also published. Haller was engaged in publishing, in 19 vols. 4to., a number of the most select disquisitions and theses in anatomy, surgery, and medicine, and from 1757 to 1766 his "Elements Physiologic Corporis Animalis," undated, a work on medical science which the eighteenth century produced. It contains every fact and every doctrine of physiology at that time known, and is written in such a style of elegance and classical beauty that it is still a model for writers on the same subject. It appeared in eight 4to. volumes from 1757 to 1766, and a posthumous "Auctarium" was published in 1782 in four 4to. fasciculi. From 1774 to the time of his death he was engaged in publishing part of his "Bibliotheca Anatomica, Chirurgica, Praktonica, Botanica, et Historiarum Naturalium," which form together ten 4to. volumes, of which the publication was completed posthumously. They are composed principally of abstracts of the most important writings of all the principal authors on each subject, so as to form a complete history of the doctrines of each science. His "Icones Anatomici," which were published from 1743 to 1756, contain most accurate and well-engraved representations of the principal organs and tissues of the human body, especially the arteries. The greater part of his contributions to the various scientific transactions, and of his shorter works, were collected in his "Opera Minora," in 3 vols. 4to., from 1747 to 1757. The most valuable of them are those on the Development of the Chick, on the Formation of the Heart and the Bones, on the Circulation, and on the Eye. (Das Leben des Herrn von Haller, von J. F. von Gergonne, 1 vol. 4to., 1756; sensations, Elégie de Haller, Geneva, 1775; Histoire de la Médecine, par K. Spengel.)

HALLEY, EDWARD. The materials for the personal
life of Halley are principally in the Biographia Britannica, which makes considerable use of a manuscript furnished by Mr. Price, Halley's son-in-law. Some years ago a manuscript belonging to the Bodleian library, purporting to be the date of the Heavens, in some one acquainted with him, was read to the Royal Astronomical Society (see their Monthly Notice, December, 1834). We find some extracts from this manuscript agreeing almost word for word with parts of the Biographia, and conclude that the document in the Bodleian library is the original, or perhaps an abridged copy, of that cited in the printed work. The Eloge of Halley in the Memoirs of the Academy of Sciences is also derived from the same source, and was inserted in the small collection of Eloges by that writer, Paris, 1747.

Edmund Halley was born October 29th, 1656, at Haggerston, near London, at a country-house belonging to his father, who was a soap-boiler in Winchester Street, London. He was educated at St. Paul's school, under the care of Mr. Gale, and was placed at Queen's College, Oxford, in 1673, being then possessed of much erudition for his age, and a strong turn for observation, as appears by his having discovered for himself before he left school the alteration in the variation of the magnetic needle. At the university, being well supplied with instruments by his father, he began to apply himself to astronomy, and before he reached the age of twenty he had given (in the Phil. Trans.) a memoir on the problem of Kepler, had invented a method of constructing the phases of a solar eclipse, and had made correctly observations of Jupiter and Saturn; the results of which we shall presently see.

Finding however that nothing could be done in planetary astronomy without more exact tables of the stars, and relying upon Flamsteed and Hevelius for the amelioration of the methods of the calculation, he obtained his father's consent and assistance, to appropriate to himself the task of forming a catalogue of the southern hemisphere. Furnished with a recommendation from Charles II. to the East India Company, he set sail for India in September, 1676, and remained there two years. His 'Catalogus Stellarum Australium,' published in 1679, was the result of this voyage, and contains, besides the positions of 350 stars, some notes of observations, particularly in the southern hemisphere, the transit of Mercury over the sun's disc, and a hint that such observations might be employed to determine the sun's parallax (afterwards so successfully carried into effect with the planet Venus). He also notices the increased curvature of the moon's orbit when in quadratures, which was afterwards explained by Newton. In his voyage out he had observed the fact that the oscillations of a pendulum increased in duration as the instrument approached the equator.

At his return from St. Helena the king granted him a mandamus to the university of Oxford for the degree of Master of Arts, and he was elected a Fellow of the Royal Society. He afterwards went to London, and deposited the observations of Hevelius, who maintained the superio r accuracy of instruments with simple sights, in opposition to Hook, who advocated the use of the telescope. Halley was a man of rapid movements; in November, 1678, he returned from Danzig in July, and remained at home till the end of 1680, at which time he set out on a continental tour, accompanied by his schoolfellow Mr. Nelson, since well known as the author of a work on the French and Flanders. In 1682 he returned to Paris, where he saw the celebrated comet of 1680 in its return from perihelion, being the first who perceived it; since it was lost in the preceding month. This body he observed with Cassini in the library, particularly assertions that are made remarkable as forming part of the foundation upon which Newton, in the Principia, verified his deduction of a comet's orbit from the theory of gravitation. He returned to London, and in 1684 married the daughter of Mr. Tooke, auditor of the Exchequer, with whom he lived fifty-five years. He resided at Islington till 1696, and in 1683 published his theory of the variation of the magnet, followed by other papers in subsequent years, such as the determination of the longitude at sea, and the determination of the distance of the sun, from the square of the distance. Having applied in vain to Hook and Wren for assistance in the mathematical part of the problem (himself being more of a mathematician than either), he heard of Newton, and paid him a visit at Cambridge. From this time he was continually at his new friend, he never rested until he had persuaded Newton to publish the Principia, of which he superintended the printing, and supplied the well-known copy of Latin verses which stand at the beginning. In 1691 he was called to the Savilian professorship, which he lost, according to Whiston, on account of his avowed unbelief of the Bible. This rest on the authority of Whiston, and of an anecdote to be found in Sir David Brewster's Life of Newton, and yet it is certain that he afterwards was appointed to the same professorship, and as he then obtained the degree of doctor of laws, which required no subscription to articles, it may be presumed his opinions, which were not considered to be a disqualification, Flamsteed, if we remember rightly, speaks of his opinions on this matter as things of common notoriety. In 1696 he was appointed comptroller of the mint at Westminster.

In 1698 king William, who had heard of his magnetic theory, gave him the commission of captain in the navy, with the command of a small vessel, and instructions to observe the variation of the magnet, and the longitude and latitude of his ship, in order to determine the position of the sun's disc, and to attempt the discovery of land south of the Western Ocean. He set out in November, but was compelled to return by the insubordination of his first lieutenant. Having tried this voyage without success, he went in September, 1701, with the same ship and another, observed in many parts of the Atlantic as far as the ice would permit, touched at the Canaries, Madeira, Cape de Verd Islands, St. Helena, Brazil, Barbadoes, and returned in September, 1703, having not lost a man by sickness during the whole voyage. He published in 1701 a chart of the variation of the magnet in all seas of the known world, and immediately afterwards, and during his residence in England in November, 1703, just in time to witness the success of Dr. Wits, who had died three weeks before, in the Savilian chair of geometry at Oxford.

If Halley was active and energetic, he was no less universal. The captain-professor found an unfinished translation by Flamsteed, who died in 1695, of the 'Astronomiae Pars,' which, as he did not understand Arabic, undertook to complete the work. [Apollosinon' 'Peprepe] The Oxford MS. says, 'This he did with such success, through his being so great a master of the subject, that I remember the learned Dr. Sykes (our Hebrew professor at Cambridge, and the greatest naturalist of his time when I was at that university) told me that Mr. Halley, talking with him upon the subject, showed him two or three passages which wanted emendation, telling him what the author said, and what he should have said, and which Dr. Sykes found he might with great ease be made to say, by small corrections he was willing to make.' Mr. Sykes, in a courtier's tone, not in a scientific manner, says, 'This Dr. Sykes expressed himself, Mr. Halley made emendations to the text of an author he could not so much as read the language of.' It is not necessary (after the article has been cited) to quote the second edition of the whole of Apollonius, published in 1710.

The Miscellaneous Curiosa, a collection of pieces, mostly from the Philosophical Transactions, many of them by himself, was superintended by him, and published in 1698.

1 Halley resided at Oxford for some years after his appointment to the Savilian chair, nor do we know when he again became a permanent resident in London: it was however not later than 1701 that he was admitted a fellow of the Royal Society. He had been assistant-secretary before, as far back as 1685, and the Transactions from 1686 to 1692 were superintended by him. From
the manner in which his name is mixed up with the affair of Flamsteed, he must have resided in town for some years previous to 1713. [Flamsteed.] In the article cited we have called Flamsteed's work the Principia of practical astronomy, and it were to be wished the connexion of Halley with the printing of this one had been as creditable as that which links his name with the Principia of Newton. It is to no purpose to insist on the correctness of saying that originating any of the unworthy proceedings to which we allude; and we must protest against his being made a scapegoat for Newton, in position even Flamsteed sailed inclining to place him, in a manner, in the same category with the contemporary. Neither the position nor the character of Halley renders it likely that he would have made a tool of Newton to any direct mode of aggression. The committee appointed by Prince George on the 13th of April, 1716, to carry the blame of all the formal proceedings; and in that committee the name of Halley is not found, though it is on the list of those who published the Commercium Epistolorum, a position which we cannot deny him the merit of deserving.

At the beginning of 1720, after the death of Flamsteed, Halley was appointed astronomer-royal. In the years before he had been employed in completing his lunar and planetary tables, which should be ready to be published. But upon his appointment to Greenwich he revived his old idea of observing the moon through a revolution of her noddos. It was doubtful that at the age of sixty-four he should make the attempt, or the prediction of the French astronomers that he would live nearly nineteen years of health; but he did undertake it, and did live to finish it. The result is the comparison of nearly 2000 observed lunar places with his previously formed tables. This he did in a year. He died January 14, 1742, in the 86th year of his age.

The remarks on the personal character of Halley which appear in the eulogy of Maiman were furnished (it is asserted) by his friends. That this is the case must be allowable so far as they speak of his prodigious information and activity. His disinterestedness in money matters is supposed to be attested by his request to Queen Caroline not to increase the salary of the astronomer-royal on his appointment to that office; that it should be allowed to him as a traitor to incompetent persons; but, though allowing that Halley was not greedy of gain, we see but little to commend in this act of a man of independent fortune. The social qualifications of Halley were such as enquired after by his friends; and he could, when no partiality stood in the way, be fair and just to others. Thus Maiman remarks on his not having treated either Des Cartes or Vieta with the respect which he was capable of returning them. The English writers. It were to be wished that he had been as free from personal as from national prepossessions, and that Leibnitz and Flamsteed had received their due from the hands of those of different opinions. Concerning the latter (Flamsteed) he inserted a preface containing culpable misrepresentations, an account of which is to be found in Mr. Baily's work. We shall also cite the following suppression, which is parallel to that of Newton mentioned in the article Fluxions since any precaution which can be afforded of the frequency of the practice may be some palliation for the particular cases. In all the editions of the Synopsis Comets published during Halley's life a numerical deduction from observations is given, to which the following is appended: 'At the moment of the first example the comet was observed at London to be close to the second star of Arietis, of which it was nine minutes north, and three minutes west; and it was supposed that the planet was projected in the augmented edition left by Halley to be published with that, the comet, at the same hour as in the preceding, is nine or ten minutes north of the star of Arietis, and nearly in the same place. The same comet was observed at the same moment, we find it struck out in favour of one by Auzout in the same hour. But though the scientific fame of a philosopher be no excuse for that supposition, it is clear that his personal friends are, plain shall less the latter be allowed to colour our views of the former. Among the Englishmen of his day Halley stands second only to Newton, and probably for many years after the publication of the Principia he was the only one who both could and would rightly appreciate the character and coming utility of that memorable work. His own attention was too much divided to a portion of his being the mathematician which he might have been; but nevertheless his papers on pure mathematics show a genius of the same order of power, though of much less fertility, than that of John Bernoulli. We shall not close this article without alluding to the most remarkable printed writings, and of the most remarkable points in them.

The separate works of Halley consist of the 'Catalogus Stellarum Australium,' &c., London, 1679, translated into French by M. Pontecoulant; 'Des Cometes,' &c., London, 1715; the 'Synopsis Cometarum', published in 1749, though printed for the most part in 1717-19. The superintendence of this work is attributed to Bradley, though it is evident that he did not write the preface. Besides the preceding there are from eighty to a hundred memoirs, including many of small importance, in the Philosophical Transactions.

In astronomy we owe to Halley, 1. The discovery and the detection of the amount of what is called the long inequality of Jupiter and Saturn, which he confidently expected would be said to be a correction of the law of gravitation, as was afterwards done. 2. The detection, by comparison of ancient and modern observations of eclipses, of the slow acceleration of the moon's mean motion. 3. The first construction of a correct method for the determination of the moon's parallax. 4. The explanation of the appearance of Venus in the day-time at particular seasons, arising out of the now well-known method of estimating the brilliancy of the planet. 5. The recommendation of the 'Observations of Venus for the determination of the sun's parallax.'

The following list of the most remarkable labours of Halley out of astronomy, arranged in the order of publication, will instil curiosity, and perhaps a desire for further information:—1. On the variation of the compass. 2. The law according to which the mercury falls in the barometer while the instrument ascends, being the first application of this instrument to the measurement of forces. 3. The construction of the wind-trades. 4. Construction of the equations of the third and fourth degree. 5. Estimation of the quantity of vapour raised from the sea. 6. Inquiry into the point at which Julius Caesar made his entry into Britain. 7. Tables of mortality. 8. Application of algebra to the problem of lenses. 9. Method of constructing logarithms, a celebrated paper, reprinted in the Philosophical Transactions, by M. Aron, Paris. 10. Other papers, partly on the history, partly on the science. Among the latter, the following are remarkable: Halley's paper, which was proved to be a constituent part of the solar system, and to revolve regularly round the sun, deriving its name from Halley, the astronomer who first discovered that it had made several revolutions within the man of correct astronomical observation, and predicted the year of its return. For the other periodic comets now known, see Comet of Briel, and Encke's Comet. See also the general article Comet.

We cannot here attempt to give an account of this body in detail proportioned to the interest which its recent appearance excited; but such detail is rendered unnecessary by the number of publications which then appeared. Extracts from the 'Almanach Royal,' 'Histoire de l'Academie,' 'Memoires des savants étrangers,' the notices of the Astronomical Society, and other astronomical periodicals, and also of communications to the daily papers, the editors of which, as might be supposed, were not uninterested in such topics as were made the subject of sound and superficial knowledge, we may refer the reader to the following articles: 'Some account of Halley's Astronomical Cometary Synopsis,' Oxford, 1835, by Professor Bishop, London; 'Des Cometes,' by M. Pontecoulant; 'De Cometae, &c., 2nd edition, 1834; 'Notices sur la Comete de Halley,' by M. Pontecoulant, Paris, 1835; and for the general history, to an article in the 'Companion to the Almanac' for 1835; and for the details of his methods, to the address of the Astronomer-royal to the Astronomical Society, on delivering their medal to M. Rosenberger, in their 'Monthly Notices,' vol. iv., p. 60.

The 'Astronomical Cometica Synopsis,' &c. Halley was
published in the Philosophical Transactions for 1705, and
again at the University press in Oxford, and also in an
English translation published in London in 1706, which
was reprinted in 1708, in the Miscellaneous Curiosities. It was
again reprinted in the second edition of Gregory's Aastro-
mony, in an English edition of the same work, 1715, in
Lemomnier's Theory of Comets, and was finally left
in the augmented form by Halley himself, and was
published with his tables in 1749. This work was a
consequence of the Principia of Newton, in which the
method of applying Kepler's laws to the computation of the
motion of the planets, and the possibility of a periodic
comet, and even an implied assertion that such things
would be discovered, is to be found in book III, prop.
xlvi, first edition, 1687. "I leave their axes and times of
revolution to be determined from the comparison of
comets which return in the same orbits after long periods."
Halley, acting upon this hint, collected the observations of
all such comets as had been observed with any degree of
accuracy, up to the year 1700. These were 24 in number,
and had appeared in the following years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1682</td>
<td>1531, 1607, 1682</td>
</tr>
<tr>
<td>1725</td>
<td>1531, 1607, 1682</td>
</tr>
<tr>
<td>1728</td>
<td>1682</td>
</tr>
<tr>
<td>1699</td>
<td>1682</td>
</tr>
</tbody>
</table>

Comets appeared having

- Long. of asc. node: 40° 47' 30° 21' 5°16'
- Long. of perih.: 301° 39' 302° 16' 302° 52'
- Perih. distance, of earth being 1: 56700 58500 58398
- Distance from perih. to asc. node: 107 46 106 5 1623

The interval between the perihelion passages of the first
and second comet is of eleven months longer than that be-
 tween the second and third, which might have puzzled a
person not acquainted with the Principia. But the dis-
turbing action of the planets, which has since been so
successfully computed that the motion of this body is now
much better known than the war of the comets in the time
of Halley, immediately suggested itself. He announced
accordingly the return of the comet about the year 1758.
It may seem perhaps that we have leased the seat of
Halley to another, and that we are to the new observer
and making his part of the work seem to be mere calcula-
tion. But it must be remembered that at this time an
expert computer in the Nautical Almanac Office would
perform the same work in half a year, yet Halley had all
the difficulties of a less advanced state of pure mathemati-
cies. He had his method to organize, if not to invent; and
so rare were those who had a competent understanding of
the Principia, that after a little hesitation, we agreed per-
fently with the astronomer-royal in saying that Halley was
in all probability the only man in Europe who was compe-
tent to perform this labour.

The edition of the Synopsis Halley examined the ele-
ments of the comet's orbit further, and repeated his pre-
pidition still more confidently, desiring that all would re-
member that its author was an Englishman, "Quaeque si
serundum predicta nostrum speciem cura annum
1758, hoc primum ab homine Anglo inventum fuisse non
inficiatur aequo speciator.

Among the years preceding 1331, in which the same
comet probably did become visible, 395, 1360, and 1466 are
years of well-attested comets. But this is evidence for the
years A.C. 139, and A.D. 593, 930, 1005, 1230, and 1380, all
of which are described as years in which comets appeared in
the collection of Lur-
bennek, upon various authorities.

The high number of famous astronomers to compute orbits
of the coming comet, but none of these took into account the
perturbations caused by the planets. In 1757 Clairaut and
Lalande (see these names) undertook the
enormous labour of computing the effect of the perturba-
tions of the principal planets through a period of 150 years.

Assured by Milankovitch, a well-known ap-
themaker of that name, Lalande performed the drudgery
of the process, while Clairaut, the first who extended Newton's
application of his theory, applied the results. The con-
sequence was, that in December 1757, the comet had al-
ready appeared as stated, and the announcement was made
that it would arrive at its perihelion within a month, one way or
the other, of April 13, 1759. The announcement of Clairaut
was just in time, for on December 24, the farmer and
astronomer in the neighbourhood of Dresden, detected the comet.
It was afterwards repeatedly observed in various parts of Europe, but it is not on record
that any one saw it with the naked eye. The observation was at all favourable for that purpose. Various orbits were
computed, but no one seemed inclined to undertake the
task of applying the corrections for perturbation, so as to
predict the perihelion place for 1835. The comet slept in
peace therefore until the improvement of methods of com-
puting the perturbations, and the approach of a new ap-
pearance, induced first the Academy of Turin, and next
that of Paris, to offer prizes on the subject. The first was
won by M. Danoiseau, the second by M. de Portencou-
lant (1817 and 1833). And M. Rosenberger at various
Astron. Nachr., Nos. 196, 180, 250, 276, 298, computed
the elements of the orbit for 1868 and 1759, and the whole
of the perturbation from 1682 to 1869 has been duly appreciated, and has placed M. Rosen-
berger in a very honourable position among living astrono-
mers.

The following list of elements (extracted from the
Nautical Almanac for 1835) were given, the first by M. Pontcoul-
tant from his own computation of perturbations, the second
by M. Danoiseau, the third Mr. Lubbock, who applied
the perturbations of M. Pontcoulant to elements for the
year 1799, computed by himself. The fourth column con-
tains the elements approximately corrected, during the
reappearance of the comet, by the superintendent of the
Nautical Almanac, from 56 roughly reduced right ascen-
sions and declinations.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Year</th>
<th>Computation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1730</td>
<td>300° 59' 70° 0' 10° 58' 39° 18' 39° 18' 39° 18' 39° 18'</td>
<td></td>
</tr>
<tr>
<td>1749</td>
<td>300° 59' 70° 0' 10° 58' 39° 18' 39° 18' 39° 18' 39° 18'</td>
<td></td>
</tr>
</tbody>
</table>

The comet was first seen at Rome, on the fifth of August,
by M. Durand, first professor of the physical sciences at
the College. From this time it continued to be observed till
the end of the year in Europe, and through a great part of
the ensuing spring in the southern hemisphere. During a
part of the time in 1758 the comet was at its nearest to
the earth, and the number of observations was very
large. The number of good observations which were procured
greatly exceeded, as might be supposed, those made on any
previous occasion. And in full proportion to the increase
of observers and instruments has been the means afforded
to the astronomical public of turning their observations to
useful account. We allude to the Appendix to the Nau-
tical Almanac for 1835, in which will be found the result
of all the most complete preparations for the treatment of
observations which has ever been furnished for any
heavenly body. Taking the elements above given as a
basis, it contains the perturbations of the comet by all the
planets from the beginning of August, 1835, to the end of
March, 1836, the deduction of the variations of the elements
during every four days, the computation of an ephemeris
for the whole period, and finally the equations of condition
by the help of which an observer may deduce the corrections
of the elements of the orbit from his own observations, if he
can judge. These last are given as often as eight times a-
day, for the period of the comet's most rapid motion. Every
thing therefore which could be done previous to the obser-
vation being made is off; we are now in the midst of the
task. Stratford and his assistants for this voluntary addition to
their already arduous labours has been awarded by judges
more competent than ourselves.

The high number of famous astronomers to compute orbits
of the coming comet is not yet completed, nor can it be until the reduction and
comparison of all the observations are made to produce a new
* From mean Ephemeris of November 16, 1833,
HAL RHOA, the name proposed by Lamouroux for a group of Exogenous plants, many of which inhabit watery places, and all of which have minute inconspicuous flowers. In consequence of the calyx being superior, the embryo without much albumen, and some of them having four petals, they are often considered to form a peculiar section of Onagraceae, or if separated from that order, are at least stations in the immediate vicinity of it. Upon this supposition, they are looked upon as an imperfect condition of the Onagraceous type, bearing the same relation to it as Sanguisorbae to Rosaceae, Chamelaucineae to Myrtaceae, or Minnescae to other Fabaceae. But in the present uncertainty regarding the true affinity of many natural orders of plants, we must not consider this a settled point. On the contrary, it is improbable that Haloragis constitute an imperfect form of the great Epigynous group of Exogens, of which Onagraceae are only one of the members. What renders it peculiarly difficult to determine the real affinity of this little group is, that as it is now constituted, it offers striking modifications of development both in the organs of vegetation and those of fructification. While Haloragis has a stem with a complete vascular organization, and regularly constructed leaves, Myriophyllum has its vascular system reduced to a rudimentary condition, and in some of the species the leaves themselves appear only in the form of filiform ramifications; and in Hippuris, the development of the vascular system of both stem and leaves is still further reduced. In like manner in the flowers, Haloragis has four petals, eight stamens, four stigmas, and four cells to the ovary; Prosperpina has no petals, three stamens, three stigmas, and three cells to the ovary; and Hippuris has no petals, one stamen, one stigma, and but one cell to the ovary. This latter genus is a common plant in the marshes and meadows of this country, where it is much valued as a forage plant.

HALS, FRANCIS, an eminent portrait-painter, born at Mechlin, 1584, died in 1666. No artist of that time was superior to him except Vandyck, and very few could be compared with him, as one of the chief emeriti of a portrait, that of strong resemblance, his pictures were executed with remarkable freedom and boldness: his colouring was extremely good, and the effect very striking.

HALS, GEORGES. [HALLS, GEORGE.]

HALMENITES. Under this generic name Sternberg (Flora der Vorzeit) and Bronn (Leitamina Geognostica) include several species of fossil foral plants, found in the slate and slates of Stonesfield and Solenhofen.

HALYS. [KIZIL ERAY.] We have referred to this head, because some further information on this river may be soon expected.

HALYSITE, the name given by Fischer to a genus of fossil corals, synonymous with Cataporia of Goldfuss. As having priority, it is adopted by Bronn in his 'Leitamina Geognostica.'

HAM, EAST and WEST. [ESSEX.]

HAMADAN. [BCHATANA.]

HAMAMELIDÆ, or HAMAMELIDES, a very small group of woody Exogenous plants, characterized by having a superabundant indefinite number of stamens, half of which are usually sterile, a two-celled ovary, and an embryo in the midst of horned albumen. There are only three genera in the gardens of this country, Hamamelis, Trichocladus, and Ophioglossa. It is at present uncertain what order Hamamelis should be placed most nearly allied, and until such further discoveries shall have been made, the question is not likely to be settled. Some of the species are large forest trees, affording good timber, but nothing is known of any other useful property in the order.

HAMBURG, the largest city in Germany after Vienna and Berlin, and by far the most important emporium of commerce, is situated in 53° 33' N. lat., 9° 56' 35' E. long. The origin of this city is attributed to Charlemagne. The founder chose for its site the most elevated spot on the north bank of the Elbe and the east bank of the Aler, about 75 miles from the German Ocean. Though at first merely a fort of fishermen, its advantageous position could not fail to make it in time a place of trade. It was several times destroyed by the neighbouring barbarians, yet it always recovered, and had attained considerable commercial importance at the beginning of the twelfth century. In the thirteenth century it had a considerable fortification of the Hanseatic League. [HANS TOWNS.] Till 1300 it was confined to the space between the Elbe and the east bank of the Aler; but the west bank was gradually built upon, especially by refugees from the Netherlands, who fled from the tyranny of the Duke of Alba. Hence arose the new town, which increased so rapidly that it was thought advisable to extend the walls so as to enclose it within the city. The actual fortifications of the city were not further enlarged after this time, though some outworks were made and a fortified line was formed enclosing the suburb of St. George. Its rights as an estate of the empire were erected by the Bishops, and though it was recognised as such in 1618, it did not obtain a seat or vote in the Diet. The kings of Denmark claiming the sovereignty as counts of Holstein, Hamburg was obliged at different times to become a thorn in their side, pay tribute, or make a present of large sums, till a convention with the bishops of Holstein in 1768 removed all difficulties; and in 1770 it was confirmed by the emperor in its rights as a free city of the empire. The possession of the cathedral had been always claimed by the archbishops of Bremen, but it was assigned by the treaty of Westphalia in 1648 to Sweden, and afterwards passed to Hanover with the duchy of Bremen. The general effect of the repeated wars in Germany to the close of the eighteenth century was favourable to Hamburg, by causing a great addition to its population and its wealth, and extending its commerce. In

Digitized by Google
1892 the cathedral and all the property hitherto belonging to Hanover in the city and territory were finally assigned to Hamburg, and its independence still further secured. Thus Hamburg at the commencement of the nineteenth century was one of the most flourishing, happy, and opulent cities of Europe. Its misfortunes commenced after the occupation of Hanover, in 1803, by the French, who seized Ritezbüttel, at the mouth of the Elbe, to prevent English ships from entering the river. Upon this the English government, whose relations with the French were at that time of the closest importance, resolved to despatch a force to the Elbe. The peace of Lübeck in 1806 Marshal Moritz with his corps occupied Hamburg, and made the city pay sixteen millions of francs as a ransom for the English goods in the warehouses. Though the French troops were withdrawn after the treaty of Tilsit, and the city had for a short time a shadow of independence, it was still subject to numerous exactions from the French generals. The decrees of Berlin and Madrid ruined the little remaining trade of Hamburg, and the English goods which had been forced to ransom were now confiscated and consigned to the flames. At the end of 1810 it was incorporated with the French empire as the capital of the department of the Elbe. In 1813 the French citizens surrendered with capture the entrance of a Russian corps, at the approach of which the French had evacuated the city. The old constitution was restored; a burgess guard of 7000 men was formed, and two thousand of the inhabitants voluntarily joined the Russian army to repair the fortifications, which had been partly razed. But the French soon returned and attacked the city on the Elbe side. The Russians, being too weak, withdrew, and Marshal Blucher and General Vaillanqy entered Hamburg, which they treated with a degree of wanton severity that excited in the highest degree the sympathy and indignation of Europe. They imposed a contribution of two million francs, being afterwards reduced to 40,000 inhabitants in the depth of winter, and even seized the treasure deposited in the bank, amounting to about 700,000l. sterling. An unhappy combination of circumstances enabled them to force the possession of it till March 1814. On the 26th of that month the old constitution was restored, and on the 8th of June, 1815, Hamburg joined the German Confederation as a free Hanseatic city. For all its severe sufferings, including the robbery of the bank, a very considerable indemnity was granted to the citizens by the proclaimed desire of the French government to secure the peace. But the public spirit of the inhabitants, its internal resources, and its favourable situation, have gradually restored its former prosperity.

The population of Hamburg, including the area of the city (which is nearly an oval four English miles in circumference), is about 150 square miles, bounded on the south by the Elbe, and on the other sides by the Danish territory. In its banks and canals are some thousands of acres of land on the Hanoverian side of the river, and the bailiwick of Ritzbüttel at the mouth of the Elbe, in which is the harbour of Cuxhaven. Conjointly with Lübeck it has the bailiwick of Bergedorff, and the districts called the Vierländen, 16 miles from Hamburg, with 10,000 inhabitants. The population of Hamburg and its suburbs is 100,000; and that of the territory, including Bergedorff, between 250,000 and 300,000. The greatest majority are Lutherans. The Roman Catholics may be from 5000 to 6000, the Calvinites 1500 to 2000, and the English may fluctuate between 1000 and 1500; the number of Jews is stated to be about 762, which we believe is more than double the real number. In 1824 it appeared from the bills of mortality that they could not exceed 4000.

The constitution is a mixture of aristocracy and democracy; the city is represented by a senate, consisting of four burgomasters and twenty-four senators, with four syndics and four secretaries, has the executive power, and the sole right of proposing laws; but no laws can be made and no taxes imposed without the consent of the citizens in common hall. The citizens are divided into five parishes, each of which chooses 36 members to the council of 180, consisting—1, of 15 elders, who are the guardians of the laws, and have the advantage of residence and the poorness decons, 9 from each parish, who with the elders form the council of 60; and 3, of 24 subdecons from each parish; all these are obliged to appear in the common hall, where at least 200 citizens must be present. From this council is chosen the board of 60, and out of that the 15 elders or eldersmen. Only the senators and the elders receive salaries. For the administration of justice there are various tribunals. In the last resort the decision is with the High Court of Appeal for all the free cities, sitting at Lübeck. In the German Diet Hamburg has one vote in the deliberations, but in the electoral college of the great princes it has no voice. It is represented in the German Diet by Berlin, Bremen, and Frankfurt. Its contingent to the army of the Confederation is 1298 men, and its contribution to the general fund 500 florins per annum. It has also an admirably organized burgler guard of 9000 infantry, cavalry, and artillery.

The interior of the city by no means corresponds with its commercial importance and its wealth. As in most of the old fortified towns of Germany, the streets are in general narrow, irregular and dark; the houses old-fashioned and awkward, and yet not interesting to the lovers of antiquity. In modern times handsome houses have certainly been erected in some streets, but they are exceptions. Some streets in the Neustadt are indeed broader and more regular, but that is all. Nor can Hamburg boast of its public buildings, either ecclesiastical or civil. The number of churches has been reduced of late years: the antiquity and the architecture of the principal cathedrals are taken to Hamburg, and since the peace four smaller churches have been demolished. There are now five principal and six smaller churches or chapels: the former being shamefully profaned by the French, who used them as stables for their horses, the latter being restored by the Russian chief, have been much beautified since 1814. The most worthy of notice is the great church of St. Michael, which was saved from French desecration. It was begun in 1724, and completed in 1746, except the spire, which was not erected till 1778. This church, built by Sonnin, is the pride of Hamburg; it is capable of accommodating 2000 persons; the height of the spire is said to be 450 feet. These churches are not, however, the only places of worship, except the chapels of the ambassadors of that religion; but the French seized for their use the small church of St. Michael, which has since been granted them by the order of the public edicts, the most distinguished for their style of architecture are the new parliament and the new observatory, and the new theatre, built after a design of the celebrated Schinkel of Berlin. But if the public edicts bare so little to recommend them. Hamburg may still be considered one of the most liberal cities in Germany. Its institutions, the bare enumeration of which would exceed our limits, and of which it may be affirmed that they are on the most liberal plan, and managed in the most exemplary manner. The city is divided into two districts, of which only two are occupied. It is reported by the state—the Johanneum, designed to qualify young men for the university, and the gymnium. Hamburg has been the birthplace of many learned men and the home of many of the most wealthy merchants in the Danish territory, its private collections of paintings, the general taste for music, the fondness for the study of foreign languages, prove that the whole attention of the inhabitants is not absorbed by thirst of gain. The principal public library, called the City Library, contains nearly 300,000 volumes, besides 2000 volumes of MSS.

The arm of the Elbe, next the town, is narrow, but the two harbours are capable of receiving a considerable number of vessels. The old town has canals to resemble a Dutch city; the canals are filled chiefly by the Elbe, but partly by the Alster, and almost all the ships pass through it on their way to and from the port. The Alster forms on the north side of the town a fine bay, and gives pleasure. On the south side of this basin is the finest line of houses in the city, with a spacious walk planted with trees, and called the Jungfernestieg or Ladies' Walk. Since the peace they have become the favourite promenade along the west side of the basin, so as to join the ramparts, the whole of which are beautifully laid as a public garden and promenade (the carriage-way is broad enough for three horses abreast). The rivers are the chief places of enjoyment of the inhabitants. North of this Inner Alster is the Outer Alster, a very large basin, on the banks of which are numerous fine country-seats, which however are not equal to those of many of the Hanoverian merchants. There are also numerous wealthy merchants in the German territory, at Blankenesee, on the banks of the Elbe, six miles west of Hamburg.
To give an account of the vast commerce of Hamburg would fill a volume. Every thing that can be bought and sold, however cost or valueless, is the object of trade, which is as free as can be desired. The import duties are extremely low, and no transit duties are levied. This city is consequently the great receptacle for English goods imported from the countries beyond the Pyrenees, and in addition to this, it is the place of transit for goods which are sold in the principal towns of the continent, from which it is very easy to distribute them to other parts of the kingdom. The river Elba furnishes a cheaper and more rapid method of conveyance than shipping, and the city is connected by sea with all parts of the world. Hamburg is, in every respect, a great seaport, and has many advantages for both commerce and navigation.

HAMEL, JEAN BAPTISTE DU, was born in 1624, and appointed in 1665 to the office of Master of the Alhambra. He was attached to the court of France, and in 1687 was appointed to the office of Master of the Alhambra.

HAMILCAB, BARCAS, the leader of the popular party at Carthage, was appointed in the eighteenth year of the first Punic war (B.C. 247) to the command of the Carthaginian fleets. He was present at the battle of the Alcione, and his early life and the time of his birth are unknown. He was appointed to the command of the Carthaginian fleet in the year 238 B.C., and was appointed to the same command in 234 B.C. He died in 229 B.C.

HAMILTON, GAVIN, descended from a noble family of Scotland, spent the greater part of his life at Rome. His labours were not without considerable success. He was appointed to the office of Master of the Alhambra, and translated the account of the capture of Carthage into English. He was also appointed to the office of Master of the Alhambra.

HAMILTON, WILLIAM, of Scotch descent, but probably born in London, studied at a very early age under the tuition of his father, and at the age of twenty, he obtained his doctor's degree in law.

HAMILTON, SIR WILLIAM, a well-known diplomatist and lover of art, was born in Scotland in 1730. He began life, he says, 'with an antient name and 1000£,' but removed the disadvantages between his name and his fortune by marrying in 1755 a lady of very large property, as well as amiable and agreeable character. He was engaged in all the public works, such as the Shakespear Gallery, Maclin's Biblio, &c. He excelled in ornament, to which he gave propriety, and elegance, a classic appearance. He died in 1801, at the age of fifty.

HAMILTON, SIR WILLIAM, a well-known diplomatist and lover of art, was born in Scotland in 1730. He began life, he says, 'with an antient name and 1000£,' but removed the disadvantages between his name and his fortune by marrying in 1755 a lady of very large property, as well as amiable and agreeable character. He was engaged in all the public works, such as the Shakespear Gallery, Maclin's Biblio, &c. He excelled in ornament, to which he gave propriety, and elegance, a classic appearance. He died in 1801, at the age of fifty.

HAMILTON, SIR WILLIAM, a well-known diplomatist and lover of art, was born in Scotland in 1730. He began life, he says, 'with an antient name and 1000£,' but removed the disadvantages between his name and his fortune by marrying in 1755 a lady of very large property, as well as amiable and agreeable character. He was engaged in all the public works, such as the Shakespear Gallery, Maclin's Biblio, &c. He excelled in ornament, to which he gave propriety, and elegance, a classic appearance. He died in 1801, at the age of fifty.

HAMILTON, SIR WILLIAM, a well-known diplomatist and lover of art, was born in Scotland in 1730. He began life, he says, 'with an antient name and 1000£,' but removed the disadvantages between his name and his fortune by marrying in 1755 a lady of very large property, as well as amiable and agreeable character. He was engaged in all the public works, such as the Shakespear Gallery, Maclin's Biblio, &c. He excelled in ornament, to which he gave propriety, and elegance, a classic appearance. He died in 1801, at the age of fifty.

HAMILTON, SIR WILLIAM, a well-known diplomatist and lover of art, was born in Scotland in 1730. He began life, he says, 'with an antient name and 1000£,' but removed the disadvantages between his name and his fortune by marrying in 1755 a lady of very large property, as well as amiable and agreeable character. He was engaged in all the public works, such as the Shakespear Gallery, Maclin's Biblio, &c. He excelled in ornament, to which he gave propriety, and elegance, a classic appearance. He died in 1801, at the age of fifty.

HAMILTON, SIR WILLIAM, a well-known diplomatist and lover of art, was born in Scotland in 1730. He began life, he says, 'with an antient name and 1000£,' but removed the disadvantages between his name and his fortune by marrying in 1755 a lady of very large property, as well as amiable and agreeable character. He was engaged in all the public works, such as the Shakespear Gallery, Maclin's Biblio, &c. He excelled in ornament, to which he gave propriety, and elegance, a classic appearance. He died in 1801, at the age of fifty.

HAMILTON, SIR WILLIAM, a well-known diplomatist and lover of art, was born in Scotland in 1730. He began life, he says, 'with an antient name and 1000£,' but removed the disadvantages between his name and his fortune by marrying in 1755 a lady of very large property, as well as amiable and agreeable character. He was engaged in all the public works, such as the Shakespear Gallery, Maclin's Biblio, &c. He excelled in ornament, to which he gave propriety, and elegance, a classic appearance. He died in 1801, at the age of fifty.

HAMILTON, SIR WILLIAM, a well-known diplomatist and lover of art, was born in Scotland in 1730. He began life, he says, 'with an antient name and 1000£,' but removed the disadvantages between his name and his fortune by marrying in 1755 a lady of very large property, as well as amiable and agreeable character. He was engaged in all the public works, such as the Shakespear Gallery, Maclin's Biblio, &c. He excelled in ornament, to which he gave propriety, and elegance, a classic appearance. He died in 1801, at the age of fifty.
the British Museum came from the collection of Sir W. Hamilton. (See Library of Entertaining Knowledge, Townley Gallery, vol. ii., index.)

Mr. Hamilton took a lively interest in all subjects connected with art or with antiquity, especially in the progress of the excavations at Herculaneum and Pompeii, and the formation of the museum of Portici. He was earnest in recommending to the Neapolitan government the great work of copying Herculaneum manuscripts, but produced little effect on that most supine court. He himself bestowed a part of his income upon this object. Ten papers of his composition, upon matters observed during his abode in Italy, were published in the *Phil. Trans.* of the years 1767 to 1795 inclusive. His other works are, *Observations on Mount Vesuvius, Mount Etna,* &c., Lond. 1772; and *Letters on Monte Vulture,* Naples, 1790. (Chalmers' *Biog. Dict.*; Watt, *Biog.*)

HAMILTON, ELIZABETH, born at Belfast in Ireland, but probably of Scottish parentage, is deservedly remembered as an early advocate of an enlarged and intellectual system of female education, and as one of the leaders of that useful class of novelists who have placed the interest of their fictions, not in rare adventure and glowing description, but in the accurate portraiture of the daily workings of domestic life. We find the little tills of her personal history. It appears that she filled the office of governess to the daughters of a Scottish nobleman, for the eldest of whom her *Letters on the Formation of the Religious and Moral Principles* were written. She was born July 23, 1786, retired and beloved. Her warm and sincere piety was uninterrupted by severity, and her natural cheerfulness and lively talents rendered her delightful in society, and, in old age, a universal favourite with the young. Of her other works:—*Letters of a Hindoo Raja,* 1796; *Modern Philosophers,* 1800, a clever, popular, and effective satire, intended to throw discredit on the sceptical and republican doctrines taught by some distinguished divines of the Revolution; *Letters on the Eucharistic and Moral Principles of Education,* 1801-2; *Life of Agrippina,* 1804, an attempt to make history interesting, by expanding it into something bearing the resemblance of a novel; *Letters on the Formation of Religious and Moral Principles,* 1806; *Cottagers of Glenburnie,* 1808; *Exercises in Religious Knowledge,* 1809; *Popular Essays,* 1813. Of these the *Letters on Education* is the most striking and important. She has here applied the principles of metaphysics to the subject of education, and shown (we quote words ascribed to a female writer of still higher note) how the doctrine of the association of ideas may be applied in the formation of natural habits, of temper, and to the principles of taste and morals; she has considered how all that metaphysicians know of secretion, abstraction, &c., can be applied to the cultivation of the judgment and the imaginations of children. No matter how little is actually known of the processes of these subjects, or how much may be made to awaken the attention of parents, and of mothers especially, to future inquiry; she has done much by directing their inquiries rightly; much by exciting them to reflect upon their own minds, and to observe what passes in the minds of their children. As a novelist, she will be best recollected by the Cottagers of Glenburnie,* a lively and humorous picture of the soberly habit, the industrious temper, the benevolent content, which prevail among some of the lower class of people in Scotland.* This piece, though only the picture of humble life in a remote and obscure district, can never lose its interest, for the characters are true to nature, essentially so, and absurd as true; and the humor and the admirable moral lessons, are of all time, and independent of the national peculiarities under which they are conveyed. (Notices ascribed to Miss Edgeworth, in the *Monthly Mag.* for September.

HAMITICS, a genus of Cephalopodous Molluscs proposed by Mr. James Sowerby. (Min. Conchology of Great Brit.) It includes only fossil species, and is yet incompletely described. Among its species, Mr. Sowerby, only those chambered shells belong to hamites which have the form of a hook or spiny bent in one plane with parallel but unequal limbs, and sinuous septa. But the species which these chambered shells bear are always imperfect; and when Professor Phillips found in Yorkshire many fossils, in other respects perfectly resembling hamites described by Mr. Sowerby, rolled in a plane spiral, the volutions in some species touching, in others free, and in a few terminating in a straight elongation (like spirula), he extended the use of the term. Dr. Buckland has adopted this view in his *Bridgewater Treatises.*

In the "Transactions of the Geographical Society of France," June 11, 1837, M. Levellel gives descriptions and figures of species of fossil Cephalopoda, which might be considered as the spiral part of hamites (Phillips), and names them *Cephalopoda,* of his genus. Mr. Sowerby has recently been led to very similar results, and has proposed to call the same group *Tropenum.* Now as certain forms of ammonites in the liny and oolitic rocks (A. fimbriatus) have no very obvious differences from Tropenum, Cephalopoda, Seaphites (e.g. Seaphites Yornnii in the British Museum), it is evident that the whole question of the true relations of these remarkable fossil genera to ammonites remains to be further examined. We can therefore reserve till the article *Tropenum* a general view of these relations.

Hamites of the typical forms occur at Folkstone, Hamsey, and other situations in the gault, greensand, and other cretaceous beds. Cretaceous and Tropenum belong chiefly to the same groups of rocks in England, France, Switzerland, &c. [TROPEUM.]

HAMMERFEST. [Norway.]

HAMMERSMITH. [See HAMLET.]

HAMPDEN, HENRY, a learned and excellent divine of the church of England, was born at Chertsey, August 16, 1605. Having been educated at Eton, and Magdalen College, Oxford, he was presented to the rectory of Penshurst in Kent, in 1633, ten years after which he was appointed archdeacon of Chichester. By birth and education a confirmed royalist, he retired to Oxford soon after the civil war broke out, continued to bear the name of the king, and attended the king's commissioners to Uxbridge, where he disputed with Venet, a Presbyterian minister. He was appointed canon of Christchurch and public orator in 1643, and attended the king; but when he perceived that he fell into the hands of the army until the end of 1647, when the king's attendants were parted from him. Hampden then returned to Oxford, and was chosen sub-dean of Christchurch, of which situation he was expected to take March, 1648, by the parliamentary visitors, and placed for some time in confinement. On his release he repaired to Westwood in Worcestershire, the seat of Sir John Packwood, where the remainder of his life was spent in literary labour, doing much good to the day of his death, in which time he had the disposal of great charities reposed in his hands, as being the most zealous promoter of almsgiving and charitable institutions that ever lived in England since the change of religion. Great was his application to moral abilities, and he lived in the whole circle of the arts he most accurate. He was also eloquent in the tongues, exact in antient and modern writers, well versed in philosophy, and better in the philosophy of the ancients than in that of the moderns. His talent as a master in church antiquity. He died after long suffering from a complication of disorders, April 25, 1660. It is said that Charles II. intended for him the bishopric of Worcester. Of his numerous works, chiefly controversial, the following are some of the most remarkable: *Practical Catechism,* 1644; *Humble Address to the Right Hon. the Lord Fairfax and his Council of War,* 1649, concerning the impending trial of Charles I.; *Paraphrase and Annotations on the New Testament,* 1653, best edition 1702. He began a similar paraphrase of the Old Testament; but advanced no farther than the Psalms, 1659, and one chapter of Proverbs; the whole was completed by his amanuensis Fulman, 4 vols. folio, 1674-84. (Life, by Bishop John: Wool, *Athen. Oxon.*)

HAMMOND, JAMES, was the second son of Anthony Hammond, of Somersham, in the county of Huntingdon.

He was born in 1710, and educated at Westminster; he sat in parliament for Truro, on the interest of the Prince of Wales, whose erry he was. He died in 1742. His views are mostly eloquent, and addressed in the rapid style of political oration. They are in the most licentious object, whom he names Della. He is said to have been in love with a Miss Dashwood, who refused him—if she read his poems it is said to have said how he could do otherwise—and to have lost his intellects in consequence of her cruelty.

An attempt has been made to defend his poetry, but we think there will be few in this age to differ from Dr. John-
son in his somewhat oracular opinion that 'these elegies
ever bear neither passion, nature, nor manners.' (Johnson's

HAMOZ*RE* [From Angleterre.]

HAMPDEN, JOHN, the eldest son of William Hamp-
den, of Buckinghamshire, and his wife Eliza-
both, second daughter of Sir Henry Cromwell, of Hinchin-
brooke, Northamptonshire, was born in London in 1615, and
succeeded in his infancy to the estates of his antient and respectable family. He
was educated first at a grammar-school at Thame, after-
schools at Magdalen College, Oxford, and in 1633 was ad-
mitted a student in the Inner Temple, where he made con-
siderable progress in the common law. In 1619 he married at
Byton, in Oxfordshire, Elizabeth, only daughter of Ed-


...
about 3 broad, contains the antient borough of Portsmouth and the town of Portsea, with their extensive suburbs. The principal naval dockyard in England, or indeed in the world, is at Portsea. The two towns have a population of 50,352. [Portsmouth.] There are sail-works on both

From the entrance of Portsmouth harbour the coast runs north-west to the entrance of the inlet or estuary called Southampton Water. In the distance of 4 miles the channel of Southampton Water penetrates about 7 miles inland to the town of Southampton, at the junction of the Test and the Itchen; its breadth, when the tide is up, is from 18 to 32 feet; at low water, about half a mile. From the entrance of the New Forest, the coast runs south-west until opposite to the western extremity of the Isle of Wight. Along this low coast are extensive salt-works, and at its extremity, upon the point of a long sandy neck, stands Hurst Castle. From Hurst Castle the coast runs west, forming the shallow bay of Christchurch, terminated at its western point by Hengistbury Head, from which the coast still runs west to the border of Dorsetshire. From the neighbourhood of Hurst Castle the coast is generally high and abrupt.

The surface of this county is rather irregular. The South Downs enter the county from Sussex on the south-east, near Petersfield, and in a north-westerly direction, entering Hampshire: Butser hill, between Petersfield and Horndean, on the Portsmouth road, one of the highest points in this range, is 917 feet high. The North Downs enter the county from Surrey near Farnham, and extend across the county, by Odiham, Basingstoke, and Kingsclere, into Wiltshire. Highclere Beacon, one of the points of this range, in the north-western part of the county, near the border of Wiltshire and Berks, is 900 feet high. The Alton hills form a continuation of the range, of the seat of the county between the county of Hampshire and the county of Berkshire, and extend towards the county of North Downs, and run from Petersfield northwards past Alton. Portdown is an isolated eminence extending east and west just above Portsmouth and Langstone harbours; it is 293 feet high; its length 7 miles, and its breadth one. All these hills are in the chalk formation.

A large part of Hampshire is within the basin of the Southampton Water; a small portion on the north and northern sides of the county is in the basin of the Test, a small portion on the south-east side is in the basin of the Arun, and a small portion of the west side is in the Wiltshire and Dorsetshire basin.

The principal streams which drain the Southampton basin are the Test or Test, the Itchen, and the Hamble. One branch of the Test rises near Hurstbourne Tarrant (between Newbury, Berks, and Andover), and another near Wooton (between Newbury and Andover); their united streams are called the New Path by the Cockbridge people. The Itchen rises in the hills around Alresford and flows past Winchester to Southampton. The Hamble rises near Bishop's Waltham, and joins the Southampton river some miles below Southampton. A small branch of the Test flows through the village of Titchfield into the sea, near the mouth of the Arun, and a small portion of the west side is in the Wiltshire and Dorsetshire basin.

The Ichin navigation does not coincide with the natural bed of the river.

The New Forest occupies nearly all that part of the county which has been represented as projecting at the south-west corner. It is drained by two small streams, the Exe and the Bolder, which besides some smaller streams. The Exe and the Bolder flow south-east into the sea, the first at Exbury, the second at Lymington; the length of the Ex is about 13 miles, that of the Bolder 15 miles.

The basin of the Thames is separated from the rest of the county by the North Downs, and drained by the Way, the source of which is in Hampshire and by the Auborne and the Loddon, which have their course along the borders of the New Forest. The main stream is joined by the rest of the county by the Alton and Petersfield hills and the South Downs. It is drained by the Rother, which rises in the county and flows past Midhurst into the Arun.

The county of Dorsetshire extends a narrow strip of the county to the west of the New Forest. It is drained by the Avon, which, entering the county just be-

low Downton, Wilts, about six miles from Salisbury, runs south past Fordingbridge, Ringwood, and Christchurch, into the sea. That part of the river which is in the county is about 20 to 22 miles long. A small portion of the Dorsetshire, and of the Great Leonard's Water, a tributary of the Stour, are in the county or upon its boundary; the Stour joins the Avon below Christchurch; its estuary forms Christchurch haven.

The county of Dorsetshire possesses two principal canals. The Andover Canal commences at Andover, and is carried along the valley of a small feeder of the Antor or Test, till the junction of this feeder with the main stream. The canal then crosses the Antor and follows the valley of that river on the eastern side of the New Forest. It runs south about 20 miles to Southampton, where it enters the Antor. Its whole length is 224 miles; its total fall is above 176 feet. It has a branch to Salisbury. It is chiefly used for the import of coal and other fuel, and of general goods from the sea, and for the export of agricultural produce. The Basingstoke Canal commences at Basingstoke, and is carried in a very winding course 22 miles east on one level to the London and South Western Railway, which it crosses into the county of Surrey, its course and course through which to the navigable part of the river Wey (near its junction with the Thames) is 12 miles, with a considerable fall. That part of the canal which is in Hampshire has a fall of 38 feet in 3 miles. Above Basingstoke the canal is carried by a tunnel above a mile long through a chalk hill; from this chalk, which yields a great quantity of water, the canal is conveyed to the main supply of the river Wey, which is the chief supply of the canal is in Surrey. Not far from the border of the county this canal is carried by an aqueduct across a valley three quarters of a mile broad. This canal serves for the conveyance of coal, deals, groceries, bales goods, &c., from Southampton to Winchester, and from Andover to Poole, and the great western road through Salisbury. The Portsmouth road enters the county between Godalming and Petersfield, but again quits it to pass through a projecting corner of the county of Hampshire; it enters the county of Hampshire from Petersfield, and runs through that town and through the villages of Horndean and Cosham to Portsmouth. The Poole and Southampton road first enters the county and crosses a portion of it between Basingstoke and Fareham, both in Surrey; beyond Fareham it again enters it and runs by Alton, Alresford, and Winchester to Southampton. From Southampton it runs by Ringwood into Dorsetshire. The great western road, travelled by the Fordingbridge, Ringwood and Exeter mail, enters the county between Basingstoke and Basingstoke, and passes through Basingstoke, Whitchurch, and Andover to Salisbury. That road passes through the villages of Fawley, Whitchurch, and Andover, and is drained by the Avon, which is also drained by the Fawley, and Exeter mail, branches off from this to Andover, in Wiltshire. Besides these principal roads there are many other roads of less importance. A road parallel to the coast coming from Clacton passes through Havant, Cosham, near Portsmouth, and Fareham to Southampton; a road from Southampton leads by Lymington and Christchurch to Poole; a road from Newbury (Works) runs by Andover, Stockbridge, and Romsey to Southampton; a road from Salisbury leads by Fordingbridge and Ringwood to Christchurch; and several roads from Winchester communicate with different parts of the county.

The county of Hampshire is drained by the Test and its tributaries, the Itchen and the Hamble.

The county of Wiltshire is drained by the Test and its tributaries, the Itchen and the Hamble.

The county of Dorsetshire is drained by the Avon and its tributaries.
about two or three miles, that of the South Downs about four miles. Portsmouth hill is an outlying mass of chalk.

The country to the north of the great chalk district and of its north-western and north-eastern bounds, which is known as Hampshire, is closely intermixed with chalk, eastwards this broad district of Waltham and the South Downs belongs to the Isle of Wight basin; and these are almost entirely occupied by the strata above the chalk.

The country to the east of the great chalk district and embraced between the North and South Downs is occupied by the strata which underlie the chalk, and which extend into the districts of the Weald, and are occupied by the Weald of the south-east of England. In the London basin the Bagshot sand, belonging to the upper marine formation, is found at Frimley Heath, on the border of Surrey, and is surrounded by chalk, and the formation is said to be partly of the chalk; but the chalk itself is not found only in the north-east of the county, and are of small extent: the rest of this basin in Hampshire is occupied by the plastic clay, except near Kingscote, where, for a short distance the chalk marl, and greensand crop out from beneath the chalk. In the Isle of Wight basin that part of the New Forest which extends from the Bolder Water to the Southampton Water is for the most part occupied by a sandy clay; probably agreeably characterized with the Bagshot sand; this district is peculiarly adapted to the growth of oak. The remaining part of the New Forest, the country around the Southampton Water, and the whole line of the coast eastward from the Avon, and including Portsmouth, are occupied by the Hampshire clay; the country west of the Avon and a belt varying from three to seven miles south of the chalk, are occupied by the plastic clay. The Weald district east of the chalk is occupied by the chalk marl and greensand, and the small detached part of the county included in Sussex, partly by these formations and partly by the Weald clay.

No minerals are procured from this county to any extent, except near Petersfield, where grey chalk is quarried and sent to Portsmouth dockyard to be burnt for lime.

Forests. — There are several forests in this county, namely, the New Forest in the south-west, Alice Holt and Woolmer Forests, near Petersfield, and in the south-east. The New Forest, the most important of these, appears to have been, at the time of the Conquest, a wooded tract thinly peopled. William the Conqueror or his immediate successors entered into the charter of the forest, and created the barony of New Forest. The forest preserves comprehends nearly 64,000 acres, and is the property of the crown, subject to rights of common and other ancient claims. The crown has also a number of rights over some, and the absolute property of other plots of ground included in the former, but not in the present bounds of the forest. For local purposes the forest is divided into nine bailiwicks, which are subdivided into fifteen walks.

The forest is under a surveyor for the navy attached to the dockyard at Portsmouth, and under the surveyor-general of woods and forests. The chief value of the New Forest is for the raising of oak and beech timber for the use of the navy, but for many years the forest has been in a most desolate condition, and the management of the forest was very bad. Within the present century many reforms have been made, from which considerable benefit may be expected. There are many deer kept in the forest; rabbits, which formerly abounded, are now scarce; a diminutive breed of horses, and a peculiar breed of swine, bearing considerable resemblance to the wild boar, are found in a half-wild state in the forest. The oaks seldom rise to lofty stems; their branches are commonly twisted into the most picturesque forms; and the scenery of the forest is very beautiful. Many of the trees are antient and of great bulk. Various encroachments have been made on the forest, and many roads have been cut across the forest by the poor who live round the borders of the forest, and who in general an indolent race, poor and wretched in their condition, and depending for a subsistence on casual pilfering from the forest.

The forest of Bere extends northward from Portsdon-
best steep-pastures. If these downs are not sufficiently rich, or if there are resources for coal, the furze and brambles are apt to overrun them, and the coarse grasses get the upper hand.

In the valleys and along the lower slopes of the chalk-hills the soil is of a tough, tenacious nature, being a mixture of chalk washed over by the hills by the rains and stiff clay. This is a soil very difficult to cultivate. In spring it is extremely heavy, and retains moisture a long time, and when dried it becomes so hard, that unless it is kept in constant motion whilst wet by rain upon the surface, and the clods are still friable, there are no means of reducing it to a proper tith. But when it is carefully managed and well manured, it produces very good crops of beans, wheat, and barley. The land can scarcely be kept clean without occasional fallows, and the most profitable rotation is wheat, beans, oats, fallow. It is much too heavy for turnips. In some spots which are not quite so heavy the Suffolk rotation of barley, after a long fallow, clover, wheat, beans, and oats, might be introduced with advantage. It is not at all adapted to the Scotch converti-

ble system; for although grass-seeds might grow well, the land could seldom be despatched with cattle, either in spring or autumn, and after a dry summer it would be almost impossible to plough it up in good time to sow it with wheat. On the eastern side of the county, bordering on Surrey and Sussex, is a soil very similar, which is generally called chalky land, forming the vale of Petersfield. It has a grey, tender, sandy soil of some depth, lying on a soft sandstone, which is almost impervious to water. This circumstance counteracts the advantages of a light soil, unless the water be carefully conducted. On the higher grounds the poor sandy soil is only fit for plantations of fir.

The land in the New Forest, and on the opposite side of the river, or estuary, below Southampton, is mostly of a light texture and benefited by the wind. Here and there with heavier bowers and clays. Where it is sound and free from springs it is of a good quality; and that which is not so may be materially improved by judicious under-draining. Some spots in the New Forest are actually drained many years ago by Mr. Elkington, and have amply repaid the expense incurred, both by the improvement of the land and the greater salubrity of the neighbourhood; for where the land has not been drained, low and marshy places are formed, which are the cause of frequent fevers and agues.

Various kinds of marl are found in many places; some of these are very useful on poor gravelly soils, which they greatly improve when a sufficient quantity is carried on

the land. The western slopes of the combe are remarkable for the great quantity of chalk marl. The plants and small trees, which almost appear to have been made the spot, and the cattle and sheep kept on the produce of the arable land.

Hampshire, although it cannot be compared with some of the other counties for agricultural improvements, is not far behind them; and there are some farms as well managed as any in England. The great fault lies in the want of economy of labour; too many horses are used; the threshing-machine is not sufficiently numerous, and the stock is not so carefully collected, nor so well prepared, before it is put on the land; and there is a great waste of the liquid part of it on the best managed farms.

The old clumsy plough, once in general use, is now replaced by a lighter and more durable plough, of which the parts that wear out most are made of cast-iron. Two horses now plough land which formerly was thought to require four. The seed is put in by a drilling-machine instead of being scattered by the hand. The corn is put into neat stakes, raised on some pillars, and well thatched, instead of being exposed to the depredation of rats in a huge barn. The farm buildings, as well as the house of the farmer, are more commodiously arranged, and there is a great diminution of the abuses of the old poor-laws, and the commutation of the tithes for a fixed annual payment, will much encourage the improvement of poor lands; and in half a century the general face of the county will be very different from what it is at present.

There are no breeds of cattle, horses, or sheep, peculiar to Hampshire, unless we consider the small New Forest ponies in that light. The cows are of various breeds. The oxen are chiefly Sussex and Devon. The horses used in husbandry are mostly bred in other counties. The sheep are—among small forest breed, or heath-sheep, which, when tolerably fat, give the high-flavoured mutton formerly known by the name of Baplhot mutton; the Dorset and Leicester sheep, in the richer meadows; and the South Down, on the chalky hills. The last are most numerous, and preferred for folding on the land.

Hampshire bacon is very high-priced. The curing of bacon; and a Hampshire hog is a very common sign for a public-house; yet the native breed of pigs in this county is by no means remarkable for its qualities. The native pigs, which live on the scorns and hedges of the New Forest, and the flavour of their pig-sties, are very considerable. On the other hand, the Norfolk hogs are coarse, raw-boned, flat-sided animals, and are now seldom met with. The improved breeds produced by crosses of the Berkshire, the Suffolk, Essex, and Chinese pigs, are so much better and more profitable, that the former breed is to be noticed in the pigs bred on different farms is that which arises from the predominant character of any one of the above-mentioned breeds.

The renowned Hampshire bacon is owing entirely to the care with which it is cured. The hogs being fattened on peas and barley-meal, are kept fasting for twenty-four hours, at least, before they are killed; they are used as gently as possible in the act of killing, which is done by inserting a long pointed knife into the main artery which comes from the heart. The hair is burnt off with lighted straw, and the cuticle of the skin scraped off. The carcass is hung up after the entrails have been removed, and the next day are hung in the open air. The spare ribs are taken out, and the bloody veins carefully removed; the whole is then covered with salt with a small quantity of saltpetre mixed with it. Sometimes a little brown sugar is added, which gives a pleasant sweetness to the bacon.

The flitches are laid on a low wooden table, which has a small raised border all round it. The table slants a little so as to let the urine run off into a vessel placed under it by a small opening in the border at the lower end. The flitches are turned and re-salted every day; those which were uppermost are put under, and in three weeks they are ready to be hung up dry. Smoking the bacon is no longer so common as it used to be, as simply drying it is found sufficient to make it keep. Those who, from early association, like the flavour given by the smoke of wood, burn sawdust and embers in a smothered fire for some time before the bacon is put in. The flitches are either either placed on a bacon-rack for the use of the family, or are packed with wheat-chauf into chests till they are sold.

The practice of cutting the hogs into pieces and pickling them in a vat, being attended with less trouble, is very generally preferred when there is only a sufficient number of hogs killed to serve the farmer's family; but flitches of bacon, which are cut in more proportion, are made ready to be hung up dry. Smoking the bacon is much preferred when a pound of grean bacon, when it is first dried, is worth more than the tenth part of the price of a bushel of barley, for a bus-

beld large breed of hogs, to produce 10 Ib. of bacon. The risk and attendance are fully compensated by the value of the dung made by the hogs, which is of the richest nature. Hogs may be made for with less expensive food, such as boiled roots mixed with meal; but in this case the bacon is much
By a subsequent arrangement made under the direction of the magistrates of the county, the divisions of the county have been increased to thirteen, not including the Isle of Wight. They are as follows:—Alton, Andover, Basingstoke, Droxorf, Fareham, Kingsclere, Lymington, Oldham, Petersfield, Ringwood, Romsey, Southampton, and Winchester.

Hampshire, not including the Isle of Wight, contains one city, Winchester; six parliamentary boroughs, Andover, Christchurch, Lymington, Petersfield, Portsmouth, and Southampton; and thirteen other market-towns, Alresford, Alton, Basingstoke, Bishop's Waltham, Fareham, Fordingbridge, Gosport, Havant, Kingsclere, Oldham, Romsey, Stockbridge, and Whitechapel, which last two were disfranchised by the Reform Act. Of these some are described elsewhere. [Alresford; Alton; Andover; Basingstoke; Bishop's Waltham; Christchurch; Lymington; Petersfield; Portsmouth; Southampton; Winchester].

Of the others an account is subjoined.

Fareham is in the hundred of Fareham, at the head of the north-west branch of Portsmouth harbour, 73 miles from London, at the intersection of the road from London to Gosport and that from Chichester to Southampton. The parish is extensive, containing 6670 acres; it contains the whole of the hundred, and had in 1831 a population of 4492. Fareham was in Lolland's time a fishing village; it is now a tolerably thriving town, depending for its prosperity chiefly on its neighbourhood to Portsmouth. Some small vessels are built at Fareham; and cordage, sacking, and coarse pottery are made. Vessels of 300 tons can get up to the port; and considerable trade in corn and coal is carried on. The market is on Wednesday, and there is one yearly fair. Petty sessions are held here. The architecture of the church is of various dates and styles; the chancel is early English. The living is a rectory in the peculiar jurisdiction of the bishop of Winchester, in whose gift it is; the annual value is £171. There were in 1833 twenty-two day and four boarding-schools, with nearly 700 children; of these schools, one with 27 boys was an endowed free-school, another with 130 children, a national school, and a third with 62 children, a subscription infant school. There were also three Sunday-schools, containing above 400 children. There are congregations of Independents and Methodists.

Fordingbridge is in the hundred of Fordingbridge, on the right or west bank of the Avon, 92 miles from London on the road to Christchurch. The parish is large, containing 5720 acres, and had in 1831 a population of 2822, more than half agricultural. Fordingbridge was formerly a place of greater extent than now, and has suffered several times from fire. There is a stone bridge of seven arches across the river. There are some manufactures of sail-cloth and bed-linend. The market is on Saturday, and there is one yearly fair. The living is a vicarage, united with the parochial chapelry of Itchen, or Hambledon, in the diocese of Winchester, and the archdeaconry of Winchester, and in the gift of King's College, Cambridge: the annual value is £601, with a glebe-house. There is an Independent congregation there. There were in the parish in 1833 one infant-school with

---

Division.  |
---|
East.  |
---|
South-east.  |
---|
West.  |
---|
North-east.  |
---|
Central.  |
---|
South.  |
---|
South-west.  |
---|
East.  |
---|
South-east.  |
---|
---

<table>
<thead>
<tr>
<th>Division</th>
<th>Situation</th>
<th>Area</th>
<th>Population in 1831.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Alton, North Division</td>
<td>East</td>
<td>74,290 acres</td>
<td>14,958</td>
</tr>
<tr>
<td>II. Alton, South Division</td>
<td>South-east</td>
<td>44,160</td>
<td>7,483</td>
</tr>
<tr>
<td>III. Andover Division</td>
<td>West</td>
<td>130,210</td>
<td>27,465</td>
</tr>
<tr>
<td>IV. Basingstoke Division</td>
<td>North-east</td>
<td>144,900</td>
<td>29,592</td>
</tr>
<tr>
<td>V. Fareham Division</td>
<td>Central</td>
<td>129,690</td>
<td>24,020</td>
</tr>
<tr>
<td>VI. Kingler Division</td>
<td>North</td>
<td>102,500</td>
<td>18,070</td>
</tr>
<tr>
<td>VII. New Forest, East Division</td>
<td>South</td>
<td>63,350</td>
<td>18,546</td>
</tr>
<tr>
<td>VIII. New Forest, West Division</td>
<td>South-west</td>
<td>133,870</td>
<td>19,127</td>
</tr>
<tr>
<td>IX. Portsdown Division</td>
<td>South-east</td>
<td>100,280</td>
<td>41,298</td>
</tr>
<tr>
<td>X. Isle of Wight Division</td>
<td>South</td>
<td>86,810</td>
<td>33,431</td>
</tr>
<tr>
<td></td>
<td>Separate Jurisdictions</td>
<td>2,250</td>
<td>8,767</td>
</tr>
<tr>
<td></td>
<td>City of Winchester and liberty of Soke</td>
<td>1,570</td>
<td>19,324</td>
</tr>
<tr>
<td></td>
<td>Borough of Portsmouth, with Ports</td>
<td>5,090</td>
<td>50,389</td>
</tr>
<tr>
<td></td>
<td>Town and county of Southampton</td>
<td>1,018,550</td>
<td>314,280</td>
</tr>
</tbody>
</table>

---

* Portsdown is a part of the parish of Portsdown, but not within the jurisdiction of the borough of Portsmouth, but comprised in the hundred of Portsdown.
45 children, eight day and boarding-schools with 153 children, one day and Sunday-school with 231 children daily and 113 on Sundays, partly supported by endowment, and one Sunday-school with 292 children.

Two miles from the town, on a hill called Godshill, overgrown with oaks, are the remains of an ancient camp, perhaps of Saxon origin, secured on one side by a double tower, by which it is surrounded by the steep side of the hill.

Havant is in the liberty of Havant (which comprises only this parish), near the head of Langston harbour, 664 miles from London by Petersfield and Horndean. The parish comprehends 2560 acres, and had in 1831 a population of 9310 agricultural. The church is in the centre of the town, in the form of a cross, with a tower rising from the intersection: some parts of it are of Norman architecture. The living is a rectory, in the peculiar jurisdiction of the bishop of Winchester, who has the presentation: it is of the yearly value of 489l. with a glebe-house. There is an Independent congregation. Havant has little trade: some parchement is made, and some of the inhabitants are engaged in fishing and bowling. The market is on Saturday, and there are two yearly fairs. There were in the parish in 1833 two national-schools with about 200 children, one boarding and day-school and four day-schools with 115 children, and one Sunday-school with 130 children.

Kingsclere is in Kingsclere hundred, 55 miles from London through Basingstoke. The parish is large, containing 3823 acres, and had in 1831 a population of 2347, of which three-fourths agricultural: the parish extends into the hundred of Evinger. Kingsclere is a small town of ancient appearance. There is some trade in malt carried on: the market is on Tuesdays, and there are nine in the week. The living is a vicarage, with the chapelry of Echeshall and Sidmonton annexed, in the deanery and archdeaconry of Winchester; of the yearly value of 400l. There were in the parish in 1833 seven day-schools with 124 children, one of which had 27 acres of land; and one day-school with 50 children daily and 60 on Sundays. At Kingsclere was antiquity a residence of the West Saxons, and there was a royal residence in the neighbourhood at the time of King John.

Odiham is in Odiham hundred, a little to the left of the great western (Salisbury and Exeter) road, 40 miles from London. The parish is large, comprehending 7350 acres, and had in 1831 a population of 2647, about half agricultural.

The market is on Friday, and there are two yearly fairs. Odiham was formerly a free borough, belonging to the bishop of Winchester: it had a royal residence and parochial chapelry of the residence has been converted into a farm-house, still called Palace Gate, or Place Gate. There is an old almshouse near the church, which latter is a large, ancient brick building. The living is a vicarage, with the parochial chapelry of Gussow annexed, in the deanery of the Western and archdeaconry of the same name, of the yearly value of 337l., with a glebe-house. There is an Independent congregation at Odiham. There were in the parish in 1833 ten day or boarding and day-schools with about 259 children: one of these schools, with 41 children, was partially supported by endowment: there was also one Sunday-school with 187 children.

Near Odiham are the remains of an old castle, which, in the civil wars at the close of King John's reign, was bravely but unsuccessfully defended by a garrison of thirteen against the Dauphin, Louis of France. In this castle David Bruce, king of Scotland, was confined for eleven years, and after his release at Neville's Cross was joined by a large army at Odiham. Romsey is a corporate town, locally situated in the hundred of King's Sombourn, upon the left bank of the Anton or Test, over which is a bridge, and close to the Andover Canal. The road leading from London to Winchester is called the Ringwood and Poole.

The whole parish is very extensive, comprehending 9310 acres, with a population of 4322, about one-fourth agricultural; but the borough contains a large part of the scenery which is known as 'Bishop's Waltham,Infra,' having an extent of 380 acres, and a population of 2046. The church formerly belonged to an abbey founded in the reign of Edward the Elder, and occupied by Bishop Peter of Winchester, but was razed to the ground at the dissolution at 25s. 8d. 10d. per annum gross, or 39s. 10d. per annum net.

The church is a cross church, having its exterior for the most part of Norman architecture, much enriched in some portions with zigzag and other ornaments: the central portion of the interior, the transepts, and the sides of the chancel, are also Norman: the west end of the church is in the early English style, very plain outside, but rich within. There are various windows of later date inserted, especially some fine ones at the east end. On the roof of the church grows an apple-tree, which for many years has borne fruit. There are dissenting meeting-houses: a town-hall, an 'audit-house,' supported by the stockholders, and the churchyard. The market is on Thursdays, formerly on Saturday, and there are three yearly fairs. By the Municipal Reform Act, the council of the borough consists of a mayor, four aldermen and twelve councillors. The living is a vicarage, in the diocese and archdeaconry of Winchester; of the yearly value of 365l. There were in the parish in 1833 twelve infant or dame-schools with 136 children, twenty day-schools with about 650 children, and seven Sunday-schools with about 700 children. Of the day-schools one is a free-school, another is a national-school, united with an old endowed free-school, and a third is wholly supported by Lord Palmerston and family. Sir William Petty was a native of Romsey, and lies buried in the church. Stockbridge is a borough in the hundred of King's Sombourn, on the left bank of the Anton or Test, and near the Andover canal; it is 664 miles from London on a road leading from Andover to Southampton, and near the borough limits coincide and comprehend 1230 acres: the population in 1831 was 821, about one third agricultural. The town consists of one street, in which are seven bridges: it has little trade, but is chiefly supported by being a communication between the Hampshire and Isle of Wight.

The market is on Thursday, and there is a yearly fair (there were formerly three fairs), one of the largest in the county for lambs. Stockbridge returned two members to parliament until the Reform Act; after which it was disfranchised: it is a borough by prescription; the town-hall is a neat building. The living is a chapelry, in the diocese and archdeaconry of Winchester, annexed to the vicarage of King's Sombourn, to which the living of Little Sombourn is also annexed; their joint yearly value is 696l. with a glebe-house. There were in Stockbridge in 1833 five day-schools with 99 children, and two Sunday-schools with 50 children.

Whitechurch is a borough in the hundred of Evinger, 564 miles from London on the great Western road, between Basingstoke and Andover, near the head of the river Anton. The parish comprehends 7320 acres, with a population of 1531, and comprises about half agricultural: buildings and serges are manufactured; also paper for the exclusive use of the Bank of England. The market, held on Friday, is said in some of our authorities to be now deserted. Whitechurch is also a borough by prescription; and the county/joint of the borough till the Reform Act. The living is a rectory, in the peculiar jurisdiction of the bishop of Winchester, of the yearly value of 140l. There were in 1833 seven day or boarding and day-schools, with about 280 children, and three Sunday-schools with about 300 children.

Emsworth, a hamlet of the parish of Warblington, at the head of a channel which forms a branch of Chichester harbour, is a place of some trade as a port; ship-building and rope-making are carried on. Hayling Island is becoming a place of considerable resort for bathers, and numerous new buildings have recently been erected. Titchfield, about 6 miles south of Emsworth, on the Chichester and Hayling Island, is a place of some trade: it is on a small river, by which small vessels get up to the town. A customary market is held.

Divisions for Ecclesiastical and Legal purposes. — Hampshire is included in the diocese of Winchester and the ecclesiastical province of Canterbury, and consists (exclusive of the Isle of Wight), the archdeaconry of Winchester. This archdeaconry is subdivided into ten deaneries, viz.: Alresford, Alton, Andover, Basingstoke, Dorking, Droxport, Emsworth, Stockbridge, Southampton, and Winchester, and the Isle of Wight. The number of churches and chapels is given in Warner's 'Collections for the History of Hampshire' at 277. In Lewis's 'Topographical Dictionary of Hampshire,' the number of rectories, vicars, and curates is given at 154 rectories, 72 vicars, and the rest perpetual curates.

This county is in the Western circuit: the assizes and quarter-sessions are held at Winchester. For the election
of members of parliament, the county was by the Reform Act divided into two parts. The Northern division compr- 
ends Alton, Andover, Basingstoke, Droxford, Kings-
eliere, Odham, Petersfield, and Winchester divisions; the 
chiefs of which are the Calleva Atrebatum, Calleva 
Valeria, and Alton. The polling stations are Alton, Andover, Basingstoke, Kings-
eliere, Odham, Petersfield, and the Borough of Waltham. The Southern division comprises Fareham, Lymington, Ring-
wood, and the Western part of the county. The chief place of 
election is Southampton, and the polling stations are 
Southampton, Fareham, Lymington, Portsmouth, Ring-
wood and Romsey. The 'divisions' are those made by the 
first return of which was the year 1708, and by the census of 
1831. The Isle of Wight was by the same act seceded 
from the county for parliamentary purposes, and al-
lowed to return one member: the chief place of elec-
tion is Newport, and the polling station Newport. 

West Cowes. Formerly, two members each were returned 
from the city of Winchester, the boroughs of Christchurch, 
Lymington, Portsmouth, Southampton, Andover, Peters-
field, Stockbridge, and Whitchurch, and for the boroughs 
of Newmarket, Yarmouth, and Yarmouth, in the Isle of Wight. 

By the Reform Act, Stockbridge, Whitbryde, Newmarket, 
and Yarmouth were disfranchised, and Christchurch and 
Petersfield reduced to one member each. The act, by re-
gularly divided the small boroughs of the county. Andover, 
and the boroughs of Portsmouth, Christchurch, Lymington, 
Petersfield, Andover, and Newport, which were all pre-
viously very close.

As for the British Antiquities, &c.: Before the Roman invasion, 
this county was inhabited by three tribes: the Regni (P purposely Plots), who occupied the coast, as well as the counties of Sussex and Surrey; the Belgae (Baneously Plots), who inha-
ited the middle portion and extended into the Isle of Wight; and the Atrates, or Atratiles (Arrested Plots), who occu-
pied, it is likely, the northern part on the confines of Ber-
kshire. Winchester appears to have been a British town anterior to the Roman invasion, as Silchester also, if it may be identified with Calleva Atrebatum. 
This part of the island was reduced by the Romans, 
probably under Vespasian, who is distinctly recorded by Suetonius, as having subjunged the Isle of Wight, called by the Romans Vectis (Oaussian, Ploemey). It was comprehended in Britannia Prima, the county, 
and was crossed by several Roman roads, and contained several Roman stations. 
It was Cæsar's opinion that the Trinovantes river men-
tioned by Ploemey (Teisnotes wereese tida), was the Anto-
or Test; it was the Southampton Water, with all the 
strems that flow into it. Others however identify 
the Trinovantes with the Arun of Sussex. If Trinovanta 
were a real river, and not a term used in the 
scriptorium of the little Anto, it is a designation peculiarly suitable 
for Southampton Water. The Roman station Clausentum, 
mentioned in the Iter vi. of Antoninus, is generally ad-
mited to be at Didcot, and in the Oxford county, 
and, for the south of the county, and by the 
abundance of Roman remains are found, and modern anti-
quarists seem to agree in fixing the station at this spot, 
which is on the east side of the Ichen, by a bend in which it 
is nearly surrounded. There are remains of the Roman 
works, a ditch and part of a rampart on the land side, 
composed of earth, flints, and large flat bricks, and faced roughly 
with small square stones. A quantity of Roman coins and 
of fine red pottery, a glass urn, and sculptured and other 
stones have been dug up. The area of the station is about 
half a mile in circumference; Southampton probably 
 arose from its ruins. In the latter part of the name Claus-entum we may conjecture the modern name Cinsi, and the 
Trin-aston, Southampton, and Hampton: (now shertinned 
to Hamp- shyre). Another station mentioned by Anto-
ninus is Venta (A Roman modification of the more ancient 
British name Casa Gwent, the white city), distinguished 
from some other places of the same name, as 'Venta Bel-
garum.' Ploemey mentions Venta, or as he writes it Uoer, 
as one of the towns of the Belgae. It is the modern Win-
chester, capital of the county. The town is also mentioned 
by the Roman writers, British or the Roman Venta. This was an important 
station: the walls with which the Romans enclosed it yet 
form the chief part, though frequently repaired and much altered, 
the walls of the town. By the Norman Conquest, the town was 
very large, and with large church, bones, sepulchral urns, and some other antiquities, 
have been discovered just outside the town walls. An en-
trance 
mont on St. Catherine's Hill, south of the city, is perhaps the 
Roman castra estiva, or summer camp.

P. C. No. 728.

But the most remarkable remains of a Roman station are at 
Silchester, a village on the border of the county, due 
north from Basingstoke. It was certainly a station of im-
portance, though it is difficult to determine whether it was 
the capital of the Calleva Atrebatum, or one of the divisions. 
Camden identifies it with the latter, and assigns to it the 
British name of Caer Segont, which is said to have been 
destroyed in the invasion by Ella, who founded the 
royal court at Silchester. The remains of Roman and Anglo-
Saxons are among the most entire in the kingdom. The walls 
form an irregular octagon and are about a mile 
and a half in compass; they enclose a space of about 
100 acres, divided into the parish church and church-
yard, a farm-house and its offices. The enclosure contains 
some ruins, and in some points has been filled up by the ruins of the walls. Coins, inscribed stones, and other antiquities 
have been dug up. At a short distance north-east of the walls 
are the remains of a amphitheatre.

The remains of a Roman station, supposed to have been 
the Brig of Antoninus, were observed by Mr. Gale at 
Broughton, not far from Stockbridge. The walls of Por-
town and Winchester contain some inscriptions of Roman archi-
tecture, and are probably on the site of one of the stations de-
nominated Portus, either Portus Magnus, or more probably 
Portus Adurni, mentioned in the Nottia Imperii. Roman 
roads may be traced running from Portus to Southamton (Old 
Serum); to Silchester and to Porchester; and from Sil-
chester in various directions.

This county appears to have been the scene of contest in 
the Saxon invasion. The invasion of Ellas has been no-
ticed. Cerdic, who founded the kingdom of Wessex, 
is said to have defeated and slain in the New Forest a 
British chieftain who bore the name of Nataleled; 
and Portus, ally of Cerdic, is said to have landed at Ports-
mouth. Portsmouth obviously derives its name from the 
fort situation; and the landing of Portus may have been fixed 
here by the ignorance of some who sought to give 
to the name an historical rather than a topographical origin.

Wessex was the centre of the English power, and in the 
year 867, called by the Saxons Wintecnesse, became the seat 
of government. Here Cerdic was buried, and here, on the 
conversion of the West Saxons to Christianity, a bishop's 
see was established. The government was centralized; and the 
isle of Wight was taken by Waltheof, king of Mercia, 
and annexed by him to the kingdom of Sussex: it was however 
soon after reconquered by Ceawlin, king of Wessex. 

Upon the predominance of the West Saxons kings over 
other Saxon potentates being permanently established 
by Egbert, Winchester became the metropolis of England.

When the Norphemmen attacked the island, Hampshire 
was exposed to their ravages. In the reign of Ethelbert, grand-
son of Egbert (A.D. 860—866), a body of them landed at 
Southampton, and advanced to Winchester, which they 
partially laid waste; they were routed however as they 
were returning to the coast. At Basing, near Basingstoke, Ethelred I., king of Wessex, 
and his brother Alfred, were defeated by the Danes, A.D. 
870. A year or two after, in 871 or 873, in the reign of 
Alfred, the invaders made another attack. Winchester 
damaged the cathedral and murdered the ecclesiastics 
belonging to it. From the time of Alfred's restoration the 
country experienced scarcely any hostility till the time of 
Harold, when the danes invaded and defeated his army. 
In the reign of Edward the Confessor, the same 

VOL. XII.—F
The extension or formation of the New Forest by William I has been already noticed; it became the scene of several disputes, and the chivalry, and as judgements on him for his arbitrary and cruel behaviour in the transaction, which however has been much exaggerated.

His son, Richard, lost his life here by what Claudian described as his accursed son, the Bishop of Bath and Wells. William Rufus was on a tour of inspection on 10 August 1100; the hunting party of Robert, was entangled among the branches and killed while hunting; and his successor William Rufus was shot by a random arrow by Walter Tyrell, a.d. 1100. Upon Rufus’s death his brother, William Rufus, was elected as king of the English, and was hanged in Winchester, where he possessed himself of the royal treasure, and afterwards succeeded to the crown. Robert, his elder brother, to whom the succession rightfully belonged, landed at Portland with a large army, a.d. 1101, to enforce his claim; but finding his rival too strong, came to an accommodation with him, and retired.

In the civil war between the supporters of King Stephen (a nephew) and the Empress Maud, Winchester was the scene of conflict. The cathedral and Wolvesley Castle, the residence of Henry of Blois, bishop of Winchester and brother of Stephen, were in the hands of the king’s party, and Winchester Castle and other parts of the city in the hands of the empress. The empress’s friends were gradually dispossessed of all they held, except the castle; and, when this was hard pressed, it is said that the empress entered by being carried through the opposing army, wrapped in a large mantle, like a priest, and her brother, Robert, the natural brother and chief supporter, the earl of Gloucester, was taken soon after at Stockbridge and exchanged for the captive king. In the civil war which marked the close of the reign of Henry I, many parts of England were contending for the crown. Much, however, the same was true of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newtown and Yarmouth burned, and Carisbrook Castle chiefly besieged. In a.d. 1416, when Henry V. was about to embark at Southampton for France, a conspiracy against his life was detected; for which the Earl of Cambridge and others were executed in that town. In the reign of that of Richard II, another attack was made on this town, but failed. About the same period the Isle of Wight was attacked by the French, and Newton...
The Table

The following table contains a summary of the population, &c., of every division, as taken in 1831:—

<table>
<thead>
<tr>
<th>Division</th>
<th>Houses</th>
<th>Occupations</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alton, North Division</td>
<td>2,401, 2,883</td>
<td>1,213, 140</td>
<td>7,753, 7,415</td>
</tr>
<tr>
<td>Alton, South Division</td>
<td>1,238, 1,455</td>
<td>747, 144</td>
<td>3,739, 3,764</td>
</tr>
<tr>
<td>Andover</td>
<td>5,283, 5,835</td>
<td>1,683, 1,404</td>
<td>7,530, 7,292</td>
</tr>
<tr>
<td>Basingstoke</td>
<td>5,232, 5,800</td>
<td>1,683, 1,404</td>
<td>7,530, 7,292</td>
</tr>
<tr>
<td>Fawley</td>
<td>4,158, 4,733</td>
<td>1,683, 1,404</td>
<td>7,530, 7,292</td>
</tr>
<tr>
<td>Kingsclere</td>
<td>3,442, 3,796</td>
<td>1,498, 1,173</td>
<td>6,874, 6,797</td>
</tr>
<tr>
<td>New Forest, East</td>
<td>3,766, 4,211</td>
<td>1,297, 1,129</td>
<td>5,771, 5,403</td>
</tr>
<tr>
<td>New Forest, West</td>
<td>3,946, 4,697</td>
<td>1,398, 1,265</td>
<td>7,001, 6,823</td>
</tr>
<tr>
<td>Portsmouth</td>
<td>7,925, 8,178</td>
<td>2,505, 2,353</td>
<td>17,265, 16,252</td>
</tr>
<tr>
<td>Isle of Wight</td>
<td>5,811, 6,643</td>
<td>2,229, 2,229</td>
<td>14,653, 14,653</td>
</tr>
<tr>
<td>Winchester, City, and Salisbury</td>
<td>1,415, 1,463</td>
<td>710, 729</td>
<td>4,255, 4,482</td>
</tr>
<tr>
<td>Portsmouth, Borough, and Ports</td>
<td>9,410, 11,394</td>
<td>245, 4,765</td>
<td>21,902, 28,487</td>
</tr>
<tr>
<td>Southampton, Town &amp; County</td>
<td>3,189, 4,659</td>
<td>17,178, 2,304</td>
<td>6,835, 10,574</td>
</tr>
<tr>
<td>Totals</td>
<td>56,556, 64,652</td>
<td>27,761, 28,398</td>
<td>152,082, 162,168</td>
</tr>
</tbody>
</table>

The saving effected on the whole sum expended in 1837, as compared with that expended in 1834, was therefore about 36 per cent; and the saving effected on the whole sum expended for the relief of the poor was rather more than 39 per cent in 1837, as compared with the expenditure in 1834.

The number of turnpike trusts in Hampshire, as ascertained in 1832, is 36; the number of miles of road under their charge is 919, and the provincial increase in 1835, arising from the tolls and parish composition, was 30,321. 13st. 6d.; and the annual expenditure, 23,931. 11st. 7d.

The county expenditure in 1834, exclusive of that for the relief of the poor, was 12,614. 19st. 6d., disbursed as follows:—

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridges, building, and repairs, &amp;c.</td>
<td>£ 1,247. 3. 5.</td>
</tr>
<tr>
<td>Gaols, houses of correction, &amp;c., and maintaining prisoners, &amp;c.</td>
<td>£ 3,095. 18. 9.</td>
</tr>
<tr>
<td>Shire-halls and courts of justice, building, repairing, &amp;c.</td>
<td>£ 598. 19. 8.</td>
</tr>
<tr>
<td>Prosecutions</td>
<td>£ 2,999. 8. 5.</td>
</tr>
<tr>
<td>Clerk of the peace</td>
<td>£ 702. 2. 6.</td>
</tr>
<tr>
<td>Conveyance of prisoners before trial</td>
<td>£ 791. 15. 3.</td>
</tr>
<tr>
<td>Constables, high and special</td>
<td>£ 91. 0. 0.</td>
</tr>
<tr>
<td>Coroner</td>
<td>£ 298. 12. 0.</td>
</tr>
<tr>
<td>Debt, payment of, principal and interest</td>
<td>£ 6,165. 10. 0.</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>£ 2,412. 12. 7.</td>
</tr>
</tbody>
</table>

The number of persons charged with criminal offences in the three septennial periods ending with 1824, 1825, and 1834, were 2,085, 2,190, and 3,187 respectively; making an average of 298 annually in the first period, of 313 in the second period, and of 455 in the third period. The number of persons tried at quarter-sessions, in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county rates, were 109, 156, and 202 respectively. Among the persons charged with offences, there were committed for—

<table>
<thead>
<tr>
<th>Offence</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felonies</td>
<td>1,182. 1832. 1833.</td>
</tr>
<tr>
<td>Misdemeanors</td>
<td>6. 16.</td>
</tr>
</tbody>
</table>
The total number of committals in each of the same years was 151, 227, 249 respectively.

1831. 1832. 1833.

The number convicted was 98 167 163

acquitted 18 23 43

Discharged by proclamation 35 37 43

In 1837, at the assizes and sessions, 622 persons were charged with crime in Hampshire. Of these, 42 were charged with offences against the person, 15 of which were for assault; there were 244 offenders against property, committed with violence; 512 offenders against property, committed without violence; 2 for setting fire to crops, &c.; 4 for maiming cattle; 13 for forging and coining; 16 for poaching; 2 for theft; 4 for other infamous crimes. Of the whole number of offenders, 437 were convicted, 138 were acquitted, no bill was found against 36, and 11 others were not prosecuted. Of these convicted, 8 were condemned to death, none of whom were executed, but the sentences of 6 were commuted to transportation for life; and of 2 to imprisonment for six months or under. Besides the above six, 19 were transported for life, for 14 years, and 45 for 7 years; 3 were sentenced to imprisonment for 2 years and above one, 49 for one year and above 6 months, and 308 for 6 months and under; 2 were fined. Of the whole number of offenders, 509 were males, and 113 were females; 235 could neither read nor write; 344 could read and write imperfectly; 47 could read and write well; 2 had a superior instruction, and the degree of instruction of 4 could not be ascertained.

The number of persons qualified to vote for the county members of Hampshire is 8983, being about 1 in 35 of the whole population, and above 1 in 8 of the male population twenty years and upwards, as taken in 1831. The expenses of the last election of county members to parliament were to the inhabitants of the county £2341, 72s. 7d., and were paid out of the general county-rate.

There are 11 savings' banks in this county. The number of depositors and amount of deposits on the 30th of November in each of the following years were:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Depositors</th>
<th>Amount of Deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1834</td>
<td>7700</td>
<td>£729,299</td>
</tr>
<tr>
<td>1835</td>
<td>8581</td>
<td>£1,201,906</td>
</tr>
<tr>
<td>1836</td>
<td>9,237</td>
<td>£3,232,493</td>
</tr>
<tr>
<td>1837</td>
<td>9,998</td>
<td>£3,314,155</td>
</tr>
</tbody>
</table>

The various sums placed in the savings' banks in 1834 and 1835 were distributed as under:

<table>
<thead>
<tr>
<th>Year</th>
<th>Depositors.</th>
<th>Deposits.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1834</td>
<td>4,000</td>
<td>£1,200,000</td>
</tr>
<tr>
<td>1835</td>
<td>5,000</td>
<td>£1,500,000</td>
</tr>
</tbody>
</table>

The schools established by dissenters, included in the above statement, are:

<table>
<thead>
<tr>
<th>Sex</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1,248</td>
</tr>
<tr>
<td>Female</td>
<td>5,591</td>
</tr>
</tbody>
</table>

The schools established since 1818 are:

<table>
<thead>
<tr>
<th>Sex</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>344</td>
</tr>
<tr>
<td>Female</td>
<td>2,706</td>
</tr>
</tbody>
</table>

The schools established by dissenters, containing 2,399

Education.—The following summary is taken from the Parliamentary Returns on Education, made in the session of 1835:

<table>
<thead>
<tr>
<th>Description</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant schools</td>
<td>99</td>
<td></td>
<td>99</td>
</tr>
<tr>
<td>Number of infants at such schools; ages from 2 to 7 years:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>426</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>634</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex not specified</td>
<td>805</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily schools</td>
<td>1,197</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of children at such schools; ages from 4 to 14 years:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>15,911</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>13,577</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex not specified</td>
<td>7,179</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36,567</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The schools established by dissenters, containing 2,399

<table>
<thead>
<tr>
<th>Sex</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>344</td>
</tr>
<tr>
<td>Female</td>
<td>2,706</td>
</tr>
</tbody>
</table>

One hundred and forty boarding-schools are included in the number of daily schools given above. No school in this county appears to be confined to the children of the Established Church, or of any other religious denomination, such exclusion being disallowed in almost every instance, especially in schools established by Dissenters, with whom are included Wesleyan Methodists and Roman Catholics. The lending-libraries of books are attached to 92 schools in this county.

Hampshire, New. [New Hampshire.]

Hampstead. [Middlesex.]

Hampton. [Plymouth.]

Hamster. Criocotes, the name of a genus of Rodents, whose economy makes them one of the most interesting of the great Linnaean genus Mus., or the family of Muridae in its most extensive sense.

Generic Character—Molar teeth simple; their crown furnished with blunt tubercles. Four toes and the vestige of a thumb on the fore-feet; five toes on the hind feet; nails robust. Tail short and hairy.

Dental Formula.—Incisors $2 \times 2$; molars $3 \times 3 = 16$.

Geographical Distribution of the Genus.—All the north of Europe and of Asia, the temperate countries of Persia, and the deserts of Askarian. If the Canada pouched rat (Hamster da Canada—Cricotus torquatus of Desmarest, Mus variegatus of Sinu) is to be considered a hamster, Canada and the borders of Lake Superior must be added; and it must be remembered that the Tucan of Hernandez, an inhabitant of New Spain, is considered by some to be identical with the 'Canada Rat' (Dr. Richardson thinks of insufficient grounds). But the last two zoological places Desmarest's Canada Hamster under the genus Geomyo, with a note of interrogation; and Say has given it a generic distinction under the name of Pseudotomts...
There are five or six species of the genus; but we shall select as our example the Common Hamster, Cricetus vulgaris, Max Cricetus of Pallis, Le Hamster et Buffon and the French authors.

**Description.**—Reddish brown above; black below, with three great whitish spots on the sides. Feet white; a white spot on the throat, and another on the breast. Length about 9 inches; tail 3. Males bigger than females. Weight of some males from 12 to 16 ounces; weight of females seldom exceeding from 4 to 6.

**Varieties.**—Variations in colour are not uncommon. There is one variety entirely black. Pennant figures one which is entirely black, with the exception of the edge of the ear, the muzzle, the under-jaw and feet.

**Localities.**—All the north of Europe and Asia (Lesson), Austria, Siberia, and many parts of Germany, Poland, and the Ukraine; all the southern and temperate parts of Russia and Siberia; and even about the river Yenesei, but not farther to the east. In the Tartarian deserts, in sandy soil: they dislike moist places. Swarming in Gotha (Pennant).

**Food, Habits, Reproduction.**—The Common Hamsters are ill friends to the farmer. The quantity of grain which they consume is very great, nor does the destruction stop with mere satiety of appetite; the animal never forgets its hoard, and fills its two cheek-pouches till they seem bursting with the booty. They are also said to be very fond of the seeds of liquorice. Their dwellings are under the earth; their mode of forming them, and the purposes to which they apply them, have been thus described:—They first form an entrance, burrowing down obliquely. At the end of this passage one perpendicular hole is sunk by the male; the female sinks several. At the end of these they excavate various vaults, some as lodges for themselves and young, some as storerooms for their food. Every young one is said to have its separate apartment; each sort of grain its different vault. The 'living apartments,' as they may be called, are lined with straw or grass. The vaults are said to be of different depths, according to the age of the constructor: a young hamster, it is stated, makes them scarcely a foot deep; an old one sinks to the depth of four or five; and the whole 'cartilage,' so to speak, is sometimes eight or ten feet in diameter. From the mode of proceeding in their work, the reader will be prepared for the statement that the male and female live in separate apartments; and indeed it appears that, excepting at the short season of courtship, they have very little or no intercourse. Pennant gives them a very unamiable character. The whole race," writes that zoologist, "is so malodorous as to constantly reject all society with one another. They will fight, kill, and devour their own species, as well as other lesser animals, so may be said to be carnivorous as well as granivorous. If it happens that two males meet in search of a female, a battle ensues; the female makes a short attachment to the conqueror, after which the connection ceases. She bore three or four young in a year, and brings from sixteen to eighteen at a birth: their growth is very quick, and at about the age of three weeks the old one forces them out of the burrows to take care of themselves; she shows little affection for them; for if any one dips into the hole, she attempts to save herself by burrowing deeper into the earth, and totally neglects the safety of her brood; on the contrary, if she is attacked in the season of courtship, she defends the male with the utmost fury.

The harvest of these animals commences in August. Grains of corn, ears of corn, peas and beans in the pods, all find their way into their cheek-pouches, which will hold a quarter of a pint English. This forage is carefully cleaned in their burrows, and the husks and chaff carried out. When all is in order, they stop up the entrance and prepare for their hibernation, which lasts during the whole of the severe season; the provision they have made having been collected for the purpose of their support before their torpidity actually commences, and also in the spring and summer before the season has produced a supply for them in the fields. If all tales be true, they are a hardy generation, and will jump at a horse if he tread near them, and hang by its nose so as to be disengaged with difficulty. Their voice is said to be like the barking of a dog. Fierce as they are, they quail before their deadly enemy the polecat, which, chasing them into their holes, destroys them unrelentingly. Notwithstanding this check, they are said to be so numerous in some seasons as to occasion a dearth of corn.

**Utility to Man.**—The fur of the animal is said to be valuable; and the peasant, when he 'goes a Hamster-nesting' in the winter, not only possesses himself of the skin of the plunderer, but of the plunder, which is said commonly to amount to two bushels of good grain in each exchange. Buffon, quoting Sulzer, says that in Gotha, where these animals were proscribed on account of their vast devastations among the corn, 11,564 of their skins were delivered at the Hôtel de Ville of the capital in one year; 54,829 in another, and 80,139 in a third.

**Fossil Hamster.**

Professor Kaup records Cricetus vulgaris fossils, from the Riphaeian sand.

**HANAPER OFFICE.** one of the offices belonging to the Court of Chancery. Writs relating to the business of the subject, and their returns, were, according to the simplicity of antient times, originally kept in a hamper, in hanaperio; and others, relating to matters wherein the Crown was immediately or mediately concerned, were preserved in a little sack or bag, in pared bagi; whence the distinction of the Hanaper Office and Petty Bag Office, both belonging to the Common-Law Court in Chancery.

The business of the clerk of the Hanaper is to receive all money due to the king for the seals of charters, patents, commissions, and writs, as well as all fees due to the officers enrolling and examining them.

**HANAU-MÜNZENBERG** is a county in the electorate of Hesse-Cassel, on the north bank of the Main, a very fertile and well-cultivated district, containing about 490 square miles, with a population of above 90,000 inhabitants. The county had formerly its own count, but the family was subsequently succeeded into two their holes, destroy them unrelentingly. Notwithstanding this check, they are said to be so numerous in some seasons as to occasion a dearth of corn.

**Utility to Man.**—The fur of the animal is said to be valuable; and the peasant, when he 'goes a Hamster-nesting' in the winter, not only possesses himself of the skin of the plunderer, but of the plunder, which is said commonly to amount to two bushels of good grain in each exchange. Buffon, quoting Sulzer, says that in Gotha, where these animals were proscribed on account of their vast devastations among the corn, 11,564 of their skins were delivered at the Hôtel de Ville of the capital in one year; 54,829 in another, and 80,139 in a third.

**Fossil Hamster.**

Professor Kaup records Cricetus vulgaris fossils, from the Riphaeian sand.

**HANAPER OFFICE.** one of the offices belonging to the Court of Chancery. Writs relating to the business of the subject, and their returns, were, according to the simplicity of antient times, originally kept in a hamper, in hanaperio; and others, relating to matters wherein the Crown was immediately or mediately concerned, were preserved in a little sack or bag, in pared bagi; whence the distinction of the Hanaper Office and Petty Bag Office, both belonging to the Common-Law Court in Chancery.

The business of the clerk of the Hanaper is to receive all money due to the king for the seals of charters, patents, commissions, and writs, as well as all fees due to the officers enrolling and examining them.

**HANAU-MÜNZENBERG** is a county in the electorate of Hesse-Cassel, on the north bank of the Main, a very fertile and well-cultivated district, containing about 490 square miles, with a population of above 90,000 inhabitants. The county had formerly its own count, but the family was subsequently succeeded into two their holes, destroy them unrelentingly. Notwithstanding this check, they are said to be so numerous in some seasons as to occasion a dearth of corn.

**Utility to Man.**—The fur of the animal is said to be valuable; and the peasant, when he 'goes a Hamster-nesting' in the winter, not only possesses himself of the skin of the plunderer, but of the plunder, which is said commonly to amount to two bushels of good grain in each exchange. Buffon, quoting Sulzer, says that in Gotha, where these animals were proscribed on account of their vast devastations among the corn, 11,564 of their skins were delivered at the Hôtel de Ville of the capital in one year; 54,829 in another, and 80,139 in a third.

**Fossil Hamster.**

Professor Kaup records Cricetus vulgaris fossils, from the Riphaeian sand.

**HANAPER OFFICE.** one of the offices belonging to the Court of Chancery. Writs relating to the business of the subject, and their returns, were, according to the simplicity of antient times, originally kept in a hamper, in hanaperio; and others, relating to matters wherein the Crown was immediately or mediately concerned, were preserved in a little sack or bag, in pared bagi; whence the distinction of the Hanaper Office and Petty Bag Office, both belonging to the Common-Law Court in Chancery.

The business of the clerk of the Hanaper is to receive all money due to the king for the seals of charters, patents, commissions, and writs, as well as all fees due to the officers enrolling and examining them.

**HANAU-MÜNZENBERG** is a county in the electorate of Hesse-Cassel, on the north bank of the Main, a very fertile and well-cultivated district, containing about 490 square miles, with a population of above 90,000 inhabitants. The county had formerly its own count, but the family was subsequently succeeded into two their holes, destroy them unrelentingly. Notwithstanding this check, they are said to be so numerous in some seasons as to occasion a dearth of corn.

**Utility to Man.**—The fur of the animal is said to be valuable; and the peasant, when he 'goes a Hamster-nesting' in the winter, not only possesses himself of the skin of the plunderer, but of the plunder, which is said commonly to amount to two bushels of good grain in each exchange. Buffon, quoting Sulzer, says that in Gotha, where these animals were proscribed on account of their vast devastations among the corn, 11,564 of their skins were delivered at the Hôtel de Ville of the capital in one year; 54,829 in another, and 80,139 in a third.
extinct in the male line, Hanau-Münzenberg came, in 1736, to the electorate of Hesse Cassel, with which it has ever since been united (except from 1806, when the French took possession of it, to 1814, when the elector recovered it). It contains some mountainous tracts, extensive forests, and rich mines of copper, silver, cobalt, and salt. The inhabitants are Protestants, with the exception of between 400 and 500 French, who were settled there by the French emigrants from the Palatine in 1718. The Lutheran and Calvinists agreed to unite together as an evangelical church. There are some manufactures, chiefly in Hanau, the capital.

Roeck, who was formerly nearly equal in extent to Hanau-Münzenberg, but the larger portion, lying in Alsace, is now part of France; and the remainder, which occupies about 100 square miles, with 20,000 inhabitants, belongs to Baden.

The capital of Hanau-Münzenberg, situated in an extensive plain on the river Kinzig, near its junction with the Main, consists of the old and the new town. In the former is the magnificent castle, the gymnasium, the theatre, the hospital, and the synagoge. The new town has straight broad streets, and in the middle of it a large market-place, forming an oblong parallelogram, with handsome fountains in the four corners, and the large town-hall at one end. The castle has the appearance of a leaning tower, like that of Pisa. The inhabitants are 13,000, among whom are some descendants of the Walloons and Flemings who fled from the tyranny of Philip II.; likewise some of the French Court, who have settled in Hanau; the remainder of all nations. Hanau is the most manufacturing place in Hesse Cassel, and has a considerable trade. In the vicinity are the electoral palace of Philippsruhe and the baths of Wilhelmshain.

Bononcini, the Capuchin, was one of the most distinguished of Hanau, where he was born, an artist of the first rank. He was director for some years of the gymnasium, and, commanded by Prince Wrede, endeavoured to stop Napoleon on his retreat to France. The loss was very great on both sides, especially on that of the French, who were stated to have had 12,000 killed and 10,000 prisoners, but Napoleon made good his passage.

HANDEL [NAZ].

HANDEL, George Frederick, who, from having nearly the whole of his life in this country, and produced in it all his great works, the English feel some right to claim as their own, was born at Halle, in Saxony, on the 24th of February, 1684. He was the issue of a second marriage, which his father, an eminent physician and surgeon, contracted after he had reached his grand climeceteric. This son of his rather advanced age he destined for the profession of the civil law, but the child's passion for music, his eager desire of playing upon the violin, of being fed, to its pursuit, and the determined manner in which he evaded or resisted all attempts to divert him from a purpose nature seems to have prompted, at length softened the father, who, taking a different plan of action, gave the direction of his son's education to the learned doctor of Saxe-Weisensfelde, placed him under Friedrich Zachau, organist of the cathedral of Halle, an excellent musician. This professor soon made so willing a pupil acquainted with the principles of the science and the art of harmony; he then placed in his hands the best works of the greatest composers, without directing his attention to any one in particular, thus leaving him to form a style of his own out of an acquaintance with numerous models of accomplished superiority. So successful was this plan of education, that the youthful student composed a set of sonatas when only ten years of age, which was in the possession of George III., and most probably still forms a part of Hanau.

Handel continued his attendance on the same master till he attained his fourteenth year, when he was taken to Berlin, where the Italian opera was flourishing under the direction of Carl Friedrich and Andreas Bach, in London. He there attracted the notice of the elector, who proposed to send him to Italy, which offer, for some reason unknown, was declined by his father, who shortly after died. In this period he lost all traces of the young Handel till the year 1703, when he returned to Hamburg, in which city he may be said to have commenced his professional life. There he found Reinhard Keiser in the other opera, who was, for some years, the most celebrated composer of the higher class of operatic celebrity, but whose expensive and somewhat dissipated habits led him frequently to absent himself from his post, on which occasions Handel was appointed to fill his situation, a preference so irritated to Mattheson, an able musician and a voluminous writer on the art, that he violently assailed his favoured rival. A duel ensued, an nothing but a score, buttoned under Handel's coat, on which his antagonist's weapon broke, saved a life that soon proved of such inestimable value. Shortly after this he was employed to set a drama entitled Almira, the success of which was remarkable; it ran thirty nights uninterrupted. In 1706 he composed in the year following, both of which were as favourably received as his former work. He now found himself possessed of the means of visiting Italy, then the land of song. Here the charms of his music made an impression on the famous beauty and singer, Signora Victoria, a lady particularly distinguished by the grand-duke; but in this, as in every instance of a similar kind, Handel showed no disposition to avail himself of any particularities exhibited in his favour. His thoughts were solely all absorbed by his art; and it is but just to conclude that he was also influenced by those sentiments of moral propriety which, in every country, conduct through life.

Quitting Venice, Handel went to Rome, where he was hospitably entertained by the Cardinal Ottoboni, who had in his service a number of operatic performers, under the direction of the famous Corelli [Coreli], with whom, as well as with Domenico Scarlatti, the young Saxon speedily formed an acquaintance. There he produced Il Trionfo del Tempo and the Day, which he wrote for the Cardinal Pamphilj, and a sacred opera, a kind of oratorio, for the Grandees, as well as with Domenico Scarlatti, the young Saxon speedily formed an acquaintance. There he produced Il Trionfo del Tempo and the Day, which he wrote for the Cardinal Pamphilj, and a sacred opera, a kind of oratorio, for the Grandees.

In 1710 this great musician first arrived in London, and was soon honoured by the notice of Queen Anne. Aaron Hill, then manager of the opera, having formed a drama from Tasso's Gerusalemme Liberata, which Rolli worked into an opera under the direction of Handel, set music to it, and it was produced in March, 1711. It was received with success; but the attractions of London brought him back the following year to this metropolis, which thenceforward became his home. At the peace of Utrecht he, by the queen's command, composed a Te Deum and Jubilate, in which, were it, on the termination of his travels, return to perform the duties of his office.

In 1712 this great musician first arrived in London, and was soon honoured by the notice of Queen Anne. Aaron Hill, then manager of the opera, having formed a drama from Tasso's Gerusalemme Liberata, which Rolli worked into an opera under the direction of Handel, set music to it, and it was produced in March, 1711. It was received with success; but the attractions of London brought him back the following year to this metropolis, which thenceforward became his home. At the peace of Utrecht he, by the queen's command, composed a Te Deum and Jubilate, in which were recorded the rejoicings on that event. A pension of two hundred pounds was the reward of this service. His promise to return to Hanover was now either forgotten or its fulfilment delayed; when, in 1714, the death of Queen Anne placed the elector of Hanover on the British throne. Handel, taken by surprise, and conscious of having offended his patron, did not dare present himself at court; but his friend Boyce having written to him to meet the king, during a royal excursion on the Thames, with a band of wind-instruments, playing the charming Water-Music, written for the occasion, the composer was not only received as an ambassador, but his answer was that if Handel was not provided for, he would not take protection. His pension was immediately doubled; and many years after, when appointed to teach the princesses, Queen Caroline, consort of George II., added another 200l. a year to the former allowance, or 60l. per annum, no small income a century ago. From 1717 to 1718 Handel was an inmate in the house of the Earl of Burlington, where he constantly met Pope, whose regard for the German composer was now matured into friendship and Love, during the same period he composed so many operas, Duodo, Teseo, and Il Pastor Fido, besides several detached pieces. In 1718 he undertook the direction of the Duke of Chandos's chapel at Cannons, for which he composed many fine su-
HAN

them. He there also produced most of his concertos, sonatas, lessons, and organ fugues, his Acts and Galatia, for which was furnished him with the poetry, and the oration of Esther.

The business, but not the most fortunate, period of Handel's life now arrived. The English nobility formed a project for converting the Italian theatre into an Academy. More immediately, the proceedings of the London Academy of Music, a volunteer society of which he gave the subject of this biographical notice as manager, with a condition that he should supply a certain number of operas. In consequence, he went to Dresden to engage singers, among whom he found a Mattozzi. His first opera to the new establishment of which was unparalleled. But Bononcini and Ariosti, before alluded to, had been attached in some measure to the theatre, and having powerful friends, opposed themselves to the German intruder, who was very insolently called the greatest scoundrel. Hence those feuds, among the weak people of fashion, the remembrance whereof is perpetuated by Swift's well-known epigram. To calmly this it was proposed that an opera in those acts should be produced, and that each of the competing composers should set one act. The drama chosen was Musica Scenica. Handel's portion was declared the best; but, strange to say, though each, no doubt, strained his ability to the utmost in this scene, nowhere in the whole opera is known in the present day! Handel now, master of the field, produced about fifteen new operas; but the genius of discord, says the work from which we have before quoted, "seems to have taken up his abode in the temple of the theatre," and that spirit of cabal often caused and always encouraged by the weak, that is the larger, part of the ranks of fashion, compelled the great composer and able manager to retire from the theatre, with the loss of 10,000/. and a constitution much damaged by incessant labour and constant turmoil.

A slight paralytic affection was the consequence, which however the baths of Aix-la-Chapelle removed.

He then made another attempt to give operas at Covent Garden Theatre, but this proved equally mortifying and unprofitable. But the vexations and losses he encountered at the Italian Theatre ultimately led to the advancement of his fame and the repair of his fortune.

He performed at Easter, in imitation of the Concerto Spirituale, which he called oratorios, and at Covent Garden gave several, most of them composed for the occasion. But the receipts at these did not indemnify him for the expenses he incurred; every sublimest work, The Messiah, was as ill-attended as received in the capital of the empire, when first produced in 1741.

These failures were imputed, and justly, to the hostility of the nobility, who in defending the unvaried patronage of the Royal Family, still pursued him with unbataled vigour. From such persecution he determined to seek refuge in Ireland, then noted for the gaiety and splendour of its courts. He soon found himself to this circumstance in the well-known appeal to the Goddess of Delusion:—

"But soon, ah! soon rebellion will commence,

Fraternally bowers from awe nerve.

Strong in new arena, let gl explain Handel stands,

Like bold Ristevs, with a hundred hands—

To stir, to serve, to shake the world he comes,

And Jove's own banners follow Mars—

Arrest him, empress, or you sleep no more—

She hear, and drive him to his Delphic shore."

On his arrival in Dublin, says Dr. Burney, in his Commemoration of Handel, he, with equal judgment and humanity, began by performing The Messiah, an attempt to remove the odium of the city prison. He remained in Ireland about nine months, and had every reason to be satisfied with his visit.

Returning to London in 1742, he renewed his oratorios at Covent Garden Theatre, beginning with Solomon. From this time success attended all his undertakings. His last work drew crowds to the house, and The Messiah was equally attractive. The latter was, during a long period, performed annually at the Foundling Hospital, and alone added 10,300/. to the funds of that institution. It is next impossible to calculate what it has produced to other charities; the amount must be prodigious. He continued, till his death, an ardent lover of science, and more particularly of the ornithological, deriving considerable pecuniary advantage from them; for though still possessed by most of the nobility, the king (George II.) and the people actively supported him.

Late in life Handel was afflicted with blindness; he nevertheless continued to conduct his oratorios, and, as usual, performed concertos and other organ pieces between the acts. He even composed, employing as his amanuensis Mr. John Christian Smith, and assisted at one of his oratorios a week only before his decease, which took place on a Good Friday (according to his wish, it is said), April 13th, 1759. He was buried in Poet's Corner, Westminster Abbey, where a monument was reared—"a work which never fails to arrest attention and excite admiration—erected to his memory. 'But,' says the biographer before quoted, 'a still more honourable tribute to his memory was in the performances which took place under the roof which he had erected in his dust. A century having elapsed from the time of his birth, it was resolved that a Commemoration of Handel should take place. The management was entrusted to the directors of the Academy Concerts, and eight of the most distinguished members of the musical profession. The King, George III., zealously patronized the undertaking, and nearly all the upper classes of the kingdom seconded the royal views. The receipts at five performances amounted to the sum of 12,736/.; the disbursements to rather more than 6000/.; of the profits 1000/. was given to the Westminster Hospital, and the remainder to the Society for Decayed Musicians.

Handel was great in every style. In sacred music, especially of the choral kind, he not only throws at an immovable distance all who preceded and followed him, but which that subclass of genius which, between the middle and late periods of the eighteenth century, produced the most attractive productions. His choral works were in general in the German oratorio style. The most striking was between fifty-four and sixty-seven years of age, Jephtha, was produced at the latest moment of that period. And here we may, in passing, observe that the finest offprints of Haydn's genius had their birth after he had become a sexagenarian.

In the Queen's library are the original MSS. of nearly all Handel's works, filling eighty-two large folio volumes. These include 32 Italian operas, 23 oratorios, volumes of anthems, 4 of cantatas, 3 of Te Deums and a Jubilale, together with concertos, sonatas, &c. Not in the royal collection are 11 operas, harpsichord lessons, fugues, organ concertos, water-music, &c. &c. Of all these, Messiah was first performed in 1733; Israel in Egypt in 1738; Solomon in 1740; Messiah in 1741; Samson in 1742; Judas Macabaeus in 1746; Joshua in 1747; Solomon in 1749; and Jephtha in 1751.

HAND-FASTING. [Betrothment.]

HANDGLASS is a name given by gardeners to a portable glazed cover which they place over certain plants for one or two purposes; either to screen them from the effects of cold and wet without depriving them of much light, or to maintain around them an atmosphere of uniform humidity. Bell-glasses differ from handglasses in no respect with regard to the purpose they are intended to serve, but are blown from a larger piece of plate-glass; of volumes composed of many pieces fastened together. Glasses of this description are principally used to assist cuttings of plants in the process of striking root, or newly-planted individuals in establishing a new root. They also assist the formation of the action of handglasses seems to be this:—when cuttings or newly-planted individuals are exposed freely to the atmosphere, they part readily with the moisture they contain, and the air around them absorbs it. The moisture of the atmosphere of the plants or cuttings is thus removed, and the action will go on till the plant is exhausted or dead. The effect of a handglass is to invert this state of things: the moisture raised from the soil by evaporation, or produced by vegetable perspiration, necessarily accumulates beneath the handglass, the air enclosed by which gradually becomes

Digitized by Google
more and more moist, and at last is saturated; this circumstance is abated by the leaves, or branches, or soil, and thus restored to the plant which had lost it; in addition to which, perspiration itself necessarily goes on the more slowly in proportion as the air itself is charged with moisture. Whence it is that a handkerchief or any such transparent cover, keeps the temperature in which the plant breathes higher than the external air, and thus stimulates the languid powers of vegetation.

Hannibal, the son of Hanno in Africa, was born b.c. 247. At the age of nine he accompanied his father to Spain, who, previous to his departure, took his son to the altar, and placing his hand on the victim, made him swear that he would be a friend to Romans. It does not appear how long Hannibal remained in Spain, but he was at a very early age associated with Hasdrubal, who succeeded his father in the command of the Carthaginian army in Spain, and obtained the undivided command of the army, and quickly conquered the Oscines, Vaccines, Carpienses, and the other Spanish tribes that had not been subdued by Hasdrubal. They were anxious to Saguntum, alarmed at his success, and messengers to Rome to inform the Romans of their danger. A Roman embassy was accordingly sent to Hannibal, who was passing the winter at New Carthage, to announce to him that the independence of Saguntum was guaranteed by the treaty between the Carthaginians and Romans (concluded b.c. 226), and that they should consider any injury done to the Saguntines as a declaration of war against themselves. Hannibal however paid no regard to this remonstrance.

More than twenty years had elapsed since the termination of the first Punic war, during which period the Carthaginians had recovered their strength, and had obtained possession of the greater part of Spain; and the favourable opportunity had arrived for renewing the war with the Romans.

In b.c. 219 Hannibal took Saguntum, after a siege of eight months, and employed the winter in making preparations for the invasion of Italy. He first provided for the security of Spain and Africa by leaving an army of about 16,000 men in each country; the army in Africa consisted principally of Spanish troops, and that in Spain of Africans, under the command of his brother Hasdrubal. He had already received promise of support from the Gauls who inhabited the north of Italy, and who were anxious to deliver themselves from the Roman dominion.

Having thus made every necessary preparation he set out from New Carthage late in the spring of b.c. 216, with an army of 40,000 foot and 12,000 horse, from the Ebro to the Pyrenees he was opposed by a great number of the native tribes, but they were quickly defeated though with loss. Before crossing the Pyrenees he left his nearest country with a detachment of 11,000 men. He sent back the same number of Spanish troops to their own cities, and with an army now reduced to 50,000 foot and 3000 horse, advanced to the Rhone. Meantime two Roman armies had been levied; one, commanded by the consul P. Cornelius Scipio, was intended to oppose Hannibal in Spain, and a second, under the other consul T. Sempronius, was despatched for the invasion of Africa. The departure of Hannibal was delayed by a revolt of the Boan and Insubrian Gauls against whom the army was sent which had been intended for the invasion of Spain, under the command of one of the praetors, who was therefore despatched to remit them to Hannibal till a new army could be raised. When the forces were ready he sailed with them to the Rhone and anchored in the eastern mouth of the river; being persuaded that Hannibal must still be at a considerable distance from him, as the country through which he had to march was difficult and inhabited by many warlike tribes. Hannibal however quickly surmounted all these obstacles, crossed the Rhone, though not without some opposition from the Gauls, and continued his march all the way up the left bank of the river. Scipio did not arrive at the place where the Carthaginians had crossed the river till three days afterwards; and despairing of overtaking them, he sailed back to Italy with the intention of meeting Hannibal when he had crossed the Alps. Scipio sent his brother Cneus into Spain with the greater part of the troops to oppose Hasdrubal.

Hannibal continued his march up the Rhone till he came to the Isere. Marching along that river, he crossed the Alps (probably) by the Little St. Bernard, descended into the valley of the Dora Baltea, and followed the course of the river till he arrived in the territories of the Insubrian Gauls. The passage of Hannibal across the Alps has been matter of considerable doubt. Whitby (Hist. of the Alps) says that "The Course of Hannibal over the Alps ascertained," Lond., 1794, 2 vols. 8vo., maintains that the passage was made over the Great St. Bernard; those who wish for the correctness of Hannibal's route would consult A Dissertation on the Passage of Hannibal over the Alps, by Wickham and Cramer, 2nd ed., Oxford.

Hannibal completed his march from New Carthage to Italy in the autumn of b.c. 216, and immediately set to work on the conquest of Italy. According to a statement engraved by his order on a column at Lacinum, in Bruttia, which Polybius saw, his army was reduced to 12,000 African, 8000 Spaniards, and 6000 cavalry, when he arrived in the territories of the Insubrian Gauls. After remaining some time among the Insurbans to recruit his army, he marched southward and encounteredCornelius Scipio on the right bank of the river Tisnus. In the battle which ensued the Romans were defeated, and Scipio with the remainder of the army retiring along the left bank of the Po, crossed the river before the Romans could take him, and encamped near a town called Placentia. His Afterwards retreated and entrenched himself strongly on the right bank of the Trebia, where he waited for the arrival of the army under the other consul T. Sempronius. Sempronius had already crossed with his army to Sicily; he was on his first arrival were prevented from joining him by the presence of Scipio's army in their country, now eagerly assisted him with men and supplies.

In the following spring (b.c. 216) the Romans made great preparations to oppose their formidable enemy. Two new armies were levied; one was posted at Arretium, under the command of the consul Flaminius, and the other at Ariminum, under the other consul Servilius. Flaminius determined to attack Flaminius first. In his march southward through the swamps of the basin of the Arno his army suffered greatly, and he himself lost the sight of one eye. As he was marching through the neighbourhood of Fosseoli, he marched past Arretium, ravaging the country as he went, with the view of drawing out Flaminius to a battle. Flaminius, who appears to have been a slow, but strong man, hastily followed Hannibal, and being attacked by Hannibal on the right bank of the Apennus was completely defeated by the Carthaginians, who were posted on the mountains which encircled the valley. Three or four days after Hannibal cut off a detachment of Roman cavalry, amounting to 4000 men, which had been sent by Servilius to assist his colleague.

Hannibal appears to have entertained hopes of overthrowing the Roman dominion, and to have expected that the other states of Italy would take up arms against Rome, in order to recover their independence. To conciliate the affections of the Italians, he dismissed without ransom all the prisoners whom he took in battle; and to give them an opportunity of distinguishing their army, he took the eastern side of the peninsula, through Umbria and Picenum, into Apulia; but he did not meet with that co-operation which he appears to have expected.

After the defeat of Flaminius, C. Caius Maximus was appointed dictator, and a defensive system of warfare was adopted by the Romans till the end of the year.

In the following year, b.c. 215, the Romans resolved upon carrying Hannibal into Spain, and another army under the command of T. Aemilius Paullus was raised, which was commanded by the consuls L. Aemilius Paulus and C. Terentius Varro. The Carthaginian army now amounted to 40,000 foot and 10,000 horse. The armies met each other in a battle near the mount named Bac Cusnus, in the country of the Insubrians, and near the town of Acapulco. In the battle which was fought near this place the Romans were defeated with dreadful carnage, and with a loss which, as stated by Polybius, is quite incredible: the
whole of the infantry engaged in the battle, amounting to 70,000, was destroyed, with the exception of 3000 men who escaped to the neighbouring cities, and also all the cavalry, with the exception of 4000 of Prusias, king of Bithynia, who were left and escaped with Varro. A detachment of 10,000 foot, which had been sent to surprise the Carthaginian camp, was obliged to surrender as prisoners. The consul L. Flaminius, the two brothers C. and T. Fabii, and the praetor C. Domitius, were also among the slain. Hannibal lost only 4000 Gauls, 1500 Africans and Spaniards, and 200 horse.

This victory placed the whole of Lower Italy in the power of Rome, and also made it difficult for Hasdrubal to come to his brother’s assistance. Hannibal was unable to make any active exertions for the further conquest of Italy till he received a reinforcement of troops. He was in hopes of obtaining support from Philip of Macedon and from the Syracusans, with both of whom he formed an alliance; but the Romans found means to keep Philip employed in Greece, and Syracuse was besieged and taken by Marcellus, B.C. 214-212. In addition to this Cipus was retaken by the Romans, B.C. 211. Hannibal was therefore obliged to depend upon the Carthaginians for help, and Hasdrubal was accordingly ordered to march from Spain to his assistance.

Concis Scipio, as already observed, was left in Spain with the forces left by his father. He was afterwards joined by P. Cornelius Scipio, and the war was carried on with various success for many years, till at length the Roman army was entirely defeated by Hasdrubal, B.C. 212. Both the Scipios were killed in the battle. Hasdrubal was able to join his brother, but was prevented by the arrival of young P. Cornelius Scipio in Spain, B.C. 210, who quickly recovered what the Romans had lost. In B.C. 210 he took Perus, and C. Flaminius, son of that great commander, was killed, in the Carthaginians had lost almost all their dominions in Spain, that Hasdrubal set out to join his brother in Italy. He crossed the Alps without meeting with any opposition from the Gauls, and was invited into the Roman citizenship, but the Romans were aware that he had entered Italy. After besieging this town without success, he continued his march southward; but before he could effect a junction with Hannibal he was attacked by the consul C. Claudius Nero, at M. Livius, on the banks of the Metaurus, in Umbria, his army was cut to pieces, and he himself fell in the battle. This misfortune obliged Hannibal to act on the defensive, and from this time till his departure from Italy, B.C. 203, he was supposed to have lived in the temple of Cronus, at Ephesus, by which time he had maintained his army in a hostile country without any assistance from his government at home.

After effecting the conquest of Spain, Scipio passed over into Gaul, where he went to the aid of the French, who had lost their kingdom by being compelled to pay tribute to Italy, B.C. 204. With the assistance of Massimina, a Numidian prince, he gained two victories over the Carthaginians, who hastily recalled their great commander from Italy to defend his native state. Hannibal landed at Leptis, and advanced near Zama, five days’ journey from Carthage towards the west. Here he was entirely defeated by Scipio, B.C. 202; 20,000 Carthaginians fell in the battle, and an equal number were taken prisoners. The Carthaginians were obliged to sue for peace; and thus ended the second Punic war, B.C. 201.

After the conclusion of the war Hannibal vigorously applied himself to espionage, which was left to the Carthaginian government. He reduced the power of the perpetual censors (judges as Liy, xxxiii. 46, calls them), and provided for the proper collection of the public revenue, which had been embezzled. He was supported by the people in these reforms; but he incurred the enmity of many powerful men, who represented to the Romans that he was endeavouring to persuade his countrymen to join Antiochus, king of Syria, in war against them. A Roman embassy was consequently sent to Carthage, to demand the punishment of Hannibal as a disturber of the public peace; but Hannibal, aware that he should not be able to resist his enemies, supported by the Roman power, escaped from the city, and sailed to Tyre. From there he sent a brother named Ateus, B.C. 199, and contributed to fix him in his determination to make war against the Romans. If Hannibal’s advice as to the conduct of the war had been followed, the result of the contest might have been different; but he was only employed in a subordinate command, and had no opportunity for the exertion of his great military talents. At the conclusion of this war Hannibal was obliged to seek refuge at the court of the Ptolemies, king of Euxeneis, B.C. 217, and there he remained about five years, and on one occasion obtained a victory over Eumeenes, king of Pergamum. But the Romans appear to have been uneasy as long as their formidable enemy was alive. They twice sent embassies to demand his surrender, but were afraid of offending the Romans, agreed to give him up. To avoid falling into the hands of his ungenerous enemies, Hannibal destroyed himself by poison at Nicomedes, in Bithynia, B.C. 205. He was 63 years old. It has been said that the whole of Carthage was destroyed, but that is not the case.

The personal character of Hannibal is only known to us from the events of his public life, and even these have not been commemorated by any historian of his own country; but we cannot doubt that his writings, which have not come down to us, would have here presented a more outline, even in the narrative of his enemies, without admiring his great abilities and courage. Polybius remarks (b. xi. p. 637, Casaub.); ‘How wonderful is it that in a course of many years, in which he maintained the war in Italy, he showed himself to dismiss his army from the field, and yet be able, like a good governor, to keep in subjection so great a multitude, and to confide them within the bounds of their duty, so that they neither mutinied against him, nor incurred among themselves. Though his army was composed of people of various countries, of Africans, Spaniards, Gauls, Carthaginians, Italians and Greeks—men who had different laws, different customs, and different languages, yet he was enabled to organize among them that was common—yet so dexterous was his management that, notwithstanding this great diversity, he forced all of them to acknowledge one authority and to yield obedience to the regulations and laws of the Roman state, in the midst of very various fortune. How high as well as just an opinion must these things convey to us of his ability in war. It may be affirmed with confidence that if he had first tried his hand at the city, and had not come last to attack the Romans, he could scarcely have failed in any part of his design.’ (Hampton’s Translation.)

Tobias, b. iii., which contains the history of Hannibal’s campaigns till the battle of Cannae, and the fragment b. vii., viii., ix., xiv., xvi.; Livy, xxi., xxii.; Appian; Plutarch; Life of L. Fabius Maximus; Nepos’ Life of Hannibal.

HANNUS PERPLUS is a small Greek treatise, entitled ‘The Perplus (i.e. voyage) of Hanno, king (i.e. commander) of the Carthaginians, round the parts of Libya beyond the pillars of Hercules, which he posted up in the temple of Kronos at Calabria in the sea, and which has been doubted by many critics; but it appears probable, from the testimony of Pliny (Nat. Hist., ii. 67; v. 1, 36, Mela (iil. 9), and other ancient authors, that such a voyage was actually performed by a Carthaginian, and that the ‘Perplus’ of the western coast of Northern Africa could not have been written by a person who had no knowledge of the localities. The treatise we possess appears to be a translation of the Carthaginian document preserved in the temple of Kronos. The time at which this voyage was performed is quite uncertain; Pliny (N. H., ii. 67) places it in the flourishing period of Carthaginian history.

The object of the expedition is stated at the commencement of the Perplus: ‘It was decreed by the Carthaginians that Hanno should sail beyond the pillars of Hercules, and found Libyphoenician cities. He sailed accordingly with 60 ships of Cyrene, and a body of men and women to the number of 30,000, and landed at the six cities, the first of which he founded was Thamitateron, near the pillars of Hercules, probably in the neighbourhood of Marmora. He then doubled the promontory Solor, which Rennell considers to be the same as Cape Blanco, 33° N. lat. A little to the south of C. Cantin, five more cities were founded, namely, Karikon-techos, Gute, Akra, Melita, and Arambus, and Kerne. After passing the perpetual other cities, he founded Cape Blanco, Hanno founded Kerne. From Kerne the voyage was one of discovery; and after advancing as far south as Estrus Leonia or his range, according to Rennell, he was obliged to return through want of provisions.

The Greek text is printed in Hudson’s ‘Geographiche veteris Scriptores Graec Minores.’ It was also published VOL. XIV.—G

Many other Carthaginians of the name of Hanno are mentioned. Of these the most celebrated was the leader of the party at Carthage which was opposed to a war with the Romans at the time of the first and commencement of the second Punic War.

HANOVER, THE KINGDOM OF, is situated between 50° 20' and 53° 51' N. lat. and 11° 18' and 11° 10' long. E. of Greenwich. It is bounded on the north-west by the German Ocean, on the north by the Elbe (which separates it from the territory of Denmark, and Mecklenburg), on the east and south-east by Prussia and Brunswick; on the west by Hanover, the whole containing an area of 14,470 square miles.

The kingdom of Hanover is divided into six provinces, called Landdrostei, and one Mining Intendency (Berghauptmannschaft), the total population being 1,072,898 souls.

1. Hanover (320,180 inhabitants) consists of, 1. The principality of Calenberg (177,920 inh.), containing the towns of Hanover, capital, Puttenen, Hamelin; 2. the county of Ems (97,490 inh.); 3. the county of Hildesheim (110,700 inh.), chief town Hildesheim.


3. Lower Saxony (306,117 inh.), chief town, Lüneburg (13,486 inh.), Harburg (5,450 inh.), Celle, otherwise Zoll (10,137 inh.).

4. Stade (241,142 inh.) consists of, 1. The duchy of Bremen (190,119 inh.), chief towns, Stade (5660 inh.), Buxtehude; 2. the district of Olden (17,409 inh.), chief town Olden; 3. the principality of Verden (23,523 inh.), chief town Verden (5117 inh.).

5. Osnabrück (265,624 inh.) consists of, 1. The principality of Osnabrück (182,534 inh.), chief towns, Osnabrück (2670 inh.), Duderstadt (2670 inh.). 2. The Lower Lüneburg, comprising districts on the northern and western declivities of the Harz, lying in the territory of Hannover and Brunswick, and belonging to both in common. Hanover having four-sevenths and Brunswick three-sevenths of the revenue.

Hanover, as a member of the German Confederation, is the fifth in rank, with four votes in the full council. It furnishes one elector, one first and two second members to the Congress of the Confederation, which forms part of the 10th corps, and contributes 2000 florins annually to the treasury of the Confederation.

Of the Country, Soil, Climate.—The southern provinces of Grabenberg and Güttlingen are mountainous: in the former is the Harz (Güttlingen), in the latter the Sollingerwald. Lower ranges, uniting these, traverse the greater part of the kingdom. The towns of Hildesheim, Hanover, and Osnabrück, to the sea-coast, the whole country is one vast plain, with only occasional and not considerable elevations. The mountains abound in mineral wealth, and are covered with forests of red pine and fir, with some oaks and other timber. The largest oak in the kingdom is in the village of Hartmannshausen, near Celle. Its circumference close to the ground is 43 feet, and it is said to have been produced by the first branch of a tree 35 feet. Between the mountains the country is the most fertile valleys, and where the country slopes from the mountains to the plain there is excellent arable land. Then follows a sandy tract from 50 to 70 miles in breadth. The lower tracts are rich marshes, and the upper parts are partly forested. All this part of the country is alluvial, and numerous marine substances are found preserved in it. The climate is on the whole mild and temperate, differing of course according to the relative situation of mountain or plain, and the state of cultivation. In the lower parts fogs are frequent, and on the sea-coast violent hurricanes. The prevailing winds are the north-west in winter, the east in spring, and the south-west in summer. The principal rivers are the Elbe, the Weser, and the Weser, in their course numerous secondary streams, as the Aller, Leine, Ilmenau, and Lüne, and empty themselves into the German Ocean. There are only two large lakes; the Steinabben and the Dimmers, near the Wehrberg in the Harz. In East Friesland is the subterraneous Lake Jordan, the surface of which is so thickly overgrown with vegetation that waggons can pass over it.

Manufactures and Trade.—Manufactures are not carried on to any considerable extent. Thread and linen ist manufactured at Hamelburg (52,000 inh.) and at other places, and woollen and calicos are introduced, and considerable quantities are exported. If a better system of agriculture were introduced, the produce of the country might be increased. The income of the Revenue is chiefly derived from the taxes, export, import, and transit duties. The total net
The military establishment is 20,000 infantry, 2700 cavalry, and 18,000 militia, or Landwehr. All men able to bear arms, from the age of 17 to that of 50, without excep-
tion, are liable to serve in the regular army, garrison troops, or local mili-
tia. There are 10 garrison towns. The manufactures connected
with the army, are one of small-armers at Herzberg, one of gunpowder at Herszen, and a cannon-foundry in Han-
over.

Religion, Education, National Church.—The religion is
Protestant: of the inhabitants, 1,340,000 are Lutherans, 100,000 Calvinists, and about 2000 Mennonites and Moravians. There were originally 11,000 Jews, but 19,000 Jews. In 1830 a superior board was established in Hanover for the direction of all matters relative to the
schools. Hanover has a university at Göttingen (Göttingen
Gymnasium); an academy for the equestrian order; an academy
for the general staff, founded in 1824; a seminary for school-
masters; 16 gymnasia; 20 central schools; 5 seminaries; a surgical and two veterinary schools; and 3285 schools in the
towns and country, of which 2650 are Protestant, and 536
Roman Catholic. There are besides, numerous poorhouses
and work-houses and charitable institutions.

History.—In the remotest times of which we have any
record, the Germanic tribes which inhabited the west were
inhabited by small independent tribes of hunters and
herdsmen. The Cherusci, celebrated for their victory over
the Roman General Quintillus Varus, dwell about the Harz
and face into Saxony, and to the north of the mouth of
the Weser; the Longobard or Lombards, on both sides of
the Elbe. When Charlemagne first introduced the
Christian religion, the country was in the power of the
Saxons. Though subsequently, as the imperial or central
authority was gradually weakened, the counties were
ruled by petty territorial princes, called Electors, a
principle of spiritual and temporal, or Prussian "fief,
with almost despotic authority, yet the condition of the
people improved; the mines of the Harz and the salt
springs of Lüneburg were discovered, and a considerable
town and extensive military establishments, of which no
notices are preserved, were founded at the northern
boundary of the country. The mines of the Harz region
were worked by the Elector of Saxony, and some mines of
silver and coal are now worked at Haldensleben, in the
county of Haldensleben, by the Elector of Hanover, and
the copper mines are now worked by the Elector of
Hannover, the latter of which succeeded to the throne of
Saxony in 1827. In 1830 the Saxon government dissolved
the University of Göttingen, and the Saxon University
League found favour here, and of the 85 towns com-
posing that celebrated confederation, 13 were in the present
kingdom of Hanover. We cannot trace the various parti-
tions of territory which took place in consequence of the
division of the family into different branches, all which
have however become extinct, except those of Brunswick
Wolfenbüttel and Brunswick Lüneburg, the latter of which
were the immediate successors to the throne of Göttingen on
the death of Queen Anne in 1712. (See Emerick Lütz) and of the same
consequences, that the electors of Hanover continued to be kings
of Great Britain, till, on the death of his late majesty William
IV., the crown of Great Britain devolving on Queen Victo-
ria. The total expenditure of the crown being limited to the
male line, the two countries were separated, and the Duke of Cumberland, eldest surviving brother of
King William, ascended the throne of Hanover by the name of
Ernest Augustus. That Hanover was not to be governed
without a sufficiency of the union of the two persons in one
person cannot be denied, but whether they were not more than compensated
by the disadvantages is a question that has often been
debated, and which enlightened minds have arrived at
the conclusion, that with the eighteenth century a period of prosperity
commenced such as Hanover had not yet seen. But then
it co-operated with Great Britain in the war of 1741, and
in the same year the Hanoverian army, which had
advantages to it, as the country was through the whole time the
arena of hostile armies, and suffered both from friends and
enemies. Theuckland which Northern Germany enjoyed for
nearly 30 years after the peace of Paris, 1763, and the
great increase of the commerce of England in North
America, doubled the trade of Bremen, Hamburg, and
Altona with the interior of Germany, which was still fur-
ther augmented from 1792 to 1803 by the ruin of the
commerce of France and Holland; and one who has been
living carried on from those seaports through Hanover, gave
an extraordinary impulse to the prosperity of that kingdom.

From the spring of 1833 Hanover took part in the war
with France; but in 1795 was included in the convention
between France and Prussia for the neutrality of the North
of Germany. In the spring of 1801, when differences arose
between England and the Northern powers, Prussia occu-
pied the vacant position of Hanover, and Napoleon, in
April, 1801, took possession of it. Hanover was then
occupied by the French army, and remained in occupation
until 1813, when the country was overrun by the
French armies, and the constitution of Hanover was
abolished by the French convention, and restored by
the peace of 1812. In 1813 the kingdom of Hanover
was restored, and the constitution of 1812 was restored.

The sudden end of the war left the country in a
state amidst the most difficult problems, and the
administration of the affairs of state fell on the
shoulders of a prince, who, though a faithful
ally of France, was a strong opponent of
the French revolution, and who, though
a friend of Napoleon, was a faithful
ally of Prussia. The French
armies were driven out of
the country, and the
constitution of
Hanover was
restored.

The

1763,

1792,

1806,

1813,

1816,
principality of Calenberg, lies in 52° 28' N. lat. and 3° 42' E. long. It is situated in an agreeable, well-cultivated plain, on the river Leine, which is navigable from the city to its junction with the Weser. The city consists of three parts, the Old Town, the English New Town, and the New Town, on the other side of the river. In the first the streets are for the most part crooked and narrow, and the houses old fashioned and irregular; but the two other parts are handsomely and regularly built. In the last is George Street, consisting of large houses built in a plain, and facing the rampart now converted into public walks. A tract or suburb outside of the walls, called the Gartengemeinde, contains above 500 houses with handsome gardens. The most considerable buildings are the palace (with the opera-house and palace church), which the French converted into barracks and an hospital, and which is now used for the government offices, the palace of the duke of Cambridge, the mint, the arsenal, the royal mans, the town-hall, with a good library of 40,000 vols., the royal library with the archives, both situated on the esplanade (or parade). Hanover has also four Lutheran, one German Calvinist, one French Calvinist, and one Roman Catholic church, and a synagogue. Among the charitable institutions are the Orphan Asylum, infirmaries, hospitals, and poor-houses. For the purposes of education there is a lyceum, a female school of industry, many country schools for schoolchildren. The Georgianum was founded in 1776, for the education of forty sons of Hanoverian nobles, who are admitted at the age of ten years, paying a small sum on their admission, after which the expenses of their education is defrayed by Government. A flourishing Bible Society has been established here for some years. The manufactures are numerous, and the trade extensive. In the neighbourhhood are the royal country palace of Monbrilliant, the gardens formerly belonging to Count Wurtemberg, and now to the crown, with fine collections of works of art, and the royal palace of Harrenhausen. The approach to this building, which is by no means remarkable for its architecture, is a long avenue of lime-trees. The pleasure-gardens are extensive, in which there are remarkable water-works that throw up a column of water as thick as a man's body to the height of 120 feet. The orangery, greenhouses, and hot-houses of Herrenhausen were formerly the royal-pleasure, the new addition, and the collection of rare exotics supposed to be exceeded only by that of the emperor of Austria at Schoenbrunn. But the French carried away all the finest plants, particularly an almost unique collection of Cape botanicals, as they did the swans from the parks, to adorn the empress Josephine's seat at Malmaison. Great efforts have since been made to replace the loss.

Hanover was founded at the latter end of the eleventh century, and in 1203 was assigned to the eldest son of Henry the Lion. In 1641 Christian Louis took up his abode in the palace which had been lately erected, and it has ever since been the residence of the prince and the capital of the state. In 1648 the alliance between the League and Prussia was concluded here: and in 1745 the convention which preceded the peace of Dresden. The walls, with five gates, and broad ditches, were partly levelled in 1758, and laid out in streets, and the remainder converted into a handsome esplanade, on which is the marble bust of Leibnitz, by an Irish sculptor of the name of Hewetson, placed under a cupola in the antique style; and the Waterloo Column, 162 feet high, with the figure of Victory on the summit, which was finished in 1832.


HANSE TOWNS, called also the Hanze, and the Hanseatic League, a celebrated commercial confederacy, which took its name from the antient German word 'Hanse,' signifying an association for mutual support, in which sense it was adopted by the towns of the Elbe and itsdelta. It was formed in 1161, by the cities of Hamburgh, Lübeck, and Bremen in the middle ages the depositories of the manufactures of Italy and Germany, importing into which they supplied the northern countries of Europe in exchange for their raw produce. The wealth which they acquired by their commerce excited the envy and the rapacity of the princes and nobles; the imposition of new and the augmentation of old tolls were great impediments to trade, which was likewise rendered unsafe by numerous banditti and pirates who infested the roads and the neighbouring seas and rivers. In order to protect the commerce on the Elbe and the German Ocean, Hamburg concluded in 1239 an alliance with the inhabitants of Ditmarsch, at that time independent, and those of the land of Hadelin. Two years later Lübeck concluded a similar alliance with the towns of Schleswig and Holstein. The other cities of the league maintained this alliance with their individual shires, and at the same time collected and facing the rampart now converted into public walks. A tract or suburb outside of the walls, called the Gartengemeinde, contains above 500 houses with handsome gardens. The most considerable buildings are the palace (with the opera-house and palace church), which the French converted into barracks and an hospital, and which is now used for the government offices, the palace of the duke of Cambridge, the mint, the arsenal, the royal mans, the town-hall, with a good library of 40,000 vols., the royal library with the archives, both situated on the esplanade (or parade). Hanover has also four Lutheran, one German Calvinist, one French Calvinist, and one Roman Catholic church, and a synagogue. Among the charitable institutions are the Orphan Asylum, infirmaries, hospitals, and poor-houses. For the purposes of education there is a lyceum, a female school of industry, many country schools for schoolchildren. The Georgianum was founded in 1776, for the education of forty sons of Hanoverian nobles, who are admitted at the age of ten years, paying a small sum on their admission, after which the expenses of their education is defrayed by Government. A flourishing Bible Society has been established here for some years. The manufactures are numerous, and the trade extensive. In the neighbourhhood are the royal country palace of Monbrilliant, the gardens formerly belonging to Count Wurtemberg, and now to the crown, with fine collections of works of art, and the royal palace of Harrenhausen. The approach to this building, which is by no means remarkable for its architecture, is a long avenue of lime-trees. The pleasure-gardens are extensive, in which there are remarkable water-works that throw up a column of water as thick as a man's body to the height of 120 feet. The orangery, greenhouses, and hot-houses of Herrenhausen were formerly the royal-pleasure, the new addition, and the collection of rare exotics supposed to be exceeded only by that of the emperor of Austria at Schoenbrunn. But the French carried away all the finest plants, particularly an almost unique collection of Cape botanicals, as they did the swans from the parks, to adorn the empress Josephine's seat at Malmaison. Great efforts have since been made to replace the loss.

Hanover was founded at the latter end of the eleventh century, and in 1203 was assigned to the eldest son of Henry the Lion. In 1641 Christian Louis took up his abode in the palace which had been lately erected, and it has ever since been the residence of the prince and the capital of the state. In 1648 the alliance between the League and Prussia was concluded here: and in 1745 the convention which preceded the peace of Dresden. The walls, with five gates, and broad ditches, were partly levelled in 1758, and laid out in streets, and the remainder converted into a handsome esplanade, on which is the marble bust of Leibnitz, by an Irish sculptor of the name of Hewetson, placed under a cupola in the antique style; and the Waterloo Column, 162 feet high, with the figure of Victory on the summit, which was finished in 1832.
HANWAY, JONAS, born in 1712, deceased in 1786, was a Russian merchant, connected through his Russian dealings with the trade into Persia. Business having led him into that country, he published in 1753 his "Historical Account of the British Trade over the Caspian Sea, with a Journal of Travels from London through Russia into Persia, &c." 4 vols. 4to., a work of no pretension to literary elegance, but containing much information on the commercial subjects of which he speaks, and on the history and manners of Persia. The latter part of his life was employed in supporting, by his pen and personal exertions, a great variety of charitable and philanthropic schemes: and he gained so high and honourable a name, that a deputation of the charitable parties, among them a request to government that some substantial mark of public favour should be conferred on him. He was in consequence made a commissioner of the navy. The Marine Society and the Magdalene Charity, both still in existence, owe their establishment mainly to him: he was also one of the great promoters of Sunday-schools. (Pugh's Remarkable Occurrences in the Life of Jonas Hanway.)

HAPALE. The name employed by Iliger, Kubl, and others, to distinguish the generic name of Sima, commonly known by the name of Sangilina, Sangunia, &c. [JACQUES.] HAPSGURPS. A village on the coast of Norfolk, remarkable for bold cliffs of diluvial clay and pebbles. These wasting cliffs are supplied by most geologists to be the original repositories of the numerous remains of the mammoth and other quadrupeds which are dredged from the cliffs of the coast of Denmark. Many of these specimens have been obtained from the face of the cliffs, it is conceivable that in the course of ages many may have been collected on the bed of the sea, out of the enormous quantity of each species of such materials which have been undermined and sorted by the waves. The specimens are in a peculiar state of conservation. [HAPSGURPS.] [HARSBURG.] HARSBURG. HARSBURG.

HARDICANUTE, HARDECANUTE, or HARDACNUTE, was the eldest of the sons of Canute the Great, king of England, Denmark, and Norway, by Emma, styled the "Flower of Normandy," daughter of Richard I., duke of Normandy, and widow of Ine, king of Mercia, whom he had married in 1017. [ETHELRED II.] The death of Canute, in 1035, brought forward as claimants to the inheritance of his dominions Sweyn and Harold, his two sons by Alfgiva, daughter of Alfhelm, earl of Northampton, to whom however it is asserted by most historians that he never had married; Hardicanute, his son by Emma; and Edward, the elder of the two sons of Emma by her former husband Edward the Great. In 1040, these two kings made no pretensions to that of England. Edward (afterwards Edward the Confessor) and his brother were with their uncle, Duke Richard II., in Normandy. Hardicanute was also in the government, but it is thought that he had some time before entrusted to him by his father. It has been supposed that Canute had intended that Hardicanute, as his eldest legitimate son, should succeed him in all his three kingdoms; it is certain that he designed him for his successor in the sovereignty of England, in conformity with a special arrangement which had been made on his marriage with Emma. Harold however had the important advantage of being on the spot at the time of his father's death, and had to contend over the pretensions of both his rivals. A civil war was prevented by an agreement that the authority of Hardicanute should be confined to the country south of the Thames, constituting the Anglo-Saxon kingdom of Wessex, while Edward, king of the northern Saxons, received the rest of the kingdom of England, including London, should be reserved to Harold. Meanwhile Hardicanute remained in Denmark, leaving the government of his English province in the hands of his nephew Hardicanute, earl of Northampton, to whom and Harold beacame undisputed king of all England. For the next two years Hardicanute did nothing to vindicate his rights. At last, on the repeated importunities of his mother, he undertook to make good his claim, and on the 23rd of April, 1042, Harold in a great array attacked and routed the army of Hardicanute, which, after abandoning the field, made its way to Denmark, and thence to Norway, where Hardicanute was assassinated (see Skive's Chronicle of Scandinavia, 1047, 1050, &c.).

HARDEOUIN, JOHN, commonly called PÈRE HARDEOUIN, was born of obscure parents at Quimper in Brittany, in 1647. He entered the society of the Jesuits at an early age, and devoted himself to the study of belles-lettres, the learned languages, history, philosophy, and divinity. A large portion of his life was spent in undertaking to prove, chiefly from medallists, that the greater part of those writings which are considered as ancient, both classical and of the early Christian age, were forged by means of the thirteenth century. He excepted only the works of Cicero, Pliny's "Natural History," Virgil's "Georgics," and Horace's "Satires" and Epistles." These he supposed to be the only genuine works of antiquity remaining, except a few inscriptions and fast; and that from these the monks had drawn up and published Tertullian's "Plays," Livy's and Tacitus's "Historics," Virgil's "Aeneid," Horace's "Odes," &c. See his "Chronique Antiquité de la France," 4to., Paris, 1666; "Lettres de l'Antiquité," 4to., Paris, 1692; "Lettres de Nummis Hierodulium," 4to., Paris, 1693. His opinions upon religious subjects were not less wild than those upon profane learning. The Society of the Jesuits at last interferred, and Hardouin, in 1708, published the recantation of his opinions.

His edition of Pliny's "Natural History," prepared for the use of the Dauphin, was published at first in five volumes, 4to., Paris, 1703; the second edition was published with great improvements in three volumes folio, Paris, 1728, and a more copious Index than had up to that period been appended to
any classic. In 1715 he edited a new edition of 'The Councils,' prefixed to the royal press in 4to, folio.

Philip Dormin died at Paris, Sept. 3rd, 1729. After his death a volume of his 'Opuscula,' in folio, was published by an anonymous friend.

HARDWICK, PHILIP YORKE (first Earl of), was the son of an attorney at Dover, where he was born the 1st December, 1690. His father was in very indigent circumstances, and wholly unable to afford him the education generally bestowed upon young men in his station of life. It is singular that one of the sons of two of Sir Thomas Salkeld, an eminent solicitor in London, his diligence and talents won the respect and esteem of that gentleman also. So steady was his perseverance, and so rapid his progress in the knowledge of the law, that Sir Thomas Salkeld caused him to be entered of the Middle Temple, in November, 1708, as a preparatory step to his call to the bar. During the time he was keeping his term, he became acquainted with Mr. Parker, one of his chambers, appointed solicitor-general. The consequence of which was an introduction to Lord Macclesfield, who highly appreciated Yorke's merits, and employed him as the companion and tutor of his sons. To this extent may be traced the rapid and extraordinary success of Mr. Yorke at the bar is mainly attributable. In May, 1715, he was called to the bar, when the support of his old benefactor Salkeld, who was in very extensive practice as a solicitor, together with the favour and patronage of Lord Macclesfield, enabled him to acquire an extensive practice: indeed the favouritism of Lord Macclesfield, even in court, justified and aggrieved many old and eminent practitioners.

The elevation of Lord Macclesfield to the woolsack (1719) enabled him further to promote the interests of his favourite, and accordingly, through his interference, in the same year Yorke took his seat in the House of Commons as member for the county, in which he continued to be till his appointment being frustrated by the ministry. In the same year he married Mrs. Lygon, a young widow, the daughter of Mr. Cock, a gentleman of good estate in Worcestershire, and the niece of Lord Somers and Sir Joseph Jekyll, then master of the rolls.

In March, 1720, while upon the circuit, and within five years after his call to the bar, he was, through the influence of his patron the chancellor, appointed solicitor-general. This step was a very hazardous one; for besides the professional jealousy which was perhaps not unjustly directed towards him, he had to contend with the doubts felt by all professional men when any person who had not possessed of sufficient learning and experience to discharge the duties of a leading counsel. The talents however which he displayed in the conduct of the business in which he was employed soon made it evident that he was fully equal to the duties of his new station. Shortly after his appointment he was knighted, and in 1724 he was made attorney-general. It was after that period that his patron, Lord Macclesfield, was impeached for gross corruption in office, and Sir Philip Yorke had great difficulty in procuring himself to be excused from the task of assisting the managers of the Commons in making good their charge. In 1733, having held the office of attorney-general nearly ten years, he was appointed lord-chief-justice of the King's Bench, and created knight baronet. Harlowe. He presided in the King's Bench for three years and a half, during which period he added largely to his former high reputation. On the death of Lord Chancellor Hardwicke he was made chief-justice, and it is upon his judgments as chancellor that the reputation of Lord Hardwicke is principally founded; he held the great seat during nearly twenty years, dispensing justice throughout that period with the most consummate skill at a time when the principles of equity jurisdiction were by no means in a settled state. His integrity was never called in question; the wisdom of his decrees was the theme of general eulogy, and it is said that during the whole time that he presided in the Court of Chancery three of his judgments were appealed from, and those were confirmed by the House of Lords. In 1734 he succeeded to the seat of Hardwicke at Macclesfield. He continued to hold the great seat until the 19th of November, 1755; the Duke of Newcastle having resigned the premiership on the 11th. After his retirement from public life Lord Hardwicke divided his time between his seat at Wimpole in Cambridgeshire and his house in Grosvenor Square, enjoying unimpaired his vigorous intellect until nearly the close of his 73rd year, when he was attacked by a disorder which proved fatal on the 6th March, 1764. The labours of Lord Hardwicke's mind are recorded in his legal judgments. They are preserved, so far as the points decided by them, in the reports of Atkins and Vesey, sen., and in the case of the 'The Case of the Judicial Authority of the Master of the Rolls,' has been attributed to him, and some few letters have been preserved by Dr. Birch. It has also been said that he was the author of the 'Speculator' for the April 14th, 1761, signed Philip Homebred; but this statement is exceedingly doubtful.

This brief memoir and the facts and dates are taken from a new Life of Lord Hardwicke, in the 3rd No. of the Law Journal.

HARDYNG, JOHN, one of our old historians, descended of a respectable northern family, was born in 1578, at York, and at that period was made a privateer of the son of Sir Henry Percy, eldest son to the Earl of Northumberland, known by the name of Hotspur, with whom he fought as a volunteer at the battles of Homildon and Cokelawe. After the death of his patron, whom he supported in the fight of Shrewsbury, as it is said, having no other means of livelihood had been proclaimed for the adherents of the Percy's, Hardyng enlisted under the banner of Sir Robert Umfraville, who was connected with the Percies by affinity, and under whom in 1406 he became constable of the castle of Holy Island, in the Earl of Northumberland. How long he remained at Warkworth is unknown; but his knowledge of Scottish geography seems soon to have engaged him in the secret service of his country, and he was made known in the north to obtain restitution of the deeds of homage, which had been given up by Mortimer in the minority of Edward III., does not appear; but it must have been early in the reign of the V. He remained in Scotland three years and a half, indefatigable in the search, and obtained some at the hazard of his life. In 1415 we find him, with Sir Robert Umfraville, attendant on the king at Harleux. His journal of the march which preceded the memorable battle of Agincourt forms one of the most curious passages in his chronicle. In 1416 he accompanied the duke of Bedford to the sea-fight at the mouth of the Seine.

An able historian, the Lansdowne manuscript of Hardyng's Chronicle intimates that he was at Rome in 1424. Soon after we find him again employed in ascertaining the fealty due from the Scottish kings. In one or two passages of his Chronicle he distinctly alludes to an incurable injury received, as he himself expresses it, to his England's right; and in one or two others he states the offer of a thousand marks which had been made to him by king James I. of Scotland, on condition of his embrazing some of the earlier instruments he had procured. The letter of protection from king James, making this offer, is still preserved among the antient deeds in the Chapter House at Westminster. In another passage of his Chronicle, he alludes to the proposal made to him to introduce 450 marks as the price for which he obtained some other of the deeds of homage. Notwithstanding these declarations however several writers have considered our author the successive and national defender of his country's fabric. But whither Hardyng in his zeal for his country became the tool of some more powerful person, or was imposed upon in the purchase of the deeds, cannot now be thoroughly determined.

Actively as Hardyng was engaged in life, he seems to have been constantly employed in gathering materials for his Chronicle, the first composition of which he finished in the reign of Henry V. In the court Royalians, he became a close friend with the Earl of Northumberland. In the Lansdowne manuscript already referred to closes with the life of Sir Robert Umfraville, who died January 27th 1746,
under whom Hardyng seems to have lived, in his latter years, as constable of Kyme Castle in Lincolnsire.

Of the rewards which Hardyng appears to have received, the first was in the 16th Henry VI, when he had a grant for life of 10d. per annum out of the manor of Wyloughton in the county of Lincoln. In the 19th Henry VI, a confirmation of the grant occurs for seven years, with the further grant after that time of the reversion of the same estate to be held by Hardyng for life, with the right to bequeath the same, or any part of the reversion, to what end soever he please, at his con- doctrine of the late battle of Wakefield, December 31, 1460. It was afterwards presented to king Edward IV himself. The history comes no lower than the flight of Henry VI to Scotland. But, from a passage in which the queen is said to have exclaimed that he could not have finished his work before 1465. How long he sur-
vived its completion is unknown, but he must have then had at least eighty-seven years of age.

The present printed text of Hardyng's Chronicle is from the re-composition presented to Edward IV. The Chronicle as written for Henry VI, the only manuscript known of which is preserved in the Lansdowne collection in the British Museum, has never been published in any form. Heavens had intended its publication. Several manuscripts of the later text of Hardyng's Chronicle are extant: one in the Harleian Collection, No. 661; one in Selden's; another in the Douce Collection; a third, which is now in the Bodleian; and one in the possession of Henry Oxford. A sixth manuscript was formerly preserved in the library of Basil earl of Denbigh.

HARELIP, a malformation in which the lip is divided in one or more situations by clefts extending from its free edge towards its attachment. It has received this name from the resemblance which it bears to the divided upper lip of hares and other gnawing animals, and is one of the most common malformations of the human head. [MONSTER.] In the embryo each lip is formed of four pieces which project separately from the jaws and unite with each other at different periods of fetal life; but if by any accident the connexion between these middle portions be not completed, or they remain permanently in the condition which they had at the time of its occurrence. The separate portions of the upper lip unite long before those of the upper, and fissure of the former is so exceedingly rare as to be seldom the subject of treatment. Of the portions of the upper lip the two middle unite first, and then the two lateral to them; hence a fissure in the middle line is more rare than that extending in each side. Harelip may be single or double, that is, there may be one or two clefts—these may be seated in the middle line of the lip, or opposite to the union of the two incisors with the canine tooth—if there be two, they will be found in the latter situation on each side of that line. Harelips may be either transverse, separating the gum or palate, which being developed in an analogous manner may be influenced by the same cause as the lips, though being earlier united they are less rarely affected.

For the purpose of fixing the portion of the lip with forceps, the operator is to hold only with a knife; or a pair of knife-edge scissors, taking especial care that the un- cut edge deformity, but because sucking is prevented in infancy, and in later life the speech is affected. It is accom- plished by cutting off quite smoothly the opposite edges of the fissure, to be done lengthwise, and then bringing them to- gether and maintaining them in accurate apposition till, like the edges of a common wound, they have firmly united. For this purpose, after fixing the portion of the lip with forceps, the operator is to hold only with a knife; or a pair of knife-edge scissors, taking especial care that the uncut surface should be left of the same form and size in each. They are then to be placed in accurate contact by transfixing them with one or two hare-lip pins (according to the length of the fissure), and connecting them with silk thread wound round them in the form of an 8. These pins should be made of silver, with removable steel points; the lowest should be placed longitudinally, the next should be transverse, and the remaining spurt should be closed with a suture or with sticking-plaster. The intervening portions of the lip are now to be compressed by the suture and additional stitches, and the whole is afforded by placing a compress on each check, and there remain to be done, and it firmly, so as to prevent the muscles of the lips from con- structing and separating the cut edges. After the operation the part should be kept perfectly quiet and cool; in four or five days the pins and other dressings may be removed, and the edges of the wound, which ought to be completely united, will need only to be secured by sticking-plaster.

When the fissure is double, it is generally advisable to operate first on one side, and when that is sufficiently healed, on the other; but in some cases the whole may be done at once, by cutting off both edges of the middle and each of the lateral ones, and transfixing the whole by the same pins and sutures. In many cases where the bone projects much, it may suffice to remove part of the bone to depress it below the surface; and besides that very young children are likely to be quiet and asleep all day, and that the healing processes are then very active, it has the great advantage of enabling them to rest at once to their natural food by restoring the power of sucking.

HARFANG, the names of the Snowy Owl, Sirevaux.

HARLE. [SIREVAUX.]

HARLEFUR. [SIRE NEFUR.

HARIOT. [HERMIT.

HARLE, the French name for the Merganets. [MARGANIS.

HARLLIAN COLLECTION. [BRITISH MUSEUM.

HARLES, GOTTLEBE (or THEOPHILUS) CHRISTOPHER, a learned physician and author, was born at Culumbech, 1738, died November 2, 1815, held several academical offices in the university of Edinburg. He published many editions of Greek and Latin authors, which, although they are not much esteemed; not by any means a laborious student rather than of a judicious and able critic. Those of his works most highly recommended are his "Instructions to the History of the Greek and the Latin Language," and his "Lives of the Most Eminent Philologists of our age," a very useful collection to those who are concerned with literary biography, 1770, 3 vols. 12mo, Bremo. See the "Biog. Uni," for a list of the persons herein contained. The most important of his publications is an edition of the 'Bibliotheca Graeca' of Fabricius, Hamburg, 1790-1811, in 12 vols. 4to., which contains great addi- tions, and a new arrangement of the original matter.

FABRICES, [J. A.] (Biographic Unia; Weit, BibliothecaBritannia.

HARLEY, ROBERT, EARL OF OXFORD, was born in London in 1661, of a family long of distinguished note in the county of Hereford. His grandfather, Sir Robert Harley, was made a baronet in the reign of Charles I, and his father, Sir Edward, was governor of Dunkerque after the Restoration. In the troubles of the seventeenth century the Harleys acted with the Presbyterian party, for which the family was considered one of the heads, and, although both Sir Robert and his son Sir Edward took the field on the side of the parliament in the early part of the civil war, they went into opposition when the republicans obtained the ascendency, and Sir Edward afterwards took an active part in bringing about the Restoration. The sub- ject of the present article entered parliament after the Re- solution as member for Trogony, and afterwards set for...
Randex, professing for some time the whig principles of his family. After a transition period however, in which he followed a course that perplexed and successively excited the expectations of all parties, he went fairly over to the tory side. At a subsequent stage, he was chosen one of the most active and efficient combinations in the House of Commons. In the House which met under the tory administration of Rochester and Godolphin, in February, 1701, Harley was elected speaker by a greater majority, and even in the next parliament which assembled in December of the same year, although his friends now appeared in diminished numbers, they were still strong enough to place him again in the chair. He was chosen to the same position in the first parliament, in October, 1705, and retained it till April, 1704, when he was made secretary of state. He is believed to have been principally indebted for this promotion to the good word of his Absalom Hill, who, after Easter, entered upon the royal household by his cousin Sarah, Duchess of Marlborough, and who by this time beginning to supplement her patroness in the queen's favour. Miss Hill's father, it seems, a merchant in the city, who had fallen in on a transaction connected with that of Abigail, his relation to Harley as her mother was of the duchess; and this circumstance had probably something to do in bringing him and the daughter together. According to the scandal, it was the understanding of Miss Hill that after having fixed her affections on Mr. Masham, the queen's page, applied to her cousin Harley for his aid in forwarding her object: by Harley's management she became financially established; and in return, the former was able to influence to attach the weak mind of the queen to Harley and his friends. It is certain that from this time and Harley acted in conference against the Marlborough interest. In the variety of the latter party began to seek a new support by inclining towards the whigs; and various circumstances chanced for the moment to favour this line of policy. In the parliament which met in October, 1705, the party was stronger than it had been six weeks before, beginning of the reign; this sufficed to introduce into the cabinet two distinguished members of that party, William Cowper Esq. (afterwards Lord Cowper), as lord chancellor, and Lord Holland, as lord treasurer, whom Harley had opposed to the interests of Marlborough, as one of the secretaries of state. But the struggle was finally decided against Harley by the public suspicion and odium to which he became exposed in consequence of the conviction of one of his clerks named Gregg, for carrying on a treasonable correspondence with France. Gregg, who was executed for his crime, left a paper with the sheriff, in which he entirely exculpated Harley; even this however did not alloy the outcry against the latter; it was said that he was the wiser for the exposure of his intrigue, and he induced Gregg to sign and to deliver by the promise of a reprise. On the other hand, Harley's friends asserted that the strongest endeavours were made by the opposite party to induce Gregg, and to procure his resignation of the promise of a pardon, to accuse Harley. In the beginning of February, 1705, after the conviction, but before the execution of Gregg, the Duke of Marlborough and Lord Godolphin intimated to the queen that unless Harley were removed, they would leave her service; on this, although it is believed that the queen was herself willing to incur the threatened risk of continuing to support him, the secretary resigned, along with his friend St. John (afterwards Lord Bolingbroke). Harley remained out of power for about two years and a half; at the end of which time the whig ministry was partly undermined by his intrigues and those of Mrs. Masham, who were destroyed by the due consequence of over-confidence. In August, 1710, Godolphin was dismissed, and Harley was appointed chancellor of the Exchequer, all the other whig members of the cabinet having at the same time resigned or been turned out, and taken their places. A new parliament was soon after called, which completely sanctioned this arrangement; so inflamed was the temper of the public mind against the late ministry, that only about a hundred of their friends were returned from all England. The duke of and statesman was soon after called (and his wife was made a peer), and by those to whom she lent her influence and protection.

On the 5th of March, 1711, an accident happened to Harley, which in the end proved very serviceable to his schemes of ambition: a French emigrant, who called himself the Marquis de Guiscard (he was in fact an abbé, and brother of the Count of Guiscard), having been apprehended as a spy and brought for examination to the cockpit, suddenly seized a penknife and struck at the minister. Harley's wound was slight, but he took care to remain as long as possible in the surgeon's hands. In the meantime, the king, high treasurer, being about the same time created Earl of Oxford and Earl Mortimer, and invested with the orders of the garter. As the victories of Marlborough constituted the great support of his Queen Anne's reign, the Duke of Utrecht, concluded 5th May, 1713, is the event for which that of Harley is chiefly memorable. It was after this that the jealousy between the premier and Bolingbroke asserted itself. He was now believed to have been having secret in men for years before, one account deducing its origin from a remote date as the affair of Guiscard, of whose blow, which he asserted for intended for himself, Bolingbroke never forgave his colleague for taking all the credit and meanwhile the advantage. The ambitious and intriguing dispositions of the men, both, it is probable, equally unprincipled, made it impossible that they should long continue to act together after the defeat of the whig party in France, ceased to unite their efforts. Bolingbroke had now the art to gain the favour, Lady Masham, whose influence Harley, on the other hand, seems to have erroneously calculated, to use to prevent this, and he proceeded not to despise. It was soon proved that he was wrong; on the 27th of July, 1714, the lord treasurer received his dismissal. It is said that a few days before he had excited the determined opposition of both Oxford and Bolingbroke, for he had given the queen the assurance of an annuity of 1500l. a year which she had obtained from the crown. The queen's death, three days after, put an end for ever to the political existence of both Oxford and Bolingbroke. The French minister saw his hopes of a return to the House of Commons. When St. John made his escape to France, Harley was committed to the Tower, and there he lay for nearly two years. At last, in June, 1717, he was on his own petition brought to trial before the House of Lords; but the Commons not appearing to prosecute their impeachment, the prisoner was on the 1st of July acquitted and discharged. After this the earl of Oxford lived in retirement till his death, 21st May, 1724. He was succeeded in his titles and estates by Edward, his eldest son, by his first marriage with Elizabeth, daughter of Thomas Foley, Esq. whose brother was made Baron Foley in 1711, being one of the two peers then introduced in a body into the House of Lords; he was created afterwards Duke of Buckingham, to the smile of his grandfather. By his second wife, Sarah, daughter of Thomas, Earl of Clarendon, and his family showed his attachment to literature both by his patronage of Swift, Pope, and others, and by the extensive and valuable library of printed books and manuscripts which he spared no pains or expense to collect. [Burman Murray.] His own writings do not show much literary talent. They are, a Letter to Swift on Correcting and Improving the English Tongue; an Essay on Public Credit; an Essay on Loans; and a Vindication of the Rights of the Commons of England. He has given an account of his own administration in a letter to the queen, written a few days before his dismissal, which is printed in Tindal's History and elsewhere. There is a curious circumstance concerning the Duchess of Marlborough's Account of her own Life, and the anonymous reply to that work by James Ralph, entitled 'The Other Side of the Question' (5vo, London, 1742), many years after the materials of which had evidently been supplied by the Oxford family. The proceedings of Lord Oxford are in the 'State Trials.' Some very strong evidence, implicating both Bolingbroke and Oxford in the crime of plotting on secret negotiations with the French court for a year previous to the peace of Utrecht, has been lately laid before the public in the 'Edinburgh Review,' No. 125, in an account of the collections made by the late Sir James Mackintosh, in 1715, from the archives of the foreign office at Paris. H A R

HAR

HARMER, THOMAS, a Protestant dissenting minister, was born at Norwich, A.D. 1715, of pious parents. He received his education under the care of Mr. Evans in Lon-
HARMODIUS. [ARISTOTLE]

HARMODYTES, a genus of tubular stony corals, proposed by Fischer and adopted by Bronn. The same species were formerly designated by Goldfuss, Syringopora, a name generally adopted.

HARMONIC PROPORTION. The reciprocals of numbers which are in arithmetical proportion are themselves said to be harmonic proportion; thus

\[
\frac{1}{1} \quad \frac{1}{2} \quad \frac{1}{3} \quad \frac{1}{4} \quad \frac{1}{a} \quad \frac{1}{b} \quad \frac{1}{c} \quad \frac{1}{d} \quad \&c.
\]

is a series in harmonic progression.

A line AB is said to be harmonically divided when two points, C and D, one within it and one on its continuation, are so placed that AC is to CB as AD to DB.

In this construction, CD is an harmonic mean between AD and BD, or AD, CD, and DB, are as the reciprocals of terms in arithmetical proportion.

HARMONICS (Acoustics). By the harmonics of a musical note are meant all those other notes in which the number of vibrations per second are twice, three times, four times, or any multiple of the number of vibrations which produce the note in question. Thus the harmonics of a note which is sounded by 200 vibrations per second are those notes which require 400, 600, 800, &c., vibrations per second. The following compiled from relations incidentally mentioned in books of Voyages and Travels into the East.

By the interest of Dr. Lowth, bishop of London, who warmly approved of the work, Harmer obtained the MS. papers of Chardin, which furnished him with a variety of curious additions to his book. The last and best edition was published by Dr. Adam Clarke in 1816, in 4 vols. 8vo. Harmer was also the author of "An Account of the Jewish Doctrine of Resurrection," the first part, "The Dead," is a New Commentary on the Book of Solomon's Song," 8vo, 1769, 2nd ed., 1775.

Memoirs of the Life, Character, and Writings of Mr. Harmer, prefixed to Dr. Clarke's edition of the "Observations"

HARMONY. In the strictest sense, harmony is the concurrence of two or more sounds in agreement. In a more extended sense, it is the mutual adjustment of the parts of a composition, as well as of the whole. It is the result of the vibration of all sonorous bodies, and the foundation on which much artificial harmony is built. Under the word "harmony" the reader will find this matter further explained. Musical instruments, harmonics, are much used, particularly in those of the violin class, and in the flute. The performance of Paganini upon a single string, which a few years ago created such a sensation among musicians, arose from extraordinary power of producing harmonics. In the flute the harmonics may be attained without much practice, as an harmonic of the fundamental note of the instrument; and we have heard of players who could produce the third and even the fifth in the same way. On the long strings of a pianoforte, as the fundamental note subsides, G', C', and E''' may be perceived; and we have heard, among the vaulted roofs of a cathedral, several of the harmonics of the notes sounded in chanting. For further information see the references in Acoustics.

HARMONY (in Music). Musical sounds simultaneously produced according to certain rules, forming a chord, or a succession of chords, by a combination of the strings, organs, or voices of a musical instrument; or, in the case of concerted music, the result of the simultaneous proceeding of two or more harmonic progressions. The word "chord," in modern French theory of great authority, has divided harmony into natural and artificial, including in the former all chords not requiring preparation; in the latter, all that are formed by retardation, suspension, &c. But we cannot acquiesce in this arrangement, for it places the chord of the seventh, which is the source of the three real chords of dissonance, in the same category as the triad, or the chord of nature, which of course will never be admitted. It is true that the chord of the seventh requires no preparation—that is, the dissonant note need not be heard as a concord in the immediately preceding chord [Discord]; nevertheless this privilege cannot make natural that which is essentially artificial.

Harmony and Counterpoint are now practically considered as synonymous terms, and for some rules concerning the latter, as well as for examples, we refer to that word. To this that has been previously said we will add the following:

1. No two perfect concords, namely, two 5ths or two 8ths, are allowed to succeed each other in the same progression, but are permitted in contrary motions that is, when the one rises and the other falls. Examples

Vol. XII.—H

P. C. No. 739. A bar in the untuptuned diatonic scale. The fifth harmonic, with 6a vibrations, gives G', the octave of G the second harmonic. In general, every harmonic with a whole number of those in the keynote, is an octave to a preceding harmonic, and presents no new character. The sixth harmonic, having 7a vibrations, is an imperfect (being too flat) double octave to G, or B flat. This last note, in the common mode of notation makes three vibrations per second; whereas the same note derived from the harmonic makes 17 1/2a vibrations. The eighth harmonic, 9a, with 96 vibrations, is correctly D', or three octaves above the untempered major second. The tenth, with 11a vibrations, is a little too sharp for E'', being 1 1/2 instead of 10a. The twelfth, with 13a vibrations, is a little too flat for E'''', being 1 1/2 instead of 13a.

The preceding proposition is useful, as giving an account of the scale of all those musical instruments which consist of one unaltered pipe. These are the bugle, the French horn, the trumpet, (and for its slide) the trombone; in all of which (except the last) no note is the same as in any other. It will accordingly be impossible to adopt an harmonic of the fundamental note of the whole tuba. Calling the fundamental note C (which however is not very exactly sounded), the ordinary scale of these instruments is—

C C' G C'' E' G' G G'' G D' G M' A' A B B'', E B'' B flat, E''' is too sharp, and A''' too flat. A short pipe however will not produce artificial harmonics; the bugle goes no further than G', at least with common lips. Various contrivances have been introduced to extend and correct this scale; the keyed bugle, the use of the hand and mouth to throw the note higher, the pipe applied to the same instrument, and the short slide of the trumpet, to say nothing of the slide which is the principal distinction of the trombone, will suggest themselves to all who are acquainted with musical instruments. Many of these harmonics are much used, particularly in those of the violin class, and in the flute. The performance of Paganini upon a single string, which a few years ago created such a sensation among musicians, arose from extraordinary power of producing harmonics. In the flute the harmonics may be attained without much practice, as an harmonic of the fundamental note of the instrument; and we have heard of players who could produce the third and even the fifth in the same way. On the long strings of a pianoforte, as the fundamental note subsides, G', C', and E''' may be perceived; and we have heard, among the vaulted roofs of a cathedral, several of the harmonics of the notes sounded in chanting. For further information see the references in Acoustics.

HARMONY (in Music). Musical sounds simultaneously produced according to certain rules, forming a chord, or a succession of chords, by a combination of the strings, organs, or voices of a musical instrument; or, in the case of concerted music, the result of the simultaneous proceeding of two or more harmonic progressions. The word "chord," in modern French theory of great authority, has divided harmony into natural and artificial, including in the former all chords not requiring preparation; in the latter, all that are formed by retardation, suspension, &c. But we cannot acquiesce in this arrangement, for it places the chord of the seventh, which is the source of the three real chords of dissonance, in the same category as the triad, or the chord of nature, which of course will never be admitted. It is true that the chord of the seventh requires no preparation—that is, the dissonant note need not be heard as a concord in the immediately preceding chord [Discord]; nevertheless this privilege cannot make natural that which is essentially artificial.

Harmony and Counterpoint are now practically considered as synonymous terms, and for some rules concerning the latter, as well as for examples, we refer to that word. To this that has been previously said we will add the following:

1. No two perfect concords, namely, two 5ths or two 8ths, are allowed to succeed each other in the same progression, but are permitted in contrary motions that is, when the one rises and the other falls. Examples

Vol. XII.—H

P. C. No. 739.
2. Most discords require to be prepared, and all must be resolved; i.e. the dissonant note is to be first heard as a concord, and after percussion, or being sounded, must pass into a concord, generally by falling a tone or semitone. But sometimes the resolution is brought about by the base, as in the instance of the discord of the 2nd. Examples:

![Similar motion, bad.](image)

Contrary motion, good.

3. It is in the nature of sharpened intervals to rise, and of flattened ones to fall; but extreme sharp intervals almost invariably must rise, and extreme flat ones as invariably must fall. Example:

![Example of sharpened and flattened intervals](image)

These examples will also show a reason for giving two names and appearances to that which is, practically speaking, one and the same note; though, theoretically, a sharp and a flat are different sounds.

4. In music in four or more parts, the parts should be dispersed, or separated, in a manner as nearly equal as possible: thus a more perfect symmetry is obtained, and a richer harmony produced. But with a view to some particular effect, a very different distribution of the parts is occasionally made.

5. As a general rule, every composition, whatever its kind, is to commence in its key; but as regards the termination, the rule is without exception, and peremptory: though sometimes the third is changed, from minor to major.

To enter fully into the subject of Harmony would be to give a treatise on musical composition, and require the appropriation of a much larger portion of a volume than the nature of our work admits. The symbols of harmony—or certain figures, some written, some implied—will be explained in the article THROUGH-BASS, a term of the most inadequate, and indeed unmeaning kind, but which time, and the backwardness of musicians in the march of improvement, have so firmly fixed, that any attempt to substitute a better would be vehemently opposed, and rendered nugatory. For the accompaniment of the scale—La Règle de l’Octave, as the French call it—a very important study when properly carried out, see Accompaniment.

That the term harmony was not used in the same sense by the ancients as by the moderns, seems now to be generally admitted, but admitted without all affecting the long-disputed and, we believe, undeniable question, as to the knowledge of counterpoint possessed by the Greeks and Romans, or compromising any opinion delivered or entertained on that most obscure and perplexing subject. By Harmony (συμφωνία) the Greeks meant simply to express the proper relation of one sound to another, the pleasing agreement of intervals, in a melody, and nothing beyond. Though, however, they employed the word harmony in a very different sense from that given to it in later ages, it does not therefore follow necessarily that they were ignorant of the high branch of the science to which we apply the term. That they played and sung in octaves is undeniable; and it is almost equally certain that they occasionally used simultaneous triads and four-part harmony. It seems unlikely, then, that so active, so ingenious and musical a people, furnished with an abundance of many-stringed lyres, of double-flutes, as well as other instruments, should not have discovered, even by mere accident, something of harmony, and have been led to investigate its nature and cultivate its practice. But on the other hand, if they were acquainted with the effect of combined sounds, and, as a sure consequence, had converted their knowledge to some useful purpose, they would, to almost a moral certainty, have left, among the numerous disquisitions and lengthened conversations on the subject of music which have reached us, some undeniable evidence of so important a fact.

HARMOTOME. Androctonite; Eurectite. This mineral occurs in attached crystals, generally intersecting each other lengthwise. Primary form a right rhombic prism; cleavage parallel to the primary planes, and to both the diagonals of the prism; hardness 4; cleavage poor; brilliancy vitreous; yellowish white; fracture uneven; lustre vitreous, and sometimes pearly; streak white; sp. gr. 2.35, 2.4.

By acids, unless heated, harmotome is scarcely acted upon. Before the blowing it fuses into a clear glass. It occurs at Strontian in Scotland, and at Andresberg and Oberstein in Germany.

The analyses of this substance do not greatly differ in general. The harmotome of Strontian yielded, by the analysis of Mr. Connell:

- Silica: 47.04
- Alumina: 15.24
- Barytes: 20.85
- Lime: 6.10
- Soda or potash: 0.88
- Water: 14.92

99.03

Harold I, surnamed Harefoot, was the younger of the two sons of Canute the Great, by his wife Alfgiva, but, according to others, his first wife Alfgiva. On the death of his father, in 1035, Harold disputed the possession of the English crown with his half-brother Hardicanute, whom their father had designated for his successor, and succeeded in acquiring the sovereignty of London and all the country to the north of the Thames. [HARDICANUTE.] In 1037 the thanes and people of Wessex also submitted to him, on which he was crowned king of all England, although it is stated that Egelnoth, the archbishop of Canterbury, at first refused either to perform the ceremony himself, or to permit any of his brother bishops to officiate in his stead. No events of the reign of Harold, after he became sole king, have been preserved. Even his character may be said to be unknown—some of the chroniclers representing him as a friend to the church, others as not even professing a belief in Christianity. He died in 1040, and was succeeded by his brother Hardicanute. The name of Harefoot is of common account; it is a diminutive form of the name Harefoot; and their surname of 'Harefoot' is that which was given to him for his swiftness in running; it is said that, in his favourite amusement of the chase, he used often to pursue the game on foot. According to Breme, he also was noted for his skill in riding—a most unbecoming taste, says that ananlist, for a king. Another explanation is that his foot was all over hairy.
British Museum), says distinctly that he was the son of a cowherd ('filius bubulei'). These statements are consistent, so far as they go, with a curious account which Mr. Turner has translated from the Knittinga Saga, and which represents Godwin to have been the son of a peasant named Ulfhadd (evidently the same name with Wulfhnoth), and to have been one of his [sic] introductions to the service which he performed to Ulfr, one of the noble captains of that Danish conqueror, whom, having lost himself in a war after the battle of Skorsten, or Sceorsten [Einaro to his wife] Godvin was taken prisoner, and was by him conducted in safety first to the cottage of Ulfhadd and then to the camp of Canute. This story however makes Ulfhadd to have had an uncle Edric who had already raised himself from the humble station of mercenary to a noble succession. Godwin's talents and address, his handsome person and fluent speech, speedily enabled him to make his way at court. In course of time he married Gyda, or Githa, the sister of Earl and as one of the subjects of his detail, if there had then been the least suspicion of her participation in it.

If Emma was innocent, Godwin, who was and had all along been her associate in governing Wessex for Hardicanute, was in all probability equal to it. He was true that a few days after, in the reign of Hardicanute, he was, in a quarrel with Alfric, archbishop of York, passionately accused by that prelate of having been the instrument through whom the murder of his father was committed. He could hot be freed by any means, only by being demanded to put upon his trial, and the result was his complete acquittal. When Alfred and his followers were fallen upon by the soldiers of Harold, they were under the paternal care of him and his brother. Under his handings, having, as he asserted, been sent by Emma to be their conductors; this circumstance seems to have formed the sole ground for an imputation which pursued him to grave, and after his death eagerly taken up by the Norman historians, when everything that could blacken the characters of Godwin and his family was grateful to the reigning dynasty. After the accession of Hardicanute, Godwin was envoied in conjunction with Archbishop Alfric to disrupt the body of Harold and to drive him into the Thames. It was a disagreeing arising out of this barbarous commission that gave occasion to the quarrel between the archbishop and the earl. The history of Prince Alfred, he had a hand in the business, is but thinly sketched in the notice of Edward the Confessor. The histories after the Conquest assert that his death, which certainly happened in consequence of a sudden seizure of illness, was in all probability equal to it. It is true that a few and he returned home with something like suspicion, to the assembled Norman barons, that he would do everything in his power, on the descent of Edward, to promote the duke's succession to the English crown. It was known that Harold had twice carried fire and sword through their country, they sent him the head of their Prince Griffith, in token of their entire submission. It was about two years after this that he sent to Harold a request that he would come to Pontine, where he was immediately seized by the Earl of Gloucester, and on the demand of William, duke of Normandy (afterwards king of England), delivered over to that prince. William did not undertake that expedition for England until he had compelled him to take a solemn oath of allegiance to his father. Immediately after he returned home Harold found himself involved in a new affair of difficulty. This was the insurrection of the people of West Mercia against his younger brother Tostig, who a few years before had been appointed their earl on the death of the great Siward, but whose misgovernment and savage excesses of despotism had at length produced much resentence. The insurgents had placed at their head Morcar, the eldest of the two sons of the recently deceased Earl Alfard; and he and his brother Godwin came to their assistance, in conjunction with the men of the church, with the king's ter, and also a body of Welsh auxiliaries. Harold, who was sent to meet them, either deemed their force too formidable, or their chances too bad, to resist it; he was agreed, without consulting his brother, that the command should be given from Tostig and given to Morcar. On this Tostig retired to Bruges, brooding, as it presently appeared, on schemes of vengeance. The death of Edward the Confessor (9th January, 1066) followed in little more than a month after this pacification, which had been perhaps the more readily accorded by Harold in consequence of the near prospect of that event: he was at hand when it took place. On the evening of the same day, a report having been circulated that Harold had been murdered, he breathed his last, he was proclaimed king in an assembly of the thanes and of the citizens of London, held in the cathedra of St. Paul's. The next day he solemnly crowned in the same place, a few hours after the interment of the late king.

For more than half a year Harold was left to occupy the throne he had thus obtained in quiet. His accession evidently took place in the course of the day, for a halt was made for the nobility with few exceptions, and the bishops with scarcely any, avowed themselves its authors and supporters; the acquiescence of the people was complete everywhere, except, for a brief space at a distance, in those who were however easily induced to lay aside their scruples by the influence of their Earl Morcar, whose sister Editha Harold had married; and on the whole there is no reason to suppose that he had had any difficulty in establishing himself if he had been allowed to remain un molested by attacks from abroad. Two foreign enemies however at
length assailed him nearly at the same time. His brother Tostig, having formed a confederacy with Harold Hardrada, king of Norway, first made a descent upon the Isle of Wight, and after he had received contributions from the inhabitants, sailed round at the head of his fleet of sixty vessels to the mouth of the Tyne, where he was joined about the beginning of September by Hardrada with a navy of three hundred. The two kings met at Harwich, and Edward, who with those of Denmark, having been already slain. This victory, as all know, gave the crown of England to the Duke of Normandy, by whose descendants it has ever since been worn.

The English fleet was at this time taken possession of by Sir Henry. By his first wife, whose name has not been preserved, he had three sons, Edmund, Godwin, and Magnus, who, on the death of their father, fled to Ireland, from which they afterwards returned. A son of Godwin, son of Earl Godwin, and named Edith, was left in England, but eventually retired to Denmark. His second wife, Editha, otherwise called Althia, the daughter of Earl Alfgar, is said to have been the widow of Griffith, the Welsh prince, who had been sent on a peace-offering to Harold. By her Harold is asserted to have had a son and two daughters; but, as it is admitted that he was only married to her some time in 1065 at the earliest, we may doubt if she could already have produced so considerable a family. His eldest son, named Wolf, is said to have been knighted by William Rufus; Gunilda, the eldest daughter, became blind, and passed her life in a nunnery; the second, whose name is unknown, is supposed to have gone to Denmark with his half-brothers. Queen Editha survived her husband many years, during which she is said to have lived in obscurity in Westminster. This lady, according to the Scottish historians, was the mother, by her first husband, of a daughter, whose son, son of Banquo, thane of Lochaber, whose son Walter, marry- ing a daughter of Alan the Red, earl of Britanny, became the progenitor of the Stewarts. (On this see appendix N.)

Harp (bearharp, Aephr, Saxo), a musical instrument which, under different forms and denominations, may be traced to the remotest ages. According to Holy Writ, Judas, seventh in the line of Adam, is said to have been the inventor; ...p. c. &c., to the Romans, to thereby liberate the Greeks from the evils of hell, and from those who were held in captivity.
But though the harp in this highly improved state may be used for the performance of any music written for the piano-forte, it is not the instrument in which there is much modulation, the difficulty is of an extreme kind, and un conquerable without devoting more time to practice than ought to be bestowed on an accomplishment, however eloquent.


HARPALIDÆ, an extensive family of Coleopterous insects of the suborder of Goeolepididae, the species of which are distinguished by the tarsi of the two anterior pairs of legs being dilated in the male sex.

In these insects the tibiae of the anterior pair of legs have always a deep notch on the inner side; the head is almost always short and rounded in front; the thorax is generally broader than long, somewhat convex, but slightly narrower behind than before, and nearly equal in width to the elytra. The body usually approaches more or less to a cylindrical form; the elytra are almost always rounded at the apex, and never truncated at this part. They are usually found under stones.

Of the family Harpalidæ, Dejean, in his 'Species Général des Coléoptères,' enumerates twenty-seven genera; others however have been discovered since the publication of that work.

The number of species known is probably upwards of five hundred.

The most convenient way perhaps of grouping the genera of this family is to take, in the first place, the form of the mentum as a guide. We then find almost all the species divided into two families, those in which the mentum is simply emarginated, and those in which there is a small projecting process in the middle of the emargination. Besides these there are certain species (the natural situation of which is perhaps somewhat doubtful) which have the mentum trilobed, and there are others in which the mentum is bilobed.

The various genera described by Dejean are as follows:

Section I.—Mentum trilobed.

Genus 1. Pelzleum (Kirby), containing two species, both inhabiting the Brazils.

2. Erius (Höfner), containing two species, one of which is from California, the other inhabits Mexico.

Section II.—Mentum bilobed.

3. Pronemodorous (Dejean), of which there is one species from New Holland.

4. Cyclosomus (Latreille), containing two species, one from India, the other from Senegal.

Section III.—Mentum emarginate, and without central tooth.

5. Depus (Fischer); two species. Found in North America.

6. Cranognathus (Dejean); one species. Probably from Buenos Ayres.

7. Agonoderus (Dejean); five species; three of which are from North America, one from India, and one from Senegal.

8. Barysomus (Dejean); Two species from India, and one from Mexico.

9. Amblygnathus (Dejean); Five species. All inhabitants of Cayenne.

10. Platymetopus (Dejean); Ten species. From Africa and India.

11. Selophonthus (Dejean); Fifty-nine species. From North and South America.

12. Anisodactylus (Dejean); Twenty-three species. Chiefly from Europe and North America.

13. Brachybus (Dejean); Three species. From Senegal.

14. Stenoborus (Megerle); Twenty-two species. Almost all European.

Section IV.—Mentum emarginate, and with a small projecting process in the middle.

15. Crotodesmus (Dejean); One species. From Brazil.

16. Somoplatus (Dejean); One species. From Senegal.

17. Axiomota (Dejean); One species. From Senegal.

18. Anomopus (Breteler); Six species. Chiefly European.

HARQUEBUS. [ARMS.]

HARRIER (Ornithology), a name applied to certain Hawks (Circus). [FALCONER, vol. x., p. 183] and see, among other works, Gould's Birds of Europe, and Yarrell's Bird-Book.

HARRIER, the English name for the hawk employed in hunting the Hare. The size and breed of the Harrier depend upon the taste of the owner, and that is most frequented in the districts in which the pack is to hunt. Mr. Beckford, a great authority in such cases, says, 'The hounds, I think, most likely to show sport are between the large slow hunting harrier and the little fox-beagle; the former are too dull, too heavy, and too slow; the latter, on the contrary, too light, and too fleet. The first, it is true, have most excellent noses, and, I make no doubt, will kill their game at last if the day be long enough, but you know the days are short in winter, and it is bad hunting in the dark. The other, on the contrary, flying, dash, and are all alive; but every cold blast affects them, and if your country be deep and wet, it is not impossible that some of them may be drowned. My hounds were a cross of both these kinds, in which it was my endeavour to get as much bone and strength in as small a compass as possible. It was a difficult undertaking. I bred many years, and an infinity of hounds, before I could get what I wanted. I at last had the pleasure to see them very hand-some; small, yet very bony; they ran remarkably well together; went fast enough; had all the acuteness that could be desired, and would hunt the coldest scent.'

Hare-hunting, it has been said, is generally followed by sportsmen in the decline of life; though when the district is tolerably open and the hare 'flies the country,' there is then seen the most wholesome sort of sport for persons who wish to show themselves. But these capital runs come 'twixt and between,' and the old fox-hunter can seldom break the change. In a close or woody district, the constant repetition of the same scene, and the discovery that in consequence of the constant double of the clay, the galloway who knows the country is frequently as near the hounds as the man who is mounted on a first-rate hunter and has taken some daring leaps at the first burst, prove rather disgusting both to the author of youth and to the experience of age. The rapidity, variety, and dangers of a fox-chase are more congenial to the young man and the good horse, and are not readily forgotten by the old sportsman. In most of the countries where harriers are kept, a bag-fox, or 'bagman,' as he is sometimes facetiously termed, is occasionally procured by way of giving the wary 'thistle-whippers' a taste of the nobler hunting. But to return to the points to which we have already strongly reproaches this practice. 'Harriers to be good,' says Mr. Beckford, 'like all other hounds, must be kept to their own game: if you run fox with them you spoil them; hounds cannot be perfect unless used to one scent and one style of hunting. Harriers run fox in so different a style from hare that it is of great disservice to them when they return to hare again; it makes them wild and teaches them to skirt. The high scent which a fox leaves, the straightness of the country, the eagerness of the pursuit, and the noise that generally accompanies it, all contribute to spoil a harrier.'

HARINGTON, SIR JOHN, was born at Kelston near Bath, in the year 1561. His mother was a daughter of Sir Henry VIII, and his father held an office in the court of that monarch. This pair having on one occasion shown great fidelity to the princess (afterwards queen) Elizabeth, she manifested her gratitude by standing godmother to their son John. She was afterwards wont to speak of him as 'that witty fellow, my godson,' or 'that merry poet, my god-son,' or in some such way.

Harington was educated at Eton and at Christ's College, Cambridge, the university giving for a short time a pretence of studying law, he, by means of his wit and many accomplishments, gained the notice of Queen Elizabeth, and became a member of her court. He had exercised his style of poetry in a collection, in translation, called 'Orlando Furioso,' (the story of Ginevra, in the twenty-eighth book), and he circulated this among the ladies of the court, who were greatly pleased with it. When the queen saw it, we are told, that she affected great indignation at the indeficacy of some passages, and, by way of punishment, forbade Harington the court until he had translated the whole poem. This he accomplished in 1591, and dedicated it to the queen.

When the Earl of Essex was appointed Lord Lieutenant of Ireland in 1599, Harington was made a commander of horse under Lord Southampton, in his service. When the Earl of Essex was taken prisoner by the Dutch, Harington was one of the few officers whom he chose to accompany him, and he came in for a share of the queen's indignation. She was angry also, we are told, that Essex pretended that Harington was his cousin, and that the queen of England was of a nobler birth than the queen of France. She confided to Harington the honour of knighthood. 'I came to court,' he tells one of his friends, 'in the very heat and height of all displeasures; after I had been there but an hour, I was threatened with the Fleet; I answered poetically that "coming so late year, I must not be made use of, nor must I serve to swell the list of those who are sent to serve in her majesty's fleet in Fleet Street." After three days every man wonder to see me at liberty.' But the queen shortly relented, and thus writes Sir John in the true style of his running, 'Iorry, &c., &c., for myself for the time, like St. Paul, rapt up in the third heaven, where he heard words not to be uttered by men.'

On the accession of James I. in 1602, Harington continued in possession of royal favour; for with the new monarch, who affected learn-
ing, a literary reputation was everything. He now wrote for
the private use of Prince Henry his 'Brief View of the
later the Church,' which was translated into the Chinese
who lived in the reigns of Elizabeth and James I.
He died in 1611.

Besides the translation of the 'Orlando Furioso' and the
'staff of the State of the Church,' which have been
mentioned, Sir John Harrington wrote a satirical poem
entitled the 'Metamorphosis of Ajax,' a volume of epigrams,
and several occasional pieces in verse, most of which have
never before been printed. Among the group of
which are preserved in Harrington's 'Nugas Antiquae,
show him to have been a man of wit and taste; and the
'View of the State of the Church' is pleasantly written.
On the other hand, the following criticism: 'Although executed without spirit or
accuracy, unamianted and incorrect, it enriched our poetry
by a communication of new stores of fiction and imagnation,
both of the romantic and comic species, of Gothic
machinery and familiar manners.' (History of English
Poetry, vol. iii., p. 485.)

The above sketch of Sir John Harrington's Life is taken
entirely from the biography of Harrington's 'Nugas Antiquae,
2 vols., 1604.

HARRINGTON, JAMES, descended from an antique
and noble family in Rutlandshire, and the eldest son of Sir
Sapcotes Harrington, was born in January, 1611. He
entered the University of Oxford in 1629, and shortly
received the title of 'Oceana,' to which he was
obliged to the interest of one of his uncles, who
had there the advantage of Dr. Chillingworth's
instructions. At the close of his residence at the univer-
sity, during which his father had died, he set out on a
course of travel through different countries in Europe,
and the other part of Italy, and eventually, at the
Hague, where he lived on terms of familiarity with
the queen of Bohemia, daughter of James I., who was then
a fugitive in Holland, and with the prince of Orange.
With the latter he visited the court of Denmark, and the prince
of Orange subsequently confided to Harrington the
management of all his affairs in England. From Holland he
proceeded to France and Italy.

On his return to England, Harrington principally passed
his time in retirement, cultivating the family affections
and pursuing his studies in political science. But in 1646 he
was requested by the commissioners whom parliament had
appointed to carry king Charles I. from Newcastle nearer
to London, to undertake the task of waiting on his Majesty,
as being personally known to him, and as being no partisan.
He complied with the request, and the manner in which he
performed the task having pleased to the king, he was shortly
after made a gentleman of the chamber. The king now
became much attached to him. 'His Majesty loved his company,'
says Anthony Wood, 'and, finding him to be an
ingenious man, chose rather to converse with him than with
other men.' On this account, he was included in all the
petitions made to the king, and was employed in the
businesses of the state; and when they happened to talk of a
commonwealth, the king seemed not to endure it. On
the king's removal from the Isle of Wight to Hurst Castle,
Harrington, who had offended the parliament committee,
went up to Newport, was removed from the king's service,
and on his subsequently refusing to swear that he would
not assist or conceal the king's escape, he was placed
under arrest, and detained until an application of General
Ireton obtained him his liberty. He afterwards showed
his attachment to the king by accompanying him to the
scaffold.

After the king's death,' says Mr. Toland, 'he was ob-
erved to keep much in his library, and more retired
than usually, which was by his friends a long time attributed
to melancholy or discontent.' He was engaged however in
the composition of his 'Oceana.' At that time, Harrington
needed some way in its composition, making no secret of
his views on government and of his partiality towards
a commonwealth, he found that he had already brought down
upon himself the suspicions both of Cromwell and of the
Royalists. His book was seized, while in the press, by
Cromwell's order. Harrington, having failed in other at-
ttempts to recover the book, betook himself at last to an
alternative course: thus: that Harrington, in his opinion,
by which he means that the form of government in a state
must depend on the mode in which property is distributed
therein. Proceeding on this doctrine, he requires what he
calls an equal Agrarian law as the foundation of his com-
monwealth. Its chief features are popular election of
councillors by ballot, and the going out at certain periods
child down at her foot, said, Madam, 'tis well you are come
at this nick of time, or I had certainly stolen this pretty
little lady. Stop, madam, don't do that, or I'll appear to
do with her?' for she is yet too young to become your
mistress. Madam, said he, though her charms assure her of a
more considerable conquest, yet I must confess it is not
love but revenge that impels me to commit this theft.
Lord, answered the lady again, what injury have I done
you that you should steal my child? None at all, replied
he, but that you might be induced to prevail with your
king, in the name of your sex, to make him desist from
the destruction of the nation. Harrington's wit fascinated
the lady, and through her interces-
sion he succeeded. Cromwell afterwards read the book,
which, according to promise, had been dedicated to him,
and professed to admire it.

The 'Oceana' on its appearance excited great attention.
Answers were published, and those Harrington in turn an-
swered. Richard Baxter's 'Holy Commonwealth' was
written principally against him, but so far as it
From this time Harrington proceeded to
an abridgment of his own work, designed, that in 1663 it was publicly burnt by a
decree of the University of Oxford, together with some of the writings of Hobbes and Milton, and other works, among which how-
ever his own 'Oceana' was included. Baxter published an abridgement of the 'Oceana,' under the title of the
'Art of Lawgiving;' and he subsequently published several tracts, many of which are quite of a temporary na-
ture, yet more or less of a utilitarian sub-
ject as the 'Oceana.' He had also founded a club, called the Rota Club, at which he gave nightly discourses on
the advantage of a commonwealth and of the ballot. The club was broken up after the Restoration. But the members
of the club had become marked men.

On the 28th of December, 1661, he was seized by order of
the king on a charge of treasonable designs and prac-
tices, and was examined before the Tower Com-
mittee. He denied all cognizance of the proceedings which
those gentlemen with great show of circumstance and
detail attributed to him, but his denial was set down,
it being considered as a breach of the peace. Afterwards he
represented through his several petitions to the
king, praying that he might either be released from confinement
or brought to a public trial. Having received an answer to
his petition, he was released for a time from Hales Oanes; and
shortly after this he was again in confinement, and
ordered to be removed to Plymouth. Shortly after he
became deranged, owing, it is supposed, to a medicine
recommended to him for the cure of the scurvy. Lord Bath,
the governor of Plymouth, then made intercession with the
king, and Harrington was released from imprisonment. On
being removed to London, and obtaining the best medical
advice, he rallied considerably as regards bodily health, but
his mind was never again right. At his advanced age, and
in this unsatisfactory state of health, he married. He died of
palsy on the 11th of September, 1677, in the sixty-seventh
year of his age.

The 'Oceana,' which is Harrington's chief work, is an
imaginary account of the construction of a commonwealth
in a country of which Oceana is the imaginary name. It
opens with an exposition of the ground on which
a commonwealth; and the principles which are there
established are afterwards sought to be applied in detail.
Harrington lays great stress on a doctrine which he enun-
ciated, 'that all property and all liberty belong to
a state, by which he means that the form of government in a state
must depend on the mode in which property is distributed
therein. Proceeding on this doctrine, he requires what he
calls an equal Agrarian law as the foundation of his com-
monwealth. Its chief features are popular election of
councillors by ballot, and the going out at certain periods
of a certain number of these councillors, which is also managed by ballot. Harrington is a very powerful advokate for the House of Commons by ballot.

HARRIOT, THOMAS, an eminent mathematician and astronomer, was born at Oxford in the year 1560. He took his degree of Bachelor of Arts in 1579, and in 1584 he accompanied Sir Walter Raleigh in his expedition to Virginia. He was employed in the east of Northumbeland, whose zeal for the promotion of science led him to maintain several learned men of the day, such as Robert Hoo, Walter Warner, and Nathaniel Tarporely. This eminently noble and generous man inhabited in his house, and settled on him an annual salary of 300l., which he enjoyed to the time of his death, in July, 1621. His body was interred in St. Christopher's Church, London, and a monument erected to his memory; but the other itself, was destroyed by the great fire of 1666. During his lifetime Harriot was known to the world merely as an eminent algebraist; but from a paper by Zach in the 'Astro- nomical Magazine' of the Royal Academy of Sciences at Berlin for the year 1786, it appears that he was equally des- sembling of eminence as an astronomer. The paper referred to contains an account of the manuscripts found by Zach at the house of the late Earl of Epernon, and a letter from them descended from the earl of Northumberland. From it we learn that Harriot carried on a correspondence with Kepler concerning the rainbow; that he had discovered the solar spheric motion having given to it the name of Galileo. It is still a matter of dispute between the followers of Galileo, Scheiner, or Phryssus; also that the satellites of Jupiter were observed by him January 16, 1610, although their first discovery is generally attributed to Galileo, who states that he reached the same conclusion long before them. A correspondence with Kepler on various optical and other subjects is printed among the letters of Kepler. Ten years after Harriot's death his algebra, entitled 'Arts Analytice Praxis,' ad Emendationis Algebraicae nunc, expedita, et Generali Mathematica, was published at Paris, in the name of a friend. It is with reference to this particular work that Des Cartes was accused of plagiarism by Wallis, whose admiration of its author was so high, that he could not even see the dissection of Vieta's algebra but in the 'Praxis' of Harriot. This charge however has sunk with time, though the French writers still continue to answer it. The geometry of Des Cartes appeared in 1637, six years after the publication of Harriot's algebra. (Hist. Dictionary, Mathematical Tracts, vol. ii., &c.; and Montuda's Histoire des Mathematiques, tom. ii., p. 105.)

HARRIS, JOHN, D.D., born about 1667, died Sept. 7, 1735, was a writer, in the course of whose works we find numbers of sermons, treatises on algebra and fluxions, geometry, trigonometry, astronomy, and navigation. He also wrote, 'Remarks on some late papers relating to the United States.' He died the Nat. Hist., 'History of the Vitigantia ag. Itinerarium Bibliotheca, or a complete collection of Voyages and Travels,' &c., 1705, 2 vols. fol., reprinted with additions and corrections in 1744 and 1764; 'Lexicon Technicum, or a Universal English Diction- ary of the Arts and Sciences, explaining not only the terms of Arts, but the Arts themselves,' 2 vols. fol., 1704-10. From this, says Watt, 'have originated all the other dictionary of the science and surgical terms that have since appeared,' and it is as the originator of this impor- tant and useful class of works that his memory best deserves to be preserved. [Dictionary.] 'History of Kent,' 2 vols. fol., 1719. Harris was secretary and vice-president of the Royal Society, and possessed considerable church prefer- ment, but was reduced to poverty by neglect of his affairs. He died in want, and was buried at the expense of his friends.

HARRIS, James, born July 20, 1709, was the eldest son of James Harris, Esq., of Salisbury, by the Lady Eliza. Ashley Coopar, sister of Lord Shaftesbury, the author of the 'Cato.' He was educated at the grammar- school in his native place and passed seven years at Oxford College, Oxford. In his twenty-fifth year he lost his father, and thereby became independent in fortune, and able to devote his time to studies more congenial to his taste than the law which he had entered. For four years of his life he did little else than study the Greek and Latin authors with the greatest diligence, and his works show how deeply imbued he was with their spirit. In 1745 he married the daughter of John Clarke, Esq., of Sandford near Bridgewater, by whom he had five children. In 1761 he was returned for Christchurch, which seat he retained till his death. In 1762 he was appointed to the post of a lord of the Admiralty, and next year to that of a lord of the council of trade. In 1773 he was elected as member for the Dishborough district. As a member he managed his affairs with great credit. His seat was about twenty miles from London, to which he resided at Newmarket. He died in 1780.

Harris is best known by his 'Heremens, or a Philosophical Inquiries,' a work which Lowth characterized as one of the most beautiful pieces of analysis which had appeared since the days of Aristotle. He begins by defining grammar, and giving an account of the different systems of grammat- ematical or universal grammar, turns directly to the latter, which he proposes to treat in two ways; first, by dividing speech into its constituent parts; and secondly, by re- solving it into its matter and form. In pursuing the for- mer inquiry he determines speech to consist of sentences, and these sentences to be resolvable into two grand classes, those which refer to our perceptions, and those which refer to our will; the first including all forms of assertion, the other all forms of command. A sentence he defines, with Aristotle, to be a 'compound quantity of sound signi- ficant of which certain parts are themselves also significant, and that by which a word is declared to be no part of itself significant.' Giving instances of words, he says that in the sentence 'the sun shineth,' the words sun and shineth have each a meaning; but that there is some meaning of the word shineth in any of their parts, neither in the syllables of the one, nor in the other. 'Going next to words, he divides them into those signifi- cant by themselves, and those significant by relation. The former class, he observes, are significant either of substances or of attributes; the latter from being a part of one word or more. Hence he arrives at four species of words, substantives, substantive, and connectives, which he further explains by giving them the better- known names of common, proper, and proper substantive. Substantives he divides into primary and secondary, or nouns and pronouns; the first of which denote things ge- neral, special, or particular. On arriving at attributes, which include adjectives, verbs, and participles, he finds it necessary to qualify his assertion that there is no meaning in the parts of words, which he does by saying that the verb is becomes a latent part in every other verb, so that rizeth becomes rising, and arises. The contemplation of the verb brings him to a discussion of the nature of time, in which he stops just short of the conclusion that it only exists in the mind, but does not quite arrive at it. His ar- guments on time are accurate, but are taken up at a point when the reader is taken nearily word for word from Aristotle. In the matter of tenses his exposition is very intelligible, founded on the distinction between absolute and relative time; but when we get to number and person, all his usages are, he says, 'exposed to the objections of the verb,' of which 'the most that can be said is that verbs, in the more elegant languages, are provided with certain terminations, which respect the number and person of every substantive, that we may know with more precision, in a complex sentence, each particular substance, with its attendant verbal attribu- tives. As verbs consist of an attribute, time, and an assertion, by abstracting the last we get a participle, and by abstracting the other two we get a verb, and we have attributes of attributive, or adverbs, which concludes the subject of attributes.

Definitions, or articles, cost him very little trouble, and he perhaps did no more to connectives, conjunctions and con- junctions. What he says on this subject is not so satisfactory as might be wished, as, in defining a conjunction to be a part of speech void of signification itself, but so formed as to help the other words, he makes us understand under any known meaning of the words in which it is couched. This brings us to the end of the second book. The third treats of the matter or sound, and makes the three latter parts of language. He supposes he defines a word to be 'a voice articulate and signifi- cant by compact:' under which definition we are at a loss to know, first, how it can include those words which he has before said did not contain signification; and se- condly, by what communication that compact was instituted.
through which we now derive our only channel of communication.

Having now got through the subject-matter of his essay, he concludes it by a rapid glance at the genius of different languages; and in his admiration of the Greek, what scholar is there who will not go along with him?

The real merit of this work of Harris is perhaps best exemplified by the following few words of his sensible preface: 'The chief end proposed by the author of this treatise in making it public has been to excite his readers to curiosity and inquiry.' A careful perusal of Harris's work will fail to bore a man, and will make it more accurately, though he may, as he ought to do, reject some of the writer's premises.

Harris's 'Hermes' was published in 1751. Some years before he had become a member of the Royal Society, and in 1724 he published his 'Philosophical Arrangements,' a part of a large work on the Aristotelian Logic. His last work is called 'Philosophical Enquiries,' and it does not however answer to its title, as it is in fact a history of literature subjoined to dissertations on criticism. It is considerably interlarded with quotations from the authors of antiquity, but not nearly to such an extent as his other works.

His private character appears to have been excellent, and his son's admiration for him proves that his moral nature was so perfect as to secure the respect of those who had the advantage of his society. It rarely happens, let a man deceive the world so completely, that he succeeds in deceiving his own children.

HARRISON. [Holinhed.]

Avery Harris, son of the above, was born at Faulby, near Pontefract in Yorkshire, in the year 1593. He was the son of a carpenter, which profession he also followed during several years. In 1700 the family removed to Barrow, in Lincolnshire. Harrison early displayed an attachment to mechanical pursuits, and his attention was particularly directed to the improvement of clocks. After many failures and many minor improvements, he at last succeeded in constructing a pendulum, the excellence of which depended on the difficulty of maintaining the clock in due action, and particularly on the variations of temperature. This important principle is now employed in the construction of the balance-wheels of chronometers, and is that on which the accuracy of those timekeepers mainly depends. (Cromw. Sci.)

In the year 1714 an act was passed offering a reward of 10,000l. 15,000l., and 20,000l. respectively, for a method of ascertaining the longitude within 60, 45, or 30 miles. In 1715 Harrison came over to London with the timepiece which he had constructed. Having obtained certificates of its excellence from Halley, Graham, and others, he was allowed, in 1736, to proceed with it to Lisbon in a king's ship, the King George, in which he had been taken on a voyage as an engineer to the acquaintance of Jameson, whose son's tutor he had been, canon of Windsor. He died at Both in 1774. (Biog. Uni.)

HARTEPOOL. [Durham.]

HARTEWALTER, was educated at Marlborough school and Oxford. The dates of his birth and academic life are uncertain; he seems to have been born about 1700, and to have graduated as M.A. of St. Mary Hall, January 1730, and to have been appointed to theCambuslang school. At an early age he became acquainted with Pope, whose style he imitated; and in return the great poet corrected his admirer's verses. With this advantage Harte published his 'Poems on Several Occasions,' 1727, on St. John's, 1729; 'Essay on Painting,' 1732, in which Pope said he had contributed very considerably; 'Essay on Painting,' date unmentioned; 'The Amaranth,' 1767, his last work. As a poet however he is not distinguished from others once successful but now forgotten imitators; but he has made a valuable addition to our literature in his 'History of the Life of Gustavus Adolphus,' 2 vol. 4to., 1759; republished in 5vo., corrected and improved, in 1763. An affected, self-satisfied, and pedestrian work, it has by no means a single advantage over that of the poet whose name it bears, and the interest of Lord Chesterfield, whose son's tutor he had been, canon of Windsor. He died at Both in 1774. (Biog. Uni.)
on the 25th of August, 1757, at the age of fifty-two years. Combining as he did with his profession the pursuit of learning, he enjoyed through life the friendship of many men of his time. Among these may be mentioned Blasows Law, Butler, Warburton, and Hoadley. Dr. Jortin, Young the poet, and Hooke the Roman historian. One of his children thus writes concerning the quality of his friendship: 'His affection had an endearing, like the present nothing more than the most general notion can be furnished of the character and object of Hartley's great metaphysical work. Its chief end and its great achievement is the application of the principle of association, which he himself calls 'not them perhaps very happily, 'our intellectual pleasures and pains.' But before proceeding to set forth and apply the principle of association, he attempts to explain physically and intellectually. His work is replete with natural and revealed religion.

HARTSHORN, the horn of the Cervus Elaphus, the common stag [Deer], which has a place in the pharmacopoeia because it contains lead, antimony, and sugar, is used in medicine. It is kept in the kept in the shavings, of which a sufficient quantity boiled in water yields a jelly suitable to convecentes, which may be flavoured with lemon-juice or wine, &c.; but there is no proof that these were the only substances used, for it is sometimes a useful addition to milk for young children, but it possesses no alkaline properties, and the further addition of a little lime-water is often necessary to fit it for edible use.

HARTSHORN, SPIRIT OF. [Ammonia, Carbonates.

HARUN AL RASHID. [Abassides.

HARUSPICES, a class of priests in ancient Rome, whose principal duty was to inspect the entrails of the victims which had been sacrificed, and thereby to forecast future events. They also interpreted various phenomena, such as lightning, earthquakes, &c. (Cic., Div. i. 41.) This art, called Haruspician, was derived from Etruria, where it is said to have been discovered once. (Cic., Div. iii. 25.) The Romans used frequently to send their children to Etruria in order to be instructed in this art (Cic., Div. i. 41); and Etrurian haruspices often practised their profession in Rome. The duties of the Haruspices in many respects resembled those of the Augurs; but they were not reckoned so important, and they never acquired that political influence which the Augurs possessed. (Augurs.) They were formed into a college or corporation at Rome, of which the chief was called 'Summus Haruspex Publicus.' The haruspex fell into disrepute amongst the well educated Romans in the later time of the republic. Cicero ridicules their pretensions of foretelling future events, and relates a tale of Cato, who used to say that he wondered how one haruspex could meet another without laughing. (Cic., Div. i. 24.) The Emperor Claudius wished to revive the study; and under his directions a decree of the senate was passed for that purpose (Tac., Ann., x. 15); but it probably produced little effect, and it was the uneconomical and unreasonable to harvest. Although the state of the weather is beyond his control, he may, by an attentive observation of the usual changes at particular periods of the year, be enabled to determine, in any particular situation, the precautions which are necessary in a northern climate, where the fruits of the earth come late to maturity, to be superfluous in more southern latitudes. It is from the principles of his legislation, which he endeared to us, that we are likely to learn the means of obviating the effects of an unfavourable season and a late harvest.

In those southern climates where the heat and want of water are not too great for the growth of corn, the only care of the farmer is to procure hands sufficient to reap it. The heat of the sun and air soon dry the straw, and harden the grain. A spot is levelled in the field, and the corn is threshed out immediately, either by the trend of cattle driven over it, or by the flails of numerous throwers. The corn is winnowed and stored in granaries; and the straw is reserved till winter, when it forms the chief fodder of horses and cattle. In these regions the harvest is a continued state, and the force of the land is apportioned to the harvestman. But in northern climates, where the harvest is later, and cold rains and storms are frequent in autumn, the ingenuity is often taxed to save the corn from being spoiled or injured. The whole surface of the country is laid waste, and the reapers and stacks are in a hurry. Threshers are erected to secure the straw, till it can be threshed; and the joy of harvest is frequently interrupted by the anxiety which is the consequence of sudden changes of weather. To lessen the casualties of harvest in a moist climate, the experienced husbandman endeavours to arrange the time of sowing each kind of grain, so as to ensure its coming to maturity in the greater part of the summer season, and to attend to the precautions of which experience has taught him the utility; and if the duration of harvest is longer, there is less danger of all his crops being spoiled by a wet season.

It was the custom through the whole of the north of Europe to store all the produce of the farm into barns, especially the corn; and it was thought that as soon as the corns were collected under a roof, all danger was past. Thus it was that the produce rapidly increased; and the improved system of agriculture gave rise to the practice of stacking corn in the open air, and securing it by a covering of thatch. It was soon found that the grain thus stored in the open air did not suffer so much from the attacks of light, wind, and rain, as when it was kept in the barn; and the invention of stone, or cast-iron pillars, as supports for the frames on which the grain was stacked, not only secured it from the depredations of vermin, but kept it in a much drier state than when stacks were made on the ground. This was a great improvement; and now, in the best managed farms, the only barn required are those in which the corn is threshed; and if there is sufficient room to hold the contents of one stack of the usual dimensions, it is all that is absolutely required.

The wand of room in the barns was probably one of the reasons why the reapers were permitted to cut the straw still in full kernel and to collect in stacks only half the straw in the field. Another reason also was the precaution of weeds which grew amongst the corn, and which retarded its drying, by retaining the wet much longer than was necessary. It was a little better, so that the seeds of these weeds were thus prevented from mixing with the grain in the threshing, and giving more trouble in the winnowing. The usual prohibition against selling any straw also made the farmers less careful to secure the whole. The stubble was mown after harvest, and formed into bundles which were some places haum-walls, round the yards where the cattle were fed in winter, for the double purpose of fodder and shelter. But it is evident that this practice is defective; there can be no reason why produce, which was formed into straw by the dung and urine of cattle, and what is left as stubble is much wasted before it is mown and carried into the yard. The seeds of noxious plants remain on the land, whereas they would be much more effectually destroyed if they were
stacked with the corn. The subsequent separation of them is a very trifling additional labour, where a winnowing machine is in use. It may therefore be admitted as a general rule in reaping, to cut the straw as near to the ground as possible: this is best done by an instrument called a cradle scythe, which mows the straw, and collects it so as to be readily carried into the harrow. The Hasnaulot scythe has a very short handle, and is used with one hand, while the other collects the straw into a sheaf by means of a large hook at the end of a wooden rod. It is a most useful instrument, and greatly preferable to the scythe of the rest of the kingdom, and of the adjoining counties, where straw is valuable and sells at a high price. It cuts more straw at each stroke, and is less fatiguing to the reaper, because his position is nearly upright while using it, instead of bent over, as with the scythe. Corn is stacked into sheaves, except rye, wheat, and beans. Barley and oats are usually mown, raked into heaps, and carried into the stack or barn when dry, like hay; but this is a slovenly practice, which should not be recommended. With good tillage and proper mowing the straw of barley and oats will be strong, and of sufficient length to require being tied up into sheaves; and much less of the grain is shaken out and lost in this way than by the usual method.

In rainy seasons it frequently happens that the sheaves remain a long time in the field before they are sufficiently dry to be carried and stacked. If the ears are not secured firmly together, a conversation with the weather may injure the ear. This is a great loss; for sprouted grain is very inferior, and can only be sold at a low price. A little attention will often prevent the bad effect of rains. In some places six or eight sheaves are set up together, on a slight mound, so that the air to circulate among them; a sheaf is opened by spreading out the ears, and is placed inverted over the ears which lean against each other, forming a truncated cone. Thus the butt-end of the top sheaf is the only part in which the rain can lodge, and the first sunshine will soon dry this: the rain runs off the sides of the inverted sheaf, and the ears, pointing downwards, will not long retain the wet. If the sides of the sheaves are placed outwards, and project gradually over the sides of the frame, and over one another, so as to build the stack in the form of a bowl, with a cone or pyramid over it, according as the frame is round or square; this is carefully thatched with straw, and the outer surface is cut smooth by means of shears. This not only saves all the ears which chance to lie outwards, and which would have become the prey of birds; but it also prevents the rain from beating into the stack and injuring the corn. It may then be considered as safe.

Where there are no raised frames, and the stack is built on the ground, or on a bottom made of faggots to keep it dry, it is the most accurate method to put a foot-wide, round the stack, about 18 inches from the ground, after the surface has been cut quite smooth and even. This contrivance is intended to prevent the rats from lodging in the stock, and it is very effective. A frame made entirely of iron, and supported upon iron columns, has lately been invented. It may be readily taken to pieces and put together again when it is wanted. The advantage of it is, that it is cheaper and more easily moved than any other; and it is very convenient for a temporary purpose.

Harvest is proverbially a joyous time, and one when hospitality is practised with more good-will than at any other season of the year, on the part of men and women, when the last corn is carried, has been observed from time immemorial; and it must be regretted that in many farms it is now omitted, or a mere generosity is given in harvest-home. It is generally admitted as a general rule to exist between the master and his servants or labourers, is most effectually kept up by occasional friendly intercourse; and a harvest-home supper was formerly a kind of sport, in which no expense of refreshment was spared, without fear of offence. The anticipation of it was an incitement to exertions in the field; and the farmer was amply repaid the expense which the feast occasioned. The stimulus of strong beer is still applied at harvest, and frequently ignites into boisterous sallies of sport, without any fear of offence. The anticipation of it was an incitement to exertions in the field; and the farmer was amply repaid the expense which the feast occasioned. The stimulus of strong beer is still applied at harvest, and frequently ignites into boisterous sallies of sport, without any fear of offence. The anticipation of it was an incitement to exertions in the field; and the farmer was amply repaid the expense which the feast occasioned. The stimulus of strong beer is still applied at harvest, and frequently ignites into boisterous sallies of sport, without any fear of offence.
in their turn assume the same action, and propel most of the blood into the pulmonary artery and vessels, from which it is propelled onward by the valves distributed at the entrance of those vessels. The author next proceeds to describe the manner in which the blood passes from the right to the left side of the heart.

He says he, this is sufficiently evident. Part of the blood passes directly from the right to the left auricle through the foramen ovale, whilst the rest is conveyed into the right ventricle, and by its contraction forced into the pulmonary artery, and so through the ductus and pulmonary artery into the descending sora; for, as he observed, the lungs do not admit of its passage through them in the fetus. In the adult a new condition is introduced, namely the valves of the lungs, by which, he observes, the question was so much obscured that physicians were unable to give a correct explanation of the phenomena. However the consideration of the obvious use of the valves of the pulmonary artery led Galen to maintain that a portion of the blood contained in that vessel passed through the lungs into the pulmonary veins, but this passage he supposed to depend more upon the action of the lungs themselves than of the heart proper. Harvey eral further, and maintained in it that the whole of the blood which is propelled from the right side passes through the lungs to the left side of the heart. In like manner he supposed that the blood is prevented from flowing into the arteries and distributed to all parts of the body. He next proceeded to give approximate calculations of the quantity of blood which passes from the veins through the heart in a given time. This he showed to be so much more than that required for the nutrition of the body, and the surplus he supposed to be absorbed by the lungs by the absorption of alimentary substances, that the surplus must of necessity return through the various tissues of the body to the veins again. He then argued from the construction of the valves of the veins that the course of the blood in them must be from the smaller to the larger divisions, and thus to the heart again. These views he still further confirmed by reference to the now well-known effects of ligatures, and the more minute degrees of ligation. If the ligature be so placed as to compress the veins alone, they become swelled and turgid beyond the ligature, and quite empty between it and the heart, whilst the pulsations of the artery remain unaltered. If it be drawn a little tighter the pulsations of the artery cease beyond, and are felt more violent than usual just within the ligature.

Such is a brief abstract of the principal steps in the great and most original discovery in physiology, which was so directly opposed to all the previous notions of physicians, that its author might well observe, 'Ad eum novum sententiam et inaudita ut non solum ex invidiis quondam maxam malecum, sed etiam ab adversis cum belli semper consuetum aut semel illimitata doctrina antiquae defixa radicibus quasi altera natura, apud omnes valet, et antiquitatis veneranda suspicio cogit.' This anticipation proved correct; for Harvey afterwards complained to one of his friends, that his practice fell off considerably after the publication of his treatise 'On the Circulation of the Blood,' and it is well known that the doctrine was not received by any physician who was more than 40 years old. His opinions were violently opposed by Primorius, Parissius, Riolanus (1645), and others. Parissius was at last urged by his friend Dr. George Ent, Fellow of the College of Physicians, and other advocates of Harvey's views appeared on the Continent. The only man who was honoured by a reply from Harvey himself was Riolanus, professor of anatomy in Paris, in answer to whom he published two letters. In 1629 Harvey had the satisfaction of seeing one of his early opponents, Hampsoe, profess in a letter that he was himself a convert to his opinions, and by his example many more were induced to withdraw their opposition. In the whole of this controversy, says Sprengel (Hist. of Med., sect. XII., c. 1), "there is no testimony which more distinctly and more unequivocally afford the best model for naturalists and scientific writers. Harvey had been so much disgusted by the disputes in which he was involved upon the publication of his views on the circulation of the blood, that he had determined to publish nothing more, and it was only at the earnest request of his friend Dr. Ent that he was induced to allow his 'Exercitaciones de Generatione' to be printed. This work consists partly of his own CONCLUSIONS, and partly of the writings of Aquaspedente and Fabinus about the subject, and partly of details of his own observations and experiments. The earlier

Exercitaciones contain a description of the organs of generation in the female, and the manner in which the egg is formed, and its extrusion from the body, and of the use and nature of its various parts, as well as the changes which it undergoes during the process of incubation. He then proceeds to enter upon some discussions on the nature of the act of generation, and the degree in which the parts of the female contribute to its performance, in the course of which he examines the opinions of Aristotle upon this abstruse subject, and advances some of his own. The concluding part of this work contains a description of the analogous processes in the deer.
De Exercitatio De congregatione... It was mainly inhabited by aliens; and the people were known as 'Flautas.' His view, as is now well known, is incorrect. His description of the vessels and of the placenta is of considerable value. The smaller divisions of the umbilical cord were noted by him, as also was the site of the umbilicus. Two arteries arise from the branches of the descending cord. These vessels arise from and pass to the cotyledons of the placenta. In like manner the maternal vessels are distributed to the same cotyledons.

A layer of honey-like matter is interposed between the maternal and fetal portion of the placenta; and it is by absorption from this substance that the nutrition of the fetus is carried on. For, there is no vascular connection between the mother and the fetus.

He noticed the late union of the lateral parts of the upper lip and assigned it as a cause of the frequency of hare-lip. He claims to have been the first to discover the connection between the ruptures and the incisions of the birds, and to show that in all birds, serpents, oviparous reptiles, quadrupeds, and fishes, kidneys and ureters exist, a fact not noticed by Aristotle and all succeeding writers. This account was the foundation of Harvey's most important discovery. The importance of the discoveries of Harvey in this branch of physiology, and to make us withhold our assent to the assertion of Sprengel (sec. 12, ch. 6), that the Treatise De Generatione... was chiefly written by the physician of Charles I., and was in the habit of exhibiting to him and to the most enlightened persons of his court the motion of the heart and the other phenomena upon which his doctrine was founded. A summary of his discoveries is given by the king, and while staying for a short time in Oxford was made by him master of Merton College, and received the degree of Doctor of Medicine. He held the mastership however for only a few months, when Brent, who had been expelled by the king for favouring the parliamentary cause, was replaced by that party, which had now gained the ascendancy. Soon after his house was plundered and burned by the same party, and unfortunately several unpalatable portions of his other writings were destroyed. The latter years of his life were chiefly spent at his country-house at Lambeth, or at his brother's near Richmond. In 1654 he was elected president of the Royal Society, and educated the youth of his age; but on the inroads of the plague he was induced to decline that honourable office. But he testified his regard for the society by presenting them with his library, and conveying over to them, during his lifetime, a farm which had been left by his father. He died on the 3rd of June, 1657, in the 90th year of his age, and was buried at Hemsted in Essex, where a monument was erected to his memory.

The best edition of his works, which were written in correct and elegant Latin, is that published by the College of Physicians in vol. 4to., in 1766, with an engraving by Hall from the portrait by Cornelius Jansen, in the college library. They contain 414 pages of text, 114 of tables and diagrams, and 11 plates, of which 7 are woodcuts, 3 are engravings, and 1 is a copperplate print. Among the works destroyed, were: "Observationes de usu Lienis; "De Motu Locali; "Observationes Medicinales; "De Amore Libidine et Coitu Animallium; "De Insectorum Revolutione in Quantitate Sanguinis Singularis Cordis Pulsatulionibus Prophila; "Et Scientiam Physiologicum. Two other MS. works by him are preserved in the Library of the British Museum; one, "De Musculis et Motibus Animalium Locali;" the other, "De Anatomie Universali;" in the latter of which, written late in 1616, the principal propositions of the doctrine of the circulation are contained.

Left, prefixed to his Works: Sprengel's History of Medicine."

HARWICH, a parliamentary and municipal borough and seaport town in the hundred of Tendring, and county of Essex, 71 miles north-east from London. On the east it is bounded by the sea, and on the north by the counties of Suffolk and Norfolk. The town is situated on the north bank of the river Granta, and its name is derived from two Saxon words, Here, an army, and Wic, a fortification (Mornat's Essex, vol. 1, p. 499), from which circumstance it is supposed that a Saxon army was encamped here prior to the occupation of the country. That of James I. are now extant. Under the Municipal Corporation Act the council of the borough consists of a mayor, four aldermen, and twelve councillors. The revenue of the corporation, in 1831, arising from lands, port dues, and other property, amounted to 671L., and its expenditure for the same year was 585L. The borough returns two members to parliament, a privilege which it enjoyed previous to the time of Edward III., in whose reign it was disfranchised, and was not restored till the commencement of that of James I. The town consists of three principal streets, is well paved, and lighted with gas. The church, dedicated to St. Nicholas, is a spacious structure of brick, with stone ribs and pinnacles, intersected by arches. The collegiate church of St. Mary Magdalene, founded, about the commencement of the 13th century, by Roger Bigod, earl of Norfolk. The living is a vicarage in the patronage of the crown, with an average net income of about £150. There are offices in the town for ship-building and other maritime occupations, but the trade of the town is in a declining state, which is partly attributed to the removal of the government packets. Within the last twenty years several vessels have been built in the dockyard for the harbour, and the custom-house receipts, have fallen off considerably. The harbour is deep and spacious, the anchorage good, and there is a lighthouse, erected upon a hill between the town and the creek. In 1654 the town had a population of 4000, and was, he believed, beneath the Prince of Orange, and the king, and while staying for a short time in Oxford was made by him master of Merton College, and received the degree of Doctor of Medicine. He held the mastership however for only a few months, when Brent, who had been expelled by the king for favouring the parliamentary cause, was replaced by that party, which had now gained the ascendancy. Soon after his house was plundered and burned by the same party, and unfortunately several unpalatable portions of his other writings were destroyed. The latter years of his life were chiefly spent at his country-house at Lambeth, or at his brother's near Richmond. In 1654 he was elected president of the Royal Society, and educated the youth of his age; but on the inroads of the plague he was induced to decline that honourable office. But he testified his regard for the society by presenting them with his library, and conveying over to them, during his lifetime, a farm which had been left by his father. He died on the 3rd of June, 1657, in the 90th year of his age, and was buried at Hemsted in Essex, where a monument was erected to his memory.

The best edition of his works, which were written in correct and elegant Latin, is that published by the College of Physicians in vol. 4to., in 1766, with an engraving by Hall from the portrait by Cornelius Jansen, in the college library. They contain 414 pages of text, 114 of tables and diagrams, and 11 plates, of which 7 are woodcuts, 3 are engravings, and 1 is a copperplate print. Among the works destroyed, were: "Observationes de usu Lienis; "De Motu Locali; "Observationes Medicinales; "De Amore Libidine et Coitu Animallium; "De Insectorum Revolutione in Quantitate Sanguinis Singularis Cordis Pulsatulionibus Prophila; "Et Scientiam Physiologicum. Two other MS. works by him are preserved in the Library of the British Museum; one, "De Musculis et Motibus Animalium Locali;" the other, "De Anatomie Universali;" in the latter of which, written late in 1616, the principal propositions of the doctrine of the circulation are contained. At Walton, near Harwich, the eago yielding many fossils may be seen resting on the London clay, a rare and important occurrence.

HARWOOD, EDWARD, a biblical and classical scholar of the last century, was born in Lancashire, in 1729, and educated at Cambridge, and after going through various other employments, he accepted the charge of a congregation at Bristol, in 1765, which however, at the end of five years, he was obliged to quit, in consequence of reports (untrue as it is said) touching his religious opinions, which gave offence to his congregation, and also of a slur cast on his moral character. He then removed to London, devoted the rest of his life to private tuition and literary labour, and died in distress, Jan. 14, 1794. He used to say that he had read more books than any living author, except Dr. Priestley. (For the list, see Watt, Bibl. Brittan.) His reputation as a scholar rests chiefly on his edition of the various appendices to the Greek and Roman Classics," 1775, fourth and best edition 1790, 'a valuable little book, no doubt far from being perfect, but that can hardly be expected in a work of the kind.' (Watt.) It has been translated into German and Italian. His 'Biographia Classicum, the Lives and Characters of the Greek and Roman Classics,' 1778, a new edition of an old work, with additional matter, is another useful work. Dr. heritage also published an 'Instructor in the New Testament,' 1767; a New Translation of the New Testament, 1768; a new edition of the Catholic Testament, with English Notes, 1776, &c.

HADRIBAL, the name of several Carthaginians.

HADRIBAL, the son of Hamilcar. (Hamilcar)

3. Hadrabal, who commanded the Carthaginians in their last war against the Romans, u.c. 146.
HASLINGDEN. [LANCASHIRE."

HASSE, ADOLPH, a composer of great celebrity during the middle of the 18th century, was born at Bergedorf, near Hamburg, in 1705. When very young, he distinguished himself as a superior tenor singer, but soon left Germany for Italy, and became first the disciple of Porpora, then of Metastasio. He produced an opera, Soccorrete, at Naples, which was followed by others in different parts of Italy. In 1733 Hasse, being then in London, was engaged by the noblemen hostile to Handel, to write an opposition opera, which he brought out with success his Ariausare. He could however be persuaded to remain in London, the head-quarters of a cabal did not approve, but went to Dresden, where he remained several years. It is in 1747 that Frederick of Prussia heard his Armide, which so pleased that warlike, musical, and commonly parsimonious prince, that he sent the composer 1000 dollars and a diamond.

In 1760, at the bombardment of Dresden, Hasse lost all his property, including his valuable manuscripts, by fire. This was his first affliction. In 1763 he experienced a second, having been obliged, by changes made in the court of Dresden, and being rather set down as a false speculator that capital he wrote several operas. He finally retired to Venice, where he produced a grand Te Deum, which was performed before the pope in the church of Santo Giovanni. He died at Venice in 1797, and was buried in the Church of St. Mark, where a special requiem for his own funeral, which was duly applied to the intended purpose, and is a work affording evidence of his powers in an advanced period of life. Hasse is certainly one of the best composers of operas in the whole 18th century. One of his productions, and among these his Pelligrini and two Litaniies, are much admired by real unprejudiced judges, and are occasionally heard at that asylum for what is classical and reeking with fashion, called the Concerts. But it must be acknowledged that many of his operas have sunk into an oblivion by no means merited.

HASSELQUIST, FREDERIC, a Swedish naturalist, and a clergyman of the name of Pontin, took charge of young Hasselquist's education, and placed him with his own children in the school of Linkoping. After the death of his benefactor, Hasselquist transferred to the university of Upsal, where he entered in 1741. He there acquired a taste for natural history, became a pupil of the great Linnaeus, and was led very particularly to apply himself to the study of the properties of plants. An inaugural thesis, called 'Viera Plantarum,' which appeared in 1747, evinced him to be a judicious explorer of the nature of living plants, and of the mind, and worthy of his master. He showed how puerile were the notions at that time entertained regarding the medicinal properties of many plants, how much the whole of vegetable knowledge required a new formation; and he pointed out a philosophical mode of investigating the facts connected with it, by insisting upon the old doctrine of 'like forms, like virtues.' This truth, which is one of the most important among those connected with the practical application of botany to useful purposes, had been so obscured by want of science in the age immediately preceding Linnaeus, that it had ceased to be a point of view in the 18th century. He also set down in a specu- lation of forgotten theorists. Hasselquist however maintained its accuracy, and with so much skill that he may be said to have established it upon a solid foundation, from which it could not afterwards be shaken. This, and his general proficiency in other branches of science, procured Hasselquist some of the royal stipends provided for travelling students, and he was thus eventually enabled to carry into execution his favourite project of visiting the Holy Land for the laudable purpose of investigating its natural history. Having sailed from Stockholm in August, 1747, he proceeded to Smyrna, thence to Egypt, and afterwards to the Holy Land, where he continued his researches, and the exer-

HASTINGS, a parliamentary borough and the chief town of the county of Sussex. It is situated in the hundred of Guscott and county of Sussex, 64 miles south-east from London. Hastings is a town of considerable antiquity, but nothing is known with certainty respecting its origin, or whence it derived its present name. Dalney, in 'History of Sussex,' speaks of the town being destroyed by the Danish, and restored to a用电 1000 ships, commanded by the pirate Hastings, landed at the mouth of the river Rother, near Romney Marsh, and immediately possessed themselves of Apsuore, where an ancient city called from its legendary and distinguished was called Arcturus. A number of the most constructed forts and ravaged all the coast to the westward of the country, but it is probable that the town had an earlier origin, as in the reign of Ethelstan, a.D. 924, it was a place of considerable importance, and in 937 the Confessor granted it a charter, and several other kings did the same down to James II., but the charter to the in the county of Kent. The town consists of a mayor, six aldermen, and eighteen councilors, and the style of the corporation is the mayors, burgesses, and commonalty of the town and port of Hastings. Hasting has returned two members to parliament since the reign of Edward III. It is one of the Cinque-ports, and is next in importance to Dover, the chief of those ancient ports of which Charles II. (as is said to be nearly situated on the sea-coast, in a hollow, sheltered on every side, except the south, by lofty hills, and has of late years been much restored to during the battle the advantage, and which is principally of two streets, running nearly north and south, and are called the Bourne, which runs into the sea. To the westward of the town, upon a lofty cliff, are the ruins of an ancient fortress, supposed to have been erected prior to the Norman conquest. It was a strong and handsome structure, supported on arches, with a marketplace beneath it; but the soil is small and inconvenient. There are five principal hotels, which are said to be generally well kept, but the Theatre is not the most flourishing one: the hotels are numerous, and comprise the theatre, marine parade, Royal Pelham Arcade, &c., besides subscription libraries. The inhabitants are chiefly employed in the fishing trade and fisheries, but a considerable number are engaged in boat-building and in the making of lime. The cliffs are situated to the west of the town, and produce on an average 120,000 bushels a year. Hastings is in the diocese of Parkman. There are two churches, both very ancient, edifices, dedicated to All Saints and St. Clement. The living is a rectory, with an average net income of 300l. The port is divided into eight parishes, the aggregate population of which, in 1871, was 10,500. The town is noted for the education of boys, founded and endowed by the Rev. William Parker in 1619, and another founded and endowed by James Saunders, Esq., in 1678. The average yearly income of Saunders's charity is about 210l, that of Saunders's is about 210l. About a mile to the west of Hastings is situated the new and well built town of St. Leonard's. The principal range of buildings extends along the coast, about three-fourths of a mile in length, and is formed by a very elegant esplanade. As the town was only commenced in 1828, the public buildings are not yet very numerous. There is however abundant accommodation for visitors, and the three principal hotels are one of them, on an average an splendid scale. (Allen's History of Sussex, 5vo, 1830; Dallaway's History of Western Sussex, 4to, 1839; Parliamentary Papers, &c.)

HASTINGS SANDS. The middle group of the Wlad- den formation, which constitutes the uppermost part of the

Like most travellers' books of that age, this work showed

that the author had combined with energy and industry great attainments in the sciences of his day. It is rich in observations upon the moods, properties, habits, feasts, fish, insects, mollusca, plants, minerals, and materia medica of the countries he visited, and is to this day a standard work of reference. His science was not the flimsy, superficial, and unscientific gossips so often heard under modern travel, but a sound matter-of-fact, precise, and definite information of which use may be made so long as science endures, whatever changes it may undergo in its forms. So much is his"
The totality system in England, is thus named from its characteristic development among Hastings in Sussex. In the Hastings sands we may distinguish four divisions, which lie in the following order:—

The Horsham beds... fawn-coloured sand and friable sandstone, a good flagstone occurs here.

The Tisbury beds... Sandstones often calcareous, with variable grits and conglomerates, resist decay in water. In these... have yielded a considerable number of organic remains, plants, molluscs, fishes, and lighter rocks of gypseous limestone. [JUANGOODON AND H. L. GRUBUS].

The Ashburnham beds... Nodules and beds of limestone, alternating with clays and sandstones.

The axis of elevation or foreland of the Weald of Kent and Sussex is chiefly formed of Hastings sands, which rise in Crowborough Beacon to 804 feet above the sea. [GEOLOGY.] (Manoitt's Tisgar Forest; Fytton's Geology of Hastings, &c.)

HASTINGS, WARREN, a memorable name in the history of British India, was born in the rank of middle life in 1733, and after receiving the usual education at Westminster School, went out in 1756 as a writer in the service of the East India Company. His appointment was due to his own industry and discernment, which led him to master the Persian and Hindustani languages, a study at that time almost universally neglected; and he was therefore unusually useful in the commercial and diplomatic, in the interior. After residing about fourteen years in India, he returned home with a moderate fortune, intending apparently to pass the remainder of his life in England. However, he unexpectedly received the appointment of second in council at Madras, and in 1772 was appointed to the highest office in the Company's service, that of President of the Supreme Council of Bengal. His powers were enlarged by the alteration of the Indian constitution by act of parliament, in virtue of which he became, January 1, 1774, governor-general and supreme head of all our Indian dependencies. Affairs were at this time in great distress. The territories of the Company had been greatly extended by the conquests of Clive and his successors; but their dominion, authority, and influence were still unconsolidated, and were exposed during the government of Mr. Hastings to great danger from the invertebrate enemy of Europe and India, supported by the Maharrattas, and others of the native powers. That he did many things under the pressure of circumstances, which nothing but expedience could justify, is hardly denied by his defenders; and more, supported by the Maharrattas, and others of the Indian powers. That he did many things under the pressure of circumstances, which nothing but expedience could justify, is hardly denied by his defenders; and more, supported by the Maharrattas, and others of the Indian powers. That he did many things under the pressure of circumstances, which nothing but expedience could justify, is hardly denied by his defenders; and more, supported by the Maharrattas, and others of the Indian powers.

Hastings was appointed to the highest office in the Company's service, that of President of the Supreme Council of Bengal. His powers were enlarged by the alteration of the Indian constitution by act of parliament, in virtue of which he became, January 1, 1774, governor-general and supreme head of all our Indian dependencies. Affairs were at this time in great distress. The territories of the Company had been greatly extended by the conquests of Clive and his successors; but their dominion, authority, and influence were still unconsolidated, and were exposed during the government of Mr. Hastings to great danger from the invertebrate enemy of Europe and India, supported by the Maharrattas, and others of the native powers. That he did many things under the pressure of circumstances, which nothing but expedience could justify, is hardly denied by his defenders; and more, supported by the Maharrattas, and others of the Indian powers. That he did many things under the pressure of circumstances, which nothing but expedience could justify, is hardly denied by his defenders; and more, supported by the Maharrattas, and others of the Indian powers. That he did many things under the pressure of circumstances, which nothing but expedience could justify, is hardly denied by his defenders; and more, supported by the Maharrattas, and others of the Indian powers. That he did many things under the pressure of circumstances, which nothing but expedience could justify, is hardly denied by his defenders; and more, supported by the Maharrattas, and others of the Indian powers.

Mr. Hastings attempted to refute the charges of extortion by publicly asserting in the most solemn manner, that never at any time of his life he was worth 100,000/. The law-house of his defence amounted to 70,860/. In March, 1776, the trial of Mr. Hastings for corruption is deferred to the third day, Mr. Hastings was tried, and was acquitted, on July 17, 1776, and was acquitted on July 17, 1776. He retired completely from public life, to an estate which he purchased at Deyeston, in Worcestershire, for an annual sum of 1,000/. He died August 22nd, 1818, having been raised to the dignity of privy-councillor not long before.

On his real character as a man and a statesman it is somewhat hard to decide. That his talents and his services were alike eminent, is admitted; that the means which he used were often most culpable, appears to be equally certain. His apology is to be found in the necessities of his situation, in the general neglect of justice in our dealings with the Asiatic princes, and in the notorious laxity of Anglo-Indian morality, where making a fortune was concerned, in those days. Mr. Mill, after exhibiting without reserve on this subject, would not, according to the administration, think it necessary to recommend him to the favourable construction of the reader, on the ground that he "was placed in difficulties and acted on by temptations, such as few public men have been called on to overcome; and although such a body of men as I have the advantage of viewing the conduct of other men, who have been as much engaged in the conduct of public affairs, as completely naked and stripped of all its disguises as his, few of them would be found whose character possessed a higher claim to indulgence; in some respects, I think, even to applause. In point of ability he is beyond all question the most eminent of the chief rulers whom the Company have ever employed; nor do I know of any who would not have succumbed under the difficulties which, if he did not overcome, he at any rate sustained."
HAT

He had no genius, any more than Clive, for schemes of policy, including large views of the past and large anticipations of the future; but he was hardly ever excelled in the skill of applying temporary expedients to temporary difficulties, in blunting off the evil day, and giving a day's reprieve to the present one. He had not the forehead and imposing audacity of Clive; but he had a calm firmness, which usually by its constancy wore out all resistance. He, too, was one among the first of the servants of the Company who attempted to acquire any language of the natives, and who set on foot those liberal inquiries into the literature and institutions of the Hindoos, which have led to the end of the country's学科. He knew that great art of a ruler, which consists in attaching to the governor those who are governed; and most assuredly his administration was popular, both with his countrymen and the natives in Bengal.

We have thought it fair to give at length the testimony of Mr. Mill, who has dissected the events of Hastings' government with an unsparring hand. At the same time, assuming Mr. Mill's representations of particular events and his struck by much to be just, we feel bound to dissent from the meed of comparative praise conveyed in this passage, and believe that most persons, on perusing the fifth book of the 'History of British India,' will do the same. Mr. Mill's criticism is the soul of HAT.

In every civilized community it has been the custom for men to wear a covering on their heads in the open air; and in Western Europe, and those countries which have borrowed of it, the exteriors since the fourteenth century has been that which we call a hat. The difference between a hat and a turban, the covering generally used throughout Asia and a part of Eastern Europe, is in one, it appears to us, in not being an extension of the head; and that a cap consists in the shape, as both may be made of the same materials. The hat has usually a cylindrical crown, or receptacle for the head; and a rim or brim encircles the crown and is perpendicular to it, to which brim does not form part of a cap; but this distinction is not sufficient, as hats such as those worn by naval and military officers, and those which until late years were employed in polished society and ceremony, as well as coco's women's hats, have not any brim, properly so called, but a part, of ample dimensions, answering to it, and turned up so as to be parallel with the crown.

Hats are made of straw, of silk, or of wool. Straw-hats and felt-hats are little used in this country. The material chiefly used in making them is wheat-straw plaited in strips and sewed together in the required form. Silk-hats are composed of a form made of silk or silk, and covered with silk, and their shape and size are determined by the shape and drawn over the form. A considerable number of these hats are made for exportation to different places in the Mediterranean and to our Colonies. The greater part of these hats are made by felting, a process peculiar to that substance. There are three descriptions or qualities of hats made of wool, viz. beaver-hats, plate-hats, and felt-hats. Each of these has the body composed of felt: the first has a covering or nap of beaver; the second, a nap of the fur of the musk-rat, or the nutria, or some other fur of small value; and the third kind is without a nap. It will be sufficient to describe the mode of making beaver-hats.

According to the general belief the art of felting was brought to Western Europe by the Crusaders, who found the tents of their enemies covered with that substance. When a hare is shot, or a rabbit is killed, it is necessary to the process that it should be well scoured, when the fibres are brought together have a tendency to mat together. This tendency is so strong that it is not possible to spin woolen yarn without previously oiling the wool. Hats of the very finest quality are made with lamb's-wool imported from Spain or Saxony, and the fur of English rabbits. The nap is composed of the fur of the beaver and nutria, and the down from the back of the English hare mixed together. To form the body of the hat, the hare's fur and rabbit-fur are separately boxed in the manner employed for freeing cotton from its seeds. [Cotton.] The two boxes are then bowed together until they are intimately mixed, after which the mass is spread evenly covered with an oil-cloth and pressed; first gently and afterwards more strongly, by which means the fibres will become tangled or interlaced. A very loose and imperfect felt is thus produced. The next process is to cover the felt with a triangular piece of damp brown paper, and then to fold it in a damp cloth and work it well with the hand, pressing and bending, rolling and unrolling it, until the nap begins to fall off. This mixture is kept near to the boiling point. The workmen having the palms of their hands protected by a covering of thick leather, lay the felt on the margin of the boiler, and then proceed to sprinkle it with the hot water, to work it about with the palms of their hands; by this means it shrinks and becomes more compact; it is then dipped into the boiler and worked, first with the hands, and next by the help of a rolling pin, which admits of more force being used, and this process is continued until the felt no longer contracts.

The next process is that of stiffening. The substance employed for this purpose is shell-hat, a solution which is applied by means of a brush to one side, and sometimes to both sides of the felt, after which it is stoved, and by this means the whole substance becomes duly impregnated with the resin. Shell-lace being insoluble in water, spirit of wine is usually employed to assist in the penetration of the mixture made from coal-tar is sometimes substituted for it. The use of this resin is the greatest modern improvement in hat-making; the substance is thus rendered perfectly water-resistant. The hat is then carefully dried, and perfectly stiffened in the manner already described, and shaped the same as the body to which it is to be applied; that body is then softened by immersing it in the boiler, and when the nap is applied and the felt is filling, until the required union is effected between the two bodies.

The felt thus covered is in the form of a cone, and must be brought to the cylindrical shape in which it is worn by means of a cylindrical form, which is required for the operation, which is called blocking, is performed by working it with the hand on the block to which it is tied. It is then dyed in a bath composed of water, logwood, sulphate of iron, verdigris, and gall-nuts, in which the hat is boiled during some hours; it is then dried. After this it is softened by steam, the crown is strengthened by placing it in a disc of scale-board, and linen is pasted over this. The nap is raised and a uniform direction given to its fibres by means of strong warm and cold starches. The last processes are binding and lining, when the hat is ready to be worn.

It is not possible to form any correct estimate of the extent of the felt and hat industry in this country. The quantity and value of felt hats exported in the ten years, 1827 to 1836, were as follows:

<table>
<thead>
<tr>
<th>Years</th>
<th>Denars</th>
<th>Value</th>
<th>Years</th>
<th>Denars</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1827</td>
<td>75,497</td>
<td>£175,482</td>
<td>1832</td>
<td>85,468</td>
<td>£144,596</td>
</tr>
<tr>
<td>1828</td>
<td>83,114</td>
<td>197,581</td>
<td>1833</td>
<td>93,138</td>
<td>130,232</td>
</tr>
<tr>
<td>1829</td>
<td>81,182</td>
<td>189,590</td>
<td>1834</td>
<td>80,155</td>
<td>125,970</td>
</tr>
<tr>
<td>1830</td>
<td>77,061</td>
<td>209,849</td>
<td>1835</td>
<td>66,489</td>
<td>133,800</td>
</tr>
<tr>
<td>1831</td>
<td>62,854</td>
<td>170,188</td>
<td>1836</td>
<td>53,984</td>
<td>149,282</td>
</tr>
</tbody>
</table>

The great bulk of these shipments are made to our own colonies and dependencies. The exports so made in 1836 amounted to 100,634 dozens.

A duty of 10s. 6d. each is imposed on the importation of hats of foreign make, which operates as a prohibition.

HATCHETINE. Mineral Adipocris. This substance has been seen in the form of quantities of the station of South Wales. It is very soft, somewhat granular in appearance, translucent; colour yellowish-white or greenish; not elastic; inodorous; combustible. It melts at 170°, and is soluble in ether.

According to Professor Johnston it consists of—

One atom of carbon ... 86:910
One atom of hydrogen ... 14:624

HATFIELD. [Essex.]
HATHERLEIGH. [Devonshire.]
HATTERAS. CAPE. [Carolina, North.]
Haukal's work on geography is entitled 'A Book of Roads and Kingdoms,' He states in the preface that he composed the work to give a description of all the countries in which the Mohammedan religion prevailed, together with the revenues, natural productions, and commerce of each. After giving a general view of the earth, and a brief description of the nations which do not profess the Mohammedan religion, he first describes Arabia, since it contains Mecca and Medina, and afterwards the seas and other countries subject to Mohammedans. The description of each country is accompanied by a map; but Abulfeda, who frequently quotes Haukal in his treatise on Geography, occasionally speaks of the cost of the work, and that the latitudes and longitudes are not put down in these maps. Haukal mentions the names of other writers on Geography, from whom he derived great assistance; namely, Ibn Khordabeh, Ibn Huppok, and Ibn Huppok's father, whose works he always carried with him in his travels.

Manuscripts of Haukal's work on geography are rarely met with even in the East; there is a copy in the Bodleian Library at Oxford, and another at Leyden. From the latter MS. Uylenbroeck has given an interesting account of the work in his 'Tractatus Persico Descipendi; promissa est Dissertatio de Ibn Haukali Geographi codice Lugndou-Batavo, 4to., Lugduni Batavorum, 1722,' to which we are indebted for the greater part of the preceding remarks.

Ouseley published, from what he conceived to be a Persian translation of the Arabic of Haukal, a work entitled 'The Oriental Geography of Ibn Haukal, a Traveller of the 16th Century,' London, 1800; and De Saey gave a further account of this work in the 'Magasins Encyclopédique,' vol. VI., pp. 29-76, 151-186, 367-333. But Uylenbroeck has shown, in the work already referred to, that the Persian treatise translated by Uylenbroeck cannot be regarded as obtain a translation or an abridgment of the Arabic of Haukal, since, independently of other differences, it appears to have been written in the beginning of the 4th century of the Hegira, while Haukal's treatise cannot be dated later than 366 or 367. But he considers it probable from many circumstances that the Persian work was one of those which Haukal made use of in compiling his Geography, and that it was written by Haukal's father.

Haukabee or Hawkebee, Francis, was born in the latter part of the seventeenth century. The exact year of his birth is unknown, and also that of his death; but it appears from the minutes of the Royal Society that he was admitted a Fellow of that body in 1706, at which latter period it is probable he was appointed to the office of curator of experiments to the Society. Previous to the time of Haukabee, electricity could not be said to exist as a science. In 1693 the School of Mines of Paris had laid down the laws of magnetism about the beginning of the seventeenth century, wherein he gave a list of certain substances which, when rubbed, acquire the power of attracting light bodies; and he likewise gives an account of some discovered by Boyle, but with the exception of these insulated facts nothing was known concerning electricity. Even the electrical discoveries of Mr. Haukabees were not of any great importance to themselves, but, as Dr. Thomson observes in his 'History of the Royal Scottish Society,' they contributed to the beginning of the science, and, by drawing the attention of philosophers to that particular subject, were doubtless of considerable service in promoting electrical investigations.

Between 1702-11, the paper 'The Electric Actions of the Royal Society,' giving a detailed account of his experiments. In 1706 he had recognised the electricity of glass by friction, and was hence led to the first rudiments of the electrical machine. In 1709 he published his P. C. No. 722.

- Physico-Mechanical Experiments on various subjects; or throwing light and electricity producible on the attention of bodies, 'London,' 4to., which was shortly after translated into Italian by Thomas Doremah. The work was also translated into French by M. Bremont, but the latter having died before completing the translation, the publication was delayed till 1714, when it was revised and edited by Mr. Desnais, who added the more recent discoveries of Haukabee, and the yet more important ones of Mr. Gray. In addition to the works already mentioned, Haukabee's 'Electrostatick and Magnetick Experiments on Fire,' 4to., London, 1731, 4to.; 'An Essay for introducing a Portable Laboratory,' London, 1731, 8vo.; besides numerous papers on various philosophical subjects in the Society's Transactions.

Hautbois. [Orobr.]

Hautes Pyrenees. [Pyrenées, Hauts.]

Haüy, René-Just, Abbé, a distinguished French mineralogist, was born February 26, 1764, at St. Remy, in the present department of Beaujolais. He commenced his studies at the college of Navarre, to which college he was appointed professor in 1764, and subsequently also to that of the Cardinal de Moine. His attention was first drawn to the subject of mineralogy by attending the lectures of M. Daubenton, but the accidental fracture of a beautiful specimen belonging to his friend M. Franc de Croisette is said to have led him to the discovery of the geometrical law of crystallization. He was anxious to employ in collecting the scattered fragments of the crystal the apparatus of Haukabee, when M. Croisette, whom the accident had rendered almost insensible, desired he would not give himself that trouble, and directed a domestic to remove the pieces, which, in his own opinion, would have thrown no light on the subject. He regarded them with extreme attention, requested permission to remove them himself, remarking that the conformity of the superposed plates of crystalline matter with the planes of the central prism of a crystal is the result of the natural secret which he wished more fully to explore. From this moment he applied himself sedulously to the development of the truth which his genius had detected, and his efforts were rewarded with success such as he merited. He was the first to show that the structure of crystalline substances was regulated by laws as invariable as those to which organized bodies are subjected, and thus crystallography for the first time assumed the character of a regular science. His theory rests upon the supposition that all the crystalline forms belonging to any single species of mineral are derivable from some one simple form which may be regarded as the type of the species; it likewise supposes that the angles at which the planes of crystals cut each other are confined within certain limits, an erroneous supposition which may probably be attributed to the imperfect execution of the instruments employed to measure them. From the art of crystallography (in the sense in which it is now understood) Hauy was able to derive the principles of mineralogy. In compliance with the request of MM. Daubenton and Laplace, Hauy communicated the result of his researches to the Royal Academy, and was elected a member of that society in 1783. During the Revolution he was thrown into prison for refusing to take the oath of obedience required of the priest, but the intercession of Geoffroy Saint-Hilaire, one of his pupils, and the remark of a citizen, that 'it were better to spare a recusant priest, than to put to death a quiet man of letters,' obtained his release, and probably saved his life. In 1794 he was appointed overseer of the mineralogical collections of the Museum of Natural History at St. Germain, which he had received the appointment of secretary to the commission of weights and measures, 'Under the consulshe Napoleon he became professor of mineralogy at the Museum of Natural History, and professor of the Faculty of Sciences at the Academy of Paris.


Hauyn. Latitutte. This mineral occurs in attached rhombic dodecahedral crystals, also granular and massive. The primary form is the cube. "Fuller's earth" belonged to the Royal Society's Transactions. Vol. XII. - K
diagonal planes of the cube, indistinct; fracture uneven; brittle, hardness 5-5 to 6-0; sp. gr. 2·68, 3; colour when opaque, indigo blue, when translucent, blue or bluish-green; streak white; lustre vitreous. The massive varieties are amorphous; structure granular, compact. When heated in an acid it becomes gelatinous and transparent. Before the blowpipe it fuses with borax into a clear glass, which becomes yellow on cooling. This mineral is found in the cavities of Vesuvius, and also in pumice and lava near Andermach on the Rhine, &c. According to Gmelin, the mineral from Marino yielded—

Slate.

Alumina.

Potash.

Lime.

Sulphuric acid.

Water of iron.

Water.

35·48

18·87

15·45

1·49

1·16

1·20

90·35

HAVANA, the capital of the island of Cuba, is situated in 23° 9' N. lat. and 28° 2' W. long., on the northern shore of the island. Its harbour, which is one of the most secure and commodious in the world, communicates with the sea by a channel little more than half a mile in length, from 9 to 10 fathoms wide; its depth varies from 8 to 10 fathoms. The harbour itself is a basin of an oblong form, measuring in length from south-east to north-north-west nearly two miles and a half, but its greatest width does not exceed 1 mile. Its depth, at its greatest, is from five to six fathoms, except on the small shoal de La Lusa, where it is less. This basin is surrounded by heights which shelter it from every wind. The town is built on the western side of the basin, near the channel, on a kind of promontory. The channel is protected by two strong fortresses, El Morro and La Punta, and a continuous series of batteries along both shores. The town is equally strong towards the land. A well-built wall runs across the isthmus of Havana on which it stands, and at a distance of respectively 1240 and 660 fathoms from it are two fortresses erected, Del Principe and De Atures, both well fortified. The space between the walls of the town and these fortresses is occupied by the suburbs of Habana, Habana Vieja, and Habana Nueva. The walls of the town are of great strength. Its course from north to south is about 5 miles, and the walls are from 20 to 26 feet thick. The thickness of the stone varies from 16 to 25 inches. The suburbs are not fortified, but their walls are only about 15 feet thick. The city of Havana is divided into nine parishes or quarters, viz., San Francisco, San Ignacio, San Principe, San Pedro, San Cristóbal, San Roque, San José, San José del Principe, and Santa Clara. The population of Havana is estimated at 120,000 individuals.

The streets are narrow, crooked, and generally unpaved: in the rainy season they are full of mud. A few of them contain well-built houses, especially the calle de los Mercaderes. There are several good buildings among the churches, one of which now contains the remains of Christopher Columbus, which were formerly at S. Domingo, but were removed to this place when that town was ceded to the French (1762). The other large buildings, as the palace of the commandant (casco del gobierno), that of the commandant of the marine, the arsenal, the post-office (correo), and the buildings used for the manufacture of tobacco, are less remarkable for their architecture than for their solidity.

The town has a theatre, a circus for bull-fights, and two fine promenades, one called L'Alameda, within the town, and the other Paseo Extra Muros, without the town. There is a ruined castle called the Castillo de los Tres Reyes del Morro, which served originally for a hospital, a printing-office, and a botanical garden. Havana is the seat of the capitan-general, and of a bishop. The manufactures are not important, except those of coppers and chocolate. The commerce is principally in sugar and cotton, and there is a considerable trade in wine, tobacco, vessels, and cotton. Several other ports of Cuba have been opened to foreign vessels. More than half of the produce of the island destined for foreign markets is shipped at Havana. [Cuba.]—To this port is shipped the produce of Cuba, which, with that of Porto C either, we need only add, that it is very unhealthy, and that more than one-half of the Europeans who arrive there are carried off in the course of a year, mostly by the yellow fever. (Humboldt, "Cosmos," vol. iv.)

HAVANT. [Hampshire.]

HAVERCAMP, SIEGBERT, was born at Utrecht, a.d. 1688. He studied philosophy at Leyden under Gronovius, whom he succeeded as professor of Greek. He was also appointed afterwards professor of history and eloquence. He died on the 25th of April, 1742, in the 60th year of his age.

He edited many of the classical writers with numerous notes, which were principally selected from former commentators, of these the most important are 'Territorialis Apologeticus,' 8vo., Leyd., 1716; 'Laurentiis', 2 vols. 4to., Leyd., 1707; 'Ilotis,' 2 vols. 4to., 1709; 'Paniculius,' 2 vols., Leyd., 1729; 'Orosius,' 4to., Leyd., 1736; 'Salust,' 2 vols. 4to., Amst., 1742; 'Celsiorius,' 8vo., 1743. He was also the author of many original works, of which the most important is 'A Universal History,' 8 vols. fol., Leiden, 1741; 'Einleitung in Historiam Petriis & primis Hollandiae comitibus,' 8vo., Leyd., 1789; 'Synopsis scriptorum qui de lingua Graeco versa et recta productionem commentantia' 4to., Leyd., 1748; 'Dissertationes de Alexandri Magni Numismatia,' 4to, Leyd., 1742; 'Thesaurus Morellianus,' 2 vols. fol., 1734; 'Introduction in Antiquitates Romanas,' 8vo., Leyd., 1740. The list of Havercamp's writings shows that he was a laborious scholar; but many of his works bear traces of having been written in a hasty and careless manner.
trict of which Rouen is the capital), tobacco, hides, iron, tin, dried fish, &c. The exports are silk and woollen stuffs, lace, gloves, trinkets, perfumery, wines, brandy, &c. Grain and flour are sometimes imported, sometimes exported. The value of the imports in 1839 was £1,600,000, and of the exports £1,000,000, of which the value of the cotton imported was estimated at £26,000,000 francs or near 1,100,000l.; that of the French colonial sugars 44,000,000 francs, and that of the grains 500,000l. Lo Haître has regular communication by packets with Southampton (some of the packets on this station are steam-boats), New York, Vera Cruz, Bahia, Lisbon, and Hamburg. Steam and other boats ply between Le Havre and Honfleur, and between Le Havre and Honfleur, on the opposite bank of the Seine.

This town has a subordinate court of justice and a court for commercial disputes, a Calvinist church, a nunnery, a poorhouse, a foundling hospital, and three prisons. There are also a public library of 15,000 volumes, and other literary establishments; a museum of natural history, a high school, a school of navigation, and one of geometry applied to the arts. There is a military hospital; and a yearly fair, that of St. Michael, is held in a field belonging to this institution outside the town. Lo Haître was the birth-place of St. Pierre.

Lo Haître is the capital of an arrondissement which comprehends an area of 344 square miles, has 9 cantons and 121 communes, and had in 1836 a population of 142,292.

It was near the site of this town that Henry V. of England landed previous to the siege of Hauteur and the battle of Agincourt. In the year 1720 the French marched upon Le Haître for an invasion of England, which drew upon the town a severe bombardment from an English squadron under Admiral Rodney.

11. [A WARD, ESQ., L.C.]

HAWES, STEPHEN, author of 'The Pastime of Pleasure,' lived at the beginning of the sixteenth century, but the date of his birth and death are alike uncertain. He calls himself gentleman and great of the chamber to the famous Prince and second Salomon, Kyng Henrye the Seueth. He was a native of Suffolk, and refers in his poems to Lydgate as his master. His accomplishments were in harmony with Henry VII., who had some taste in literature, particularly French, in which Hawes's travels had given him uncommon skill, and poetry such as that of Lydgate and Chaucer, in the repetition of which Hawes was a great proficient.

His 'Pastime of Pleasure' is an allegorical poem, containing the knowledge of the seven sciences and the course of Man's life in this world.' Grund Amour goes through the town of Doctrine, where he meets the Sciences, becomes enchanted by the charms of the lady, and finally marries and with whom he spends his life.

It is by courtesy to metre, and scarcely for any other cause, that we call 'The Pastime of Pleasure' a poem. We have repeated in the following pages some extracts from it to show to us the natural order of poetical creation; and this work seems to belong to that period when the epic element (the poetry of action) had been worn out, but having long held undisputed sway in the romances, as action itself lay in real life, compelled those who lived in a more thoughtful and therefore lyrical age to clothe their reflective poetry in an epic dress.

Another poem, 'The Temple of Glass,' is ascribed to Hawes, but there are almost equally strong reasons for believing it to be Lydgate's, as Hawes himself tells us that Lydgate composed a work under that name, and there is something about the run of the verses which reminds us rather of Lydgate than of Hawes. [See, Progn:e, Progn:e, Progn:e, Frisoine, Frisoine, Frisoine, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the Italians; Kernheiheiser, Kirsch Kabinet, Kernheiheiser, Nusbeiser of the Germans; Arpel-eink of the Netherlands; Loriz Cocothomeiron, Cocothomeiron, of the I...
of woods and forests, and when disturbed it invariably perches on the tallest tree in the neighborhood.

**HAWICK. [ Roxburghshire. ]**

HAWKESWORTH, JOHN, LL.D., was a successful writer of the last century. The date of his birth (1715 or 1719) and the occupations of his early life are variously stated: in so short a notice, all that is essential to record is that he was bred to some mechanical occupation, and therefore deserves the more credit for his talent and industry in supplying the defects of a rude and illiterate education. His first appearance was as a contributor to the *Gentleman's Magazine,* in which he succeeded Dr. Johnson as compiler of the parliamentary debates in 1744. In 1752, encouraged by the success of the *Rambler,* he undertook, assisted by Johnson, Watton, and one or two others, a series of essays, called the *Adventurer.* They extended to the number of 140 (70 of which are ascribed to Hawk- esworth himself), were received with great approbation, and contributed much to the increase of his reputation and friends. Herring, archbishop of Canterbury, was so much pleased with the work, that he procured him a degree in civil law for the conductor. This compliment however produced a permanent alienation on the part of Johnson, who had not yet received the same distinction. He probably regarded the man so patronised as a mere imitator of himself; and in fact Hawksworth's style appears to have been modelled upon Johnson's, though less remarkable for pomp and involution of diction. In 1761 he published an edition of Swift, with an introduction, to the merit of which Dr. Johnson has borne a hand. Hawksworth's reputation as an able writer obtained for him the commission. He completed the task in three vols. 4to. 1773 [Cook], illustrated with maps and plates at the expense of government, including the prior voyages of discovery of Byron, and of Wallis and Carteret, and received for recompense the liberal sum of 6000l. The work however did not give entire satisfaction: the warmth of his descriptions of manners, in some respects, was thought to verge upon immorality; and exceptions were taken to some religious speculations, which, right or wrong, were certainly out of place. The chagrin occasioned by these censures is said to have shortened his life, which was cut off in November of the same year, the statement is probably incorrect; the effect of criticism on a practised author is seldom so rapid and deadly. The accounts of Cook's subsequent voyages were written by Cook himself, and gained more in simplicity and correctness than they lost in literary elegance. Dr. Hawksworth translated *Telemachus,* and wrote *Almora and Hamet,* an eastern romance, which was much admired. He was a regular contributor to the *Gentleman's Magazine.*

**HAWKING. [ Falconry. ]**

HAWKING, SIR JOHN, a distinguished seaman of the reign of Elizabeth, was born at Plymouth, about 1520. His youth was spent in trading to Spain, Portugal, and the Canaries; and the information and experience which he thus obtained made him well aware of the gain to be derived from supplying the Spanish colonies with slaves from Guinea. With the assistance of some merchants, he fitted out a small squadron in 1562, and obtained, partly by purchase, partly by force, a cargo of 300 negroes, whom he carried to Hispaniola, and there sold. This, we believe, was the first adventure of Englishmen in that inhuman traffic. He made a second voyage in 1564, and a third in 1567; the latter turned out unfortunately. All trade between the Spanish settlers and foreigners being prohibited by the mother-country, though often, from interested motives, connived at by those in power, he was at last attacked by the Spanish authorities in behalf of the port of S. Juan de Ulloa, and saved but two ships of his squadron, with which, after suffering great hardships, he returned to England in January, 1568. This seems to have been his last commercial enterprise. The queen's approbation of his services sufficiently justified that adventure; and after the lapse of more than two centuries, the tardy voice of Europe has branded as piracy, was conveyed in the ex- pressive grant to wear as his crest 'a demymoor in his proper colour, bound with a cord.' In 1572 Hawkings was appointed treasurer of the navy. In 1588 he served as rear-admiral against the Spanish armada (Armada); and his bravery on this occasion was rewarded by Elizabeth with the honour of knighthood. Being sent with Frobisher in 1590 to intercept the plate fleet and harass the trade of Spain, he failed in the first object, but succeeded in the second. In 1595 he was appointed, jointly with Drake, to command a more important expedition against the Spanish in the West Indies. The other force proved fatal to both these hitherto successful commanders. They disagreed upon the conduct of operations, and soon separated. [Drake.] Hawkings died November 21, 1595, chiefly from the effects of the climate, and his part in the expedition; and Drake expired in the following month. Sir John Hawkings sat in parliament for Plymouth, and founded an hospital at Chatham for poor and sick seamen.
the county of Middlesex, and immediately became a most active magistrate. Among other useful acts, he wrote, 'Observations on the State of the Highways, and on the Laws for amending and keeping them in repair,' subjoining the draught of a bill, which passed into a law. In 1764 he successfully opposed the attempt made by the corporation of London to throw on the county two-thirds of the expense of building the gool of N.W., a winding road through the vast country of man of the Middlesex quarter-sessions. Here again his independent spirit and charitable disposition were manifested. Acting as a magistrate, he at first refused the choice of a verbal nature, but the public interest, and the proceeding rather increased the litigious disposition of the people in his neighbourhood, he altered his plan, took what was his due, but kept the amount in a separate purse, and a fixed period consigned to the management of his parish, and instructed at his discretion. When the riots at the Brentford election took place in 1768, he was active in their suppression; and the dispersion of the Spitalfields weavers in 1769, who had collected in a very threatening manner, was mainly owing to his decision and boldness. For these services he received, in 1772, the honour of knighthood.

Sir John Hawkins now set seriously about finishing his greatest work. He went to Oxford, and there remained some time, to examine the books in the Bodleian and other libraries, connected with his inquiry. 'He was accompanied by an artist, whom he engaged to make drawings of the portraits in their original state. During this time he wrote his History. From the Rev. Mr. Gostling of Canterbury, whom he visited two years consecutively for the purpose, he also gained much valuable information, as well as from Dugald Stewart and others, and added to his knowledge in his pursuit. In 1776 appeared, in five quarto volumes, the work on which he had been 16 years engaged, under the title of 'A General History of the Science and Practice of Music,' which he dedicated to George III., and presented to the University of Oxford. The latter, in a letter to the author, expressed himself as a greater, but he had reasons for declining: but that learned body paid him the compliment of requesting his portrait. With the public however the reception of the History was widely different. The best judges, it is true, discovered its value; its research and accuracy were obvious to those who were qualified to form an opinion on the subject; but five large volumes were alarming to the public, and, unfortunately for its sale, the review extension of the book, the critics untouched those matters in which the living many were most interested. Moreover, on the appearance of the History, Sir John was immediately attacked in the St. James's Evening Post, by Steevens, the commentator on Shakspere, in their well-known character, abilities, and theobalds of richness and picturesque character in the north side, which, until the late alterations, was the only one exposed to view. This façade is remarkable for having no windows, but in lieu of them three large niches, decorated with columns and external rustics, and in themselves not ill-imitated, although much too cut up by the smaller niches inserted between the pedestals of the columns; bad the smaller blank windows or panels been entirely omitted, the effect of the whole would have been decidedly improved. The interior, which is lighted chiefly by a square dome or lantern, is rendered effective by the bold and dark contrasts of large and small columns at each angle, and having a large semicircular window on each of its sides, is one of the best specimens of church architecture of that day, though the effect is greatly impaired by the additions of gallery and noble roof, which were projected by the architect of St. George's, Bloomsbury, that his Norwich is entitled to notice, that being a work which of itself ought to confer a lasting reputation. It is true, Walpole has stigmatized the steeple as 'a masterstroke of absurdity,' and adopting that smartly expressed opinion others have continued to repeat his censure. Malton was one of the first who ventured to express a contrary judgment, and it has more recently had plainer justice done to it by a writer in the 'Quarterly Review,' who very deservedly gives it the preference over every other steeple in London. It is certainly the happiest as well as the most original in its idea; picturesque and graceful in outline; well combined in general effect; compact and unencumbered; and that by a statue of George II., which gave rise to a peltry epigram that bad perhaps quite as much influence in exciting a prejudice against the structure as Walpole's dictum. Yet if there be any inconsistency or absurdity in terminating the church by a steeple, it is assuredly erased by the consideration that at which it was published; it is found in every good library, and the more it is read and known, the more it will rise in public estimation and demand. The leading fault in Malton's praise, in this steeple, is Hawkins accumulated a fine musical library; and it was his singular good-fortune to become possessed, by purchase, of several of the most scarce and valuable theoretical treatises on the sciences itself, which were collected by the celebrated Dr. Pepusch, F.R.S. After the completion of his history, and the publication of his work, most liberally gave to the British Museum, where it remains.

In 1768 Hawkins published his edition of Walton's Lives of the Artists, of which three or four editions have since appeared. On the death of Dr. Johnson, in 1784, Sir John undertook, in consequence, it is supposed, of some conversation between them, to write the life of his friend, and to become editor of a complete collection of his works. In this task, as in his 'History of Music,' it was his fate to meet with unexpected composition and unmerited criticism. But he had scarcely entered on the work when his whole library—a library which no expense could replace—was destroyed by fire. The blow was severe, though the sufferer never murmured, but began again to collect. In 1787 he closed his literary labours by the publication of his Life of Dr. Johnson, and an edition of his works. In the month of May, 1789, Sir John Hawkins suffered a paralytic attack, which from the first was considered of a fatal nature, and which, had it not been for an active constitution, would have been fatal. He recovered, however, and went on with his labours, until the death of Dr. Johnson, whose executors appointed him to the vacant chair. He died at Houghton, in the county of Norfolk, on the 3rd of July, 1790. The houses of Parliament were closed by his death, and his house was taken down by the order of the House of Commons, and the great mass of the people were assembled at his funeral. He was buried in Westminster Abbey, where he had the best parts of the monument of his friend, Sir Joshua Reynolds, to which was added a statue by Mr. Harington. His son, John, was a man of talent, and a distinguished musician, and died at Paris in 1794.
a hexastyle Corinthian, is very little inferior to it in execution, and displays itself still more advantageously, being considerably raised above the street by a flight of steps, enclosed by pedestal walls, which gives it an air of dignity beyond that of the more modern and less ample buildings in the neighborhood. Besides which it possesses the further advantage of its roof not being interrupted by a steeple immediately behind the portico, the campanile spoken of being attached to the church, to the right by the Donzello. There is another church in the same location; but if St. Martin's justly entitles Gibbs to the reputation he has hitherto maintained, St. George's, Bloomsbury, ought to acquire for Hawkins a much greater share of commendation; the style of the latter is in every respect superior. St. Luke's, Ludgate Circus, is another church by him, which deserves more praise than has fallen to its share. With much that is incorrect, and with very little that is positively beautiful, its ensemble has an air of grandeur very frequently missed where it seems to have been more studiously aimed at.

Among his other works were Easton Neston, in Northamptonshire, and a mausoleum at Castle Howard. He was also employed to repair the west front of Westminster Abbey. The south quadrangle and street front of Queen's College, Oxford, have by some been attributed to him, though they are generally supposed to have been the work of Wren. That he did much at All Souls College, in the same university, is unquestionable; and produced for the year 1716 has been traced a very grand design by him for rebuilding Brlanenoce, somewhat in the style of Greenwich Hospital, where he held at one time the appointment of clerk of the works. Besides the design for the Radcliffe Library, but that of Gibbs obtained the preference. He died in March, 1736, at the age of 70.

HAWKWOOD, SIR J. [Confessari]—

HAYDIN, JOSEPH, the father of modern orchestral music, the most original and imaginative of composers, was born at Rohrau, about fifteen leagues from Vienna, on the 12th of September, 1722. His parents were poor, and his father was a small wheelwright, and his mother, previous to her marriage, was cook to the lord of the village; but both, true Austrians, were musical; the former had a fine tenor voice, and could play on the harp; the latter sang, and with the aid of a relation they got up little concerts on Sunday afternoons, in which the young Haydn, when five or six years of age, pretended to join them with two pieces of wood cut in imitation of a violin and bow. The accuracy with which his musical talents at this early age were so evident attracted the notice of a cousin, a schoolmaster at Hamburg, and a good musician, who made an offer, which was readily accepted, to take the child into his house as a scholar. Under the instruction of this kinder, he soon became capable of using a real violin, and acquired some knowledge of Latin. He was also taught to sing in the parish church, where he was heard by Herr Reuter, Kapellmeister of the cathedral of St. Stephen, a fine singer, who was travelling in search of boys for the use of his choir,—and immediately engaged as a chorister in the metropolitian church of the empire.

Under Reuter, Haydn continued till he arrived at the age of thirteen, practicing almost incessantly, but receiving only such instructions from his master as qualified him for the duties of the choir. At that period failing, for want of sufficient knowledge, in an attempt at composition, and being utterly destitute of the means of obtaining the assistance of a master, he contrived to procure the well-known treatise on counterpoint by Fux, with one or two other works on the theories of music, from the domestic musician. At the age of fourteen his own independence in the gilded industry, he speedily surmounted the first difficulties encountered by a youthful composer. He now made himself known to the famous Porpora, who was living in the hospital of the Holy Spirit, from Venice, and was very anxious to call his attentions to the old musician gained much knowledge from him, particularly in singing, in which he made such progress that the ambassador, having heard him, took him into his service, and bestowed on him a trifling salary. But at the age of seventeen his master received from Vienna, and with very flattering assurances, letters, which were accepted, and Haydn was, in obscurity, enabled to pursue his studies. But his residence with the friendly tradesman powerfully influenced his future domestic life. Keller had a daughter, who was offered to the young musician in marriage. He gave his promise to her, which after a time he honourably fulfilled; the union however did not contribute to the happiness of either party, and ended in a separation not very long after it had taken place.

By giving a few lessons in music, and occasionally performing in the orchestra for what he could get, Haydn supplied himself with absolute necessaries. But his family having on the whole been in a tolerably decent appearance; till fortune first began to smile on him, by leading him into the house of the Abate Metastasio, where he gave instructions to the poet's niece, and gained not only a great admiration for his language, but a general knowledge of literature, and the most useful advice on the subject of setting words to music, from the imperial laureate. This connection also introduced him to the Count Marion, a noble patron of music to whose service he entered in 1759: and hence, in 1761, he passed into that of the rich Prince Esterhazy, to whom he remained attached, as Maestro di Capella, to the end of his life.

Comfortably settled in the palace of Eisenstadt, in Hungary, enjoying in moderation his favorite diversions of hunting and fishing, and relieved from care for the future, Haydn thereto composed and published a large number of compositions from 1771, and under advantage which few, if any, have possessed,—he had a full, choice band, living under the same roof with him, at his command every hour in the day; he had only to order, and they were ready to play at the touch of a key. In 1772, he quitted his abode, but that, quietly seated in his study, he might commit to paper. Thus at leisure he heard, corrected, and refined whatever he conceived, and never sent forth his compositions till they were in a state to meet with a worthy challenge.

We now arrive at that period in the life of Haydn in which he produced most of those works which have raised his fame to the highest point it has attained. In 1790, he published, the celebrated violin sonatas, having determined to give a series of subscription concerts in London, went to Vienna to engage either Haydn or Mozart, not only to produce certain compositions in aid of his design, but to superintend in person the performance of them. It was mutually agreed by the three parties that Haydn should be the first to visit London, and that Mozart should follow the year after; but it was destined that the latter should not live to fulfill his part in the agreement. In 1791, Haydn arrived, and produced during that and the following year, at Salomon's Concerts, in the Hanover-square Rooms, six of his Twelve Grand Symphonies, which immediately made an extraordinary sensation in the musical world, and have ever since been held in the highest estimation. This work was followed by a still greater one; for in 1793, he was employed in the composition of a large number of songs, which for originality, for musical expression of every kind, and for the succession of charms which they present, have no rivals. Besides these his profligate imagination gave birth to many quartets, sonatas, &c.

In 1794, Haydn accepted a second engagement from Salomon for the same purpose. He reached London in January, and in the course of that and the succeeding season brought forth the remaining six of his grand symphonies, with the same brilliant result. For these twelve symphonies, and for superintending their performance, he received a sum— included in the benefit concerts, the profits guaranteed by Salomon—amounting to 1500l. To this is to be added, as the fruits of his visits to England, what he derived from the cachet of Salomon, and other compositions: it was therefore with great regret he declared that he would never lose the real value of the reputation he enjoyed in Germany. His reception here was of the most flattering kind; the university of Oxford conferred on him the degree of Doctor of Music; he was associated with the nobility and the gentry; and the duke of York he was a frequent guest; and nearly all classes vied in showing him attention. The satisfaction which he felt he gratefully acknowledged and returned in a diary he kept while in his part in London, a publication on which (a curious document, with notes, appears in the fifth volume of the Harmonicon).

In 1798, Haydn gave to the world his oratorio The Creation, the only one of his productions which has reached the age of sixty-five. It is enough to say of this fine production of his advanced years, that it is the only oratorio, of many that have been produced, that can bear comparison with
those of Handel. The design was suggested, his biographer, M. Boylo, tells us, by an English gentleman named Lidley (Liddell, we suspect, is the true name). The German text however, and the barbarous English translation (which to our shame is still in use), were furnished by the Baron Von Swieten. Two years after this essay was composed The Triumphs, a work of as much originality as the Creation, but not exhibiting, nor intended to exhibit, the same depth of thought. The subject is not of so grave a nature, and is treated more formally. The last three numbers were two sets of quartets, which betray no abatement of his vigour; on the contrary, the second of his Op. 89 is perhaps the most original and exquisitely-finished of all the works of which he has given a public performance.

When Haydn's Creation reached Paris the Institut National elected him a member, an honour contested with him by some of the greatest men of the time in Europe; but the decision was just; for among the candidates had contributed so much to the happiness of civilized nations? His few remaining years were spent in the enjoyment of a great and well-earned reputation, and a small independence created by his talents and the last part of his public life were crowned with honours. (Supplement to Musical Library, i. 27.)

His death is supposed to have been accelerated by the bombardment of Vienna, which powerfully agitated his weakened frame. Though it must be said, he was not under the same strict orders that the abode of Haydn should be respected; and when the troops entered the city a French guard was placed at his door to protect him from every kind of injury. He had indeed been a devoted member of Dr. Priestley's Universal Church, and had been buried at Gunpordorf, his country then suffering all the horrors of war, and the capital of the empire being in possession of the enemy. He left no children. His property, except the house which he was entitiled to, came into the hands of a blacksmith, his distant relation. His works are astonishingly numerous, embracing every class. Among them are 116 symphonies, 83 violin quartets, 60 string quartets, 40 masses; besides the following in his own handwriting: Seven Last Words, a grand Te Deum, a Stabat Mater, 14 Italian and German operas, 42 duets and canzonets, upwards of 200 concertos and divertisments for particular instruments, &c. &c. Many of these, but not the most valuable, were irretrievably lost in the war which consumed the palace of his patron at Eisenstadt: the best are out of the reach of danger; they have been printed and reprinted in half the capitals of Europe.

Hayley, William, best remembered as the friend and biographer of Cowper, during the end of the past and the beginning of the present century enjoyed a considerable reputation, less perhaps from his sterling merit as a poet, than from the occupation of the situation of a patron of letters, and devoted to art, literature, and society, and in a country where the taste for poetry, music, art, and literature, was assiduously cultivated, he had a high and flourishing practice. His friendship with Cowper, and the latter's admiration for his early productions, and the friendship and patronage he received from the Haslem hunting party, in which Cowper was a member, brought him into the most popular, and probably in consequence of the domestic interest of the subject, The Essay on Poetry, 1785, and the Essay on History, 1781, addressed respectively to his friends, Romney the painter, and Gibbon, rank among his best productions. We may add, as the most important of his other numerous works, the Essay on Epic Poetry, 1782; Life and Poetical Works of Milton, 1797-9; the Essay on Time, an essay on the beauties and uses of time, 1794; and the Essay on Fashion, 1780; Life of Cowper. 1823.

HAYTI. [HISPANOILA.]

HAYZBROMK, an English painter in France, in the department of Nord, on the road from Paris to Dunkerque: distant from Paris 128 miles in a straight line almost due north, or 140 miles by the road; in 50° 43' N. lat. 2° 32' E. long. This town is situated in one of the richest and most delightful plains in France, and is celebrated for oil, and fruit. The streets of the town are well laid out, the houses handsome, and the place has the air of being inhabited by a wealthy and thriving population. There is a large and handsome market-place, in which is the town-hall, with a Doric colonnade, built of freestone. There are a subordinate court of justices, an agricultural society, a high school, and two theatres. The population in 1836 was 7674.

Hazelbrouck is the capital of an arrondissement having an area of 257 square miles and containing 27 communes; the population in 1836 was 5353 communes; the arrondissement had in 1836 a population of 105,879.

HAZEL-NUT, the fruit of the wild bush of Corylus Avellana, unexcelled as an article of food or drink. It differs from the domesticated varieties only in being smaller and rather more luscious. [Filbert.]

HAZLITT, WILLIAM, the son of a Unitarian minister of the same name, was born at Maidstone on the 10th of April, 1778. When he was five years old his father suffered the scene of his ministerial exertions to Auries, and remained with his family in the United States for two years. On his return to England the father became pastor of the Presbyterian congregation of Hackney, and it is here that the work of Hazlitt's education was commenced. At the age of nine he was put to a day-school at Wem. Some letters written by him, between the ages of nine and twelve, are among the few specimens which have been preserved of his forward mental development; and in addition to these specimens of private correspondence, there is a letter, which he published at the age of thirteen, in a newspaper, in defence of his late maternal grandfather, Dr. Priestley, as well as an article on the character and duties of a biographer, as also as literary skill. In 1793 Hazlitt was entered as a student of the Unitarian college at Hackney, in order to be educated for his father's profession. But for this profession he had no liking; and having devoted himself while at the college, principally to moral and political philosophy, and having comparatively neglected theological pursuits, he returned home in 1795, having determined, as he said, to commit himself to the service of a profession. Hazlitt had from a very early age shown a love of pictures and a taste for drawing, and it was now determined that he should follow the profession of a painter. He commenced with great ardour and assiduity, continuing to cultivate metaphysics in his intervals of leisure. We are told by his son that the first rough sketch of the essay on the Principles of Human Action was thus begun at the age of eighteen. In 1802 he visited Paris for the purpose of studying the paintings in the Louvre; and on his return to England in the next year he made a professional tour through some of the midland counties and the manufacturing towns, and painted a considerable number of portraits; the position of which he acquired in this manner is now established, and his fastidiousness so great that he could never satisfy himself, and he determined on again changing his plans.

He now proceeded, in the autumn of 1803, to the metropolis to start as a literary adventurer. He commenced his almost endless series of publications with the essay on the Principles of Human Action, and on which, as we are told by his son, he always prided himself as much as on any other of his numerous works. As a metaphysical essay it is of little value, though to a certain extent ingenious and acute; while, so far as the merits of composition are concerned, it is inferior to his writings on miscellaneous subjects. This essay was published in 1803, and was followed up quickly by other works. In 1806 he married a Miss Stoddart, the sister of Dr. (afterwards Sir John) Stoddart; and after his marriage retired into Wiltshire, where he continued his literary pursuits. In 1811 he returned to London, and we find his residence in a house in York-street, Westminster, which had been once inhabited by Milton, and which then belonged to Bentham. His administration for genius led him to erect, in the garden of this house, a tablet 'inscribed to the Prince of Poets;' and he was afterwards much scandalized by a plan of Mr. Bentham's to cut down two beautiful lime-trees which adorned this tablet, and to expose the garden and the tablet to the continual indulgence of the members of a Chrestomathic society. The passage however in the Spirit of the Age, in which Hazlitt speaks of this contemplated profanation, as he deems it, is perhaps not altogether free from the taint of sentimentality, of which it must be allowed, he is not often guilty.
In 1813 Hazlitt delivered a course of lectures at the Russell Institution, on the history of English philosophy; and subsequently he lectured on the English poets generally, the comic poets, and the poets of the age of Elizabeth, in separate courses, at the Surrey Institution. The three last series of lectures have been published, but not those on the history of philosophy. He acted for a short time also as reporter to the 'Morning Chronicle,' and after giving it up he became a contributor to the 'Edinburgh Review,' and some smaller magazines. His life was indeed one unintermitting course of literary exertion; and his labours brought him neither fame nor income, which however his impi- dence always quickly dissipated.

In 1822 he was divorced from his wife, and two years afterwards he married a second time. He died on the 18th of September, 1830, of cholera, and was buried in the churchyard of St. Anne's, Soho, where a friend has raised a monument to his memory. A long and eloquent inscription concludes thus: 'This stone is raised by one whose heart with him in his grave.

Hazlitt's principal works, besides those which have already been mentioned, are the 'Round Table,' in which he was assisted by Mr. Leigh Hunt, the 'Table-talk,' the 'Plain Speaks,' and the 'Characters of Shakespeare's Plays,' the 'Spirit of the Age,' which is a series of interesting sketches of his most distinguished contemporaries; his 'Political Essays,' which appeared in six volumes, and published in one volume, with a preface, by Home; and the 'Life of Napoleon,' which Hazlitt himself looked upon as his great work, and which was his last. The articles 'Fine Arts,' in the 'Encyclopaedia Britannica,' was also written by him.

The principal merits of Hazlitt as a writer are force and ingenuity of illustration, strength, terseness, and vivacity. Another characteristic, which, by excess, often becomes a fault, is his fondness for the question, as often as he said, one good quality frequently exhibited in his writings is terseness, it often happens that he is chargeable with the opposite faults of verbose and diffuseness. There is also a want of repose in his style, which prevents its pleasing the a long time, and which, despite the splendour of particular passages, tends to leave an unsatisfactory general impression. But in a number of fine passages which one would read, not only once, but again and a third time, or short, striking, nervous sentences, which, without an effort, would impress themselves on the memory, there are few writers who can match Hazlitt. We hardly know, in the whole circle of English literature, even for the sake of wit, as many of the writings being excepted, a finer specimen of accumulative eloquence than the account of the intellectual life of Coleridge in the 'Spirit of the Age.'

Hazlitt's chief title to fame is derived from his Essays on Criticism, Art, and literature, which are deservedly popular. For an historian he was too prejudiced, to say nothing of the unfitting luxuriance of his style; and he was not clear-headed enough for a metaphysician. His personal qualities were undoubtedly not of that kind which gains the good-will or affection of men. Yet there was something in his moral disposition, and that not little, to be admired. If amiability was wanting, strength was there; and the regret which with which one contemplates his irritable temper and its constantly distressing consequences is in some degree at least compensated by admiration for the moral courage with which he was ever ready to take off the mask and conventions of the world and despise the frowns of the great.

Since Hazlitt's death, two volumes of his 'Literary Remains' have been published by his son, with a short life, and shows much taste and good feeling, and to which we are principally indebted for the above account.

HEAD. [BRAIN; SKULL.]

HEAD, INJURIES OF THE. From the many peculiar and important features which they present, injuries of the head are particularly remarkable, and take a prominent position in all systems of surgery. For not only is the brain so essential to life that even its least injury must be regarded as serious, but the parts around and guarding it have peculiarities. The skull is composed of two layers of bone, much exposed to external violence, and protected from it by only slight coverings, is extremely liable to fracture, and it is covered by a very dense and tightly applied membrane, the periannium, of which the injuries and diseases exhibit all the peculiarities of those of other fibrous membranes. By the free communications of its vessels with those of the similar membrane (the dura mater) lining the interior of the skull, and less directly with those of the brain, disease is very liable to spread from the periannium to these more important parts; and it is itself covered by a single membrane (the dura mater) which is always pruned to extend widely. The injuries of the head are best considered as they affect the parts enclosing the brain or the brain itself.

In most cases, where the scalp two circumstances are worthy of notice. A vessel of some size may be burst without the skin over it being wounded, in which case a most copious effusion of blood takes place, raising up the scalp from the skull, and producing rapid swelling of the whole of the upper part of the head. If, however, a particular treatment is not instituted, no incision should be made into it, for if cold wet cloths be diligently applied, the blood will be again rapidly absorbed. If the effusion of blood from the bruise take place between the periannium and the skull, the former is raised into a tumour, with sharp defined edges, and yielding to pressure in a manner so similar to that of fracture with depression of the skull, that the most experienced surgeon might be deceived into mistaken treatment. In the last case it should be kept in mind that it should never be employed except in cases in which the brain itself is implicated.

A common superficial wound of the scalp needs no particular treatment. In the case of a deep wound, the head is covered with a large flap of the scalp as soon as it is decrated. The skull is comprised of a thick bony wall, and the brain is covered with a delicate membrane. The wound should be cleansed, kept clean, and left for nature to take its course. The brain is in a situation to recover from all injuries, excepting those, which may have affected it, if it have been properly treated.

The head is divided into three parts, the perianium, the scalp, and the skin. Of these the perianium is the largest, and the most important, and the scalp is the smallest, and the least important, and the skin is the most delicate. The perianium is the largest, and the most important, and the scalp is the smallest, and the least important, and the skin is the most delicate. The attention of the surgeon is equally divided between the perianium and the scalp; the skin is but little considered.

The perianium is divided into three parts, the upper, the middle, and the lower. The upper part of the perianium is the most exposed to the action of the air, and the most subject to injury. The middle part of the perianium is the least exposed to the action of the air, and the least subject to injury. The lower part of the perianium is the most subject to injury, and the most subject to injury.

The skin is the most delicate of all the parts of the head, and is the most subject to injury. The skin is the most delicate of all the parts of the head, and is the most subject to injury. The skin is the most delicate of all the parts of the head, and is the most subject to injury.

The scalp is the largest of all the parts of the head, and is the most subject to injury. The scalp is the largest of all the parts of the head, and is the most subject to injury. The scalp is the largest of all the parts of the head, and is the most subject to injury.

The skin is the most delicate of all the parts of the head, and is the most subject to injury. The skin is the most delicate of all the parts of the head, and is the most subject to injury. The skin is the most delicate of all the parts of the head, and is the most subject to injury.

The scalp is the largest of all the parts of the head, and is the most subject to injury. The scalp is the largest of all the parts of the head, and is the most subject to injury. The scalp is the largest of all the parts of the head, and is the most subject to injury.

The perianium is the largest of all the parts of the head, and is the most subject to injury. The perianium is the largest of all the parts of the head, and is the most subject to injury. The perianium is the largest of all the parts of the head, and is the most subject to injury.

The scalp is the largest of all the parts of the head, and is the most subject to injury. The scalp is the largest of all the parts of the head, and is the most subject to injury. The scalp is the largest of all the parts of the head, and is the most subject to injury.

The perianium is the largest of all the parts of the head, and is the most subject to injury. The perianium is the largest of all the parts of the head, and is the most subject to injury. The perianium is the largest of all the parts of the head, and is the most subject to injury.
The general symptoms of fever are in these cases less severe than in erysipel; the scalp is less hot and swollen, but more painful and very tender; the face is never affected.

After a few days of general illness, a feeling indicating a collection of fluid may be perceived over some part of the head. The scalp will be reddened, and the hair fluffed up. A few drops of fluid may be pressed out of it from beneath a large portion of the scalp. When this affection is suspected to be coming on, leeches should be applied, and the surface of the head should be cold diligently applied; but if matter should form, one or more free incisions should be made through the scalp to let it out, and the part afterwards treated like a common abscess.

In cases in which the bone has been exposed, the same general and local treatment should be employed. The scalp when replaced may at once unite to the bone; or if it do not, granulations may spring up from the surface of the bone and close the wound; in worse cases, the outermost layer of the skull may die, and require a tedious process for its excision and healing; in the worst, the whole thickness of the skull may perish, and the dura mater may be exposed. In such cases the mildest treatment is requisite, but as the disease is extremely liable to spread to the interior of the skull, the general health should be carefully watched, and if any indications of mischief arise, general or local bleeding is useful.

When the bone itself is injured, no active treatment should ever be adopted, unless there are evident signs that the brain is suffering from compression or other pellable injury, and the symptoms indicate that a cerebral or contrecérébral depression is present. In such cases, the skull must be opened, the dura excised, the bone removed, and the interior of the skull washed out, and the dura and bone dressed every hour. Cases of fracture of the skull in which the brain is not at first injured may be amongst the most simple or the most dangerous in surgical practice—through the logi of the brain the blow will be transmitted to the brain, and it will be subjected to the same influences. 

Injuries of the dura mater (the membrane lining the interior of the skull) are generally of yet more importance, because they more immediately affect the brain. The dura mater is connected with the skull by a tissue in which numerous vessels ramify, and these may be ruptured by the jar of a blow which does not even break the skull. The blood that flows from them, accumulating between the dura mater and the skull, produces compression of the brain. The chief indication of this very dangerous accident having occurred is that the patient, who for some time after the blow had sensations and movements of the body, begins to speak incoherently, general is drowsy, and becomes dull, sleepy, comatose, and at last totally insensible, just like one suffering from apoplexy. These symptoms supervene with a rapidity corresponding to the size and number of the vessels ruptured; the most rapid and fatal are those in which, by a blow on the side of the head, the main artery, supplying the dura mater and upper part of the skull, and which ascends just before the ear, is wounded. The only hope in these cases is to bleed the patient largely, to check the flow of blood in the head, and if that be not evidently beneficial, to apply the trophine wherever it is most probable that the blood may be found and removed. It must be confused however, that there is little prospect of doing good by trophining in these cases; it is seldom possible to decide at what part of the skull the blood is effused, or whether it may not be between the dura mater and the skull, or in the matter within the skull, and in either each case are the same, but the mechanical removal of the blood is possible only when the blood is immediately beneath the upper part of the skull.

Instead of blood, purulent matter may collect between the dura mater and skull, and produce equally fatal results. This is indicated by the patient (usually some considerable time after the accident) complaining of headache, restlessness and irritation of eye; he has frequent irregular shiverings, his pulse is quick and hard, and he cannot sleep; if unrelied by treatment, all these symptoms increase, and are shortly followed by delirium, convulsions, insensibility, or paralysis, which are no distant precursors of death. Even if all these symptoms be not present, he may be very hot or painful tumour, forms over the part struck. If this be opened, the pericraniu will be found detached for some extent from the skull, which when exposed is seen to be dead, of a dull yellow colour, and covered by purulent fluid. In this case it may be expected that the dura mater is separated from the interior of the skull to the same extent that the pericraniu is from its exterior. The best method of removing this is, to perforate the dead portion of bone with the trophine, and let out the matter collected between it and the dura mater, and which compressed the brain.

The brain hemorrhage may be either from blood effused in it by rupture of its vessels, from compression by fractured portions of bone being forced down upon it, from wounds, from concussion, or from inflammation, and its various effects will be treated as they arise. The treatment need not here be particularly treated of; it does not differ in its symptoms from the cases of common apoplexy with edussion of blood (Apoplexy), and admits of no mechanical treatment. The second class comprehends the more important injuries of the head; those of 'fracture with depression,' as they are called, and those which occasionally happen in children, in which the skull is indented without being broken. The symptoms of such an injury are insensibly, generally in direct proportion to the degree of pressure; the breathing is slow, laboured, and snoring, and at every expiration the cheeks are pushed out and elevated; the pulse is slow and irregular; the pupil widely dilated and insensible to light; the patient may be at once emaciated and deformed, and lies as if in a fatal state of apoplexy. The part struck may of course present most varied characters: it may be starred from the centre of the blow, so as to have a shallow depression of the surface, or a deep and hard depression may be passed under the other; or it may be broken up confusedly, and the brain be protruding through the openings in it. It is worth remembering that the inner part of the skull may, in consequence of its brittleness, be much more widely fractured than the external, so that the degree of pressure on the brain is not always indicated by the depth of the indentation felt in the skull. If unrelied by treatment, the space or the cavity may be slowly filled, the brain grows more and more insensible; his pulse becomes more irregular, and he rapidly dies. The evident and indeed the only mode of affording relief is to remove the pressure from the brain. The removal of the bone is done by enlarging the wound in the skull, or making a fresh one, and taking away or elevating all the portions of bone that are depressed. The mode of doing this will be determined in each case by the form of the fracture and other circumstances; in some it may be sufficient to remove the loose pieces with forceps; in others, to saw off portions with a Hey’s saw, or to apply the trophine and raise the other depressed parts to their proper level with the bone. In these cases, if not mechanically relieved, can only be treated like common apoplexy, by bleeding the patient, by cold sedulously applied, and by vigorous reducing measures. The after-treatment of cases in which the trophine or analogous means have been used is nearly the same as in wounds of the skull and soft parts; the edges should be brought gently together, and slight pressure employed to support the dura mater where that is exposed by the aperture in the skull, and the other usual precautionary and curative measures, as cold, local bleeding, &c., resorted to.

The immediate consequences of wounds of the brain vary greatly, and in many instances, of which something has been said above, a very slight injury is rapidly fatal, as in those (of which many are now recorded) in which a pointed instrument has passed through the orbit, and produced almost instant death; whilst in others severe and dangerous wounds, the gun-shots, have been followed by serious symptoms at only a late period from their reception. In most of the cases where the dura mater is perforated, whether by wound or by ulceration, the effects extend only to the surface; and, as the consequence of these, either reducing any pain or ill consequence. This is indeed the best treatment of it. If after having protruded to some
HEA 74 HEA

distance it shows no disposition to decrease or to slough, it should be cut down to the level of the skull, and gentle pressure by compresses and other means, with the mildest ointment, and skirnov. in others the fungus mass sloughs and the remaining parts heal; but in the large majority the exposure of the brain and its irritation by surrounding parts produce such continued inflammation.

The last injury of the brain that needs particular notice is that called concussion or commotion. The exact nature of it is totally unknown; the name indicates only that which, in a most severe case, yielded, and was a disturbance of the minute parts of the brain. In its slightest degree it is merely a stunning, from which perfect recovery takes place in a few minutes; in its most severe, it is rapidly fatal; but even in these, a post-mortem examination discovers some alteration whatever in the structure of the brain.

One of the most interesting points in surgery is the diagnosis of concussion from compression of the brain. As the latter seldom occurs without the former (for of course a blow which fractures or indents the skull would violently shake the brain), compression has the symptoms of concussion, with the addition of some of the most severe which we have already mentioned. In concussion the little brains are not moved; the palsy which moves his limbs; he appears, in short, as if in a sound sleep, without fear or vomiting, and the extremities feel cold. If the case is about to terminate fatally, the whole body grows rapidly cold, the pulse becomes irregular and weaker, the breathing short and intermitted, and the breathings noises inaudible.

In treating cases of concussion much caution is needed; it has not appeared that bleeding, which is the remedy popularly expected for all such accidents, has at all diminished its primary symptoms, nor has the contrary treatment by stimulants been more successful. The patient, while suffering from the immediate stunning consequences of the blow, should merely be kept quiet warm in bed, and carefully supported by pulse groans, which he can be colder, and the other symptoms of sinking seem increasing, stimulants are first called for, and should be given till he is completely roused to his former state; but if, instead of a short while, an unconscious state, or passive motion of any kind should be employed. Cases are not rare in which, after remaining in a nearly insensible state, as if in a sound sleep, for four, six, or eight weeks, with only very slight temporary disturbances, the patient wakes, complaining of but little inconvenience, and rapidly recovers. If instead of waking nearly well, he is observed to grow restless, to seem suffering from headache, or should he become delirious or convulsed—his pulse becomes quick and hard, and his eyes are hurt by strong light—he has in all probability inflammation of the brain, which is a most frequent consequence of concussion, and must be at once met by the active depleting and reducing measures necessary for its cure. In such cases the symptoms of concussion gradually change into those of compression, which may then be suspected to arise from effusion of blood into or on the brain, as in the cases above mentioned.

The account here given is only a sketch of the most prominent and constant symptoms, progress, and treatment of the effects of injuries of the head. There are other effects, of which one or two may be mentioned, which the accidental, which it is necessary briefly to advert to. Furious delirium, lasting for some days and requiring active depletion, sometimes immediately follows concussion; vomiting sometimes also, either as slight inflammation or on concussion; paralysis or hemiplegia may also be produced, or unfrequently produced directly by compression, and they still more commonly occur as its sequela. Loss of memory, sometimes most singularly limited to particular classes of events or things; impairment of individual sensations, and various forms of insanity, are all the occasional consequences of inflammation of the brain which follow them, and to the prevention or cure of which the chief attention is, in the majority of cases, to be directed.

HEA 74 HEA

HEARNE, THOMAS, an eminent English antiquary and editor of books and manuscripts, was born at White Waltham, in Berkshire, in 1678, where his father was the parish clerk. In 1692, under the patronage of Francis, Earl of Denbigh, Esq., of that place, with him he resided as a servant, and was placed at the free-school of Bray; and subsequently, in 1695, at that gentleman's expense, was entered of Edmund Hall, Oxford, where Dr. Richard White, his tutor. Dr. John Mill, who was principal of the hall, and Dr. Grabe, gave Hearne much employ in his younger days in the collation of MSS. He became B.A. in 1699. In 1701 he received his first emolument in the Bodleian Library, of which Dr. HUDSON had just been chosen keeper. He was afterwards made junior of the library, and in 1712 succeeded to the place of second librarian. In January, 1716, he was elected archdeaconry and esquire beadle of civil law in the university, and next he held the under-librarianship till the month of November following, when, finding the two places untenable together, he resigned the beadle's place, and soon afterwards his post in the Bodleian Library. In 1717 he succeeded to the govern ment, with which he could not conscientiously comply. He continued a non-juror to the last, much of the expense of his worldly interest. In the latter part of his life he resided at his native village, and published a few of his various works; but his constant recurrence to Jacobite sentim ents, even in the prefaces to publications which could have no connection with them, kept him as constantly in the disfavour of his neighbours, as the underwritings of one prosecution to another. Hearne's temper was naturally irritable, and he was far from being either an amiable or a happy man. His life however was one of unwearied literary industry, and English antiquaries and historians will be for a long time indebted to him. He died June 10th, 1735, in consequence of a cold, succeeded by a fever which was improperly treated.

Hearne's publications, almost exclusively printed by subscription at Oxford, were very numerous. Among the most valuable were an edition of Livy, 6 vols. 1708; the 'Life of Alfred the Great,' from Sir John Spelman's MS. in the Bodleian Library, 8vo., 1710; Leland's 'Itinerary,' 9 vols. 1711; 'Catalogue of the Library of Sir James Bingley,' 8vo., 1712; 'Acts of the Apostles,' in Greek uncialis, from a very antient MS. in Archbishop Laud's Collection, 8vo., 1715; Livius Foro-Julianus's 'Life of Henry V.,' 8vo., 1716; Alured's 'Life of St. Dunstaple,' 8vo., 1720; Edward Thomas More's life of Thomas More, 8vo., 1716; Camden's 'Annales,' in Latin, 3 vols. 8vo., 1717; 'William of Newbridge,' 8vo., 1719; the 'Textus Rotensis,' 8vo., 1720; Fordun's 'Scotchchronicon,' 8vo., 1722; 'History and Antiquities of Gloucester,' 8vo., 1725; 'Hening's Charitoly, 8vo., 1728; Robert of Gloucester's Chronicle,' 2 vols. 8vo., 1724; 'Peter Langtof's Chronicle,' 2vols. 1725; 'Adam of Domerham,' 2vols. 1727; the 'Liber Niger Scaccarii,' 2 vols. 1728; 'Heningford's History,' 2 vols. 1731; Otterbourne and Whathamado's Chronicles,' 2 vols. 8vo., 1733; the 'Annales of Dunstable,' 8vo., 1733; and 'Benedict, Abbot of Peterborough,' 2 vols. 8vo., 1735.

Hearne published at various times a few small books, containing a few unprinted or imperfect MSS. and several of Hearne's pieces were reprinted at different times, and in 1530 the project was entertained of reprinting the whole of his works, as it appeared in 1735; but after the publication of four volumes, containing Randle Cotman and Peter Langtof's Chronicles, the scheme was abandoned.


HEART is the central organ of the circulation, and by its alternate contractions and dilatations exercises the principal power by which the blood is moved through the body.
of the higher animals. Its anatomy and physiology will be
made most easily intelligible by considering first the principal
varieties of the circulation or other motion of nutritive fluid
which occur in the animal kingdom; bearing in mind that
the main objects for which such a motion is required are
a constant supply of fluid adapted for their nutrition to all
parts of the body, and its regular exposure to the influence
of atmospheric air, that by the process of respiration it may
be fitted for maintaining the life of the animal.

The simplest mode by which a distribution of nutritive
fluid is effected is by means of ramifications proceeding
from the stomach or intestinal canal to various parts of the
body, which occurs in the polyps, infectusoria, intestinal worms,
echinin, medusæ, and other zoophytes. In all these the di-
gestive canal and the circulating system form but one ap-
paratus: the food, which in the higher animals requires a
complicated process of assimilation before it is fitted to
move with the blood, is in them already adapted for nutri-
tion. In most of them currents can be seen passing in op-
posite directions along the canals opening into the digestive
cavity, exactly like those well known to exist in the stems
of plants, and probably produced by the motion of cilia
which line the tubes, but are too minute to be discerned
even with the microscope.

In the planaria and some of the trematoda a separate
vascular system has been discovered in addition to the ra-
milled digestive tubes. In the former the main trunk has the
shape of an oval loop (a, b, c, d), from which capillary net-
works arise and communicate freely together, and with a
dorsal median vessel (e).

These vessels have been seen contracting and dilating,
but not regular course of fluid has yet been discerned.

A more perfect form of circulation of this kind is found
in the annelids, and it has been closely observed by Müller
in the leech, as shown in the annexed drawing. There are
two main lateral vessels (b, b, c, c), communicating at their
extremities and by transverse branches with each other,
and with a third central vessel (a, a, a), which contains
within it, bathed in its blood, the nervous cord, and pre-
sents knot-like swellings at the same situations as that cord
does. Alternate motions of the blood may be seen in these
vessels: at one moment the lateral vessel (a, b), and the cen-
tral (a, a, a), with the communicating branches between
them, are seen filled with blood; while the other lateral vessel
(a, c) and its branches are empty. In the next moment c, c
and its branches are filled, while a and b are empty; so that
one lateral vessel, and the central one, are always opposed
in action to the other lateral one. The central continues
acting with one of the lateral for twenty or twenty-five pul-
sations, and then its relation changes and it acts in unison
with the other. During the contraction of a lateral vessel
the blood evidently flows from it through the middle trans-
verse vessels over to the other side, and in the next moment
returns. The contraction proceeds gradually from behind
forwards, so that a wave (as if it were) of blood is seen passing
from one end of the lateral and of the central vessel to the
other, and then returning in the contrary direction through
the other lateral vessel. In this manner it is probable that
a constant circulation is maintained along the sides of the
animal, and its direction seems to be changed after every
eight or thirteen pulsations. The same general type of cir-
culating system is found in earthworms and all the other
annelids.

Hitherto nothing has been seen which could fairly be
called a heart, nor have the vessels presented any characters
by which they could be separated into systems of arteries
and veins, for all alike seem to perform at different times
the functions of both. A more distinct division of the parts
of the circulating system is found in insects. They have a

large vessel (a, a) running along the back, divided by nu-
merous constrictions into a series of communicating cavities,
between which there are lateral openings through which the
blood is received, and which are guarded by valves to pre-
vent the blood from flowing out. Through this, which is
commonly called the dorsal artery, but which may rather be
regarded as a series of ventricles, the blood passes from be-
hind forwards, dividing into small streams, one of which
flows to each of the tentacles, feet, &c. No distinct vessels
can be detected in which these minor currents may run;
they seem simply to pass through the various tissues, and
having arrived at their destination, to form there into ar-
ches, and return empty themselves into abdominal ves-
sels, b, b, which may be regarded as veins, and through which
the blood flowing from before backwards is returned into
the dorsal artery through the communications which exist
between them at the posterior part. This is also the plan

\[\text{Diagram}\]
of the circulating system which with various modifications prevails in the arachnids and the lower crustaceans.

In the orders already mentioned no special arrangement of vessels has been found for the purpose of exposing the blood to the influence of the air. Either the whole or part of the blood undergoes respiration on the whole surface of the body, or at the tracheae, or the vessels arranged in especial systems for that purpose. In those which follow however, we shall observe a separate and complicated respiratory apparatus; and that the form of the heart and its large vessels are adapted in accurate correspondence with that of the gills or lungs, and according as the whole or part of the blood is required to be exposed at each round of the circulation to the influence of the air.

The simplest kind of a heart, forming a defined cavity, is found in the larger decapods, and some other crustaceans. The annexed sketch represents the heart and large arteries of the lobster. There is a single cavity or ventricle (a), into which the arterial blood flows from the gills by vessels which unite into two trunks, whose orifices (b, b) are protected by valves. Six main arteries proceed from the heart; the three anterior (a, c, c) go to the head; two from its inferior part to the liver; and the largest of all (d) from its posterior part. This last gives off a superficial and a deep artery to the tail, and then curving forwards under the sternum, gives branches to the feet and deep arteries to the head. From these the blood returns by veins into a number of venous sinuses which lie at the sides by the articulations of the legs with the chest, and all communicate together. From them branchial arteries proceed, which run on the outer edge of the gills, and pass through capillary vessels in them, terminating in branchial veins which unite into the two trunks that open into the heart.

In most of the molluscs the blood flowing through the branchial veins, instead of being poured directly into the ventricle, is received first into an auricle, presenting the first instance of a heart with more than one cavity. In most of the gastropods and pteropods the auricle is single; in the bivalves the auricle is double. In the latter division, the blood, collected from the systemic veins into one venous reservoir, before going to the gills passes by numerous branches into a spongy tissue which Bojanus calls a lung, and others a kidney, but whose real nature is as yet unknown. From this a few branches pass at once into the auricles, but the greater number go as branchial arteries to the gills. In the brachipods the systemic ventricle is also double, each cavity giving rise to an auricle. But the most singular form of heart in this class, and one of much interest as presenting all the cavities separated, which in higher classes are united in one body, is that of the cuttle-fish. The blood passes in it from a systemic or central ventricle (o), through the auricles superior (b), and inferior (o), and is thence distributed throughout the body, whence it is collected into six venous caves (d, d, d, d, d, d), which open into two branchial auricles (e, e), conducting into two branchial ventricles (f, f), by which it is forced through branchial arteries (g, g, g). From the extremities of these it is conveyed into branchial veins, of which that of the left side (b) is here shown, which open into the two systemic auricles (i, i), conducting again into the systemic ventricle (o). Here then we have the first appearance of a separate heart for the respiratory circulation, and the elements of all the compound forms which we have now to notice.

Among vertebrate animals the simplest form of heart is found in fish. They have a single auricle (a, a), which receives the blood from the trunks of the veins of the whole body (b, b), and communicates with a single ventricle (c), which forces the blood into an arterial trunk with a contractile bulb (d). From this trunk all the branchial arteries (e, e) arise, and passing on each side in arches to the gills, divide there into capillary branches. The blood thus scavnted passes on, and the arches again unite into a common trunk (e), the true aorta, which runs along the under surface of the spine, and sends the blood to all parts of the body. From these it collects again into the systemic veins (b, b), by which it is carried back to the auricle. The same type of formation is found in the reptiles which have gills, as in the proteid of their adult state, and in the larve of many which at that period also breathe by gills.

In fish all the blood is subjected to the respiratory process before it passes to the body: in the reptiles, which breathe in air, and have therefore a much more complete exposure of the blood to it than fish, who breathe only the air that is dissolved in the water, only a part is exposed before entering the general circulation, but the modes in which this is effected very greatly. The annexed sketch represents the circulatory system of the frog in its perfect state. It has
a single ventricle (a), from which arises a single aortic trunk (b), from which proceed the two pulmonary arteries (c, e), conveying part of that blood which is to undergo respiration to the lungs (d, d), whence it is returned by pulmonary veins (e, e). From the same aortic trunk four other arteries arise, two of which, forming arches, unite to form the dorsal aorta, while the two uppermost are distributed to the head and upper extremities. From the terminations of these arteries in all parts of the body the blood is collected into large venous trunks, which open into the double auricle (f, f), from which the aerated blood from the lungs and the impure blood from the system pass separately into the common ventricle, in which they are intimately mixed. In other reptiles the ventricle is more or less completely divided by a septum, which in the crocodilus lucius separates it into two distinct cavities, one connected with a pulmonary, the other with a systemic aorta; in some others the septum is nearly complete, and the mixture of the two kinds of blood is supposed to be prevented by a valve, but in the rest of the order the septum is so small that the blood must necessarily be mixed. In all of this order however the abdominal aorta, which runs along the spine, is formed, as in the frog, of two arches, and in those which have separate ventricles a branch proceeds from each to form it, so that while the head and upper extremities are supplied with pure arterial blood from the left side of the heart, the lower portion of the body receives a mixed blood from the left side and the right.

Lastly, we arrive at the complete double circulation of man, mammals, and birds, to which some of the forms just described make very close approximations. In all of them the blood arrives at the heart from the veins of all parts of the body by two large trunks, the venous cavae, superior and inferior, from which it is received into the right auricle, and thence passes into the right ventricle. The right ventricle, by contracting, forces it into the pulmonary artery, in whose branches it is exposed to the air, and passes from them to the pulmonary veins, which open into the left auricle, from which it proceeds to the left ventricle, thence through the single aorta into all parts of the system, and again into the veins and right auricle.

We may now consider the anatomy of the heart, and the chief phenomena of the circulation, in man. The heart is of a somewhat conical form, having its base directed backwards towards the spine, and its point forwards, downwards, and to the left side, so that at each contraction it may be felt striking between the 5th and 6th ribs, about four inches from the middle line. It rests upon the diaphragm (a, a), the muscular partition between the chest and abdomen, and the surface upon which it lies is much flattened. It is firmly attached to the diaphragm at its right side, and behind by the inferior cava, which passes through that muscle at the aperture b, and above and behind it is fixed, though more loosely, to the upper and back part of the chest by the rest of its great vessels, which there pass out of the pericardium, and are united to the surrounding cellular tissue and organs. Everywhere else it is quite free and moveable, though the range of its motions is limited by the pericardium, or membranous bag in which it is contained, and which closely surrounds it at all times. When the heart is exposed by cutting open the front of the pericardium, it is seen to be divided along its front and most convex surface by a line running from the middle of its base downwards to the right side of its apex. This line and a similar one on the under and flatter surface, both of which are traced out by two vessels, the principal trunks of the coronary arteries and veins by which the walls of the heart itself are supplied with blood, indicate the position of the septum, or partition by which the ventricles are divided from each other. At the base, above and on each side two other divisions will be seen, each having a little fleshy pendulous appendage at its corner; these are the auricles. Thus may be seen at once a right auricle (d) and ventricle (e) on the right side and front of the heart, and a left auricle (f) and ventricle (g) on its left side and back.

From the greater thickness of the walls of the latter, they form the larger portion of the whole heart, but the cavities will be found to be nearly of the same size. The right anterior or pulmonary side of this double heart is exclusively for the circulation through the lungs (a, h); the left posterior, or systemic, for that through the body.

To examine the interior of the heart it should be removed from the pericardium, and an incision should be made into the front of the right or front auricle, so that an angular flap may be cut out of its walls, and the whole view of the back part and sides of its interior may be exposed. There will then be seen, behind and to the right side, two large spoutures; the upper leading to the venous cava superior (a), through which all the blood is returned from the head and upper extremities, and the lower leading to the veins cava inferior (b, b), by which all the blood is conveyed from the abdomen and lower extremities. These apertures will be seen to be surrounded by a few muscular fibres continuous with those of the auricle itself, and that of the inferior cava is partially guarded by a thin semilunar membranous fold, called the Eustachian valve, varying much in size, and often much torn. The left side of the cavity, on the partition which

* The heart and large vessels of any of the larger of our domestic quadrupeds may be used for popular dissection; their structure differs so little from that found in man, that the present description will almost exactly apply to them.
separates it from that of the right auricle, presents an oval depression (the fossa ovalis) surrounded by an elevated border, indicating the situation of the foramen ovale, through which, during the fetal state, the blood, which was prevented by the Eustachian valve from passing into the ventricle, was conveyed directly from the right into the left auricle, and thence into the left ventricle. Lastly, at the anterior and left angle of the cavity another and the largest aperture is seen, which leads into the right ventricle, and has attached to its sides a membranous curtain d, by which it is closed and which is called the tricuspid valve. The general form of the cavity of the right auricle is that of a quadrangular sac, from the right and anterior part of which a small flattened triangular process stands out, from the remote similarity of which to the ear (auricle) of a dog, the cavity has received its name. Its interior is tolerably smooth behind, by the orifice of the superior cava, on the partition, and about the opening into the ventricle; but to the right and front side, about the auricular appendage and the inferior cava, it is rendered uneven by prominent bands of muscular fibres (the musculi pectinati) which seem to radiate from the auricles.

Proceeding in the course of the circulation, a cut should be made from the right auricle through the aperture leading from it into the right ventricle, and along the front of the heart nearly to its apex, and then another from the end of depression up fords into the pulmonary artery, as it arises from the front and upper part of the ventricle. By raising the portion thus cut out, a complete view of the cavity of the right or pulmonary ventricle, and of its communication with the auricle, will be obtained. The cavity of the right ventricle has a somewhat conical form, with its base uppermost; that part of its walls which is formed by the septum projecting somewhat into it. Its walls are rendered extremely irregular by prominence of muscular fibres crossing each other in every direction, and enclosing spaces of various size and form, which after death are generally found filled with coagulated blood entangled in and adhering to them. Here and there stand out short columns of muscle projecting into the interior, and pointing towards the right auricle; these are called columnae carneae, and they have attached to their summits fine tendinous cords (cordae tendineae), which pass thence to be attached to the edges of the curtain-like membrane (the tricuspid valve), which guards the orifice between the auricle and ventricle.

This orifice is of a broadly oval form, surrounded by a ring of firm dense tissue, to the whole interior circumference of which is attached the leaflet of membrane, strengthened by tendinous fibres, forming the valve. The edges of this valve are very irregular, but it may be roughly divided into three principal portions (whence its name), the largest of which lies so as to separate the orifice from that leading into the pulmonary artery. If this valve be pushed inward towards the cavity of the ventricle, as in the larger of these figures of the mitral valve, of which the construction though similar is more simple, it will lie nearly flat against the walls, and would in this position present no obstacle to the passage of a fluid from the auricle into the ventricle; but if, on the contrary, it be pushed from the ventricle towards the auricle, its edges will be found to meet so as to close the orifice as in the smaller figure: a, a, a, the columnae carneae; h, h, h, the chordae tendineae; c, c, c, valves. This we shall see is the mode in which it acts during life.

From the front and upper part of the ventricle a smooth short passage leads to the origin of the pulmonary artery a, which is attached firmly to the dense ring to which many of the muscular fibres of the ventricle are affixed. At their union, and at the very orifice of the pulmonary artery, three small valves, a, a, a, fig. 1 (the semilunar, sigmoid or pulmonic valves) are seen, which is closed by the whole length of their convex edges to the walls of the artery, and hanging loosely in it with their free festooned edges directed upwards, enclosing behind them three small spaces, where the artery bulges somewhat outwards. If one looks from the cavity of the ventricle along the interior of the artery, and blows gently into it, the valves will be seen to lie nearly flat against its walls, as in fig. 1, and will offer no obstacle whatever to the passage of any fluid in that direction; but if one looks and blows in the opposite direction, from the artery down into the ventricle, the valves will fall inwards, so that their edges will meet, and they will completely close the tube of the artery, as at fig. 2, so that unless driven with force sufficient to rupture them, no fluid could pass into the ventricle. It is evident that if the artery be circular, the edges of these semilunar membranes could not exactly meet to close it, but would leave a little space, of a triangular form, between them. This is filled by three little bodies, b, b, b, Corpora Arantii, one of which is attached to the middle of the edge of each valve, and which, at the same time that they effect this, afford a strong point of attachment for the tendinous fibres by which the valve is strengthened. The pulmonary artery proceeds upwards, and to the left, in front of the other vessels, and, after a course of about one inch, divides into two main trunks of which turns sharply to go to the right lung, while the other goes straight outwards to the left. In these organs each artery divides into numerous branches, which become smaller as they become more numerous, and terminate in a most delicate network of vessels, ramifying on the walls of the alveoli, from which, after the blood which they contain has been exposed to the air, it is received into equally delicate pulmonary veins, and through them conveyed in gradually increasing branches to the four principal branches of the pulmonary veins, which open into the left auricle.

It would be useless repetition to describe in detail the left posterior or sylvic ventricle and auricle, which differ in no important point from those described. The pulmonary cavitie on the left side and all the parts contained in them are thicker and stronger than those on the right; the orifice between them is guarded by a valve which has only two principal parts, and is therefore divided, and the sylvic semilunar valves have larger and more prominent bodies (Corpor Arantii) on their edges. The sorts, f, proceeds upwards, and to the right side, then arches backwards and to the left, and, turning over the main air-tube of the left lung, passes down along the spine, at the lower part of which it divides into two large arteries (the common iliacs) which supply the pelvis and lower extremities. From the upper part of its arch it gives off on the major trunks of the head and upper extremities in three large trunks—that most to the right, called arteria innominata, g, is the common trunk which divides into the right carotid for the right side of the head, and the right subclavian for the right arm and side of the neck and chest. Next to it is the left carotid, h, and next the left subclavian, i, of which the distribution is similar to that of those on the right side. During life the blood, returning from the whole body by the veins which unite to form the two great veins, enters the right auricle and gradually distends it, at the same time that the blood returning from the lungs by the pulmonary veins enters the left auricle and distends it; when completely filled it impelled a kind of vermicular motion is seen at the point of each auricle, which is rapidly propagated along their walls, and simultaneously empties the contents of the one into the right, and of the other into the left ventricle. The ventricles are now no longer completely filled, but they contract suddenly and with much greater force than the
auricles, and propel the blood into the pulmonary artery and aorta. They drive it indeed in all directions, but in each ventricle there is but one orifice into which it can find a passage, for that by which it entered is closed by the valve surrounding it. The same contraction of the walls of the heart which propels the blood serves to raise and fix the valves in their position, which its regurgitation checks; for as the blood is forced under their edges they are lifted up and pressed towards the auricles; and they would be forced into them, but that when they have arrived at such an elevation as to close the orifices no longer further brings on their tendinous, which are attached at one end to the edges of the valves, and at the other to the summits of the columnae cavae—those muscular pillars, which we have described as standing out from the wall of the heart in the form of a bottle. 

The right and left little tendons is exactly measured to the distance to which the valves may be allowed to flap back, and as the columnae contract so as to narrow the cavity of the heart, and force the blood out of it, they tighten and fix the edges of the valves against which some of the blood is forced, and thus keep them steady, till the ventricles being emptied their walls relax and permit the valves to be forced down again by the next current from the auricles. The blood forced into the artery pushes on that which was already there (for the whole circulating system is throughout completely filled) and distends the lower part of the vessel, ventricle is thus closed; the diaphragm would have to force the blood as well back into the ventricle as forward into the branches. It would accomplish both, and half the power of the ventricles would be thus wasted, but that the semilunar valves, which are prevented from adhering to the walls by the projecting bodies on their edges, as soon as any blood gets behind them, are pushed down and close the passage into the ventricle. The whole of the blood is therefore driven on, and replacing the thing behind, and the first thing thrown in are forced into the ventricles, and itself in turn displaced by the next succeeding wave.

Through the arteries it is distributed to all the body, and returns to the heart through the veins. Some of the blood, and the organs connected with it unite into a large trunk, the vena portae, which, instead of at once entering the heart with the others, passes into the liver, and there again divides into minute capillary vessels, from which the bile is secreted, and which pass into the ultimate divisions of a series of hepatic veins, which collect into three or four large trunks which open into the vena cava inferior just before it passes through the diaphragm to enter the right auricle.

A point of much interest is the consideration of the changes which the circulating system of man and the higher animals undergoes in the various periods of their life in the uterus. In the third month of gestation, very early in the periods of fetal life fissures may be seen by the sides of the neck, in birds and many mammals, and therefore in all probability they exist in man, beneath which arches of vessels which one part of one single heart, and collect at their opposite extremities into a single common trunk; an arrangement most closely analogous to that of fish. After this, and to the end of fetal life, the arrangement is adapted to the respiration by a placenta, previous to the possibility of the coincident walls of the placenta being open for the passage of open air. The purified blood coming from the placenta circulates in great measure through the liver, before it enters the right auricle by the inferior orifice, and is made to flow through the foramen ovale, over the Eustachian valve, into the left auricle, whence it is conveyed into the left ventricle, and by it forced through the aorta and its three principal branches to the head and upper extremities, from whence it returns by the superior cava to the right auricle, and passes through it (without mingling with the other current going through it from the inferior cava, to the left auricle) to the right ventricle. From this it is carried into the trunk of the pulmonary artery; but as the lungs are at present incapable of performing their functions, it is conveyed through a direct passage, the ductus arteriosus, from the pulmonary artery into the aorta, just below the origin of the left subclavian artery, and from this it passes along the aorta through the chest and abdomen, and is conveyed through the trunks of the iliac and femoral system, to be again purified. Thus there is a single auricle, but through the right side of it two currents are constantly running in opposite directions; and two ventricles, one forcing the blood to the head and upper extremities, of which the former is at this time paused; the other actively conveying the blood through the ductus arteriosus to the placentas, and therefore now, as during perfect development, may be regarded as the respiratory portion of the heart. At this time the two ventricles, having nearly equal extents to force the blood through, are of nearly equal size. After birth the left becomes much larger, and is thus enabled to accomplish the more extensive purpose of propelling the blood through the whole body. Directly after birth changes commence which in a few days convert the arrangements for the facial circulation into those adapted for the circulation of the completely formed animal; the foramen ovale is completely closed, the ductus arteriosus may become the branch of the umbilical vein, which had passed directly into the inferior cava, is obliterated; and the terminations of the iliac arteries, which had carried the blood to the placentas, contract, gradually close, and are ultimately traceable only in the form of small arteries, which supply the placenta.

We may now consider the powers by which the motion of the blood is effected in man, and the chief phenomena of the circulation in the various parts through which it takes place.

When the ventricles of the heart contract, they are shortened, and become narrower, harder, and firmer. The heart lying loosely in its pericardium, and fixed only where necessary by the ligaments, is made to function more strongly by the pressure of a great vessel of the chest, and the compression of blood which the ventricles force out; its point is lifted up, and strikes at each ventricular contractions, or systole, as it is called, against the wall of the chest, producing that impulsion which may be felt by the finger or hand placed just beneath the left breast, and which is almost exactly coincident with the pulse felt at the wrist. At the relaxation or diastole of the ventricles they regain suddenly and forcibly their previous conditions. These actions are accompanied with certain sensations and the ear of the bed can be heard by the stethoscope, or on near the part where the heart is felt beating, a sound like that of a gentle breathing is heard coincidently with the impulse of the heart. This is immediately followed by another more or less distinct sound, sharper, more defined, like the falling back of a light valve, coincidently with which the heart seems to fall back from the wall of the chest. A short pause of perfect silence succeeds, and then the first long sound is again heard. They take place in regular rhythm. Dividing the whole period occupied between each two impulses of the heart into four parts, the first sound would occupy two, the second one, and the pause one. It is unnecessary to allude to various explanations given of these sounds; the most probably correct is that founded on an extensive series of experiments made by a committee of the British Society of Physiologists in 1836 and 1837, viz.;—that the first sound is produced by the vibrations of the muscular fibres of the ventricles during their contraction, assisted in a very slight degree by that of the heart striking against the chest, and that the second is in all probability the result of the vibrations of the semilunar valves when the blood just expelled from the ventricles regurgitates. The succession of actions in the heart has been described: the contraction of the auricles is coincident with the respiratory expiration, and the contraction does not produce any audible vibrations; the pause lasts till the ventricles are completely distended by the contraction of the auricles; then comes the first sound and the peculiar vibrations which are there produced; after this the blood into the arteries, the elevation of the valves to prevent the blood from going into the atriales, and to permit it to go into the arteries, the impulse of the heart against the wall of the chest, the pulsation of the great arteries, and fol-
allowed after a scarcely appreciable period by the pulse at the wrist and other parts distant from the heart. Lastly, the second sound is heard coincidently with the relaxation of the ventricles, the falling down of the valves to permit the blood to pass from the auricles into the ventricles, and to prevent its passing from the arteries back into the ventricles; and the rush of blood from the auricles into the ventricles, which continues through the whole time of the second sound and the pause.

At each contraction of the ventricles a very large proportion of the blood contained is expelled into the arteries, and a very little may flow back into the auricles, especially right, before the valves are completely closed, producing the slight dilation of the veins; a wave which may often be seen in each contraction of the ventricles. At each contraction of the auricles it is probable that some blood flows back into the veins and pulmonary veins, for there are seen distended rather more suddenly at this time than can be explained by the mere arrest and consequent accumulation of the blood. However, so large a portion of the heart's power is exerted in propelling the blood into the arteries, that these slight influences in the capillary direction need scarcely be taken into account in calculating its amount. At each contraction of the ventricles about an ounce and a half of blood is forced into each artery, with such force, that Hales found that the blood as it rushed from the open main artery in the thigh of a horse, after one or 2 feet of the large vessels, forced the size of the vessel, while in the temporal artery of a sheep it rose 61 and, in those of dogs from 4 to 6 feet. Poiseuille (Magendie's Journal de Physiologie) also calculated, by deductions from accurate experiments on animals, the force of the blood as it streams through the human arteries, as sufficient to support a weight of 41.3 dr. and 43.4 grains. Now if the quantity of blood in the whole body be assumed to be 30 (tr. wt.) pounds, which is probably about an accurate average, and if 1 oz. be forced from the ventricle at each pulsation, of which, on an average, there are 70 per minute, a portion of blood will go the complete round of the circulation in about 39 minutes, which is however a somewhat slower rate than we might deduce from the experiments of Hering (Tiedemann's Zeitschrift, t. 3), who found that substances injected into the veins of horses could be detected in distant arteries in half a minute.

Harvey considered the heart to be the sole agent by which the circulation is effected, but it is certain that several other agents exercise auxiliary powers. That the heart has however an influence on all parts of the circulation is evident in the large arteries; in these its effect is seen in the increase of the current which it had set in motion, in exact coincidence with the contraction of the ventricles; in the smaller ones, by the same increase at a slightly greater interval, in different arteries, by the occasional pulsatile motion which may be seen in them, when, after an animal has been largely bled, its transparent parts are examined with the microscope, and this though the heart is acting very weakly. Lastly, the veins we find its influence still exerted; for if the main artery and vein in a limb be exposed and isolated, and the latter be wounded, the flow of blood from the orifice may be exactly regulated by compressing the heart in such a way that, by preventing, in a greater or less extent, the blood from flowing to the vein with the impulse given to it by the heart. There are cases again in which the veins have distinctly pulsated, and the pulsation has proved to have been communicated from the heart through the capillary system as we may allow that the rapidity of the current in the arteries, veins, and capillary vessels, is always in direct proportion to the frequency and strength of the ventricular contraction, and always more rapid in the parts near them than in the parts remote from the heart; that it ceases in all the instant the heart is removed, or its influence on a part cut off by dividing the main artery; that in old persons, in whom the whole arterial system of the lower extremities is considerably dilated, and rendered incapable of contraction, the heart alone is sufficient to maintain the circulation through the affected parts; while on the contrary, when the heart's power is by any cause weakened or interfered with, parts of the body very remote from the heart; in cases of suspended animation no motion of the veins was produced till the heart begins to act; but when this is the case, it has of itself sufficient power to set all the blood of the body in a current.

These are so many proofs that the contraction of the ventricles has a share in propelling the blood throughout the whole course of the circulation; but the heart also assists, by the enlargement of its cavities after their contraction, which, whether it be the effect of mere elasticity, or of an active power of dilatation, certainly takes place with great force. The heart, in short, acts at once as a forcing and as a sucking pump. This result of this action will be further illustrated in speaking of the influence of atmospheric pressure.

From the heart the blood is poured into the arteries, a series of ramifying tubes through which the current is distributed, divided into a gradually increasing number of streams, which progressively diminish in size, till it arrives at a net work of the most minute canals, the capillaries. As a general rule, when an arterial trunk divides, the sum of the diameters of the branches is greater than the diameter of the trunk—thus in the annexed diagram (in which the arrows indicate the course of the blood), the sum of the diameters of the branches 2 is greater than that of 1, and the sum of those of 3 3 3 greater than that of 2, from which they arise. Hence the arterial system has been compared in form to a cone, of which the heart is at the apex—and the stream of blood will be like a current gradually growing wider, so that if no additional impulse be given to it, it will become slower as it becomes more distant from the heart, an effect to which the friction of the blood against the walls of the vessels will also contribute. The effect of both these causes however is so slight that M. Poiseuille has found that the force of the current of blood in all arteries sufficiently large to be experimentally observed, is the same; that in the aorta, for example, bears the same relation to its diameter as in the artery at the wrist in its diameter. The diameter of an artery may be taken as a measure of the quantity of blood in it. It does not appear moreover that the direction in which a branch is given off from the trunk has any appro-
ecilable influence on the velocity of the current in it—most frequently
the branches of arteries are given off so as to form an acute angle with the continuous trunk as 2, from 1—2—but often they separate at right angles, and less frequently so as to form obtuse angles. Neither can the effect of the tortuosity of an artery be calculated, though there can be little doubt that, arteris partibus, the current in it will be slower. An important point in the arrangement of arteries is the frequent union, or anastomosis, of branches with each other. It is evident to prevent any part being cut off from its supply of blood, by the compression or obliteration of one of its arteries. Hence it is that even when the main artery of a limb has been tied, the nutrition has still been maintained by the fluid being diverted into the collateral channels, which subsequently become enlarged. [Anat.]

The chief property of the arteries by which they affect the circulation is their extreme elasticity. It is by this that when water is forced through a rigid tube—the jets that had been forced into them, and propel it in every direction—and that when elongated they again shorten, and that when empty they remain open and tubular. The chief effect of the action of the heart is the dilatation and retroversion of the arteries (which are always during health in a state of slight distension) maintains a propelling force upon the blood during the intervals of its actual motion. If the elastic power were not exercised, we should see, on opening an artery, a jet of blood, and then a pause, then another jet, followed by a second stoppage of the current, just as when by the successive strokes of a piston we force water through a rigid tube; the jetting pulsatile motion which the blood receives from the forcible and successive contractions of the ventricle into an even and steady current. The elastic contractions of any pipe by which a fluid is propelling, have no generative influence to accelerate the blood, for it would press that fluid exactly in all directions, and thus would retard the current coming from the heart to any part to exactly the same degree that it accelerated the passage from that part towards the veins—the one influence exactly nullifying the other.

To convert the pulsatile motion however into a uniform one, without variations, and without the image of the heart more upon the arteries than this elasticity, which by continually acting to contract the arteries (which are always during health in a state of slight distension) maintains a propelling force upon the blood during the intervals of its actual motion. If the elastic power were not exercised, we should see, on opening an artery, a jet of blood, and then a pause, then another jet, followed by a second stoppage of the current, just as when by the successive strokes of a piston we force water through a rigid tube; the jetting pulsatile motion which the blood receives from the forcible and successive contractions of the ventricle into an even and steady current. The elastic contractions of any pipe by which a fluid is propelling, have no generative influence to accelerate the blood, for it would press that fluid exactly in all directions, and thus would retard the current coming from the heart to any part to exactly the same degree that it accelerated the passage from that part towards the veins—the one influence exactly nullifying the other.

To convert the pulsatile motion however into a uniform one, without variations, and without the image of the heart more upon the arteries than this elasticity, which by continually acting to contract the arteries (which are always during health in a state of slight distension) maintains a propelling force upon the blood during the intervals of its actual motion. If the elastic power were not exercised, we should see, on opening an artery, a jet of blood, and then a pause, then another jet, followed by a second stoppage of the current, just as when by the successive strokes of a piston we force water through a rigid tube; the jetting pulsatile motion which the blood receives from the forcible and successive contractions of the ventricle into an even and steady current. The elastic contractions of any pipe by which a fluid is propelling, have no generative influence to accelerate the blood, for it would press that fluid exactly in all directions, and thus would retard the current coming from the heart to any part to exactly the same degree that it accelerated the passage from that part towards the veins—the one influence exactly nullifying the other.

To convert the pulsatile motion however into a uniform one, without variations, and without the image of the heart more upon the arteries than this elasticity, which by continually acting to contract the arteries (which are always during health in a state of slight distension) maintains a propelling force upon the blood during the intervals of its actual motion. If the elastic power were not exercised, we should see, on opening an artery, a jet of blood, and then a pause, then another jet, followed by a second stoppage of the current, just as when by the successive strokes of a piston we force water through a rigid tube; the jetting pulsatile motion which the blood receives from the forcible and successive contractions of the ventricle into an even and steady current. The elastic contractions of any pipe by which a fluid is propelling, have no generative influence to accelerate the blood, for it would press that fluid exactly in all directions, and thus would retard the current coming from the heart to any part to exactly the same degree that it accelerated the passage from that part towards the veins—the one influence exactly nullifying the other.

...
The influence of the minutest arteries and veins, and of the capillaries, on the circulation, is best seen in the phenomena of local action, as inflammation, blushing, turgescence, &c. If the web of a frog's foot placed in a microscope be observed, it is seen slowly to dilate, so as sometimes to prevent the flow of blood through them; if the stimulus be so great as to produce inflammation, then they dilate, and a larger number of globules is seen passing along them with great rapidity. The same may be seen in the human face; if the blood-vessels of the face be irritated, a minute that they give no colour to it; but if they be irritated by a particle of dust, at once they dilate, and more blood-globules entering them, they are seen as tortuous canals filled with blood. The same effect is produced on the wound or other injury, the parts around grow redder, and swell from the influx of blood to its capillaries, and if the inflammation arise in a part which can be compared with another similar one, as in the hand, one feels that the pulse is fuller and stronger on the injured than on the sound side, indicating that a larger quantity of blood is passing through it. A still more evident accumulation of blood is shown in blushing, in which, from a mental impression, in an instant all the minute vessels of the face, neck, head, &c., become distended with blood. The paleness of fear is produced by the opposite condition, and we have other cases in which a decrease of the quantity of blood in a part is seen in the consequent nutrition and sensibility of the parts which have become useless, as in the gills of tadpoles, the horns of deer, &c. All these circumstances are clearly sufficient to prove that, independent of any influence extending from the brain, the blood-globules of all parts a power by which the supply of blood passing through them may be either increased or diminished, whether it be effected by an alteration in the propelling power of the vessels themselves, or, as some imagine, by an increased attraction or repulsion between the tissues and the blood. In any case, we have only proofs of its occasional influence, and that in many it is intimately connected with the function of secretion, for it comes follow in passive or mental excitation; but we have no evidence that it exercises any constant influence on the course of the blood.

Following the course of the circulation we come now to the veins, which may be regarded as the most passive of the parts engaged in it, though they are constructed so as to permit many important external agencies to set upon the motion of the blood. While the arteries form a series of branching canals in which the main current is diverted into streams whose number increases as their individual size decreases, the veins are made up of a series in which a vast number of canals gradually unite into others whose number decreases as their size increases (as shown in the following figures), and which, in the great trunks, the veins cavo. In addition to other peculiarities of structure the veins have valves, 5, 5, 5, very similar to those at the origins of the arteries, which are arranged in series with one another, the number of nearly all those veins in which the blood has to rise against the power of gravitation. Their simple use is evident; the blood, returning slowly through the capillaries, and much of the force of the heart being expended in propelling it so far, would be apt to retrograde, or remain stationary, if the weight of the whole column in the veins bore down upon the arteries, and through them on the heart. As soon however as a portion is raised into a vein, when it tends to return to the arteries it is counteracted by those which close the canal of the vein and support the blood above them, till another portion rising sends it onwards. Thus while they permit the blood to pass without obstacle towards the heart they entirely prevent retrograding; and if it were stationary, the column of blood would be like a stream branching out, and divided by a number of closed locks in which the portion of fluid between any two is not capable of moving from exercising any influence on the portions adjacent to it.

The veins, like the arteries, are elastic, and this power is occasionally exerted in recovering them from too great distension; for it is known that no fluid whose influence is remarkably shown in their shrinking when cold is applied, but its effects have been even less calculated than in arteries.

We have seen that pressure exerted equally on all parts of the walls of an artery would force the blood as much in one direction as the other, so that it could be of no use in
accelerating the circulation; but from the arrangement of the valves equal pressure on the veins has a very different effect, for it will be prevented by them from producing any retrograde current towards the extremities of the arteries, and thus the greater part of the power exerted will be gained in favour of the flow of blood towards the heart. Such pressure is exercised by the muscles surrounding the veins; as they contract they compress the veins, and thus force the fluid to flow in the only possible direction, viz. towards the heart. Their influence in this way is shown in the greater tendency to dilated and permanent dilatation of the veins immediately under the skin and other parts remote from the muscles, than in the deep-seated branches in which this varicose state (as it is called) very rarely occurs, although the number of valves in the former is always much greater; in the benefit derived by supplying the place of muscles by artificial pressure on the veins by bandages, &c.; by the increased fullness of the veins, and velocity of the current commonly seen in bleeding when the bleeding-staff is compressed and moved about in the hand; by the general acceleration of the circulation by muscular exertion; and, on the contrary, by the tendency to stagnation and swelling of the veins in the indolent, or those whose muscular systems are greatly debilitated.

But a still more important influence which is permitted by the presence of the valves is that of atmospheric pressure. It acts principally in respiration. When the chest is expanded for the purpose of inspiration, it is evident that the atmosphere will press with equal weight on all parts to fill up the vacuum thus produced. From without it will pass at once into the most open course through the tracheas into the lungs, which it distends; but at the same time the blood will be forced towards the heart and the great vessels contained in the chest, and will assist in filling up the vacuum to a degree directly proportionate to their volume as compared with that of the lungs. An experimental proof of this influence in the veins (for in the arteries its effect is prevented by the valves at their origins) is afforded by introducing a tube into the jugular vein of an animal, and placing its opposite extremity in a vessel full of fluid. At

every inspiration the fluid will be seen to rise, and at every expiration to descend a little, indicating first a suction towards the heart, and next a slighter expulsion of fluid from it. It is seen also in cases in which the brain is exposed by removing a portion of the skull; and in cases of Hernia Cerebri (Head, Injuries or Fractures), in which, in addition to its slight elevation by the pulsation of the arteries at its base, the brain is seen to enlarge and rise at every expiration and to become flattened at every inspiration. All these phenomena are still more evident when a strong inspiratory effect is made, as in sighing.

As inspiration draws the blood into the chest, so expiration acts by compressing all the large vessels to force it out of that cavity away from the heart. Its principal influence must be exerted on the arteries, for the blood would be prevented from passing along the veins by the valves. When the arteries (and to a less extent in the veins) it is seen to act in the increased velocity of the current that issues from a wound; in the fullness of the vessels of the face and other parts during a strong expiration, or when holding the breath, coughing, or sneezing, actions which are sometimes the causes of rupture of the smaller vessels, and produce an evident alteration in the pulse.

Atmospheric pressure on the veins must also act to some extent in filling up the vacuum which the sudden contraction of the ventricles must produce in the pericardium. Of course the lungs will expand, and in part effect this by pressing the pericardium towards the heart; but at the same time the blood will tend to rush towards the arteries and dilate them, so that they may fill up the vacant space. Dr. Barry proved this further, by showing that if a tube be introduced into the sac of the pericardium, without allowing any air to enter with it, a fluid placed in it will be seen he drawn towards and driven from the sac, at each contraction and dilatation of the ventricles.

Such are the powers concerned in the circulation, and the principal effects which they produce. The influence of one is certain, but what is its extent, and what are the circumstances under which it is chiefly exercised, cannot be accurately determined. In order of importance, the contraction of the ventricles must undoubtedly be placed for highest; then would follow the particular contractions of the ventricles, dilatation, the auricular dilatation; then inspiration, expiration, and the cavity in the pericardium in which the ventricles contract. All these assist at all times in moving the blood; the elasticity of the arteries tends at all times to equalize the velocity of the current, while their vital contraction and that of the veins, the action of the capillaries, and the muscular pressure on the veins, influence it only at particular periods. It is observable that one of these powers may sometimes replace another whose influence is prevented, as in the lungs on which muscular and atmospheric pressure can have no influence, but in which many circumstances prove the intimate relation which exists between the function of the capillaries; and in the liver, in which the ventricular contraction can have little power, but in which the constantly pulsatile state of the hepatic veins would make them peculiarly fitted for the influence of pressure.

HEART, DISEASES OF THE. When we consider the compound, or rather the mechanically complicated nature of the heart; its constant action, from the hour of birth to the hour of death; the extent to which every organ depends upon it for power to perform its functions in the animal economy; and the frequent derangement of some one of these organs, which tends to impede or render more laborious the heart's unceasing action—we cannot be surprised at finding that the central organ of such great importance, has suffered from many diseases, and that there is great difficulty in assigning to each unhealthy state its peculiar cause.

In giving some account of the disorders to which the heart is liable, we shall perhaps be able to indicate according to their causes; but as it is much easier to obtain a knowledge of the structure of this organ than of the remote causes of its several diseases, we shall here enumerate and describe those lesions which occur in its investing membrane; secondly, those which affect it as a whole; and thirdly, those met with in its various parts. Those who desire to be further acquainted with this subject are referred to the works of Mill, Cockett, Leenec, Cruvelille, Bouillaud, Bertin, and Dr. Elliotson, Hope, &c.

Diseases of the investing Membrane of the Heart, the Pericardium; Absence.—The pericardium has been reported

M 2
The sounds of the heart will in this disease appear to be removed from the surface, and dull in proportion to the quantity of the effusion, but no anomalous sound is produced, unless, by the amount of pressure, some obstruction to the circulation arises in the interior of the heart. The action of the lungs becomes much impeded when the pericardium is greatly distended with fluid, and when this obstruction to the breathing is conjointly to pressure on other neighbouring organs many very distressing symptoms are produced.

The treatment resembles much that of the cases of pulmonary abscess; but the question whether or not the operation of puncturing the membrane might be practised.

Diseases of the Heart itself; Absence.—Though the circumstances may seem rather to belong to a treatise on morbid action, rather than to this, it will be involved in a subsequent distinction wanting in some cephalopod beings who have shown, for a short time, evident signs of life.

Dispersion.—The heart is not always found in its usual situation at the time of death, there being record wherever it occupied the right instead of the left side of the chest, the other organs of the body presenting at the same time a relative change of position without any disturbance of their functions. It has also been found pushed out of the left into the right side of the chest by tumours, or, what is more common, by extensive effusion of fluid into the pleurs of the left side of the chest. The whole heart has been found indurated by the fluid to the abdomen, and forming a portion of that tumour projected beyond the abdominal parietes, constituting what are termed hernias of the heart. For a more elaborate account of these last-mentioned anomalous conditions the reader should consult a memoir on the subject by Breschet.

Carulitis; Inflammation of the Heart.—The proper muscular structure of the heart is not free from the attacks of inflammation, though whether the morbid action commences in this structure, or in the membranous, is difficult to determine. This however is certain, that when inflammation of the muscular structure exists, there will also be found traces of it in the pericardium, or in the lining membrane of the cavity of the heart. The inflammatory symptoms of the one distinct from those of the other disease: the treatment consequently will be similar in both.

The progress of this inflammation may be traced at its earliest stages, and an insight into its nature gained by observing its effects on the muscular structure softened and of a deeper colour than usual, at a further period presenting a greyish or yellowish softened mass; pus also may be found, or abscesses, which will still the walls of the heart as to occasion perforations.

Cancerous and Tubercular Development.—In the heart these deadly changes of structure are not of frequent occurrence; still, in support of the fact that they occasionally occur, we have the authorities of MM. Andr? and Lasue.

Hypertrophy of the Heart.—Independently of any morbid process existing in itself, the muscular structure of the heart is often greatly increased in bulk, so that the nutritive process were too active in proportion to the absorbent, and new matter were deposited more rapidly than the old could be removed. From the peculiar nature of the functions of the heart this disease becomes very important, and its effects not less dangerous than manifolds. It is usually divided into three kinds; namely, simple hypertrophy, the least common, in which the parietes are thickened equally throughout, and by a change of the constitution of the pericardial membrane and fluid, the circulation impeded by old adhesions and deposits between the two layers of the pericardium, and perhaps within the organ itself.

Hypertrophy of the Heart.—In addition to the above, an impertinent and apparently a negative one is the excentric or aneurismal hypertrophy, the form most frequently met with, in which the parietes are thickened equally throughout, and the enclosed cavity or cavities proportionally enlarged; and finally that which is not observed in the interior of the heart, but in proportion to the thickness of the parietes. Any one of these kinds of hypertrophy may affect the parietes of either cavity of the heart, or the whole organ. The extent to which this disease may proceed is enormous; hearts have been found weighing upwards of eight pounds, whereas the average weight of a healthy heart is from seven to nine ounces. In hypertrophy the shape of the heart is often much altered, the transverse often exceeding the vertical diameter, and a marked difference from the healthy state, and the pulsations very strong; indeed the bed-clothes are very often raised and the bed or
hand of the observer when applied to the chest forcibly pressed, yet the pulsations are for the most part regular, unless palpitations be induced by over exertion. The sounds perceived by auscultation will be found very loud, but not otherwise unnatural, if the disease be not combined with some obstruction to the passage of the blood; and unless some obstruction exists great impediment to the passage of the blood will not be much damped, provided that the hypertrophy be not of great extent; but it seldom does exist to considerable extent without the simultaneous occurrence of some impediment to the passage of the blood, already circulating with less facility than usual.

The accidents referrible to hypertrophy of the left ventricle of the heart are apoplexy and hemorrhages; it will also contribute to the production of aneurism of the aorta. It is probable that the hydrothorax in the brain by the too forcible expulsion of blood from an hypertrophied left ventricle is materially facilitated by an earthy or osseous state of the coats of those vessels. When the right ventricle, being hypertrophied, sends its blood too forcibly through the lungs, there will be a disposition to congestion of those organs. These effects will be combined when the whole heart is hypertrophied.

This is a disease in which great perseverance is required on the part of the patient and the practitioner, but with proper care it frequently admits of much alleviation. Rest, abstinence, sedative medicines, and more or less deploration, according to the circumstances of the case, are the most effectual means of the treatment.

Atrophy of the Heart is a wasting of the heart's structure, dependent on deficiency of the nutritive process. This disease is the reverse of hypertrophy, and, like it, may affect the heart in two different forms; viz: either that the heart does not exhibit more than half its ordinary weight. Like hypertrophy, it has been divided into simple atrophy, when the walls of one or more cavities are thinned without affecting the valves; a general atrophy, or aneurismal atrophy, when the enlargement of the cavity keeps pace with the thinness of the walls; and concentric atrophy, where the cavity is diminished, but the walls are thickened. Whichever of these forms the atrophy of the heart is usually accompanied by general emaciation, and the pulsations and sounds of the heart will be found feeble in proportion to the extent of the atrophy. In concentric atrophy however the pulse will be firm and resistant, though small, whilst in the excentric form of the disease it will be proportionally soft, feebie, and large.

In atrophy the powers of the patient are all below par, and the proper treatment will be to support the system by whatever means are necessary, and to encourage the functions of the alimentary atmosphere. Medicines may be prescribed as auxiliaries, when any additional symptoms appear indicating obstruction to the nutritive functions.

While the comparison of hypertrophy and atrophy we can only say that everything which increases the nutritive process in the one case and diminishes it in the other may be considered respectively as causes of either disease.

Dilatations of the Heart—It has been shown that the heart may be increased or diminished in substance, or, in other words, may be hypertrophied or atrophied; it is also found that the whole organ, or either of its cavities singly, or the orifices of these cavities, may be dilated, the same parts being merely enlarged, without any increase of substance and the contained cavities proportionally enlarged. As in hypertrophy, so in this disease, according to its extent, the shape of the heart may be much changed. The muscular parts being thinned and softened, the blood will not be carried with vigour, and the patient will be weak and unfit for exertion, easily exhausted by small losses of blood, and sometimes carried off by what usually is called a fortuitous accident; the natural tendency to fainting is increased. Partial dilatations sometimes occur after carditis; the muscular structure being thinned at some spot by ulceration, the parietes give way, and form a dilatation from which blood will be emitted. It is less does sometimes occur in persons of relaxed muscular fibre without any pre-existing impediment to the circulation, is most frequently the consequence of some obstruction to the passage of the blood, and is the natural effect of distension from within. It however not unfrequently happens that when the obstruction occurs at the orifice situated between the ventricle and artery the corresponding auricle will be the cavity dilated, its parietes being so much less strong than those of the ventricle. When the orifice of either of the cavities of the heart is dilated to such extent as to preclude the proper closure by the valves, a reflux of blood will be the result, causing the anormal bellows sound, and a sensation of purring, or of vibration such as would be produced by putting a pendulum into a wine-cask and setting it in a fluctuating motion in the jugular vein, called 'venous pulse.' Excessive exertions and strong passions seem to be exciting causes of this disease, and from the influence of these causes the paroxysms will be more frequent, and at the same time every remedy must be adopted which may contribute to equalize the circulation.

Endocarditis: Inflammation of the interior lining membrane of the heart is a disease of much frequency and productive of consequences distressing and fatal to the patient, was little known prior to the year 1824, when some excellent observations on the subject were published by M. Bouillaul. Subsequently that active and accurate observer has written more largely on this disease, the nature and effects of which he has minutely described, not however without having been considered by many physicians, both of this country and the Continent, to have contributed to its influence some organic changes, such as cartilaginous and osseous formations, not strictly speaking referrible to it. A recent acute case of endocarditis is not very frequently met with uncombined with some other inflammatory or constitutional disease. The inflammation of the interior of some of the veins, will be usually found, if not to accompany, at least to have preceded it.

The symptoms of endocarditis are more or less fever and anxiety; some bulging of the precordial region, if accompanied by pericarditis; an extension of the dull sound heard on percussion in the healthy state, the pulsations of the heart will not be as distinct, will be more intermittent, repulsing the hand when applied to the chest, and producing a peculiar vibratory sensation. Upon auscultation the bellows sound will be heard, making one of both of the first sounds; and the percussion of the heart will be augmented. In extreme cases, a metallic tingling is heard, resembling the sound produced by dropping sand into a bell of metal. The pulse as felt at the wrist will not always accord with the beatings of the heart; often when the latter are very forcible, the former will be found small, and the frequency increased; this indicates some obstruction to the free passage of the blood from the heart, notwithstanding the forcible contractions of that organ to propitiate, and the patient will exhibit symptoms of general chilling of the whole body, a state of countenance, restless tossings of the body, dizziness of the sight, and faintings; if the obstructions in the right side of the heart are extensive, as they often are from fibrous contractions, thickening of the valves, and other causes, and the valves, the venous circulation will be affected, as indicated by the livid bloated state of the countenance, and serious effusions into the extremities; various apoplectic symptoms seem to be sometimes induced by the same cause. The breathing is not affected generally beyond a sense of oppression, unless a considerable impediment is experienced by the circulation, but then the distress and restlessness of the sufferer is often extreme, accompanied by an inability to lie down, and a state of alarm and wandering amounting almost to delirium.

The causes of this serious malady are similar to the causes of pericarditis, and the treatment, which should be actively and methodically, must be deferred if the practitioner be desirous of saving his patient.

In giving this slight sketch of endocarditis, allusions have been made to effects produced by obstructions to the circulation of the blood, and the obstruction as well as obstructions, are not only caused by stagnation of the blood at the time of death, but also by inflammation of the internal lining membrane. This membrane is also often thickened, especially at the orifices of the valves; and after the death of the patient should there be a large effusion of the endocarditis, the valves will not merely be thickened, but will become the seat of a variety of warthy excrencences, or even cartilaginous and osseous formations of considerable size, extending into the cavities of the heart. This constitution
is most frequently met with in old persons, and especially those who have been addicted to a too generous mode of living. The morbid sounds produced by these obstructions at the various passages will resemble those of the bellows of a fife, or saw, according to the degree of the obstruction; and sometimes a triple or even a quadruple sound will be perceived instead of the two normal sounds. The effects of these and the suppurative adhesions in the pericardium and in the parietes, are analogous to the phenomena of tonic convulsions, oppressions of the breath, apoplectic seizures, and other symptoms of embarrased circulation.

Ruptures of the Heart.—Ruptures are sometimes found to be caused by any of the valvular and muscular masses within the heart, but also in its parietes. The effect of such injuries will depend upon their extent and situation. A valve or one of the bundles of muscular fibrine, if removed through the coronary mucous membrane with consequent loss of its free circulation, will tend to dilate in proportion to the extent of the obstruction, and this dilatation may end in rupture. Under such circumstances some violent exertion as a provoking cause of the parietes by absence will greatly promote the rupture.

Persistence of the Foramen Ovale.—It is by no means very uncommon to meet with cases in which the opening becomes imperfect to the lungs and heart, which has not been properly closed up at the time of birth. According to the extent of the communication thus remaining, a smaller or less proportion of venous blood will pass into the lungs than would be the case with red blood circulating through the arterial system. The arterial blood being adapted to produce in the animal economy certain effects and changes necessary to life, and the blood of the veins being unable to produce these effects until it has in its turn been submitted to the action of air in the lungs, the health of every individual in whom the mixture of arterial and effete blood occurs will suffer in proportion to the extent of that mixture. The symptoms of this disease are blueness of the skin, lips, and nails; a temperature of the body below that which is natural and healthy; shortness of breath, palpitations, faintings, a sense of suffocation induced by slight exertion, and proceeding in the young by intermitting apnoeas, and in the adult by alternate respiration, and by pale and sunken cheeks, caused by anæmia, or by other symptoms of blood lost or blood stagnant. This disease has from the colour of the skin been named 'blue disease,' "morbus caeruleus," or 'cyanosis.' The persistence of this opening between the two auricles is not the only thing through the most frequent cause of this disease; sometimes the partition between the two sides of the heart is ruptured or ulcerated through, and at others the duct communicating between the aorta and pulmonary artery has remained unclotted; indeed any anormal state of the cavities of the heart, or of the great vessels proceeding from it, which gives rise to an excessive adstrution of venous and arterial blood, will produce the same effects. Hydroperpyosis of the right side of the heart, with or without dilatation, and contraction or constriction of the orifice of the pulmonary artery, and of the right auriculo-ventricular opening, frequently occur at the same time with persistence of the foramen ovale, and increase all the painful symptoms produced by it. Little can be said in this state of treatment can be done in these cases, but every cause of excitement should be carefully avoided, and during the attacks of suffocation and faintness small doses of diffusive stimulants, as ether and ammonium, may be advantageously employed.

Nervous Diseases of the Heart.—The last class of diseases affecting the heart which remains to be noticed differs from all the previous in not requiring any organic changes. They are met with chiefly in women suffering from anaemia, chlorosis, hysteria, and other nervous symptoms: and in men in whom a naturally nervous temperament has been rendered more irritable by the free use of stimulii or by depressions of the mind and body of the patient are restored to their healthy condition, but it must be borne in mind that the heart is essentially a muscular organ, and by severe exertion it may be increased in bulk like other muscles; consequently if these nervous states which give rise to so much disturbance of the heart be not removed, they may in process of time lay the foundation for more permanent and serious disease.

HEARTSEASE, or PANSY, is the cultivated state of the plant called Viola tricolor by botanists, improved by crosses with V. altaica and other allied species.

Several hundreds of beautiful varieties are now common in gardens. Although they will all grow in almost any kind of soil, yet, in order to bring the finest sorts to any degree of perfection, a loam, mixed with sand, and highly manured, is absolutely necessary. By proper treatment they may be had in full flower at two different seasons—from April to June, and from August to October. The ground chosen for the first planting should not be fully exposed to the mid-day sun, as the plants are liable to be scorched by it, should be open to the east or west; and should be free from ground fully exposed, as the influence of the sun is not so powerful as to injure them at the latter season of the year.

The original species from which all these varieties sprang are easily propagated; but the larger and finer of the finer sorts, which, as in animals and in other plants, the higher they are bred, and the finer the kinds, are in proportion difficult to keep in health. The principal causes which affect them are excessive heat in summer, and wet and cold in winter. They are however propagated and only require to be looked over frequently, when, if any of them are found damping or decaying at the bottom of the stem, the top must be taken off, and strung. When there is danger of losing saturation, and the flowers in winter, the best way is to strike a quantity in autumn, and to place hand-glasses over them until spring; at that time which those which are alive may be soon multiplied in abundance.

Where fine large flowers are wanted, the plants should always be struck from cuttings the same season, and grown rapidly. In striking them, artificial heat is altogether unnecessary if the necessity of propagation is performed early. All that is required for the purpose is a small hothouse to place over the cuttings, and a mat to shade them during bright sunshine. After they are well rooted, they must be taken carefully up, and planted in a bed previously prepared for them. They will then flower in great profusion from April to June.

At this period other plants must be propagated for the autumn flowering: they must again be kept in a shaded situation, until the intense heat of summer is over, when advantage must be taken of dull rainy weather for planting them out in beds, where, if the soil and situation be good, they will soon flower, until destroyed by frost.

Varieties of Viola are obtained from seed. In order to have them fine, considerable care is requisite in selecting the seed. It must always be gathered at those seasons when the plants flower in the greatest perfection, and from the best formed and largest blooms, the seeds contained to these blooms. They will then flower in the early part of the season, from April to June, or in autumn, after the greatest heat of summer is past; at other seasons the flowers are smaller, and it is found that this induces a stunted plant. They flourished in spring, in light soil, with the protection of a cold frame. When the plants are very young, they must be removed from the frame, and planted thinly under hand-glasses, where they are sufficiently strong to be planted out in the flower-garden, and when very slighted they must have plenty of water, and no carelessly soaked during bright sunshine.

Like all other florists' flowers there are certain characteristics
which are deemed indispensable to the formation of a good bloom. Mr. Gorrie (Gard. Magazine, vol. viii., p. 573) thus defines it—Large and round petals, the flower forming nearly a circle, not much undulated—(1 inch across is large enough, but some are broader); colours brilliant, distinct, and permanent; eye rather small, and not deeply pencilled; flower-stalk strong and upright; and the stigma filling the open part of the eye.

It is difficult to conceive that this Poison has, that is, a determinate time and place of emission, when the temperature from heat emitted, can have any temperature peculiar to its locality; in fact, that vacuum can possibly have any proper heat.

But though the general theory of the free emanation of heat and light are similar, those of their transmission through substances are very different. When a metallic body is but a little heated in a fire, we have heat unaccompanied by sensible light; but on a certain day the solar rays the light, though originally transmitted from the sun, arrives at our planet without any sensible heat, even when collected in the focus of a burning-glass. Again, a plate of glass placed before a common fire will intercept the heat until it becomes itself sufficient heated to radiate heat; whereas the other source of heat is more intense, a small portion will be directly transmitted; while for the solar rays we find the heat is transmitted as well as the light. It is still more remarkable that when the rays are decomposed by transmission through a glass prism, the differently coloured rays of the spectrum have each a different intensity of heat, the least refrangible possessing the greatest portion; the greatest heat is found at the centre where the extremity red rays, or even a little beyond them.

Not only may radiant heat be collected in a focus by reflection through a lens, but also by refraction from a polished metallic object, such as a polished concave mirror. If we place such a mirror facing the disc of the sun, the heat from the mirror will be focused in the focus of the mirror, and a heated body be placed in the focus of one, and a thermometer in the other, the reflected heat falling on the bulb of the instrument will cause the mercury to rise; and conversely, a colder body will make the column of mercury descend, for the presence of radiant heat is ascertained from the thermometer. Recent experiments on heat show that the analogy of the laws of heat and light extends even to polarization.

The experiments of Leslie have shown how greatly the quantity of radiant heat may be affected by the state of the surfaces from which they finally emanate. The method adopted by Leslie for examining the powers of radiation possessed by different substances was very simple and ingenious. Having employed the system of two specular surfaces above mentioned, he placed a tin canister filled with hot water in the focus of one, and a differential thermometer in the other. If these sides were respectively covered with lamp-black, paper, and glass, and all turned so that the specular reflection be from the thermometer, the experiment tell 12°. Thus it appears that polished metallic substances are bad radiators, which may be attributed to the internal reflection of the heat from their surfaces, for the sources of radiation must evidently be at some small depth below the geometrical surfaces. A similar apparatus served to measure the absorptive power of different substances, by covering the bulb of the thermometer uniformly as with an envelop of the substance to be examined; this power is thus found to be nearly in proportion to that of radiation. The experiments of Poisson have shown that this reflected heat was not however in the strict geometric focus, but, in consequence of aberration, it was found to be a little beyond it.

The power of radiant heat is certainly the most universal mode of its propagation between different particles of matter as well as through considerable spaces. However, it is usual, for greater simplicity, to designate this propagation through solid bodies as propagation of heat, and through a vacuum as emanation. Poisson has shown that the subject of the general equations which express the law of the distribution of heat in solids may be derived from the internal radiation of the particles which compose them. Whichever of these views may be correct, we are left in the present state of our knowledge with no distinctions between different homogenous substances, viz. their conducting powers internally and externally. If we
take two substances, as a piece of metal and of wood, at the same temperature as indicated by the thermometer, when held in the warm hand the metal will feel colder than the wood, the heat of the hand being more rapidly absorbed by the metal, as being the better conductor of heat. Or if we place the extremities of a rod of copper and of glass in a fire, and hold with the hands the other extremities, the heat will be found to ascend rapidly through the metal and very slowly through the glass rod. Though this plain observation give a general idea that bodies conduct heat differently, yet, to obtain exact measurements of conducting powers, it will be necessary to have a more precise idea, since such power is a constant coefficient belonging to every particular substance, and it is known with which it would be impossible to compare the result of theory with observation.

Newton remarked that, when two substances of unequal temperatures were placed in contact, the colder received from the other in a given small time a quantity of heat proportional to the difference of their temperatures. This simple law has recently been found not strictly correct, but is sufficiently so when the difference of temperatures is inconsiderable. If \( t' \) represent the temperatures of two bodies of the same natural place in contact, and if we leave out of consideration the heat escaping by radiation from the surfaces, the quantity of heat communicated by Newton's law, be represented by \( A (t' - t) \); where the coefficient \( A \) is a constant peculiar to the given substance, and is proportional to the interior conducibility.

The theory of the distribution of heat is founded on the principle that when a body has arrived at a permanent state of temperature the quantity of heat given out by any particle to the adjacent colder region must be equal to that received from the warmer particles near it, and conversely. For example, suppose a solid body to be contained by two parallel planes of indefinite extent, the lower plane being preserved by any means at a uniform temperature \( T \), and the upper plane at a uniform temperature \( t' \). In this case it is easily seen that the temperature would be uniform in any section of the body parallel to its bases, but would increase from the lower plane in an arithmetical progression to the upper, for with the temperature of each point of the body taken in the transverse direction will differ by equal quantities from the temperatures of any two points which are at equal distances, the one above and the other below it; hence the flux of heat from the warmer region to this point is equal to that from this point to the colder. Though there is therefore a constant flux of heat from the upper to the lower plane, the distribution of heat has then acquired a permanency.

In the above instance we have had no regard to the external conducibility through the sides by supposing the planes of indefinite extent. A simple instance will now be adduced in which we can show the manner in which this conducibility is introduced into the calculation. Suppose a thin cylindrical rod to be placed in a medium of which the temperature is constantly zero, while its extremities are maintained at constant but different temperatures; in this case the heat will follow the rod, the temperature increasing from the colder extremity to the hotter, for on this supposition the heat which would be retained by any section of the rod, would depend on the difference of its temperature with that of the surrounding medium.

The propagation of heat in liquids depends very little on any communication by contact. If we place a heated plate on the surface of water in a vessel, but so as not to touch the edging, the thermometer placed in the water will indicate the temperature of the water by the alteration of temperature; liquids are therefore heated by the transposition of their parts. Thus, if with a blowpipe we apply heat to the bottom of a vessel containing water, in which are floating some small particles of dust, a current will be perceived which will be that of space from the point to which heat has been applied, and another descending current of the colder parts, which being heated in turn rise also; in this manner the heat is distributed through the whole liquid, for as the heat expands the particles of liquid which it first meets, they become specifically lighter than the adjacent fluid, and they must therefore ascend by the laws of hydrostatics, while the heavier take their places. Litter water would be similarly disturbed, but is probably much less, if any; but there would be great difficulty in establishing this experimentally. The effect of heat on gases is to increase proportionally their elasticity, and the temperature of the globe is probably that of its conducting parts, so that the whole shorty acquires a uniform temperature, when other forces, such as gravity, are not taken into consideration, and when the bounding surfaces are not essential. There is nothing subject to these limitations.

These are the properties of the distribution of heat exist in our globe, and are the cause of important phenomena in the distribution of climate.

The first great mass of the earth, considered in reference to its geographical location with respect to the external source of heat in radiation principally from the sun. The maximum quantity of this heat is bestowed on the region between the tropics, while the poles are at a temperature which, but for the action of the sea and the mountains, would be the same for the entire earth. Hence, the heat would ascend uniformly and be dissipated or lost by radiation, but the necessity of flowing a certain quantity of heat, by collecting in the lower strata is a necessary condition of the distribution of heat upon the earth. If we assume that the temperature of the earth is not uniform, but subject to uniform fluctuations, it is evident that the earth is a system of great extent, and has its own peculiar temperature and distribution of heat which is a compound of that of the sun and that of the earth.

Thus we see that the propagation of heat takes place in a manner which is not only unimportant, but which is of great practical advantage in the arrangement of heat in the world, in the case of bodies, and in the case of the earth's surface. The temperature of the earth is a compound of that of the sun and that of the earth, and the temperature of the earth is determined by the temperature of the sun and the temperature of the earth. In a similar manner, the temperature of the earth is determined by the temperature of the sun and the temperature of the earth.

Thus we see that the propagation of heat takes place in a manner which is not only unimportant, but which is of great practical advantage in the arrangement of heat in the world, in the case of bodies, and in the case of the earth's surface. The temperature of the earth is a compound of that of the sun and that of the earth, and the temperature of the earth is determined by the temperature of the sun and the temperature of the earth. In a similar manner, the temperature of the earth is determined by the temperature of the sun and the temperature of the earth.
212° Fahrenheit, the waters now occupying the bed of the sea, being in a state of vapour, could have filled no more than about one-twelfth of the entire surface of the earth; but the greater cold would necessarily convert the vapour in the upper regions into water, which, descending in rain, would be again vapourized, and this reciprocal action acting on the surface, the process of freezing accelerated by Laplace, in which an internal chamber of a box is preserved at the temperature of melting ice, being constantly surrounded with that substance, guarded against the contact of the air: in a division of this chamber, a cell finished with a stop-cock, a body is plunged at any temperature, and remains until it ceases to melt the ice, when the quantity of melted water conducted through the stop-cock is taken as a measure of the quantity of heat given out by the body.

This instrument is of use in determining the specific heats of substances, and the calculation of latent heat; but this subject more properly belongs to heat regarded relatively to its chemical effects. For the measurement of high temperatures the place between the melting surface and the surface of the earth.

The dilatation of substances by heat is nearly proportional to the increase of temperature, except when they are about to change their physical or chemical states; thus water near the boiling point, and substances in the gaseous state, have a much more readily to be diminished, which is probably owing to the different arrangement assumed by its constituent particles preparatory to crystallization. From the experiments of Dulong and Petit, the pure gases appear to afford the most striking proportionate expansions, and to correspond to mercury between the freezing and boiling points.

Water and alcohol, when near boiling, have very irregular expansions; and crystals, when finely unequally in size and exposed to their different axes, the slow propagation of heat in glass causes very unequal expansions, and consequently fractures. In gases the law of Gay-Lussac is very simple; their expansion (even when containing vapour) is 0.373 of their volume at the freezing-point, when their temperature is raised to the boiling-point; and is equable during the interval.

Experiments by Fresnel, Trevelyan, Powell, Forbes, and others, have greatly tended to prove a contrast due to the heat exists between particles at small distances. If a heated poker be laid slantingly on a block of lead at the ordinary temperature, it will commence to vibrate, first slowly and with a motion similar to that of a musical note, which continues for some time, at the termination sometimes changing to an octave. Though a different hypothesis may partly explain this circumstance, yet the number of phenomena of a similar nature has caused later years render the hypothesis of repulsion extremely probable.

The following table gives the dilatation of a unit length of different solids from the freezing to the boiling point, and is meant taken from several observers:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Expansion at 0.373</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass tube</td>
<td>0.0083</td>
</tr>
<tr>
<td>Crown glass</td>
<td>0.0089</td>
</tr>
<tr>
<td>Platinum</td>
<td>0.0093</td>
</tr>
<tr>
<td>Palladium</td>
<td>0.010</td>
</tr>
<tr>
<td>Cast iron</td>
<td>0.011</td>
</tr>
<tr>
<td>Steel</td>
<td>0.012</td>
</tr>
<tr>
<td>Do. Tempered</td>
<td>0.012</td>
</tr>
<tr>
<td>Gold</td>
<td>0.015</td>
</tr>
</tbody>
</table>


day any salt to water at common temperatures they will combine and the salt will be dissolved as long as their mutual affinity exists at the degree of heat employed; but if we increase the temperature we augment the affinity, and thus it is that most salts and other substances are more soluble in hot than in cold water, the increased affinity subordinating as the temperature falls: this however is true of fixed bodies only, for gaseous substances, such as ammonia and carbonic acid, are much more soluble in cold than in hot water, and at high temperatures the gases are totally expelled.

In the above cases of solution of salts in water, heat merely increases affinity, but is not requisite to the production of chemical action; if we ever mix oxygen and hydrocarbons in gases, they are decomposed by heating; but for any length of time, unless heat be applied to them, and they then readily combine, with the formation of water.

In other cases, as those of some solids, it is probable that heat increases affinity only by rendering the bodies fluid; thus lead and sulphur do not combine at common temperatures, but if we render them fluid by heat, they readily unite; whereas mercury being a fluid metal, although there is no reason for supposing that its affinity for sulphur is greater than that of lead, yet when triturated at common temperatures with powdered sulphur readily combines with it.

Again, some metals unite with oxygen at common temperatures, especially if moisture be present, but there are others which require the application of a considerable heat before the face of their oxygen to form a metallic oxide: the iron and copper, which are capable of forming a metal which is resistant to the fire, when heated, but not to be melted, are the most notable combination to take place between them; but tin and lead at common temperatures are but little acted upon by exposure to oxygen gas, but if we heat them in it, the oxides of these metals are readily and completely formed.

There are some gaseous compounds which can scarcely be procured by the direct action of heat on their elements: this oxygen and azote do not unite, even when strongly heated, so as to form nitrous acid, or if they are heated in a mixture of oxygen and nitrogen, the latter is liberated; but the heat which accompanies the electrical spark seems capable of producing this effect. On the other hand, ammonia cannot be obtained even by the heat so generated, when the gases are mixed together in a closed vessel; although the instances are not so numerous, yet there are many cases in which heat by direct action and without the aid of any intervening affinity is capable of decomposing compounds; thus when ammonia is heated in earthen tubes it is resolved into its elementary gases, by the mere action of the heat, unaided by any affinity between the gases and the material in which it is heated. With water the case is different; it is not decomposed by heat, unless exposed to some chemical change capable of affecting it, so that when its vapour is passed through an ignited earthen tube it suffers no change; but if we substitute an iron one, then this metal at a high temperature takes its oxygen and carbonaceous properties.

In other instances heat is capable of decomposing compounds when they consist of two substances of very different degrees of volatility: thus when sulphate of ammonia is heated the alkali is expelled and the acid left; but when the volatility is nearly equal they then rise in combination: this is the case with muriate and carbonate of ammonia.

Heat has also great power in modifying as well as in causing chemical action, and different degrees of it produce very opposite effects in some cases. If we heat mercury to about its boiling point, the air, it becomes peroxide; but if we expose this product to a higher temperature than required for its formation, it is then again resolved into metallic mercuric oxide and oxygen gas. At common temperatures sulphur retains three equivalents of oxygen, and does not yield even one equivalent to copper; sulphuric acid is constituted of the same numbers of equivalents, and on putting a piece of copper on the degree of heat employed; but when the mixture he heated the order of affinity is to a certain extent reversed; the copper takes one equivalent of oxygen, and becomes black oxide, while the sulphur united with the two remaining equivalents of oxygen is expelled in the state of sulphurous acid gas.

It is impossible to refer to or peruse any account of a chemical investigation without perceiving the important and widely extended range of the chemical experiments from which we have selected a very few, and those perhaps not the most striking cases, by which this subject might have been illustrated.

HEAT OF VEGETABLES. That plants posses a temperature higher in winter than that of the air which sur-
HEBERDEN, WILLIAM M.D., was born in London in 1710. After the war he went to St John's College, Cambridge, of which six years afterwards he was a Fellow. He studied medicine in Cambridge and London, and after taking his degree practised as a physician, and delivered an annual course of lectures on materia medica and the diseases of the throat, at the Royal College of Physicians, and soon after left Cambridge, and commenced practising in London, where he at once met with the greatest success, and obtained the highest reputation. As his health declining, he gradually withdrew himself from his profession to retirement in Windsor, where he died in 1801. In 1760 he was elected a Fellow of the Royal Society, and in 1768 an associate of the Royal Society of Medicine in Paris.

It was at the suggestion of Dr. Heberden that the publication of the Medical Transactions of the College of Physicians was commenced. He contributed many valuable papers to the first volumes, which appeared in 1766, and to two succeeding volumes: among them may especially be noticed his paper on the Angina Pectoris, a disease not previously described, and that on the Chicken-pox, which he first distinguished from the Smallpox. He contributed also some papers to the Transactions of the Royal Society; but his principal work was the 'Medical Commentaries,' which he wrote in 1784, and which was published after his death. The value of these Commentaries lies in the practical experience, and was compiled from observations which he had always been in the habit of writing by the bedside of his patient. It was written in very elegant Latin, and records such sound evidence of an accomplished and observing mind, and of a great deal of knowledge. (Memor prefaced to the Commentaries.)

HEBRADENDRON. This is a new genus of the natural family of Guttiferae, established by Professor Graham of Edinburgh. The stem from which the reference was made from Garcia. Under the article Gamboge, the two commercial varieties of this substance, known by the names of Ceylon and Siam gamboge, were mentioned. The plant yielding the Siam gamboge is a very strong and useful one, but it is less certain that the gamboge made out, that producing the latter is still unascertained.

The gamboge of Siam is in cylinders, either solid or hollow, usually called pipes: it is supposed to have this form from being so rolled, or from being pounded in the hollow of bamboo, according to Lieutenant White, in his 'Visit to Cochinn China.' It is usually of the best quality, but Mr. Purein has shown that some very impure is occasionally in the form of pipes. As this gamboge is usually exported from Singapore, it has been doubted whether it was actually the produce of Siam; but we have specimens from Mr. G. Swinton, which were sent to him direct from Siam when he was chief secretary of the Indian government, as the produce of the Emperor of Cochinn and the Rice Kak-soo. This pipe gamboge of commerce. The only information respecting its preparation which we possess is that given to Kurnig by a Catholic priest, who officiated as such to the Catholics of Cochinn China, and who stated that the insipid juice was obtained from the breaking the leaves and young shrubs, as well as the fragrant linal oil, as is given as a tribute to the king of Siam by the Christians residing there. The tree must therefore be common, and probably near inhabited places, and therefore very likely to be Ocymoporus cochinchenis of Loureiro (now referred to the genus Garcia), who names it from its acid fruit, and describes it as cultivated in Cochinn China. The Chinese Gamboge is not the same variety of this plant as this in the form of its leaves from Mr. Malcolmson, collected by him in Rangoon, which he thought might be the gambog plant, as it contained a yellow purgative juice in the resin of its flowers. Dr. Graham thinks that the Siam plant may be a nearly allied species of the same genus as the Ceylon plant.

The Ceylon gamboge is usually considered inferior; that which forms the article of commerce no doubt is so, as we have been informed by one of the planters of Ceylon that finding the gamboge there very cheap, he had been induced to purchase and send it to England, but had not been able to sell it from its inferior quality. No doubt however we have no idea whether they contain the same active principle, the tree which has been called Heberadendron cambogiazeis, and Mrs. Colonel Walkor describes it as 'brilliant and excellent,' and 'as good for water-colour drawings as any she ever used.' Dr. Graham ascribes its inferiority to want of
care in preparing the article for market; though it is yet
doubtful whether the Ceylon gamboge of commerce is all
yielded by this tree; but Mrs. Walker on one occasion, in
passing through a forest of these trees, saw all of them with
the bark cut off in various places. Dr. Christison has shown
that there is all but an identity of composition with that of
Siam; and its medicinal effects are precisely the same as
observed in Ceylon by Dr. Pitsarm, and by Drs. Graham and
Christison in Edinburgh.

This plant, though new named, is far from being new. Dr.
Graham considers it to be identical with the Carapulu of
Herman, the Cambogia gutta of Linneus, the Gaviaria
Morella of late authors, and the Stalagmites cambogioideae
of Moon’s ‘Catalogue of Ceylon Plants.’ The last name
might have been retained, as it was originally intended for
it, had it not been discovered by Mr. Brown that the speci-
cmens in the ‘Banksian Herbarium’ collected by Kunning
and from which Murray’s character of the genus and species
was established, consist not of one, but of two distinct plants,
the flowers of Xanthochymus ovalifolius being stuck by
sealing-wax upon a branch of what appears to be this Cey-
lon plant. The genera Stalagmitis and Xanthochymus are
therefore one genus, as was previously inferred by Cam-
bessedes, who has retained for it the former, as the prior
name.

The genus Hebradendron has dioecious flowers; the male
having the calyx membranaceous, four-sepalated, persistent;
corol four-petalled; stamens monadelphous; column fouri-
sided; anthers terminal, opening by the circumscision of a
flat and umbilicate terminal lid. The inflorescence of the
female tree is similar to that of the male, the flower white
and a little larger, with a germen precisely in miniature of
the fruit, and surrounded (like it) with several (ten?) abor-
tive stamens. The berry is many (four) seeded; cells one-
seeded, surrounded at the base with some free abortive
stamens, crowned by a lobed and muricate sessile stigma;
cotyledons fleshy, united; pedicle central, bifid; trees with
entire leaves.

The species called H. cambogioideae forms a moderate
sized tree, with the leaves obovate, elliptical, abruptly sub-
acuminate; the male flowers clustered in the axils of the
petioles, on short, single-flowered pedicels; sepals yellow
on the inside, yellowish-white externally; petals yellowish-

white, red on the inside near the base; berry about the size
of a cherry, round, with a firm reddish-brown external coat,
and sweet pulp; ripe in July. It is called in Ceylon auna
(estable) Gorak. G. cambogia is called by the same name.
The gamboge is used by the natives both as a pigment and
medicinally. Mrs. Walker describes it as being collected by
cutting pieces of the bark about the size of the palm of
the hand early in the morning. The gamboge comes out in
a semi-liquid state, but hardens on exposure to the air, and
is scraped off by the collectors next morning.

This tree is found in various parts of Ceylon, but not very
abundantly near Colombo. In a tour through different parts
of the island, Mr. Walker found the tree on the northern
branch of the gamboge tree several times in forests distant from the
habitation of man, which proves the tree to be indigenous.
Colonel Walker writes to Dr. Wight, that it is found in
abundance along the western and eastern coast in the
neighbourhood of Batticaloa; but it also grows inland, where
it could not have been planted by the Dutch. Its favourite
abode seems to be low sandy ground, as about Kan-
derneru, Negombo, and towards Gbach; also, 100 miles in
land, at so high an elevation as 2000 feet above the sea.

The Sepalea elliptica, a native of Sihet, and G. pictoria of the
Wynaad district, are thought to be other species of this
genus.

We are indebted to Dr. Graham’s papers in the ‘Com-
pании to the Botanical Magazine’ and the ‘Edinburgh
Philosophical Journal,’ and to Dr. Wight’s letters in the
‘Madras Journal,’ for most of the above information; and
to Dr. Lindley and Dr. D. for a specimen.

HEBREW LANGUAGE forms a branch of that ex-
tensive family of languages which are known by the name
of Semitic; a name which is derived from the real or sup-
posed descent of the people who speak these languages
from Shem the son of Noah. The Semitic languages may
be divided into three branches: the Arabic, to which the
Ethiopic is closely allied; the Aramaic, consisting of two
dialects—the Babylonian or East Aramaic (sometimes but
erroneously called Chaldee), and the Syriac or West Arama-
ian; and the Hebrew, to which the Phænician and Punic are
closely related. Of these languages the Arabic is the most
commonly spoken in the Arabian peninsula and least
developed; the Hebrew holds an intermediate rank between
those, being more perfect than the Aramaean, and inferior
to the Arabic.

The Hebrew language derived its name from the He-
brans, who date their origin from Abraham, who is called
‘the Hebrew’ (יִשְׂרָאֵל) in gen. xiv. 13. The etymology
of this word is doubtful. According to the Jews it is derived
from Eber (ארעכ), an ancestor of Abraham (Gen. x. 24,
25; xii. 15); but Gesenius and many other critics maintain
that Eber cannot be regarded as a historical person, and
that his name has been invented in the same manner as the
names of Ion, Dorus, Jolus, &c., by the Greeks, to ac-
count for the origin of the people. It has been explained
with some probability that the name of ‘Hebrew’ was orig-
inally applied to designate all the Semitic nations west of
the Euphrates, which appear to have emigrated from Mes-
opatamia. According to this etymology, the word ‘Hebrew’
is derived from the root יִשְׂרָאֵל, ‘to pass over.’ This ap-
pears to have been the opinion of the translators of the Sep-
tuagint, who render Gen. xiv. 13, ‘Abram the Hebrew,’
by Ἰφραμ ἡρὼ περάσω, that is, ‘Abram, the passer-over.’
All the descendants of Abraham were, according to this
view, originally called Hebrews; and the name was only
reserved afterwards to the inhabitants of Pa-
ladistic. (See Ewald’s Hebraic Grammar, § 3; and Ge-
seenius, Hebrew Lexicon, unter יִשְׂרָאֵל). This name is
never applied to the language of the Hebrews in the Old
Testament; in Isaiah, xix. 16, it is called the language of
Canaan (אֲמִילִים יִשְׂרָאֵל); and in Is. xxxvi. 11, 2 Kings,
xxvii. 26, 2 Chron. xxxvi. 16, and Neh. xiii. 24, the Judaic
or Jewish language (הָנָעָר). The language spoken in
Palestine in the time of Christ is frequently called Hebrew
דַּרְכָּם (Deuteronomy) in the Old Testament; xix. 13; and
Acts, xxii. 40; xxii. 2; xxxi. 14); by which the Aramaean
is probably intended. In the writings of the Rabbinical
Jews the Hebrew is generally called the ‘holy language’
(בֵּית הָנָעָר). N 2
The Hebrew language appears to have been formed in Palestine by a union of the ancient Aramian, which was brought by the Abrahmites from Mesopotamia, with the Phoenician or Canaanith, the language of the original inhabitants of the country. That the Phoenician and Hebrew languages were very closely allied is evident from the Phoenician or Canaanitic and Hebrew sources of the Phoenician language which we possess in coins and inscriptions. (Bochart, Geographia Sacra, b. ii. cc. 1-7; Bellerman, Handbuch der Bibl. Lit., vol. i. sect. 55; Bellerman, Beiträge zur Erkernung der antiken syrischen Sprache im Ptolemes des Ptolemes Dessen, De Phoenic et Punicorum inscriptionibus, Berl. 1810; Dessen, Bermerk. über Phönizische und Punische Münzen; Gesenius in an Exeget. zu der Hebr. Sprache, p. 387; and Hymde's Geschichte der Heb. Sprache; Gesenius, Verruch über die Maltheisische Sprache, 8vo, Leipz., 1830, and Palographische Studien über Phöniz. und Punische Schrift, 8vo, Leipz. 1832.) The long settlement of the Hebrews in Egypt, and their forty years' wandering in the wilderness, must have bad an important influence upon their language; but the number of Egyptian words received into it appears to have been small. Many critics have divided the history of the language into four periods: I. From Abraham to Moses. II. From Moses to Solomon. III. From Solomon to the Babylonian captivity. IV. From the Babylonian captivity to its final extinction. The latter two periods are in the only two periods in which any difference can be traced in the language; the first extending from the time of Moses to the reign of Hezekiah, and the second from the reign of Hezekiah to the dispersion. The language in which the Pentateuch is written differs so little from that of David, Solomon, and Isaiah, who lived many centuries after the time of Moses, that many critics, supposing that the laws should have been maintained stationary for so many centuries, have maintained that none of the books of the Old Testament were written previous to the time of David and Solomon. It is not easy to discover this opinion has no marks of Zwischenzweife to the subject worthy of attention. He observes in his 'Hebrew Grammar,' § 7 (Eng. trans.), that 'the Hebrew language in the first four books of the Pentateuch, which contain records of unquestionable antiquity, partly by Moses, or from this time, appears already, a few minutes excepted, fully developed.'

From Moses until about the year 700 it underwent two changes: for as the structure of the Semitic language is in general so simple, so that it is changeable, as is that of languages of greater development, as Sanskrit, to which it is to be added, that in that period the Hebrews did not experience those influences which materially affect a language. According to the general advancement of civilization, we should have supposed the exiled Jews who had been long subjected to nations of foreign tongue, and lived almost entirely separated from all nations, especially from nations of foreign language. Their language advanced considerably and is still the most refined. They have therefore been subjected from that language in the sequel. There are however in those books of the Pentateuch some certain important differences which afterwards disappear, and many changes that of kind have become less distinguishable by us, because the modern punctuation has treated all words according to one standard, and that the standard of the language at a late period.

The study of the Hebrew language appears to have been greatly promoted by the schools of the prophets, who were found to have a wide interest in it, and it is to those schools that we are probably indebted for the lyric poems of David and the didactic and amatory poetry of Solomon.

The conquests of the Assyrians and Chaldeans from about a.C. 720 tended to introduce the Aramæan language into Palestine. It appears from Isaiah (xxxvi. 12) that the principal people in Judæa, even in the reign of Hezekiah, four hundred years later, still spoke the Aramæan colonies (2 Kings, xvii. 24), which were planted in the kingdom of Israel to supply the place of the Israelites who had been carried into Assyria by Sennacherib, must have caused the spread of the Aramæan language in the northern parts of Palestine even before the destruction of the kingdom of Judah. The long residence of the Jews in Babylonia after the destruction of Jerusalem by Nebuchadnezzar caused the extinction of the Hebrew as a spoken language, at least among the common people. After their return to Jerusalem, according to the edict of Cyrus, it appears from a passage in Nebuchadnevis (viii. 8), that the common people did not understand the Scriptures when read to them in the Hebrew language. But Hebrew continued to be spoken by the upper classes for a considerable time after the Babylonian captivity. The prophecies of Haggai, Zechariah, and Malachi, which were written at that time, are written in tolerably pure Hebrew. The inscriptions of the coins of the Macabees are in Hebrew; and the Hebrew language does not appear to have been discontinued in writing. The Talmud and other religious works till the sixth century, and the Romana, numerous schools were established by the Jews, in which their language and literature were taught. Of these schools the most celebrated were those of Tiberias and Babylon.

The Maimon, which contains the traditions of the Jews and interpretations of the Scriptures, is supposed to have been compiled in the latter part of the second or the beginning of the third century, by Rabbi Jehuda. The Maimon was considered from this period one of the principal works of Hebrew literature, and the Romans and Tiberians and Babylon wrote numerous commentaries upon it. These commentaries were at length collected into two separate works, and entitled the Jerusalem and Babylonian Talmud. The Babylonian Talmud was compiled in the third or fourth century, by Rabbi Johanan; and the Babylonian Talmud in the sixth century, by Rabbi Ascal. Each Talmud is divided into two parts, the Maimon and the Talmud. The Maimon is the text, which has been edited by Surenhusius, 6 vols. fol. Amst., 1698; the Babylonian Talmud was published at Berlin and Frankfort, 12 vols. fol. 1715; and the Jerusalem Talmud at Amst., 8 vols. fol. 1721. The Maimon and the Talmud are independent of the system of punctuation and accents which we have in the Hebrew Bible. This system, which no doubt represents faithfully the traditional interpretation of the Scriptures and pronunciation of the language by the Jews, is entitled Masora (masore), that is, 'tradition.'

It is uncertain how long the school of Tiberius lasted; but the Babylonian school was broken up by the Arabs, A.D. 640, after a long period of prosperity, when most of the scholars took refuge in Spain, where they founded schools in most of the principal cities. These schools produced a succession of writers; of whom the most celebrated was Moses Maimon, who lived at the latter end of the sixth century. After remaining in Spain for nearly four centuries they were banished by the Christians in 1492.

The Christians paid very little attention to the Hebrew language after the fall of the Roman Empire. The Buxtorfs in the seventeenth century tended to diffuse the language among Christians, but their works contained no philosophical views of the language, since they implicitly followed the opinions of the Masorets, The Graunt of the Schultern, which appeared in 1727, and which may still be consulted with advantage by Hebrew scholars, contained a much clearer development of the principles of the language than the Buxtorfs had given. His knowledge of Arabic enabled him to compare the forms of that language with the Hebrew, and thus to draw the attention of scholars to the important fact that the study of the cognate languages is necessary to obtain an accurate knowledge of the Hebrew language. For the convenience of the present century, which are enumerated at the end of this article, have done more to facilitate the acquisition of the language than the works of all preceding writers.

It appears probable that the language, which was divided both physically and politically into several parts, must have contained various dialects; but this cannot easily be proved, since almost all the Hebrew works were written in the tongue of Galilee and the northern parts of Palestine appears at all times to have inclined to the Aramaic; in the time of Christ, the Galilean dialect differed from the language spoken in Judæa (vii. 75). In the book of Judges (xii. 6), the pronunciation is distinctly distinguished; and many critics think that they can discover traces of the northern dialect in the song of Deborah (Judges, xxiv.

Few literary subjects have occasioned greater discussion
than the letters, vowels, points, and accents of the Hebrew language. But with regard to the letters it appears probable that the Hebrew alphabet, upon which the letters written were not employed previous to the Babylonian cap- tivity, but that the Phoenician letters were used, which are still preserved with a slight alteration in the Samaritan and Septuagint translations. In the Greek tradition, the present square characters, which belong to the East Aramaean lan- guage, were first introduced by Ezra when he revised the canon of Scripture; but they could not have been universal till Chaldaea, as the Targum of Jonathan, the Tanna- tateuch, which was not introduced into Samaria till after the Babylonian captivity, was written in the ancient char- acter, and the coins of the Assyro-Babylonian in the second century B.C., and there is no record that this work has been recently practiced. It is difficult to say when the change was introduced. It has been conjectured that the square characters were in use in the time of Christ, from his referring to the letter גא as the smallest letter in the alphabet; a fact which is true of the present Hebrew alphabet, but would not apply to the antient Hebrew or Phoenician alphabet.

It is a characteristic of the Hebrew language, according to the system of most modern Hebrew grammars, that the alphabet consists of consonants, and that the vowels are expressed by means of small points placed above and below the letters. The antiquity of these points has occasioned great controversy among the learned. Some have maintained that the Hebrew grammar was written without letters, and that both the points and letters were taught Moses by God himself; others, that the points were first introduced by Ezra when he transcribed the Scriptures in the present square character, and that the original alphabet consisted of three vowel points, א, י, and י, answering to the three letters N, V, Y, and that the present system of punctuation was not introduced till the time of the Masorites; but it is by no means certain whether this system was adopted by Gesenius, Winer, Ewald, &c. that the whole system of punctuation was first introduced by the Masorites, of whom some account has been given above, perhaps as early as the sixth century A.D., and which was adopted by the Saffarine MSS. without points, since they frequently give a different interpretation to the words from that which they must mean according to the present system of punctuation; and it is by no means certain that these letters were used by the ancients. The best arguments on both sides of the question are given in Buxtorf's "Tiberius, sive Commentarii Maiores," 4to., 1626, in which the antiquity of the points is maintained, and in Callelch's "Arcana Punctuationis revelatum," 4to., 1624, in which their anti- quity is denied. Further information on the subject will be found in most of the grammars which are mentioned at the end of this article. The system of accentuation de- pends on that of points, and was in all probability intro- duced at the same time. The accents mark the relation of one word to another in a sentence, and thus serve an impor- tant purpose in the syntax of the language. Many scholars have considered the accents troublesome; but one of the most eminent Hebrews of the present day remarks (Ewald, 'Hebrew Grammar,' § 642, Engl. transl), "We everywhere find a beautiful harmony between the accent and the sense of the words, and the reader can explain each other. Whether we set out from the syntax, and learn to comprehend it without knowing anything of the accentuation, or whether we proceed from the accentuation to the syntax, Schoede's 'Methodus Exegetica' always lead to the same results, so that he who thoroughly understands the syntax is for the most clearly possessed of the accentuation also, and he who understands the latter becomes throughout more easily at home in the former. This is however at the same time the best com- mendment of the accentuation." We must distinguish however the accentuation of the historical and poetical books. The remarks of Ewald apply only to the accentua- tion of the historical books. Many of the accents in the

Theological books serve the same purpose as those in the historical; but the greater part were intended to indicate the tone according to the Scripture which was read in the synagogue. The accents are explained with great clearness in Stuart's 'Hebrew Grammar.'

Further information respecting the Hebrew language and literature is given in Gesenius's 'Geschichte der Hebräischen Sprache und Litteratur,' 8vo., Halle, 1766; Köpp's 'Bilder und Schriften der Vorszeit,' 1820; Gesenius's 'Geschichte der Hebr. Sprache und Schrift,' 8vo., Leip., 1815; Loewy's 'De Sacri Poëticae Procerum Metris,' 2 vols., Leip., 1826; this work has been translated into English by Gregory; Herdt, 'Geist der Hebräischen Poëse,' best edition by Just, 2 vols., Leip., 1825; this edition has been translated into English by Bellermann, 'Versuch über die Metrik der Hebräer,' 1813; Saeßlschütz, 'Von der Form der Hebr. Poëse,' 1825, 2 vols., Leip.; the introductions to the Old Testament by Eichhorn, Jahn, De Wette, and Augusti; Harms, 'Hebrew Tales, selected and translated from the Writings of Ancient Hebrew Sages,' to which is prefixed an Essay on the Uninspired Literature of the Hebrews, 12mo., Lond., 1826; the article Buke, in this Encyclopædia.'

Grammars:—The following list is intended only to direct the attention of the student to the principal grammars.

Buxtorf, 'Thesaurus Grammaticus Linguae Sacrae Hebraeae,' 8vo., Basel, 1615; this work is taken from the Hebrew grammar of Ewald, and his system of the Hebrew grammar according to the Rabbinical System; Schultens, 'Institutiones ad Fundamenta Linguae Hebraeae,' 4to., Leyden, 1731; Robertson, 'Grammatik Linguae Hebraeae,' 8vo., Edin., 1785; this and the former are the principal works in original, which have been published in English, 3 vols., Leip., 1788; Gesenius, 'Ausführliches Grammatisch-kritisches Lehrgebäude der Hebr. Sprache,' 8vo., Leip., 1817; but his smaller grammar, forming the first volume of his 'Hebraistik,' has been translated into English by Bellermann, 8vo., Genêve, 1826, is also formed upon the Hebrew grammar of Gesenius. The grammars of Ewald contain the most philosophical exhibition of the language that has yet appeared: his larger grammar, entitled 'Kritische Grammatik der Hebräischen Sprache,' was published at Leip., 1827, 8vo. The writer of a review of this work in the 13th No. of the 'Journal of Education' remarks that 'the reader will not expect to find in the work the mere elements of the Hebrew grammar entirely different from those which were stated by the Buxtorfs, and by Gesenius and his followers in Eu- rope and America. The characteristics of Ewald's gram- mar consist in the spirit of analysis, which he adopts and in his attempts to refer the rules and their appa- rent exceptions to more general principles. But this laudable aim leads Ewald into a number of new conclu- sions, which in his Critical Grammar he pronounced authoritatively against his predecessors. The conjectures of Ewald were however generally supported by independent investigations.' A smaller Hebrew grammar was published by Ewald in 1826, which has been translated into English by Nicholson, 8vo., Lond., 1836. Lee's 'Grammar of the Hebrew Language,' 2d ed., 8vo., 1831, contains many excellent observations, but it is deficient in clearness of arrangement, and can hardly be recommended to beginners. Hurbz, 'Grammatik der Hebräischen Sprache,' 8vo., Lond., 1831, is well calculated for beginners, but it does not give a philosophical development of the language. Those who wish to use a small grammar will find the fol- lowing works useful: Schroot, 'Methodus Exegetica,' which has been frequently printed, and Hincks, 'Grammar of the Hebrew Language,' Belfast, 1832. In the schools and universities of Holland the following works are principally used: Schooten's 'Methodus Exegetica,' reprinted at Glasgow, 1824, 8vo.; and Reoeds, 'Grammatica Hebræa,' 2 vols., Leyd., 1834. Stier's 'Neuordnetes Lehrgebäude der Hebr. Sprache,' 2 vols., Leip., 1833, is said by the editor of the 'Journal of Education' to be the 'best work now extant in any language on the elements and what is usually called the etymology of the Hebrew language.'

Grammars without vocal points:—Böckh, 'Grammatica Hebrewæ,' 2 vols., Pariz, 1731; Parkhurst's 'Methodical

Lexicon-Buxtorf, 'Lexicon Hebraicum et Chaldacum,' 8vo. Basel, 1634; reprinted at Glassgow in 1824; Stock, 'Clavis Linguae Sanctae Veteris Testamenti,' 8vo., Jena, 1753 (best ed.); Winer's edition of Simocion Lexicon Manuale Hebraicum et Chaldacum, 8vo., Leip., 1826: the 4th ed. was published in 1842; and the 5th ed. in 1852, a most useful lexicon for beginners. Gesenius, 'Thesaurus Philologicocriticus Linguis Hebraeis et Chaldeis,' 4to., 1829-35, of which two parts have as yet only appeared. Gesenius's first work on Hebrew lexicography was entitled 'Hebraisches Deutsches Handwörterbuch über die Schriften des Alten Testaments,' 2 vols. 8vo., 1810-12, which was translated into English by Lee, 2 vols. 4to., London, 1825. In 1815 Gesenius published a smaller Hebrew and German lexicograph, which has gone through several editions, and formed the basis of 'A Manual Hebrew and English Lexicon,' by Gibbs, Andover, U.S., 1824; reprinted in London, 1827 and 1833. The most recent Lexicon by Gesenius entitled 'Lexicon Modularium Hebraicis et Chaldaicis,' 8vo., Leip., 1833, and has been translated into English by Robinson, Boston, U.S., 1836. Parkhurst's 'Hebrew and English Lexicon,' which was published originally in 1762 in 4to., and has been repeatedly reprinted for the use of those who are unacquainted with the vowel-points. A review of the most important Hebrew grammars and lexicons is given in Nos. 5, 11, and 13 of the 'Journal of Education.'

John's who are commencing their Hebrew studies without the assistance of a master will find the following works useful:—Leusden's 'Clavis Hebraicarum Veterum Testamenti,' 4to., Utrecht, 1683; Robertson's 'Clavis Pentateuch,' 8vo., Edinburgh, 1741; Wellcome at Nantes, 1664; By d'Agincourt, 'Lyra Prophetae,' sive Analysis critico-practica Psalmorum,' reprinted at Glassgow in 1823; Meiser's 'Novae Veterum Testamenti Clavis,' 8vo., Leip., 1869; Reay's 'Narratio de Josepho,' 8vo., 1822; Oliphant's 'Analysis of the Text of the History of Joseph, upon the principle of Professor Lee's Hebraic Grammar,' 8vo., 2nd ed., London, 1833; Greenfield's 'Book of Genesis in English-Hebrew; accompanied by an Interlinear Translation, Palaeographical Notes, and a Grammatical Introduction,' 8vo., London.

HEBREWS. [Jwva.] HEBREWS, EPISTLE TO THE, a book of the New Testament. The absence of the initiatory formula usual in the New Testament is the more surprising as the book is an epistle or a dissertation. But it contains allusions to particular circumstances, which prove it to be an epistle (v. 11, 12; vi. 9, 10; x. 33-34; xiii. 19, 22, 23). The general opinion respecting the persons to whom this Epistle was addressed is that they were the Jewish converts in Jerusalem or Palestine generally. This opinion, as Michaelis has shown, is supported by the contents of the book itself. (Murdie's Michaelis, vol. iv., pp. 193-7.) Others suppose it to have been addressed to the Jews of Asia Minor, and Dr. Neesdott contends for its having been written to the Thessalouins. Concerning the language in which the Epistle was written, the critics have been much divided in opinion, some supposing that it was written in Greek, and others that it was written in Hebrew and translated into Greek. The latter opinion was held by Clement of Alexandria, (who was written by Salvian, the Hebrew language for the use of the Jews, and that Luke translated it for the benefit of the Greeks); by Eusebius, and by others; and is strongly advocated by Michaelis. The former opinion is supported by Lardner, Macknight, Rosenmiller, Professor Hart, and most modern commentators. But the arguments on either side are far from being conclusive.

The author of this Epistle is equally uncertain. The general rule of tradition assigns it to the apostle Paul, and it has also been ascribed to Barnabas, to Luke, to Silas, and to Apollos.

In the first ages of the church it appears to have been generally considered as a production of the apostle Paul, though great doubts were very early entertained on the subject. In the Alexandrian church we have the testimony of Pantaenus (A.D. 180) to its Pauline origin, as well as that of Clement, in the passage quoted above, and in other parts of his writings. These testimonies are preserved by Eusebius (Hist. Eccl., vii. c. 14). Eusebius also quotes a passage from Origin (ibid. c. 25), which has been variously understood, but which seems to imply that an objection had been raised against the Pauline origin of the epistle from the superiority of its style to that of the acknowledged Epistles of Paul, and that to meet this objection Origin supposed the sentiments to be Paul's, but the dictation that of some other person, a disciple of Paul. But he adds—'If any church therefore hold this epistle to be Paul's, let it receive concerning the person of the writer of the same such credit as that the antients have handed it down as Paul's.' In Origin's own writings it is frequently quoted as being written by Paul; and after his time the Alexandrian fathers unanimously ascribe it to the same author. Turning to the Eastern church we find passages in the writings of the fathers, which are thought by some to be indirect quotations from this epistle. The earliest direct testimony is that of Eusebius, who mentions fourteen epistles as being clearly and certainly Paul's, but adds that some have rejected that which is written to the Hebrews, alleging, with the church at Rome, that it is spoken against as not being Paul's. He frequently cites it as written by Paul. The Jews of Palestine would have a written by Paul. The Jews of Palestine would have it considered as a work of Barnabas or Clement of Rome, but held it in high esteem, and used it in their churches. Jerome himself, and Augustine, constantly refer to it, sometimes as an apocryphal production, and sometimes as a genuine and authoritative book, and fairly to have established the belief in its Pauline origin among the Western churches.

The modern advocates of the same opinion have attributed the doubts which prevailed in the Western church at the end of the second century to the fact that some who relied on this Epistle in support of some of their opinions. On the other hand, those who believe that Paul did not write the Epistle ascribe the strong testimony of the Alexandrian fathers in its favour to their great fondness for the allegorical interpretation of Scripture, which the style of this Epistle is thought to sanction. The passage in 2 Peter, iii. 15, is thought by some to refer to the Epistle to the Hebrews.

The internal evidence in favour of Paul being the author is drawn from the reference (c. xii., v. 23) to Timothy, who is known to have been Paul's intimate friend and frequent companion; and from other incidental allusions (see x. 14; xiii. 24). The author of the Epistle to the Hebrews is supposed to be the former part being doctrinal and the latter part historical; in the mode of using quotations from the Old Testament and the style of argument adopted, in the doctrines most prominently stated and the phraseology employed, there are great resemblances between this book and St. Paul's acknowledged epistles. (For examples see Prof. M. Stuart's 'Commentary on the Hebrews.' Introd., sects. 20—24, and Horne's Introduction, iv. p. 415, &c. ed. 1834.) The chief objections against the Pauline origin of the epistle are drawn from the absence of the usual address at the beginning, the superiority of the style to that of any of Paul's other works which bears a closer similarity to it; the omission of the designation of its author; the date at which it was written while the temple at Jerusalem was standing (see viii. 4-5; ix. 9), and probably not long before its destruction in a. D. 70. If Paul was the author, he was probably written during his first imprisonment at Rome, and immediately before, he was released (see xiii. 19, 25).
Accordingly most critics refer it to A.D. 61 or 62; some say 61.

The canonical authority of this Epistle depends partly on its authorship; but may be argued on other grounds. It is repeatedly quoted by Clement of Alexandria, and apparently by Barnabas, Hermas, Polycarp, Ignatius, and Justin Martyr. It is contained in the Protestant Canon, and is the only one of which is not later than the second century, and in the old Latin versions made about the same period. From that time the questions of the canonical authority and the authorship of the Epistle were repeated by enquirers of various kinds; and the great number of which is much more than seven miles from the sea-shore. It is stated that there is no place, even in the larger islands, which is more than seven miles from the sea-shore. The rivers are small, but numerous, and all of them abound in salmon, trout, and eels; many of them contain also several other kinds of fish. Some of the islands are inhabited by man. Those of Long Island alone cover 25,000 acres, and in the small island of Tyree they are stated to occupy about 700 acres. The soil is in general as good as in other parts of Scotland, and is cultivated in a manner typical of the nature. The islands of Buto and Islay are considered fertile, and also several districts in the island of Skye. But a comparatively small portion of the surface of the whole is occupied by cultivated land. The larger islands, with a 1,992,000 Scotch acres, of which only 210,000 are arable or meadow land; 500,000 acres mountains, moorasses, and lakes; 70,000 acres pasture ground, commonly on hills, and of little value; 25,000 acres of big sands tossed about by the winds; 22,000 are occupied by peat-mosses; and 50,000 acres are dry at ebb-tide, and serve as kelp-shores. There are no natural woods on the islands, but about 5000 acres have been planted.

The backward state of those islands is chiefly to be attributed to the want of timber, their great distance from towns and markets, and the difficulty of intercourse on account of the boisterous seas which surround them, and the storms of wind which frequently prevail in the small and more inhospitable islands from the south-west. This wind brings torrents of rain almost annually from August to the beginning of March. Early in March, and often also in October and November, a north-east wind blows in the night. This wind, which blows hereafter, it is generally dry and pleasant. The climate is upon the whole mild. Frost and snow are almost unknown in the smaller islands, and they seldom prevail in the larger to any considerable range. On the southern coast of Islay the autumn gales are so frequent as to make the weather of the month of March. In the island of Skye, the weather of November is the most severe; the tempests are so frequent as to make the average temperature of the month to be 21° below the freezing-point. The annual average of the population resides within a mile of the sea-shore. The traveller meets with scarcely an inhabited house 1000 yards from the sea-shore, or 300 feet above the level of the ocean, except in the islands of Buto and Islay. From their language and customs it is evident that they are of the same stock with the inhabitants of Ireland and of the Highlands of Scotland. In most of the islands they gain as much by catching herrings, cod, and ling, with which the surrounding sea abounds, as by burning kelp, as by their agricultural industry.

The Hebrides are divided into four Scotch counties.

Those of which lie in the Frith of Clyde, between the peninsula of Caithness and the coast of Ayrshire, constitute a county by themselves. [BUTO; ARRAN.] All the other Southern Hebrides, together with the islands of Stuck, Rum, and Canna, which are included in the Northern Hebrides, are annexed to the county of Argyll. [ARGYLL.] The Long Island, except Lewis, constitutes a part of Inverness-shire. Lewis is a part of Ross-shire; and Skye belongs to Inverness.

The Hebrides are mentioned by Ptolemy under the name of Eubde, and by Piny (iv. 16) under that of Heubdes. Piny makes the Heubdes thirty in number. (M'Culloch's 'Scots and Highlanders'; Macrae's 'General View of the Agriculture of the Hebrides.')

HEBRUS. [MARBTA.]

HECATEUS of Mileitus, son of Hegesander, was one of the earliest Greek prose writers; and his works offer a remarkable example of the deliberation of the Ionians (B.C. 301), and attempted to dissuade them from revolting against the Persian king. (Herod., v. 36.) He is also mentioned by Herodotus (v. 12) as being alive at the time of the flight of Aristogoras, B.C. 497.

His works, which consisted of histories, genealogies, and geographical pieces, were held in considerable esteem by the ancients. (Cicero quotes one of his historical works, Strob. i. 12, Cassius,) coins that his geographical works only contained the descriptions of the poets written in prose; but he is mentioned by Ammianus Marcellinus (xxxi. 8) in conjunction with Strabo.

Hecatus appears, like Herodotus,
HE D

E

R

H

C

A

T

E

C

O

T

E

E

C

A

E

N

I

C

E

L

A

N

D

K

E

D

H

O

to have visited distant countries for the purpose of ascertaining information respecting the history, customs, and physical peculiarities of foreign lands. Herodotus (ii. 143) gives an account of a conversation of Hecateus with the priests at Thebes in Egypt, which was apparently derived from his work.

The fragments which remain of the writings of Hecateus have been published by Creuzer in his 'Historicum Græcorum Antiquissimorum Fragmenta,' vol. 3, Heidelberg, 1800, by Klausen, 'Hecateum Milei Fragments,' loc. cit. 1811, and in the 'Museum Criticum,' vol. i., p. 89-101, Camb., 1814.

HЄCATE, one of the ancient Greek divinities, the daughter of the Titan Perses and Asteria, according to Herodotus (ii. 143) inhabited the island of Aegina. Her missions were regarded in most countries with respect to those of Artemis; and it has therefore been conjectured that she may originally have been the same as Artemis. Her name, the feminine of Hecatus ('the far-shooting'), one of the names of Apollo, the brother of Artemis, is thought to favour this supposition. Hecate presided over hunting and fishing, the deliberations of the popular assembly and the courts of justice. She seems also to have apprised herself to part of the duties of Persophone (Persephone); since she was regarded as the mistress of the lower world, and the patroness of magic. She was considered a beneficent deity, who answered the prayers of her worshippers. The Hecataeans were the crosses-planted hedgekeepers. She was held in much respect in Athens, where she was regarded as the patroness of families and children. She was greatly venerated by the inhabitants of Egypt, who held a festival once a year in honour of her, which is said to have been instituted by Orpheus. (Pausan., ii. 30.)

HЄCLA. [ICELAND.]

HЄDERA, a genus of Araliaceae plants consisting of numerous species. Inhabiting chiefly the warmer parts of the world, is interesting to Europeans for containing among others the common ivy with its numerous varieties. This plant, the Hedera Helix of botanists, does not exactly resemble the ivy, that is, the Helix of the exotic varieties, instead of being creepers, adhering to other plants, or to rocks and walls by their sucker-like roots, are trees of considerable size.

Common ivy is dispersed through many distant parts of the Old World, lying between the Canaries and Europe on the west, and the northern parts of China on the east. In the Canaries it acquires its largest size, being what is called in English gardens the Irish or giant ivy, which grows so much faster than in the rest of Europe. In this variety, the leaves are indeed occasionally in Italy, the berries, instead of being black as with us, are bright yellow, and it is supposed that this is more particularly the Hedera of the Roman poets. This species is also used in the form in which it has a kind with as a wall or hedge, and for many years do not require to be transplanted. It is a very common and quick-growing shrub, which is frequently planted as a hedge where cattle are not admitted; but of all shrubs, the most common and most useful for the purpose of hedging is the Hede, which, instead of forming a hedge in the usual way, is generally used for the purpose of enclosing the quick hedges by which our fields are separated and enclosed.

In order to have a good hedge, the shrubs should be planted in a soil which is naturally strong, but well pulverized, and in which no shrub or tree has lately grown. The best soil is that which is produced by the decomposition of sods taken from commons or old pastures; and it is observed that in new enclosures, where the quick has been inserted between two sods, it always grows luxuriantly, and only requires to be protected, when young, against the cropping of cattle and sheep, which are fond of the young shoots. But the more tender, smaller shrubs should be planted and are well suited to the purpose. The shrubs should be planted at the distance of six to eight feet from each other, and so as to form a hedge which shall remain firm and strong to all time. The young shoots require no attention, but are left to themselves. The old hedges which have been renewed, numerous hedges of the spring, two or three rows of quick in the side of the bank, on a level with the surface of the ground, where a sod has been turned over, and forms the base of the bank raised by the earth taken out of the ditch. This quick requires to be protected from cattle and sheep by some fence. [Fence.] Sometimes the quick is planted in two or three parallel rows on the top of the bank, which in this case is made much wider, with a ditch on each side. A double wall or hedge is then thus formed, which greatly hinders the escape of cattle, and by the same means prevents the growth of the quick. When the quick is planted on the top of the bank, the surface is reserved to lay at the top; and after being broken and chopped to pieces, are dug into the bank. The young shoots require to be protected from cattle and sheep by some fence. When the quick is planted, or cut down and pruned earlier, would by the foundation of a closer and better hedge. Next to holly, as forming a close and durable hedge, is the yew: it bears very close clipping, and forms a thick hedge and good shelter all through the year. It is quick to growth, and the plants are seldom required to be transplanted. But in all places where cattle are put to pasture, they should never be permitted to grow. Many valuable horses and cattle have been destroyed by grazing in places where the trees grew; and notwithstanding the instinct which leads animals to reject food which is hurtful, they greedily eat the yew leaves in spring. The same may be said of box.

The various kinds of them are peculiarly adapted to form hedges, and they are consequently by far the most common plants of which a live hedge is formed.

For high hedges and strong fences the hornbeam and a variety of hedges is used. It is a quick-growing plant, and is extensively used in old gardens, where geometrical figures and numerous angles are admired.

The yew is especially suited to such purposes as to be a good defence against cattle, of which it is very destructive. Hedges, which throw out many long hollow branches, which soon become hard, and are admirably calculated for a fence, and cattle will not eat the leaves; but it is never very close or ornamented. It appears to require to be transplanted, but when planted, it displays very unsurprisingly knots and stumps when it has acquired a certain age.

Sweetthorn is ornamental, and forms a good fence against cattle. It is a quick-growing plant, and is used to flower-gardens and enclosures in pleasure-grounds.

Many other shrubs might be named, such as the pyrus japonica, which is prickly, grows close, and bears a beautiful flower. It is as hardly as any native British plant, and will bear cutting and training as well as any of them. Hither to no edges have been made of this shrub, except a few in the gardens of nurseriesmen; but there is no doubt that if many young plants were wanted for hedges, they would be made in the same way as of box. The privet is a very common and quick-growing shrub, which is frequently planted as a hedge where cattle are not admitted; but of all shrubs, the most common and most useful for the purpose of hedging is the Hedera Helix, which, instead of forming a hedge, is usually used for the purpose of enclosing the quick hedges by which our fields are separated and enclosed.
down the young shoots every year, in order to excite them to throw out fresh ones in greater number. But this is an error by which the growth of the hedge is much retarded. The shoot should be allowed to grow to its full extent the first and second year; the root will then have struck deep into the ground, and it is the fourth year the quicks may be cut down to a few inches. They will then send out several fresh and strong shoots, which may be cut and pruned to the height and width of the intended hedge.

In Holland and Sweden the hedge is trained along stakes and rods placed for the purpose, and tied together with oxiers. In this case every slender branch is tied to the rods, and they are laid so as to cross each other frequently, and the redundant shoots which cannot be converted into branches or means of bounds when cut off are laid close together, but the leaf, look very close and light, and take up very little room; and birds can scarcely harbour in them. It appears at first sight that much labour is required to train hedges in this way; or, if it is done by men in cassock. We have seen, in one grown up to the proper height they only require to be regularly clipped.

In forming a hedge it is necessary to take into consideration the soil, the aspect of the bank, and whether the land is porous, or very retentive of moisture. In the first case it will be advantageous to plant the quick in the side of the bank, raising the earth above it to keep in the heat; and in a sandy or light soil, let the sod be laid at a couple of inches from the edge of the ditch. The water which may fall on the bank and run down the smooth side is arrested by the hedge and soaks into the root. In the second case, the back of the bank is the proper place, and a small concavity may be given to it to retain the water and keep the roots moist.

In a dry soil which does not require draining, ditches are unnecessary. A hedge on a little bank formed by a few sods about eighteen inches wide, with a small water-furrow on each side. The whole width need not be above two feet six inches, whereas a bank and ditch take up at least six feet, and the plough cannot get near to the edge from the beech sticks driven into the bank. Thus eight feet are taken up by the fence.

When a hedge has been left uncult for several years, it grows wide and high. It requires to be cut down once in seven or eight years, to the height of cassock. We have seen, in the cutting, that the shoots may grow out again regularly. The common labourers often do this very carelessly by cutting the stems downwards with one or more cuts of their bill-hook. The consequence is that the stem is split and shivered, and the rain lodging in the ragged cut injuries the wood and causes it to die down farther than it otherwise would. Hence the general maxim of 'cutting up,' so strictly observed by the Dutch, is to cut through and through, and not merely cut the outer leaves. Portions of the stems are often left of a greater length than the rest for the purpose of holding the bushes, which are generally laid over the cut stems to prevent them from breaking. The shoots of a hedge cut regularly, one row close to the ground, and one a few inches longer; this will strengthen the foot of the hedge, and prevent its being thin and hollow at bottom.

When a hedge has become old, and many of the plants are decayed, it is very difficult to renew it. If young quicks are planted on the same spot, they will scarcely ever succeed, unless very great precautions are taken. The soil is exhausted or deteriorated, and can be renewed, but manure is insufficient; fresh earth is required for the new quick. The simplest process is to level the old bank, spread the earth of which it was formed, which will be of great use to the ground where it is spread, and form a new bank of the place from earth taken elsewhere; or, where it can be done without inconvenience, it is better to make an entirely new bank and cut, and to fill up the old. This is perhaps the surest as well as the cheapest way of having a new hedge.

What has been said of renewing a hedge is equally applicable to repairing gaps in an old one. It is of no use to put in young plants in the old bank. The earth must be removed, and fresh earth put in its place. The old hedge must be cut and trimmed, so that the young quick may not be shaded, and in that case the gap will shortly be filled up, and the hedge be restored to a continuous fence. Where the quick is frequently misspent, and if more attention be given, it may sometimes be advisable to plant hollies or other plants, which will grow well and fill up the deficiency.

P. C. No. 736.

Well managed hedges are the most effective fences, the cheapest, and the most pleasing to the eye. It is to the hedge-rows that England owes much of its garden-like appearance; but the trees, which are their chief ornament, are very destructive of the hedge as a fence; and when the trees are planted it would be much better if they stood within the bank, without interfering with the hedge. Whether trees can be allowed in hedge-rows, in a perfect system of agriculture, is a question which we will not attempt to answer the hedge-rows.

There is a method of repairing hedges which is called plashing. It consists in cutting half through some of the stems near the ground, and then bending the upper parts down in a horizontal or oblique position, keeping them so by means of hooks or rings when placed on the bank. Thus a live hedge is made, which fills up the gaps in the same manner as a dead hedge would have done, and the bent stems soon throw out shoots. If the stems are young, and muscles; muscle passed stores more or less apparent; be thus formed, which, when clipped, will be close and perfectly impervious. But the work is generally done in a very injurious manner. When a hedge is plashed which has been reduced to the narrowest dimensions, whilst in the Hedgehog it appears to be brought to the greatest development.

Dental Formula.—Incisors 6 \(\frac{2}{2}\); Canines 0; Molars 7-7 = 36.

Generic Character.—Body covered with spines, with the power of rolling itself up in a ball by means of appropriate muscles; muzzle pointed; more or less apparent; tail short; each foot five-toed and armed with robust claws.

Geographical Distribution of the Genus.—Species of Hedgehog have been recorded as inhabitants of Europe, Africa, and India.

We select as an example the Common Hedgehog, Erinaceus Europaeus.

This is the name of the Italian, Erizo di Capri, the Spanish, Ourizo of the Portuguese, L'Harison of the French, Igel of the Germans, Eggel-warken of the Dutch, Pin-swin of the Danes, Draenog and Draen y cor of the ancient Britons, Urchans of the Welsh, and Draenog of the Cornish. They are known in French as Geaner, Echinus (Erinaceus) terrestres of Ray, and Acanthis vulgaris of Klein. There can be little doubt that it is the Eluneus (Ezigus) of Aristotle.

This indigenous animal is too well known to need a lengthy description. The length is generally rather more than nine inches.

Food, Habits, Reproduction.—The food of the Hedgehog, which is a nocturnal animal, consists principally of hasted worms, slugs, snails. That it will eat vegetables is shown by White of Seiborne, who relates how it eats the root of the plantain, by boring beneath it, leaving the tuft of leaves untouched. In the Zoological Journal, an account by Mr. Broderip of an experiment made by Professor Buckland, proving that, in captivity at least, the Hedgehog will devour snakes; but there is no good reason for supposing that it will not do the same in a state of nature, for frogs, toads, and other reptiles, and mice, have been known to live on its prey. From its fondness for insects it is often placed in the London kitchens to keep down the swarms of cockroaches with which those places are infested, and there are generally hedgehogs or in the sale in Covent Garden, for the purpose. It is hardly worth while to refute the idle story that this persecuted animal sucks the cows; but, according to Sir William Jardine, it is very fond of eggs, and is content with many other food. It is a burrowing animal, and the Hedgehog hibernates regularly, and early in the summer brings forth from two to four young ones at once.
birth, which, at the time of their production, are blind, and have the spines white, soft, and flexible. The next wherein they are credited is said to be very artificially constructed, the roof being rain-proof.

Utility to Man.—The fish of the Hedehog, when it has been well fed, is sweet and well-flavoured, and is esteemed on the Continent in many places. In Britain few besides the gipsies partake of it. The prickly skin appears to have been used by the Romans for hacking hamp.

To the mind development of the pure thought or simple science, and the several forms it successively assumes, which differ only in their subject-matter or contents, are the objects of logic, or dialectic.

During his retirement at Bamberg, Hegel conducted the political journal of that town with great ability, and with an honesty and candour rare in the journals of that period, until he was called, in 1808, to preside over the gymnasium of Nürnberg. The duties of this situation he discharged with as much energy as skill, and the benefit of the reforms he effected, both in the discipline and the studies of the school, are still gratefully noticed at the annual commemoration.

In 1812 he published his 'Logic,' which was designed, with the 'Phenomenology,' to complete the whole body of science. Hegel employs the term logic in a very extended sense. He does not confine it, as is usually the case, to the account of the abstract forms of thought and the laws of the mind; but he also considers the development of the human mind; and thereby the science of the self-sufficient and self-determining idea—the science of truth and of reality. From his fundamental principle, that thought and substance are one and identical, it followed that whatever is true of the former is true also of the latter, and, consequently, that that which becomes ontological. From this point of view Hegel describes in this work the progress of reason; how, by virtue of a peculiar and inherent impulse, it passes constantly from a lower to a higher level of truth and reality. The merits of this work were at once admitted, and the high powers of philosophical reflection which it evinced were acknowledged by the offer of a professorship at Heidelberg.

His first work was entitled 'The Encyclopædia of Philosophical Sciences.' In 1817, his reputation as a philosopher was established, and Hegel was invited by the Prussian government to fill the chair at Berlin, which had remained vacant since the death of Fichte, in 1814. This work, being designed as a manual for his class, takes a general view of the whole system, and shows in a clear manner the ultimate tendency of his views. Considering the 'Logic' as the base of all ontology, and starting from the idea in itself or potentiality, he considers it as the essence and reality of the individual and the idea. He thereby notices that the idea, existing in itself, then in other or in nature; next in the mind of the individual, in a purely subjective point of view; and then objectively, in its outward realisation; and lastly, as he terms it, absolutely, i.e., as manifesting itself, whether in the church, state, or art of science.

From 1817 until death terminated his career there is nothing to relate in the life of Hegel beyond the constantly increasing celebrity of his lectures and the publication of several works. He successively published the 'Philosophy of Jurisprudence; two new editions of the 'Encyclopædia;' the 1st vol. of the 2nd edition of his 'Logic;' and several articles in the 'Annals of Scientific Criticism,' which he had established as an enduring system, and as the basis of all branch of art and science. He fell a victim, on the 14th November, to the cholera which ravaged Berlin in 1831, and was, in compliance with his express desire, buried by the side of the Landwehr.

The history of philosophy from its earliest origin to its latest development forms so perfect and compact a whole, that no single part can be separately considered without losing something of its meaning. It is the life of the whole, and reality is greatly increased in the case of a philosophy which gives itself out not only as the completion of its immediate forerunner, but as the sum and result of all anterior systems. The general view of the Hegelian system will be unintelligible unless the preceding rapid sketch of the states of philosophy out of which it grew. The transcendental idealism of Kant formed the transition from the empiricism of the eighteenth century, and, effecting, as it were, a compromise between the antient realism and...
HEG

99

HEI

the scepticism of Hume. To the system of Kant succeeded the pure and absolute idealism of Fichte, destined to be displaced in its turn by Schelling's system of absolute identity and intellectual intuition, which was itself to be further modified and developed by the dialectical momentum of Hegel. Essentially the systems of Hegel and Schelling are too founded on the development of the absolute, and the identity of thought and being; for there is evidently but little difference between the doctrine of Schelling, which supposed that the human mind contains within it the fullness of all reality and which consequently it may attain to simply by contemplating its own nature, and that of Hegel, according to whom the concrete notion, or the reason, comprises within itself all verity, and that in order to arrive at the science thereof it is only necessary to approach logical thought, by its raison d'etre, which is a purely a method of method. For the cold and narrow abstractions, the rigorous formalism, of Fichte, Schelling had substituted a sort of poetical enthusiasm, and banishing from philosophy the scepticism of Hume, he then observes, that although this union of qualities in sensibility is readily admitted, it is denied in inmaterial objects, and held to be irreconcilable. Thus it is said that man possesses liberty; but that freedom and necessity are mutually exclusive, and that being one, man can never be united so as to become concrete. But according to Hegel, the mind is in reality concrete, and its qualities are liberty and necessity. It is by necessity that man possesses liberty, and liberty is not liberty that he experiences liberty. The objects of nature are, it is an object exclusively to necessity; but liberty without necessity is an arbitrary abstraction, a purely formal liberty.

Hegel develops his system in obedience to certain laws which it determines of itself. Among these Hegel distinguishes three species of thought, or three productions of thought in general. 1. The thought, which he calls formal, is considered independent of its subject matter, or, in the Hegelian terminology, of all its contents. 2. The notion, which is thought more closely determined; and 3. The idea, or thought in its totality and fully determined. The truth, determined in itself, experiences a want of development, or a want of organic union, which is manifested by the inorganic system, a totality comprising in itself vast treasures of degrees and moments, or germs of further development. Now philosophy is nothing else than the knowledge acquired of the spiritual world, and self-conscious thought, it is the development itself. With the progress of this evolution philosophy advances towards perfection. The more the idea develops itself the more will it attain to its maximum duration and the deeper its intensity. All the partial results it gives rise to, as well as their systematization, proceed from the one identical idea. Particular systems are but so many different forms of the same idea, life; they have no reality but in this unity, and their differentiation is the expression of the forms contained in the idea. The idea is at once the centre and the circumference—the source of light, which in its expansions does not pass out of itself; it is both the system of necessity and its own necessity, and yet nevertheless liberty.

In the history of philosophy we have, under the form of accidental succession, the actual development of philosophy itself. In the different systems which the history records there is one and the same philosophy at different degrees of its development, and the different principles which have been employed to support these systems are but branches of a single unity and of one whole. The philosophy therefore which is the last in time is the result of all preceding systems, and consequently must comprise the principles of all, and therefore it is the most perfectly developed, the richest, and the most concrete. The more concrete the idea becomes, the more widely extended is the domain of its action. This result is the effect of the successive appearance and reason, and a true philosophy results from the contradiction in which the antient philosophy was involved with the natural and historical development of the human mind. Starting from and nourished by experience, the thought rises to the idea of the general, and the absolute, and, being allowed its free course, passes beyond the moment of doubt and difficulty, to reproduce all that it has conceived in a moral order, and to impress upon it the stamp of a logical necessity. For all verity is virtually contained in thought, from which, being made fruitful by experience, it is the duty of philosophy to draw it, and to deduce the actual consciousness. Accordingly it is the high pretension of contemporary philosophy to support its existence with reflection, and positive religion with the state and with every political and religious establishment. It is, he observes, an evil prejudice to suppose that true philosophy is opposed to religion, which his master Schelling has urged against him. Schelling indeed disavowed him as his disciple, which honour however Hegel still loved to claim with a satisfaction mingled with regret.

A complete edition of the works of Hegel, in 17 vols., collected by Michelet and others of his disciples, is in course of publication.

HEIDELBERG, an ancient city in the circle of the Lower Main, and chief seat of the Arch-Duke of Bavaria, one of the most beautiful parts of Germany, on the left bank of the Neckar, over which there is a covered stone bridge of nine arches, 792 feet long and 30 wide; in 49° 24' N. lat. and 8° 41' E. long. The town is between the river and the mountains. On the south is the Königstuhl, 2000 feet high (called the Kaisersuhl since the emperor Francis ascended it in 1815), on the summit of which a lofty tower has been erected. The population, which is now about 12,000, and gradually increasing, is much inferior to what it formerly was. Various causes have contributed to this decay: and among them chiefly the desolation of the Palatinate by the French in 1689 and 1693, and then the removal of the Elector of Bavaria to Munich in 1719. In 1689 the elector's splendid palace was most wantonly devastated, and in 1764 it was struck with lightning and rendered wholly uninhabitable. In the cellar of the palace is preserved a large barrel, which contains 660 hogsheads. Heidelberg has three Lutherans, one Calvinist, and one Roman Catholic church, and a synagogue. It owes its chief renown to its university, which is looked on as the oldest in the world. It was founded in 1386 by the elector Ruprecht II., and soon acquired a high reputation to which its valuable library greatly contributed; for it gradually became possessed of 1520 Latin, 431 Greek, 289 Hebrew, and 846 German manuscripts, in all 3525. The whole of this university contains 3000 students, which is the most considerable number taken collectively are but the expression of the forms contained in the idea. The idea is at once the centre and the circumference—the source of light, which in all its expansions does not pass out of itself; it is both the system of necessity and its own necessity, and yet nevertheless liberty.
HEI 100

HEI

take 300 manuscripts from the Vatican, carried off 50 of the Heidelberg collection. In 1815, when France was obliged to restore all its plunder, the pope not only gave up those 30 manuscripts to Heidelberg, but, at the intervention of Austria and Prussia, ordered all the German manuscripts to be restored. Accordingly 547 antient German manuscripts, and also the celebrated Codex Palatinus of the monk Otfried's poetical paraphrase of the Four Gospels, and four Latin manuscripts containing the history of the university, were delivered up to Heidelberg. A new era for the university was commenced, and it is noted, together with the bulwrick, which has 80,000 inhabitants, besides the population of the town, to the grand-duke of Baden, who is of the Lutheran religion, and is himself the rector. The reputation and number of the students has been much reduced, because Prussian subjects must have a special permission from their government to visit it. Its annual revenue is now 188,000 florins, of which 64,000 are contributed by the government; and its library, much increased by the purchase of the library of the Cistercian convent of Saltmansion (or Salem), is said now to consist of 120,000 volumes. All the institutions and collections attached to the university, namely, the college of the members of the faculty, the most eminent men in Germany. The streets of the town are narrow and gloomy, and there are no manufactures except on a small scale. The latter is however increasing, and the buzzing of the traffic and the beauty of the country and its many other advantages have caused a great number of foreigners to settle here. There are numerous descriptions of Heidelberg; one of the latest is Benjamin's "Leypin" of the "Vie neue Zeit." Stadt, Universitt, Scholle, and Unbegungen."  

HEIGHTS, MEASUREMENT OF. There are three very distinct ways by which heights may be measured. The first is by the range of the angles of elevation of objects, such as the top of a mountain, or a ship; the second, by the height of a tower; the third, by the height of the barometer.  

BAROMETERS.] If we ascend with a barometer through any height, the weight of the column of air which presses on the instrument is diminished, and the contrary, namely, the column of mercury under the vacuum, must diminish likewise; that is, the mercury must fall. The amount of this fall depends upon the height in question: and when the relation between the two is known, it is called mercury, and the mean of determining it. If the temperature at the higher and lower station were the same in all places and at all times, and if the force of gravity were precisely the same at all heights, one formula would serve for all times and for different elevations; but if the height of the column remained always the same at the same height above the sea. In such a case, one observation made in London a hundred years ago, combined with one made at Quito in the present time, would serve to determine the difference of level between those two places. And even as it is, the mean height of the barometer at the two places, when known, could be used to determine the point. But when only one or two observations can be made at each place, the differences of temperature, etc., must be noted and allowed for: and this necessity renders the numerical operations connected with the solution of the problem more intricate than they would otherwise be.  

If the temperature were unaltered during the ascent, and the force of gravity also remained uniform, the logarithms of the atmospheric pressures corresponding to different altitudes, would themselves increase in arithmetical proportion. Thus, if at altitudes 0 and A the logarithms of the pressures were A and A', at an altitude 2A the logarithm of the pressure would be 2A, and so on. And since the height of the barometer is proportional to the pressure, for the time being, this would lead to an equation of the form  

\[ z = c \log (A - z) \]  

where \( z \) is the difference of altitudes at two stations, and A and A' the heights of the mercury at the lower and upper stations. This is proved in every elementary work on pneumatics which professes to apply the differential calculus.  

The constant c might be determined either from theory or actual measurement; for if \( A \) and \( A' \) were known in any one case, and also z by trigonometrical or other measurement, \( c \) might be determined, and being independent of \( A \), \( A' \), would then be known in all cases. But in truth \( c \) is not to be thus determined, for though independent of \( A \) and \( A' \), it varies with temperature, the force of gravity, etc.  

1. If the temperature at the higher or lower station be not the same in different observations, the multiplier \( c \) will be of one value or another, depending on the temperatures.  

2. If the mercury be not of the same temperature at all times, its specific gravity will vary, so that a given column of it will not represent the same atmospheric pressure at all times.  

3. If the force of gravity be taken into account, the pressure taken \( \log \) at a by the heights will be a larger proportion of the whole pressure than was supposed in the investigation of the preceding formula, since it is taken from the part of the atmosphere where the force of gravity is greatest. This is independent of its greatest height as being taken from the densest part of the atmosphere. The latter circumstance has already been taken into account in the formula, and from it comes the law that the logarithms of the pressures diminish in arithmetical progression, since the pressures themselves would diminish in arithmetical progression, if the density of the air were the same at all heights.  

We now proceed to describe two formulae made on slight differences, which are the element of the problem, about which we know least, namely, the law of variation of the temperature of the atmosphere. The first formula, which is nearly in the form given by Laplace, is taken from the second edition of Poisson's Mechanics, and supposed that the air intermediate between the higher and lower stations may be treated as if it had throughout the mean temperature of the two stations. The second, taken from Lindemann's Barometric Tables (Gotha, 1809), is on the speciation of the air by the grand-duke and Oriani that the temperature of the air diminishes in arithmetical progression through a series of heights increasing in arithmetical progression.  

Let \( A \) and \( A' \) be the heights of the barometer at the lower and upper stations; \( T \) and \( T' \) those of the air; \( T \) and \( T' \) those of the mercury (ascertained by a thermometer whose bulb is in the cylinder); \( r \) the radius of the earth, supposed to be 6348328 metres or 692283 yards; and \( \lambda \) the latitude of the place. All the temperatures are in degrees of Fahrenheit. Let  

\[ A = \log A \]  

\[ A' = \log A' \]  

Then \( x \) itself is a near approximation to the number of yards in the difference of level between the two stations (for metres use 18337 46 instead of 20053 95); but if a more exact one be required, it may be found by calculating using \( x \) itself as just found.  

\[ c = (\log A - \log A') \log (1 + z) \]  

\[ \frac{1}{r} \left( 1 + \frac{r}{r'} - 64 \right) \left( 1 + \frac{z}{r} \right) \]  

Let the lower station be at a great distance from the higher on the earth's surface, then five-eighths of \( \frac{z}{r} \) should be used instead of \( \frac{z}{r} \) in the last formula.  

The preceding is the most accurate formula which the present state of science will allow to be given, and there is reason to believe that the constant 20053 95 could not be altered by a single unit with any considerable error.  

The following formula however is sufficient for ordinary purposes:—  

\[ \frac{1}{r} \left( 1 + \frac{r}{r'} - 64 \right) \log A - \log A' \]  

in which the constant 20115 is that determined by a considerable number of comparisons of theory with trigonometrical observation made by M. Remond in the Pyrenees.
The second formula, by M. Lindensau, is as follows, the letters meaning the same things as before; but the degrees are those of Réaumur's thermometer, and the distances are expressed in toises. The toise is 2:1315308 English yards, and a reading of Réaumur is reduced to one of Fahrenheit by the following formula:

\[ c = (1 + t^\prime - t) \times 9442 \]

\[ H = \frac{T - 10}{4929.6} \]

\[ H' = H^\prime = (1 - t^\prime - 10) \times 4929.6 \]

Then the number of toises in the difference of elevation of the stations is

\[ c = \log(H - \log(H')) \]

and the following are the constants and \( b \) used by the observers whose names are mentioned, all reduced by M. Lindensau to those values which they should have when the thermometer is Réaumur's and the result in toises:

- Ramond: \( a = 9437 \), \( b = 400 \)
- Trembley: \( a = 9401 \), \( b = 361 \)
- Roy: \( a = 9298 \), \( b = 362.2 \)
- Schneckeburg: \( a = 9400 \), \( b = 365.6 \)
- Deluc: \( a = 9220 \), \( b = 396.4 \)

HEILBRONN, the capital of the circle of the Neckar in the kingdom of Württemberg; in 49° 7' N. lat. and 9° 8' 46'' E. long. It has 8490 inhabitants, considerable manufactures, and an extensive market; which, with the culture of the vine, give employment to the inhabitants. According to tradition, it was founded about the year 800, by Charles the Great, and named by him Heilbronn, or the 'spring of health,' from a medicinal spring in the vicinity. It was a free imperial city, till it was adjudged to Württemberg in 1803. It had formerly a commandery of the Teutonic order. The house of that order has been converted, into barracks, and the old orphan house into a handsome palace. The town-hall contains an ancient collection of archives; and the gymnasium has a library of 12,000 volumes. There are three Lutheran and two Roman Catholic churches, and numerous landed institutions. A tower called the Luitpold-Tower, in which Göt z von Berlichingen was confined in 1525, is shown as a curiosity.

HEINECCUS, JOHN GOTTLIEB, born at Eisenberg, in Saxony, in 1681, was one of the most learned jurists that Germany has produced. In 1709, he was appointed professor of law at Frankfort-on-the-Oder, and lastly held the same chair at Halle, where he died in 1741. His principal works are:—1. 'Antiquitatem Romanarum Jurisprudentiam illustrantium Syntagma,' secundum Ordinum Institutionum Justiniani digestam, in quo multa Juris Romani, atque Auctorium Veterum loco explicante illustratur,' 8vo, 1741; a very useful work, which has since been edited by Haubold, 1782. 2. 'Elementa Juris Civilis, secundum Germanicam Institutionem,' 3. 'Historia Juris Civilis Romani se Germanicam,' published with Ritter's notes, Ley- den, 1748. 4. 'Elementa Juris Civilis, tum Veterum tum Hodierni,' 2 vols. 8vo, Halle, 1736. 5. 'Corpus Juris Germanici Antiqui,' 3 vols. 8vo, 1738, 1742, 1743. 6. 'Elementa Juris Naturae et Gentium,' translated into English under the title of 'A Methodical Sytem of Universal Law,' or the Law of Nature and Nations, deduced from certain principles laid down by Aristotle, by G. Turnbull, 2 vols. 8vo, London, 1753. 7. 'Observationes Accedentes in H. Grotii de Jure Belli et Pacis libris.' 8. 'Elementa Juris Naturae et Gentium,' translated into French under the title of 'Droits de l'Homme et du Citoyen.' 9. 'Elementa Philosophiae Rationalis et Moralis,' besides academical dissertations, &c. The works of Heineccius were collected and published at Geneva, 'Opera omnium,' 9 vols. 4to, 1771, with additions and notes by his son John Christopher (Gotll) Heineccius, who prefixed to the first volume, a Life of his father, in which he has contributed a variety of articles to the 'Deutsche Merkur,' and other periodicals; including a critical account of the
principal pictures of the Düsseldorf Gallery, in a series of letters to Gleim. A complete edition of his works in 10 vols. 8vo, with a critical and biographical introduction by Laube, is now in course of publication.

HEINSIUS, DANIEL, was born at Ghent in the year 1584 or 1585. He was taken to England at an early age by his father, who was obliged to leave Holland in consequence of the part he took in the wars which then prevailed in his native country. His father returned to Holland, which he left again at the age of fourteen, to study law at Franeker. But Heinsius, contrary to the wish of his father, resolved to study antique literature; and accordingly, after remaining at Franeker or Leyden for a certain time, he prosecuted his studies in the classics under Joseph Scaliger. At the age of eighteen he explained the Latin classics in the university, and seven years afterwards was appointed professor of history and politics. In 1607 he was in the library and secretory to the university. Heinsius was considered one of the most learned men of his time, and was repeatedly solicited by many of the monarchs of Europe to settle in their dominions; but he refused to leave his native country, in which he died on the 23rd February, 1655, at the age of 75. He held the office of historian to the states of Holland, from which he received a handsome salary. He also took an active part in the political and civil wars of his time, and was a principal secretary to the celebrated syndic of Dort in 1618.

The name of Heinsius is principally known by his editions of the Greek and Roman classics. But his Latin poems, which are seldom read, are of a contemporary date. In 1602 he published at Leyden, and he also wrote some poems in his native language, which were published by Petrus Severinus in 1616. The following is a list of the principal classical authors edited by Heinsius:—Crepundia Silviana, sive notae in Silium Italicum, 1600; 'Theocritus, 1603; 'Hesiod, 1603; 'Paraphrasis Androclis Rhodii in Aristotelis Ethica, 1607, 1613; 'Paraphrasis in Aristotelis De Partibus Animalium, 1614; 'Dissertatio de Nonni Dionysiacis, 1615; 'Senecae Tragediae, 1611; 'Aristotelis Poeticae, 1611, 1643; 'Theophrastus Eresius, 1611, 1613; 'Horatia et de Sautria Horatiana, 1612; 'Apologetica, in 1613. Nota in lib. Opus, secret. Nota et Emendationes in Clementinum Alexandrinum, 1616; 'Terence, 1618; 'Paraphrasis Perpetae in Politica Aristotelis, 1621; 'Aristarchus saevus, sive Exercitationes ad Nonni Paraphrasis in Iohannem, 1627; 'Orto, 1630; 1653, 1661; 'Livy, 1620, 1631, 1634; 'Aurelius Prudentius, 1637; 'Exercitationes Sacrae ad Novum Testamentum, 1639. Heinsius was also the author of 'Rerum ad Sylvam Duas atque alibi in Belgis ac in Belgia anno 1620; 'The English law, 1636; 'The law concerning emigrants, represented in a letter to the English nation, 1644; 'Orations Variae Argumenti, Leyd, 1615, 1620, 12mo.

HEINSIUS, NICHOLAS, only son of Daniel Heinsius, was born at Leyden, 29th July, 1620. His education was largely due to his father, who endeavored to give him a manly and scientific training, by the advice and instruction of Gronovius, Grotius, and other learned men of the time. In 1642 he went to England, and afterwards went to France, Germany, and Italy, principally with the view of consulting MSS. of Ovid and Claudian. In 1649 he was invited by Christina, queen of Sweden, to settle at Stockholm, where he remained till the death of his father in 1655. He resided principally in Holland during the remainder of his life. He was sent on a public mission to Russia in 1667. He died on the 7th October, 1681. Heinsius edited 'Claudian, 1650, 1665; 'Ovid, 1652, 1651; 'Virgil, 1676; 'Valerius Flaccus, 1680. His Latin edition of Aristotelis De Partibus Animalium was published in 1666. He also left behind him many MSS. notes on the Latin poets, which have been published by Burmann, in his editions of Virgil, Valerius Flaccus, Silius Italicus, Phaedrus, &c. (Life of C. J. Burman, 1740.)

HEIR, by the law of England, is he who succeeds by right of blood to the real property or lands, tenements, and hereditaments of the deceased owner, designated by the correlative term of ancestor, not given away from him by will. The English law which determines the succession to personal property, when uncontrolled by local custom, is contained in the statutes of distributions (22 and 23 Chs. II. c. 10; 29 Chs. II. c. 3; and 1 Jac. II. c. 17), which also regulate the disposition of the property of persons so entitled as are not called heirs, but next of kin. The several rules of descent which regulate the right to succeed to real property spring from the system of feudal tenures, but have been somewhat modified by the recent statutes of 3 and 4 Wm. IV. c. 106. [DECENT; ESTATE; FEUDAL SYSTEM.

Heir-at-law, heir-general, is he who succeeds according to the rules explained in the article DECENT, where there is no will of his ancestor and no instrument which determines a special course of descent. Heir-special is he who succeeds in the order pointed out by some instrument, as a bequest, devise or grant, and to which descent is not immediate, as by bequest to the heirs of the testator—Heir-apparent is he whose right of inheritance is indefeasible, he provided he outlives his ancestor; as the eldest son. Heir-presumptive is he who, if his ancestor should die immediately after him, would succeed to the property, but whose right of inheritance may be defeated by the birth of some nearer heir; the brother or nephew of a man who has no children is heir-presumptive. Heir by custom is he whose right as heir is derived from the laws and modes of descent, which are attached to the land. [DECENT; COWPOLO; GAYELKIND.

The expression 'heirs by devise' has also been sometimes used, though such are not strictly heirs according to the English law; but have been so called inaccurately after the heres factus of the Roman law.

The rules of the civil law upon the subject long prevailed in Scotish and Italian law, and several alterations have been made in the Scotch law of inheritance, and now the different descriptions of heirs are far more numerous than in either the English or the Roman law. Heirs-at-law are called heirs whatever. Heirs-in-tail, or heirs of reversion, are the heirs of ordinary nature. There are also heirs active, heirs by conquest, heirs of line, heirs passive, heirs male, and heirs portioners, the particular distinctions between each of whom it is not necessary to describe. [See Succession, Roman; Commentaries and Principles, and Lord Kames's Law Tracts.

The French law of descent has followed the Roman law, and the obligations and privileges of the heir are essentially the same. [See Succession, Roman; Commentaries and Principles, and Lord Kames's Law Tracts.

In America the English law of descents has been in most instances rejected, and each state seems to have established rules for itself. There is no entire information upon this subject; but in the cases which have been made, there is a difference in the rights of the heir, as which stands in the testamentary cases, and the intestacy cases. The term heres in the Roman law has a very different signification from the term heir in the English law. The Roman term hereditas denoted all the rights and obligations of a testator or intestate; and the heres, when his title was completed, was entitled to the property, and had all the rights and obligations connected with it. In this sense the heres, whether testator or intestate, and as a consequence succeeded to all his rights and obligations. A man might by his will appoint one heir or more; and the property of an intestate might be divided among several heirs, according to their wishes, and with respect to their character. Each person was heres in proportion to his share of the inheritance. The heres appointed by will was called scriptus, or factus, or testamentarius; the heres who succeeded in case of intestacy, ex lege, or legitimus, that is, appointed by the law, or ab intestato.

An important distinction between heredes as established by the old Roman law was that the words and the distinction was the same (so far as it could be applicable) both in the case of testacy and intestacy. All persons who were in the power (potestas) of the testator, or intestate, during his lifetime, were heredes ; but children not emancipated, and slaves, were obliged to accept the inheritance with all its burdens; the inheritance in fact devolved upon them by the will of the testator, and no act of assent on their part was necessary. Other persons, not in the power of the testator, were only bound to undertake the burden of the testator's debts in case they accepted the inheritance, for which purpose their express assent was necessary. But by the legislation of Justinian the heres in all cases was only answerable for the debts of the testator or intestate, the succession of persons who such testator or intestate left behind him, of which however the heres was required to make an inventory within a certain time. (Cod. vii. Tit. 30. 1. 22; Inst. ii. 19.)

The definition of the word heres in the law of the Roman heres scriptus belongs to the subject of wills.

In the case of intestacy the distribution of the property.
was analogous to the distribution of an intestate's personal estate by the English law. The Roman law gave no preference to an eldest son over a younger, or to a brother over a sister. Emancipated sons, who, by the strict rule of the civil law, were excluded from the inheritance (Emancipation), were placed by Justinian's legislation on the same footing as children not emancipated. It is unnecessary here to state more minutely the rules which regulated the distribution of an intestate's property. (Inst., iii.; Abel C. Bell.)

It is important to conceive clearly the fundamental notion of the difference between the Roman heres and the English heir. The Roman heres, when his title to the inheritance was completed, represented the person of the testator or testatrix as executor or administrator. His title to the property, as heres, was absolute and derived entirely from him to whose rights and obligations he succeeded. The English heir, according to the strict principles of tenures, derives his title to the land not from his immediate ancestor, as such, but by virtue of his relationship by blood to the person who acquired the land, deduced through his immediate ancestor. The consequences which flow from the two different notions of the Roman heres and English heir are numerous and important. They are well stated, in a general way, by Mr. Butler in his note on Coke-Litt., 191 a. The stat. 4 Wm. IV., c. 82, made the title of the plain or tenant in chief liable to the payment of his debts, has materially affected the ancient right of the English heir.

HEIR-LOOMS are such goods and personal chattels as, according to the custom of the place, or by special agreement of the testator or administrator, are customarily retained within the inheritance and not to the executor of the last proprietor. (Chattels.) They are principally such things as cannot be removed without damage to the inheritance, as chimney-pieces, fixed tables, &c. Deer in an authorized park, flocks in a pond, deeds, charts, and court-rolls, together with the chests in which they are contained, are heir-looms. And so it seems are Journals of the House of Lords in the possession of a peer. By special custom, too, heir-looms also and household implements may be heir-looms.

The termination 'loom' is of Saxo origin, in which language it signifies a limb or member; so that an heir-loom is nothing else but a limb or member of the inheritance. (2 Bl. Corn.) Chattels are sometimes directed by testators to go to the heir, with the inheritance, as heir-looms, and though it is the duty of the executors to carry the intention into effect, they can not change the direction without the rights of creditors, neither can it effectually prevent the devolution of the chattels according to their real nature.

HELAMUS, a genus of Rodents nearly allied to the Jerboas, or Pimelodidae. HELARCTOS. [Braun, vol. iv., p. 91.]

Helders and Helder Canal. [Holland.]

HELDA, daughter of Constantine the Great and of Constantine. She was in marriage by her brother Constantine to her cousin Julian, when he made him Caesar, at Milan, A.D. 325. She followed her husband to his government of Gaul, and died in 329 at Vienna. The historian Ammianus Marcellinus (b. xxvi., c. 10) reports that the Empress Eusebia bribed Helena's midwife, who occasioned the death of a son, the only child that Helena bore; and yet Eusebia had been the constant protectress of her husband Julian. This story is doubted by Gibbon, in his 'Decline and Fall' (ch. xix.).

HELENA, ST., the first wife of Constantius Chlorus, was born of obscure parents, in a village called Drepanum, in Cappadocia, and afterwards resided in the principality of St. Helena in the west of the coast of Bengal, in South Africa, and nearly in the latitude of Cape Negro, and about 1800 miles east of the coast of Brazil, in South America. Seen at a distance it appears like a lofty mass of barren rocks rising pier form a pyramid. There are innumerable perpendicular cliffs from 600 to 1200 feet high, are seen encompassing the island all round, broken through in several places by deep chasms which open to the sea-shore, and which form so many narrow valleys winding up to the table-land in the centre of the island. One of the principal of these openings is called James' Valley, on the north-west coast of the island, and at the opening of it to the sea is James' Town, the only settlement on the island, which is defended by strong batteries, and is the residence of the authorities. James' Town is in 15° 33' S. lat. and 5° 49' W. long. Ascending James' Valley we arrive at Longwood, the seat of Napoleon's estate. It is a level, about the size of a town, a barren part of the island, and consisting of 1400 acres of fine land, nearly 2000 feet above the sea, sloping gently towards the south-east. Longwood House was the place of Napoleon's residence from the time he came from it, situated under a willow-tree, and covered by a plain tombstone without inscription, and enclosed by an iron railing. In the centre of the island rises Diana's Peak, 2693 feet above the sea. A casuarine ridge, which runs across from east to west, sluicing with other spurs, is cut into two unequal parts, the larger and finer of which is on the north side of it, containing James' Valley. Rupert's Valley, Longwood Plain, the deep crater-like dell called the Devil's chimney in which is the church and a minor residence. James' House, which is a country residence of the governor, &c. The whole circumference of the island is about 25 miles. The population, exclusive of the garrison, is about 5000, about one-third of which are Europeans, and the rest are blacks, men of colour, and Chinese. The climate of St. Helena is one of the healthiest under the tropics, and is found beneficial to invalids from India, and even from Europe. The range of the thermometer at Plantation House is from 61° to 73° within doors; it sometimes falls to 52° in the open air between June and September. In James' Town it is generally from 5 to 7 degrees higher than at Plantation House, and at Longwood it is somewhat lower. The summer rain falls in the winter, and the winter rains in July or August. Cloudy days are frequent and refreshing throughout the year. Viewed from the sea the island appears barren; but the interior is covered with rich verdure, and is watered by abundant streams. The soil of the valleys is very rich, and produces all the fruits and flowers of Europe and Asia. Horned cattle, sheep, and goats feed on the rich pastures. Pretty cottages in picturesque situations are scattered about the island. Major Beaton's Tracts relative to the Island of St. Helena, written during a residence of five years, 410., London, 1816, with plates. The base of the island appears to be basalt, and lava and sandstone are found scattered about. The island of St. Helena was discovered by the Portuguese in 1502. It was afterwards taken possession of by the Dutch, who abandoned it in 1654 for the Cape of Good Hope. The English took possession of it, and it became a resting-place for their ships between India and Europe. In our days it has become the place of banishment of Napoleon, who resided there five years, married, and was visited by all who visited India, who take in fresh provisions and water, and on those occasions the place assumes the appearance of a bustling market-town.

HELIGOLAND, or HELIGOLAND, a group of islands in the German Archipelago, the least of Schleswig, 25 miles from the mouths of the Elbe, Weser, and Eider. It consists of the principal island, so called, of the Sand Island, or Downs, and of several cliffs and reefs, the chief of which is that called the Monk. The main island is divided into the cliff and the low land. The cliff is a rock rising however built a church on the spot supposed to be that of the Sepulchre, which has continued to be venerated by that name to the present day. She also built a church at Bethlehem in honour of the nativity of our Saviour. From Palestine she rejoined her son at Nicomedia, in Bitinia, where she expired in the year 327, at a very advanced age. She is numbered by the Roman Church among the saints. (Eusobius, Life of Constantine; Hübner, De Crucis Domini per Helenam inventione, Helmstädt, 1724.)
almost perpendicularly, and varying in elevation from 90 to 100 feet above the level of the sea. The ascent to it is by a flight of 191 steps. The summit is a tolerably level plain about 4200 paces in circumference. It is joined by a bottom of rock, 500 paces long, to the low land, which is about two miles distant from the summit, and to the east of the down is a road where vessels may anchor in 48 fathoms. The circumference of the whole island does not exceed three miles. In former ages it was of much greater extent; but the island has so far changed its form, that the chief of the Sicambri or North Frieslanders, and the seat of worship of a Saxon deity.

Of the rapid waste of this island, Mr. Lyell presents the following particulars. It began in the year 1800 for a much consumed by the waves. In the years 1300, 1500, and 1649, other parts were swept away, till at last a small portion only of the original island remained, consisting of a rock of red marl (of the Keuper formation of the Germans), about 200 feet high. Since 1770 a current has cut a passage no less than ten fathoms deep through this remaining portion, and has formed two islands, Heligoland and Sylt Island.

(Principles of Geology, book ii., ch. 7.)

The inhabitants of the island, 2400 in number, live on the cliff. They are descended from the Frieslanders, and speak, besides the old Friesland language, the low German, retain their ancient dress and customs, and maintain their religious belief by acts of piety. They obtain turf, wood, vegetables, &c. from Cuxhaven and Hamburg in exchange for fish. The low land has now only some fishermen's huts; but when the English took possession of it in 1807, during the last division of the Danish kingdom, the small inhabitants of the enlarged islands, which were included into the Continental ports, the low land was covered with warehouses, and the population of the island increased to 4000. On the conclusion of peace in 1814 England retained possession of the island, probably for the sake of its double harbour, and for the advantages which it offers for defence, in having two wells of good water. The English have erected four batteries and a redoubt to defend the island, which is still garrisoned, and bears a nominal tax, but levy no taxes and do not interfere with the internal government.

The lighthouse is in 54° 11' 54" N. lat. and 7° 53' 15" E. long.

The inhabitants of the island are of a stock, a term applied to the rising of a star, when it takes place just before that of the sun. If we suppose a star not very far from the sun's orbit, then as the sun approaches that star it will become for a season synonymous with the sun, and when it rises after the sun, it is the heavens remaining too light in the quarter of sunset to permit the star to be seen. But as soon as the orbital motion of the sun has carried it past the star, the latter will begin to rise first, and in process of time will rise so high as to become visible some time before the rising of the sun. In this case it is said to rise heliacally: thus a star sets heliacally before its season of disappearance, and rises heliacally after its reappearance. The successive heliacal sets and rises of stars are the same in all seasons, and were used for this purpose among some ancient nations. But since the procession of the equinoxes slowly changes the offices of different stars with respect to the seasons, an antecedent record of the time of the year when a given star rose heliacally would enable us to make a rough guess at the number of centuries elapsed since the time of the observation. Upon such a basis Newton rested a great part of his system of chronology, taking the descriptions of the heliacal risings of stars from Herodotus.

HELIAC RION. [Helicidae.]

HELICIDE, HELIX FAMILY, the general name by which the animals are distinguished from other molluscs by the spiral form of their shells. Mr. Gray, in his paper on Stromatopora (Loudon's Magazine of Natural History, vol. i., new series), observes that zoologists have divided land-shells into several genera; but that the late Baron Férussac united most of them into a single genus, as he wished to establish as a rule, that all the genera of Mollusca should be alone characterized by some peculiarity in the animal. 'The increased knowledge,' continues Mr. Gray, 'since Férussac united the shell-bearing group of species he (Férussac) referred to the genus Helix have very different animals from the typical kind; and it is probable that eventually several of the genera established before his time (he attempted to set aside) will be found to represent true species, according to the present state of our knowledge of the animal, and the history of several species which were unknown at the time he wrote his system,' have shown that several of the characters which he considered as of generic importance are common to other species belonging to quite different groups. Thus we now know that some Helice (Caracolla imbericostata, Balsam Chemnitzii, and some others) are viviparous, as well as the Parietula; and that the shell of the Molluscan Cyprea is variable in the different species of Pupa and Vertigo; and that to separate the latter genus from the former, on account of the partial obliteration of these organs, has the effect of bringing the generic limits too close together, which we thought was likely to lead to the recognition of many new species. The fact is, however, that we are only led by these facts to distinguish the species; and to think that these and numerous similar facts, which must be well known to every practical conchologist, show us that we are warranted in establishing genera from any peculiarity of the shell only, as well as in recognizing the same species both on the continent and as a peculiarity in the animal alone; especially when we consider how very few of the animals of the different species which we are called upon to arrange are or ever been known; and also as we can hardly avoid admitting, that every peculiarity in the form or structure of the shell is the indication of some peculiarity in the habit or organic structure of the animal which formed it, and warrants its separation from the rest of the species of the family.

Having thus laid before the reader the difficulties with which the history of this very extensive family is surrounded, we shall first endeavour to give some account of the general organization of the Helicidae, properly so called, as manifested in one of the most common species of the family.

O R G A N I Z A T I O N. [Nutriment Organs.]

In the museum of the Royal College of Surgeons, in London (Physiological Series, Gallery, No. 301.) there is the complete dissected head of another Shell-snail the same structure the mouth and the anterior part of the animal and the alimentary canal has been injected with size and vermiculon; so that the salivary glands, from their white colour, may be distinctly perceived upon the pericardium of the stomach. Here the stomach is of a peculiar structure: the stomach and the orientation of the alimentary canal, and the position and form of the liver, are well displayed. The next preparation (No. 765), which exhibits the mouth, esophagus, and stomach of the same species, shows the junction of the two organs whereby the alimentary canal and the luminal canal (catal. Gal., vol. i.) is situated at nearly the middle of the posterior surface of the alimentary canal, and protected above by the rudimental shell, so that this part of the structure of animals is, as in other points, nearly allied. The preparation in the College Museum, No. 882 (Gallery), is a specimen of Helix Pomatia with the shell removed in order to show the heart, which is situated on the left side of the dorsal aspect of the body near the posterior part of the brachial sac. The pericardium is laid open, and the heart being injected, the auricle, from its thinner parts, is seen of a red colour; a biretial and vascular (p. 747) ventricle, and the auricle, may be observed ramifying over the liver. No. 883 is a specimen of Limax ater, Linn. (Slug), to show the heart situated in the middle of the back. (Catalogue, Gallery, vol. ii.).

Respiratory System. In some shells the soft parts of Helix Pomatia are prepared (No. 1081), to show the pulmonary sac, which receives the air by an anterior orifice on the right side of the neck. The sac is laid open from that side, and no organ has been found within it except the roof of the cavity, upon which the pulmonary sac opens. The organ of respiration, then, is the surface of the lungs. It is of the same form as the shell, which, by the operation of nature, is divided into branchial sacs. This subject is described in the detailed and well-arranged work of Olbers, entitled "Die Blutvordernde der Thiere," 1822 and 1830; and will be illustrated by a series of admirable engravings.
removed, and the orifice by which the air is admitted and expelled left entire. No. 1083 is the portion of the vascular varicities of the pulmonary sac removed from the preceding preparation, and inverted to show the ramifications of the pulmonary vessels. Those are continued from the veins of the body without the interposition of the propelling ventricle. No. 1084 is a similar preparation. No. 1083 shows the roof of the pulmonary sac of another Helix Pomatia, with the vessel injected; and collection in preparation of a slug (Limax Rafza, Linn.) — No. 1304 — laid open longitudinally along the back to show the nervous system. The viscera are removed. In this, says Professor Owen, the animal is so copiously provided adheres so strongly to these *piculi (picula), when wholly projected from the body, that they are for a time held by it. Perhaps we may suppose the touch of this tiny organ has a much more powerful effect on the muscles of a cord to regain these darts after they have been discharged; but such we should hold equally fabulous with much of the accounts related by various authors. These figures are almost similar to the common snail, and terminate in the ventricular disk or foot from their outer sides. A small unsymmetrical ganglion is formed on the nerve, which supplies the heart and respiratory apparatus. No. 1003 is the same species of slug laid open along the ventral aspect, and the viscera removed, to show more distinctly the subcerebral ganglion and its nerves. A bristle occupies the place of the esophagus. No. 1306 exhibits the nervous system of a Black Slug removed from the body. (Catalogue, Gallery, vol. ii.)

**Touch.** — In the shell-snails the sense of touch will be readily supposed, by any one who has observed the motions of a common garden-slug, to reside especially in the ventral disk or foot, inasmuch as it is furnished with very numerous nerves radiating to supply the body. The principal nerves are the two inferior ones, which extend on either side the mesial line of the ventral surface straight to the posterior extremity of the body, and form a sort of transverse ring shape, as an organ of the eye of some sort of orifice, or of a white yellow colour, as in *Achatina* and *Bulinus*. (BULINUS, vol. vi., p. 8.) Those hard-shelled eggs are generally oval; in other instances they are round. Specimens of this species of slug, showing the shell after the visceral organs and the egg-shell, are now in the British Museum (from Mr. Broderip's collection). In the museum of the College of Surgeons are several preparations, showing the same parts in the shell-saln, now numbered from 3000 to 3005, but these numbers will be changed when the catalogue of that part of the collection comes to be printed, and we have reason to believe that some other orifices exist on this great medium of the chest, or other parts. (Professor Owen, Catalogue, Gallery, vol. iii.)

**Sight.** — In the gallery (Physiological Series) of the same room, there is a Pistilus (No. 1756) with the posterior tentacles or horns extended, showing the eye-specks, or ocelli, situated at the side of the exterior of each horn. In this position, although destitute of appropriate musculi, the eye has the advantage of all the mobility with which the tentacle itself is endowed; and by the admirable construction of the same part, they are defended from external injury by being retracted and inverted, with the extremity on which they are supported within the cavity of the tentacle, as in a sheath.' (Professor Owen, Catalogue, Gallery, vol. iii.)

**Generative Functions.** — In the common shell-snails (Helix), the male and female sexual organs are complete in one and the same animal. The male consists of a pair of organs, each containing several individuals to produce a fruitful impregnation. The situation of these organs is at the anterior orifice of the shell; and at the time of congress a sharp horny or glass-like exocutaneous operation was employed to open the peritoneal pouch of stimulus. Some assert that these appendages are absolutely shut out from the body of one snail into the body of another, and engravings even exist where two snails are represented cohabiting, but the best proofs of this I have never had an opportunity of seeing. (Professor Owen, Catalogue, Gallery, vol. iii.)

*Ephemaneleon* describes the eyes in detail; but some are of opinion that the organs above alluded to are not eyes. Sir Everard Home denies that they are eyes. (Cl. Gandor, who observed the first conch, says they have senses of taste and touch. The latter of which he admits it is possess of in an extraordinary degree.) Also see Mr. Burch (J. Benn, Esq., Zoel. Journ. 1794) Mr. Burch, in his paper, with notes, by T. Bell, Esq. (Zoel. Journ. vol. i.)

See also Mr. Bupaphus, in his Observations on the Vegetable Crops of the Helix, usually regarded as their prey, &c. (Zool. Journ. vol. ii.)

No. 797.
The peculiar substance was observed fixed in the upper jaw; this proved to be the new tooth. The parts then became further developed and more conspicuous, occupying a greater space, and in two or three months the injury was so completely repaired that the lighter color only of the new head served to distinguish it from the old one. These experiments were confirmed by others, by Girard among the rest.

**Hybernation.**—M. Gaspard remarks that in our temperate climate, as in the first autumnal chills are not, about the commencement of October, generally, *Helix Pomatica* becomes indolent, loses its appetite, and associates in considerable numbers on hillocks, the banks of ditches, in thickets, hedges, and such places. In a day or two the animals all but expel the body of the secretions of the testes, and then hide themselves under moss, grass, dead leaves, or the like rubbish. Here each forms for itself, with the anterior part of its muscular foot, a cavity sufficiently large to contain at least its shell; this cavity enlarges and excavates by turning itself round on every side, then raising itself against the sides of the cavity, and at last against the roof formed of moss or leaves, or a small quantity of earth brought there by its motions. When it has succeeded in bringing the aperture of the shell to nearly a horizontal position, it stops. The foot is soon contracted within the shell, the snail then expands, so as completely to fill the cavity which is at this period very wide; and then inspires a quantity of air, after which it closes the respiratory hole. When this is done, a fine transparent membrane is formed with its mucus, and interposed between the mantle and any extraneous substance lying above. Then, within it is secreted a quantity of very white fluid over its whole surface, which sets uniformly, like plaster of Paris, and instantly forming a continuous covering about half a line thick. When this is hardened, the animal separates its mantle from it by another and stronger mucous secretion; and after a few hours, expelling a portion of the air it had previously inspired, it is enabled to shrink a little farther into the shell. It then expels the other free foot, pushes forward, and thus retires farther into the shell. In this way sometimes a fourth, fifth, and even sixth partition are formed, with intermediate cells filled with air. Such is M. Gaspard's rule; but Mr. Bell does not completely explain the manner in which the excavation is formed. 'It is not by the pressure of the foot,' says the last-named zoologist, 'and the turning round of the shell, that this is principally affected. A great quantity of viscid mucus is secreted on the under surface of the foot, to which a layer of earth or dead leaves adheres; this is turned on one side, and a fresh secretion being thrown out, the mantle is then united with the mucus so left. The animal then takes another layer of earth on the bottom of the foot, turns it also to the part where he intends to form the wall of his habitation, and leaves it in the same manner, repeating the process until the cavity is sufficiently large, and the shell somewhat smooth, even and forming the dome or arch of the form, a similar method is used, the foot collecting on its under surface a quantity of earth; and the animal turning it upwards, leaves it by throwing out fresh mucus, and this is repeated until a perfect roof is formed. As I have very often watched this curious process, I am certain of the facts. On removing very carefully a portion of the roof soon after its completion, I was enabled to see the formation of the operculum. In about an hour, or even less, after the hybernaculum is covered in, the whole surface of the collar of the mantle instantaneously pours out the calcareous secretion in considerable quantity. This is at first a very thick cream, but very soon acquires exactly the consistence of bird-lime, being excessively adhesive and tenacious; and in about an hour after it is poured out it is perfectly solid.'

Recent investigations on the inner structure of the operculum of various species by Dr. Lewes, show that in a large number of cases, the formation of the operculum, is again inspired, and each separate membranous partition broken by the pressure of the hinder parts of the foot projected through the mantle, when it arrives at the calcareous operculum, the animal, making a last effort, bursts and detaches its most obtuse angle. Then insinuating by little and little the edge of the foot between the shell and the operculum, it forces the latter off or breaks it away. (See the Abstract of M. Gaspard's Memoir, with notes, by T. Bell, F.L.S., ' Zoological Journal,' vol. i, the whole of which is well worthy the perusal of the student in natural history and physiology.)

**Systematical Arrangement and Natural History.**

We now proceed to give a sketch of the views of systematists with regard to this numerous tribe of animals.

The genus *Limax* (Slugs) is placed by Linnaeus at the head of the Mollusca, including *Vaginula*, *Tentacella*, and *Perna-cella*, the *Excargells* (*Heliz*), the *Nompinelle* (*Clavius*), and the *Agutines* (*Achatina*). Lamark defines his *Octoactidae* to be air-breathing *Trachelipods* (*Trachipodes atricole*), provided with or devoid of an operculum, and having cylindroconic tentacles. Their shell he characterizes as spiralvate, having no projecting parts on its exterior except the rim and ribs (costules) of growth, and whose aperture is often recurved or reflected outwards. He divides this, the first family of his *Phylogaphes* (plant-eating) *Trachelipods*, into the following sections and genera:

1st. *Fours Tentacles.*
- *Helix*, *Caracolla*, *Anastoma*, *Helentina*, *Pupa*, *Clavilla*, *Bullina*, *Achatina*, *Succinea*.

2nd. *Two Tentacles.*
- *Auricula* and *Cyclostoma*.

M. de Férussac makes the fourth and fifth orders of Gastropoda, consist of the Pulmoniferous Gastropods, within one operculum, and the Pulmoniferous Gastropods with a operculum (*Pulmones opercule*).

The fourth order consists of the following suborders and genera:

- 2nd. *Aquaticula* and *Cyclostoma*. M. de Férussac makes the fourth and fifth orders of Gastropoda, consist of the Pulmoniferous Gastropods, with an operculum, and the Pulmoniferous Gastropods with an operculum (*Pulmones opercule*).

The fifth order consists of the following genera:

- 1st. *Spiralina* (*Helicinum*).
- 2nd. *Helicinum* (*Cyclostoma*).

- *The Pulmonobranchiata* form the first order of M. de Blainville's *Paracostophora Monostoma*, the second subclass of the second class (*Mammalia*) of the *Mollusca*.

M. de Blainville gives the following description of the *Pulmonobranchiata*:

- Organs of respiratory reform or *särini* hair, lining the roof of the mouth and floor of the pharynx, by which the animal is enabled with its body within the shell and without expelling its contents, to ensure its escape from confinement. The air which is contained in the shell, and which had been expired on the animal, is expelled by the power of the partition, or the border of the operculum, which is closed, and the shell and operculum, which is again inspired, and each separate membranous partition broken by the pressure of the hinder parts of the foot projected through the mantle, some live on the banks of fresh waters, and others on the sea-shore (rivage des mers). None bury themselves in...
the mud, with the exception of the Limacinae, during the rigorous season; all are phytophageous. Some of them are known in all lands.

M. de Blainville divides the Palmbranchiata into the following families and genera:—

1st Family, the Limacinae. (Limnea, Physa, Planorbis.)

2nd Fam., the Auriculacea. (Pedipes, Auricula, Pyramidella.)

3rd Fam., the Limacinidae. (Limacina, Bulimus, Achatina, Laurina, Achatina, Tomogorlea, Heliz, Helicoidea—Testacella, Parapulmo, Helixa, Limax, Onchidium.)

M. Latrielle divides the Palmbranchiata, his fourth order of his first section of Gastropods (the Hermaphrodites), into the following families and genera:—

1st Fam., Nudilimacinae. (The Slugs and Planorbida.)

2nd Fam., Geocoelidae. (Helicarion, Vitrina (Helicolimax), Succinea, Heliz, Caracolla, Anostoma, Pupa, Chloris (Grapheina), Cynulina, Bulimus, Achatina, Ver PCA, Atrica.)

3rd Fam., Laimococclidae. (Caryophylleum, Scarabaeus, Auricula, Conus, Caecula, Laimina, Physa, Planorbis, Anomia.)

The second section, the Disciniac Gastropods, consists of his fifth order (Pseudomarginales), and contains two families:—

1st. The Helicinidae (Helicina). 2nd. The Turbinoclidae (Cyclostoma).

M. Rang in his ‘Tableau Méthodique’ makes the Limacinae of France (Asculiopodites collinae of Lamarck; Limacinae of De Blainville; Gecoelidae of Latrielle) the second family of the Palmbranchiata. (Cricares De Blainville.)

M. Rang, following De Blainville, thus, with some slight alterations, defines and arrange the family:—Animal elongated, having the body distinct from the foot, and forming a twisted spiral, rarely furnished with a cyrass, but always showing a flatly collar which closes the shell. Testacea to the number of four, rarely two, the upper coiled. Pulmonary cavity placed forward, and opening in the thickness of the collar. Organs of generation united in front; vent near the respiratory orifice. Shell always spiral, very variable in form, receiving the animal more or less completely. Terrestrial.

** Tytheracous.**

A. A cyrass and a collar.

1st Genus. Vitrina, Draparnaud (Helicolimax and Helicodinac). 2nd Collar without a cyrass.

1st Genus. Helix, Muller (Helix, Succinea, Amphibolus, Acanthus, Poydonites, Tomogorlea, Anostoma, Caracolla, Bulimus, Achatina, Polyphemus, Pupa, Clausilia, &c., &c., &c.).

(?) Redundant.

1st Genus. Helicodinac, Draparnaud (Helicodinac and Helicolema). 2nd Redundant.


I. Subgenera. Helicophanta, Fussac. 2nd Peristome simple.

1st Group. Vitrinites, F. (Helix brevispe, &c.). 2nd Peristome thickened and subreflected.


II. Subgenus. Cochliodyna, F. (Succinea, Drap.; Amphibolus, Lam.; Amphibolus, Monf.). (?) Unfused.

1st Genus. Cochloidea, F. 2nd Subgenus. Cochliodina, F. (Helix, Linn.)

Columella solid and twisted.

1st Subgenus. Helicodinac, Draparnaud (Helicodinac and Helicolema). 2nd Shell perforated.

1st Group. Collolumatella. 2nd Group. Peristomites, F. (Helix ligata, &c.).

Shell univalved: umbilicus entirely covered.

Shell globulose or subglobose. 2nd Subgenus. Acanthus (Helix aspera, &c.).

Shell imperforate.


Aperture defended by one or more elongated and internal lamellae.


Shell white or reddish, very much ornamented with bands or small vivid-coloured lines; epidermis itensile, never hairy; sometimes carinated; peristome bordered but not spread.

4th Group. Helicodinac, Draparnaud (Helicodinac and Helicolema).

* Shell somewhat depressed or globulous. (Helix, Linn.)

Here it is that the new group Strombatella should be inserted. Mr. Gray, who established it, stated in his ‘Synopsis of Mollusca, Nat. Hist. vol. v. New Series’ that the Antiquite lamp (Helix ringer, Linn.), on which Lamarck established his genus Anostoma, had been long known and valued, on account of its rarity and strange form; the animal turning up the last shell before it completes its growth, so that the mouth of the shell is even with the outer surface of the spire. A similar form, Mr. Gray remarks, has been lately observed among the shellfish, which on account of its resemblance to the Strombatella by the roundness and simplicity of its mouth. M. Deshayes has separated into a genus under the name of Strombatella. (See P. F., Fussac, p. 109.) Mr. Gray in his paper on the shells of Helix (Phil. Trans., 1830) pointed out that some land shells, as Helix aspera, when they arrive at a certain period of their growth, throw their apertures outwards, as also regular animal in the shell had been crushed, producing what may be considered as a natural distortion. Having since that time had the opportunity of observing other species of a similar structure, and finding that they all agreed in the general form and position of their mouth, Mr. Gray was induced to consider them as forming a peculiar group, for which he has proposed the name of Strombatella. One of the species, he states, forms, during the dry season, a hard, thin, calcarious sphenus, differing considerably in structure from any that has hitherto been observed among the Helicidae; but this, he observes, may be only a peculiarity of the species, though the epiphragms in this family often forms a good subsidiary characteristic. The following is Mr. Gray’s definition of Strombatella:—

Animal like Helicids. Shell ovate or oblong; when young, sub-eheimidious, deeply umbilicated, with weakly excurled whorls. As the whorls increase, the length of the shell is borne partly towards the right and dorsal side of the shell, and the umbilicus becomes compressed and often cut off by the two sides of the shell; the shell at length becomes obliterated.

Mr. Gray gives six species, which he divides into four sections, and says thatThese shells inhabit the tropical parts of Africa and South America; and that two of these species of these two distinct countries appear to be very nearly allied. He further observes, that the situation of these shells, like the Anostoma, &c., must remain indeterminate, since the two sides of the shell have grown upon one another, as does the Helix, &c. If, now, a new shell were added to it, it would entirely alter the form of the shell.

P. 2
** Shell trochoid and a little carinate. (Helix *pyramidata,* &c.) VII. Subgenus. *Helicostyla,* F. Columella strait; peristome simple; shell subdepressed. 1st Group. *Aplostomes,* Aplostoma, F. (Helix *miscella,* &c.) Columella twisted, truncted as it was at its base, or furnished with an internal spiral rib, forming a gutter and appearing under the form of a tooth or calibity. 2nd Group. *Canalculata,* F. (Helix *delineta,* &c.) Columella flattened, without either tooth or lamina, forming a sort of gutter at its intersection with the penultimate whorl; peristome reflected. 3rd Group. *Margarites,* Felicostyla, F. ** Evolution. Cochliotes. * Mouth generally toothless. 1. Columella solid. a. * En filet, not truncated at its base. VII. Subgenus. *Cochlostyla,* F. Peristome reflected. 1st Group. *Lomastomes,* F. (Helix *metaformis,* &c.) Peristome simple. 2nd Group. *Aplostomes,* F. (Helix *Hyphrenem,* &c.) * Columella solid, flattened, and truncated at its base. † Shell conic or very ventricose; aperture enlarged. IX. Subgenus. *Cochitoma,* F. Shell conical; mouth short; anterior border advanced. 1st Group. *Achabana,* F. (Helix *exorata,* &c.) Shell ventricose; mouth very large; external border in a vertical direction. 2nd Group. *Achitina.* ‡ Shell ovoid or turriculated; mouth elongated and narrow. X. Subgenus. *Cochitopa,* F. Shell ovoid; mouth long; exterior border is a vertical direction. 1st Group. The *Polyphemes,* Monit. (Helix *Primus,* &c.) Shell turriculated, mouth short, external border a little advanced. 2nd Group. *Styloides,* F. (Helix *fulminea,* &c.) 2. Shell perforated or unincised; umbilicus masked or unincised; peristome simple. a. Whorls of the spire equalized; the last whorl shorter than the others united. XI. Subgenus. *Cochlicella,* F. Only group. *Turria,* F. (Helix *conoides,* &c.) * Last whor of the spire generally larger and longer than the others united. XII. Subgenus. *Cochlogena,* F. † Peristome simple or thickened, but with sharp edges. a. Shell umbilicated, columella straight. 1st Group. *Umbilicata,* F. (Helix *fossamata,* &c.) * Shell perforated, columella twisted. 2nd Group. *Perforata,* F. * Shell oblong. (Helix *fusoclinata,* &c.) ** Shell ovoid. (Helix *costulata,* &c.) ‡ Peristome reflected or dentated. Mouth crescent-shaped, without either teeth or folds; peristome reflected and regular; columella twisted, perforated; last whorl of the spire somewhat shorter than the others united. 3rd Group. *Lomastoma,* F. * Last whor of the spire longer and longer than the others united; shell ornamented with vivid colours. (Helix *Fusamatt,* &c.) ** Last whorl shorter and less than the others united; shell unicoloured. (Helix *Helicata,* &c.) Mouth short, crescent-shaped; peristome simple or thickened and regular; columella twisted, more or less projecting and bent, or furnished with a flat which turns upon it and makes it appear truncated; umbilicus masked or exactly closed; last whorl of the spire sometimes shorter than the others united. 4th Group. *Helicites,* F.; *Achatinella,* Sw. * Shell coniform. (Helix *vulpina,* &c.) ** Shell turriculated. (Helix *turritella,* &c.) *** Shell ovoid. (Helix *tritista,* &c.) Mouth angular at its extremities, or overlaid superiorly, often narrowed by the sinusities of the 'external border' columnella large, more or less spiral, and forming a flat more or less projecting in the aperture. Peristome thick and reflected; last whorl of the spire longer and more convex than the others united. 5th Group. *Stomatoides,* F. (Helix *Auris Lesperus,* &c.) Mouth crescent-shaped, rather angular at its extremities, most frequently furnished with short teeth at the peristome, which is bordered or a little opened out or reflected; never any lamina; columella twisted, hollow, flattened at its base, or forming a protuberance; generally perforated. 6th Group. *Donatostomes,* F. (*) Last whor of the spire longer and longer than the others united. (Helix *Auris Boisot,* &c.) ** Whorls of the spire equalized, often pressed and narrow. (Helix *turgens,* &c.) (**)* Mouth generally furnished with teeth or lamina. 1. Without g tựters; peristome generally not continuous. XIII. Subgenus. *Cochlodonita,* F. Shell cylindrical. 1st Group. *Pupa,* F. (Helix *Urea,* &c.) Shell fusiform. 2nd Group. *Cerates,* F. (Helix *Moricandi,* &c.) 2. One or two gutters; peristome generally continuous. XIV. Subgenus. *Cochlodina,* F. (*)* Shell right-handed. † Mouth without teeth or lamina. Peristome not continuous. 1st Group. *Papoides,* F. (Helix *Cerinula,* &c.) Peristome continuous. 2nd Group. *Tracheloides,* F. (Helix *Simonii,* &c.) ‡ Shell armed with great plains or elongated teeth (Helix *Gorgansy,* &c.) (**)* Shell left-handed. Mouth without any lamina. *Balea, Gray.* 3rd Group. *Anomalodes,* F. (Helix *pervera,* &c.) Mouth armed with lamina, one of which performs the part of an abradial operculum. 4th Group. *Claviola,* Draupnus. (Helix *torticolis,* &c.) Dicères. Genera. Vertigo. (Muller.) *Animal* elongated, demi-cylindrical, with a rather large spiral body; a collar closing the shell and carrying theifice of the pulmonary cavity on the right and at the external angle of the aperture; two tentacles only, cylindrical and retractile, oscillated on their summit; organs of generation united; showing their orifice near the right tentacle, oviparous. *Shell* cylindrical, very spiral; aperture straight, in the direction of the axis, short, often dentated; peristome often sinuous and reflected; right or left handed (dextral or sinistral). *Partula.* (Férussac.) *Animal* elongated, semi-cylindrical, with a rather large spiral body; a collar closing the shell and carrying theifice of the pulmonary cavity on the right and at the external angle of the aperture; two tentacles only, cylindrical and retractile, oscillated on their summit; organs of generation united; showing their orifice near the right tentacle. Ovoviparous. *Shell* oval, pointed; spire conical, last whorl convex and longer than the others united, orifiss of the spire four to six; aperture straight in the direction of the axis, short, sometimes dentated or furnished with elevated lamina; peristome commonly very much reflected, with the edge in the same vertical plane; columellar side or lip, callous at its base; dextral or sinistral. M. Rang's 3rd family of inoperculate pulmonatous molluscs consists of the *Auriculae de Férussac* (*Auriculae* de Blainville; *Auriculae* de Gray; *Limnochitides* (4 coils) of Laclotte). They present both terrestrial or marine, and one has been announced as fluvial. They comprehend the genus *Carychiom, Auricula, Auricula and Conoinea,* Lam.; *Melanopsis,* Montf.; *Pedipes,* and *Scorbutus.* To these may be added *Cithonia, Gray; Amea, Hartmann,* and *Montaediculata.* None of these can be considered to belong to the *Helicidae,* properly so called. The 4th family, the *Limnaces of Lamarck* (*Limnacea*
of De Blainville; Limnocochilus (without a collar) of Latreille, is entirely flat, with a foot well developed, and organs Flora, Lam. No., or, as Lamarck writes it, Lymnaea, and Physa, Apixea, Flem., and Amphipiles, Nils. This family cannot be considered as belonging to the Helicidae, properly so called.

**Pulmo-Operculum** of Ferussac (Trachelipodides colinacids of Lamarck; Pectinibranches of Cuvier; Chismobranches crocistomes of De Blainville; Pneumotomes of Latreille) is thus defined by M. Rang—

"An operculated pulmo, being a foot well fitted for creeping, no branchie, but a pulmonary cavity receiving the ambient fluid by a large opening placed above the head; tentacles two in number; organs of generation on different individuals.

**Shell external, complete, spiral, globulose or conical.**

**Operculum** calcareous or horny. All terrestrial.

M. Rang observes that this order was established by M. de Ferussac at the expense of the Pectinibranchiate of M. Cuvier, and for the genus Cyclostoma only; but afterwards M. de Ferussac added to it the genus Helicina, which was, at one time, confounded with the Colimacids of Lamarck. At present, continues M. Rang, the Operculated Pulmo is established very well the passage from the Pulmonians to the Pectinibranchiates, because they are related to the first with reference to the organs of respiration, and to the second with reference to the separation of the sexes.

1st Family.

**Helicinae of Ferussac** (Helicinidae of Latreille).

**Animal** furnished with a collar, and two filament tentacles carrying the eyes at their external base upon tubercles.

Shell sub-globose, with a demibranch aperture, and the columella transversal and delicate. **Operculum** horny, sometimes calcareous externally.

M. Rang observes that M. de Ferussac established the two families of Helicinae and Turbinidae for two genera nearly approximated, and that it would be perhaps more convenient to unite them, the difference between them being really not very remarkable, except in their testaceous envelop; but Mr. Gray has pointed out that there is an s.n.r., and the other a s.p.n.r. See also the Rev. M. G. Berkeley’s memoir hereinafter alluded to.

Genera. Helicina, Lam. (Olivya, Say; Ampullina, De Blainville.)

**Animal** very spiral, furnished with a proboscisiform head and a bilabiate muzzle; tentacles filiform, carrying the eyes at their external base on tubercles; foot short, rounded, with a transverse anterior furrow; pulmonary cavity opening in front of the mantle by means of a large transversal slit.

Shell sub-globose or conid, a little depressed, not umbilicated, with a low spine, an aperture semi-oval, or nearly oval, at the base of the columnella, into which it is partly placed, and a left lip enlarged upon the umbilicus, which it entirely covers; columella transversal and planulata. **Operculum** horny, sometimes slightly calcareous externally, lines of growth concentric.

Helicina was established by Lamarck, and placed by him among his Colimacids. M. Rang is of opinion that the genera Ampullina of De Blainville and Olivya of Say ought to be referred to Helicina, an opinion which seems to be in union with that of M. de Blainville himself, who has arranged both those genera under Helicina in his Manual. Mr. Gray has published a valuable monograph of the genus in the first vol. of the Zoological Journal; and the latter Rev. Landsewnding Hall has recorded some other species, with plates of the animal, in the same work, vol. iii.

The definition of M. de Ferussac’s second family, the Turbininidae, is—animal without a collar, provided with two tentacles attached at their external base.

Shell conid, more or less elevated, with a roundish aperture and continuous borders. **Operculum** calcareous.

**Cyclostoma.** (Lamarck.)

*Animal* very spiral, furnished with a proboscisiform head, which bears two cylindrical tentacles, convex, or swollen at their summit, contractile, and oscillated at their external base; foot elongated and oblong; pulmonary cavity compound; aperture at the summit, a minute slit at the superior and anterior part of the mantle; position of the male organ indicated by a tentaculiform appendix situated at the right side, and connected to the mantle by a filamentous appendage, this one being disconid, discoid, or turriculated, more or less elevated, with a sharp or mammillated summit, having all the whorls rounded; aperture round, with continuous and reattached borders. **Operculum** calcareous, with concentric lines, summit subcentral. (Rang.)

The species of Cyclostoma are very numerous, and many of them are very beautiful. Mr. G. B. Sowerby has added considerably to the catalogue. They are principally the inhabitants of temperate or warm climates; there is one English species, Cyclostoma elegans. The reader will find an excellent paper on the anatomy of this species, by the Rev. M. G. Berkeley, in the 4th vol. of the ‘Zoological Journal.’

M. Rang adds to these pulmoniferous operculated mollusks, the fossil genus Ferussina, Grateloup. (Strophostoma, Deshayes.)

**Shell** oval, subglobulose; aperture round, bordered, oblique, simple, toothless, turned over from the side of the spire; umbilicus more or less large. **Operculum**? (Rang.)

M. Rang remarks that M. Grateloup established this genus for a fossil shell from Dax, which seems at the first view very near to Anostoma, but which M. Grateloup, from the examination of the aperture, concluded to be more approximative to Cyclostoma. M. Rang states that he participates in this opinion, which the knowledge of the operculum can alone confirm; and he goes on to observe that M. Deshayes, doublets, continuing to see the publication of this genus in the first number of the ‘Bulletin of the Linnean Society of Bordeaux,’ had subsequently published it under the name of Strophostoma. Three or four species are known. (See above, Strophizas, p. 107, note.)

Some may have doubts as to the propriety of placing those operculated pulmoniferous terrestrial mollusks under the family Helicidae. But we believe, notwithstanding the difference of the operculum, that their general organization will warrant their placing them under the terrestrial class, and that shell-sausages may without violence be placed in one great family, which may be subdivided into the Helicidae without opercula, and the Helicidae with opercula.

Before we conclude this part of the subject, we must draw the reader’s attention to the following arrangement proposed by Mr. Gray in the ‘Annals of Philosophy’ (August, 1824):

**Terrestrial.**


**Aquatic.**


Gasteropodous (mante shield-like). Onchitidae.

In the paper above alluded to, some interesting observations are made on the affinities of the family; and, with regard to the arrangement, Mr. Gray informs us that he has in his M.Sc. corrected that of the first division, because the distinction between the two first families, though it is that used by Lamarck, Cuvier, and others, is, in his opinion, artificial, and of little importance; and the knowledge which he has since acquired of the animals of several genera which were before unknown, has shown him that the character which De Ferussac pointed out as the distinction between Arion and Limax (but which many succeeding naturalists have considered of little importance) is even of more importance than was accorded it by De Ferussac, affording a good character for dividing the Land Pulmonibranchiate Mollusca into two families. Thus, he observes, the *Ariodidae* is—without the organ of generation on the right side immediately below the espiritu; whilst in the *Limacidae* there is no gland on the side of the tail, and the orifice above referred to is just behind the base of the upper right tentacle. There is also, he states, an important difference in the nervous system between the two families: in the first the under part of the infra-gastric ganglion is 4-lobed, whilst it is only 4-lobed in the *Limacidae*. Mr. Gray is further of
people if ge-

graphical distribution and habits.—the helicidae are most widely diffused over the surface of the earth; scarcely any countries but those where the climate is surprisingly rigorous are without some species of the family. Many of the shells are strikingly beautiful in form and colour, and these are mostly the inhabitants of intertropical countries. Some of the genera (Achatina, for instance) attain a very large size, and lay eggs in proportion. *Helix aspersa*, the common garden-snail, is distributed over a large portion of the globe. It is found, for instance, at the foot of Chimborazo, in the forests of Guiana and Brazil, and on all the coasts of the Mediterranean in Europe, Asia, and Africa. *Helix Pomatia* has been naturalized with us, and is still found in some countries. The first importation is attributed by some to Sir Kenelm Digby. Merrett mentions it as a British inhabitant before his time. A moist and rather warm state of the atmosphere seems most congenial to this family. To avoid great dry heat they get under stones, under old trunks of trees, leaves, &c. &c., and some of the species will burrow into the earth for protection against it. A shower will bring them forth in such numbers sometimes, the smaller species especially, as to induce the belief in some cases that it has been raining snails. Most of the species hibernate.

utility to man.—the helicidae, from their voracity, are very injurious to the agriculturist and horticulturist; but there can be no doubt that the larger species are good food. We know that they were a favourite dish with the Romans, who had their coelentera, where they were regularly fat-
tened with new wine boiled down and meal (*sapa et farre, &c.*). (Pliny, Hist., lib. ix., c. 56.) *Helix Pomatia* is used as food in many parts of Europe during Lent, and the snails are kept in an escargoir (snailery), which is generally a large place covered half a foot deep with herbs, where the animals fatten. Many are familiar with the passage in Pliny (loc. cit.), who, on the authority of Varro, relates the incredible size to which the art of fattening had brought the snails. There must, one should think, be some mistake in the text, which says, 'Cujus aris gloria in eam magnitudinem producit sit, ut octoginta quadrantes caperent singulum calicem.' Pen-
nant, referring to this and to Varro (*De Re Rustica*), says, 'If we should credit Varro, they grew so large that the shells of some would hold ten quarts! People need not admire the temperance of the supper of the younger Pliny (*Epist., lib. i., Epist. xx*), which consisted of only a let-
tuce a-piece, three snails, two eggs, a barley cake, sweet wine and snow, in case his snails bore any proportion to those of Hippus.

the following cuts, and those given under Bullimulus and Bulinus, will afford the reader an idea of some of the forms of the helicidae.—*Anostoma, Streptaxis, Carocolla, Belea, Partula, Vertigo, Clausilia, Cyclostoma.*

![Helix Pomatia](https://via.placeholder.com/150)

**Anostoma depressum.**

**Streptaxis contusa.**

![Carocolla Lamorkii](https://via.placeholder.com/150)

**Carocolla allhitatoris.**

![Pupa Uva; Pupa Chrysalis, with the animal](https://via.placeholder.com/150)

**Bulea fragilla, magnified.**

![Partula Austalia](https://via.placeholder.com/150)

**a, Vertigo pusilla; b, another species of Vertigo, with the animal; both magnified.**
The strata of Bourdelotius, the vols. 15-6, while Dr. Schmidius, 1
fossil of Pliocene three Montagu, hayes, Ferussac,
tion of animal's appearance both of smells naked
Tricca entitled who of 1836).

Helictus. Helicidae are by no means rare. Thus M. Deshayes enumerates thirty-five species of Helix, two of Anostoma, one of Helicea, three of Pupa, two of Clavulina, three of Bulimus, three of Achatina, seven of Patella, and six of Cyclotoma, etc., as fossil (tertiary), mostly in the Pliocene period of Lyell, and many of them as both living and fossil.

The student should consult especially the great work of Férussac, and the writings of Covier, De Blainville, Deshayes, Draparnaud, Gray, Lamarck, Linnaeus, De Montfort, Montagu, Range, Sowerby, Swainson, etc., etc., and the works of Bosc, Gaspard, Réamur, Redi, Scheffer, Spallanzani, and Swammerdam. He will find many new attacks on the subject recorded in the Proceedings of the Zoological Society of London, and in Miller's Synopsis Testarum (Berlin, 1836). He should also consult M. Boullée's Catalogue of the Terrestrial and Fluvial Testacea of Auvergne, both recent and fossil, among the latter are two species of Vertigo.

Helicina. Helicidae.

Helicostygues. [Foraminifera, vol. x, p. 348.]

Helictis. Mr. Gray's name for a genus of quadrupeds, which inhabits eastern Asia and has the general appearance and colouring of Myalida, combined with a dentition resembling that of Gulor or Mostela, but differing from both the latter genera in the large internal central lope of the upper carnivorous tooth. The genus is thus characterized by Mr. Gray:

Dental Formula:—Incisors (primorosa) 6; Canines (lani-
arii) 1-1; molars 5-6; 1-1; 5-6

Head elongated. Feet short; soles of the feet nearly naked to the heel; toes 5-5; claws strong, the anterior ones long and compressed. Tail cylindrical and moderate. Mr. Gray exhibited to the Zoological Society new species, Helicostygus microstoma, the entire length of which was 23 inches, of which the tail measured 8. Inhabits China and smells strongly of musk. For further particulars see Zool. Pict., 1831, p. 166; Phil. Trans., part 2, vol. 58, p. 463.

Heli. ST. JEREMY.

Heliocentric (having the sun as centre), a term applied to the place of a planet, as seen from the centre of the sun, in opposition to its geocentric place, as seen from the centre of the earth. [Parallax.]

Heliocentric, was born at Emesa in Syria, in the fourth century of the Christian era. He was bishop of Tripolis in Thessaly, and is said to have introduced into his diocese the custom of depositing from their offices all priests who lived with their wives after their ordination.

He wrote in his youth a romance in the Greek language entitled * Helithpata*, which contains an account of the wonderful adventures of two lovers, Charileos, the daughter of

Hydaspe, king of Ethiopia, and Theagenes, a noble Thessalian. It has been remarked that the work of Heliodorus served as a kind of model to the subsequent Greek writers of romance. Though not without merit in point of style and animated description, it belongs to that kind of works of fiction which deal in improbabilities and strange adventures, and in no respect approaches to that class of works which fix our attention and hold on our sympathies by exhibiting a portrait of human life and its accidents. This work was published for the first time by Obscureus, 4to., Basel, 1534; afterwards by Commelinus, 8vo., 1543; Bourdelotius, 8vo., Paris, 1619; Quoy, 8vo., Paris, 1631; Schmidius, 8vo., Leip., 1772; Mitscherlich, 2 vols. 8vo., Bippont edition; but the best edition is by Coray, 2 vols. 8vo., Paris, 1804.

The *Ethiopica* has been translated into most of the modern European languages, and especially into French by De Mages, 1536, 1539, anonymous, 8vo., Paris, 1633; anonymous, 8vo., London (Paris), 1743, 1745; by Quemyeux, 3 vols. 12mo., Paris, 1638;—into Spanish by Ferdinand de Mena, 12mo., 1616;—into Italian by Ghini, 1556, frequently reprinted;—into German by Meinhard, 2 vols. 8vo., Leip., 1767; and by Götting, 8vo., 1822, said to be a good translation—into English by Underdowne, 4to., 1557; Lisle, 4to., Tate, 8vo., 1686 and 1753; anonymous, 2 vols. 12mo., 1791;—into Dutch, 12mo., 1699; and into Polish, 8vo., 1606. At least half a dozen other Greek writers of the name of Heliodorus are mentioned.

Helicornus. [Eklarbus.]

Heliotometer (Grec. the sun; "measurer," "measure") is the name given by M. Bouguer to a micrometer invented by himself about 1745, by means of which the diameters of the heavenly bodies may be measured with considerable accuracy. The construction of this instrument is a combination of geometrical and conical form, and provided with two object-glasses of equal focal length, which were so adjusted as to admit of being moved in a direction transverse to the axis of the tube. By this contrivance he was enabled to introduce at once the focus of the eye-glass may be made to diverge, coincide or lie, and by merely varying the distance between the centres of the object-glasses, and this distance is independently adjustable by a groove cut into a wheel, as the two images coincide, the angle subtended by the observed objects will be equal to that subtended by the centres of the object-glasses, which being known, the magnitude of the observed object may readily be computed when its distance is given, or the distance determined from the information thus given. As this instrument does not differ in principle from the divided object-glass micrometer, the reader is referred to the article Micrometer; and for further information relating to the invention of the *Heliotome* see "L'Académie Royale des Sciences," 1748, p. 11. [Bouguer.]

Helipsoid. [Balbek; Egypt.]

Helipora, a genus of stony Polyplax, established by Blainville, from which he introduces into the names of the Linné, and Gaimard on a recent species called by Lamarck Picollipora cerulea.

Generic Character. Animals short and cylindrical, provided with a simple circle of thick tentacula, fifteen or sixteen in number, contained in vertical or diverging cylind-
merely blackened the inner side of the eye-glass by holding it over the smoke of a lamp or candle. (Dr. Hooker's treatise.)

HELOSTAT ( hell. sect. 'the sun', and the root era, at to 'put or place') is the name given to an instrument employed in optical experiments to fix the position of the solar rays. 'Exploitation' (exploitation) is a term of light properties of light, and is usually made in a room so darkened as only to admit the solar rays through a single aperture. The solar ray thus admitted is in two respects unfavorably circumstanced for being operated upon. In the first place, from the ordinary elevation of the sun, the ray enters the room obliquely, is immediately thrown upon the floor, and thereby that portion of its length which can be experimented upon is inconveniently small. Secondly, from the obliquity of the entrance of the ray it may only be admitted during a few hours in the day, and even during that time the position of the ray will be constantly changing, and will thus require a corresponding movement of the mirror.

To remedy these inconveniences is the object of the heliostat, invented by G. Gauss, and of which the solar ray may be fixed at pleasure in any desired position on a plane mirror, and moved with a vertical and horizontal movement, and of a clock, the index of which moves in a plane parallel to that of the equinoctial. The extremity of the index is connected with the mirror by means of a long thin rod adjusted perpendicularly to the plane of the mirror. The subordinate parts, which are numerous and complicated, are explained in Desaguliers's translation of G. Gauss's 'Natural Philosophy,' vol. i., p. 107, ed. 1747; and Bichet & Pinedo 'The Experiments,' tom. ii. cap. 4.

HELI. [Heli.].

HELIX. [Screw.]

HELLANICUS, one of the early Greek prose writers, was born at Helice in the island of Lesbos, b.c. 496 (Gell. xv. 23). According to Lucian (Macrob. c. 22) he lived to the age of 85. Suidas says that he lived at the court of Amyntas, King of Macedon, together with Herodotus; but this statement is inaccurate, since there was no such king of Macedon as the name of Amyntas during the lives of Hellenic or Herodotus.

He wrote several works, which are frequently quoted by ancient writers, of which the most important appear to have been, a 'History of Argos,' arranged in chronological order, according to the successive priesthoods of the temple of Hera in that city; b. 'History of Attica, Cyprus, Aetolia, and Lesbos,' an account of Phenicia, Persia, Syria, and other Eastern nations; and some geographical pieces. Hellenic is mentioned by Thucydides (i. 97).

The fragments which remain of the writings of Hellenicus are contained in the 'Sturmius,' vol. 1, Leip. 1787; 2nd edition, 1826; and in the 'Museum Criticum,' vol. ii., p. 90-107, Camb. 1826.

HELLEBORE, WHITE. [Veratrum Album.]

Helleborus, a genus of everlasting plants belonging to the natural order Ranunculaceae, among which it is known by its having eight to ten very short tubular petals, permanent sepals, and from three to ten leathery follicles. The most remarkable species is that which produced the 'Black Hellebore,' a dangerous acid poison, much used by the ancient Greek physicians in mania, epilepsy, and dropsy. This plant, the Helleborus orientalis of botanists, was found by Herodotus in a mountainous broken ground in Greece and the Levant, where it is still used medicinally under the name of scorpius (Serpo). It has a thick black rhizome, pedate deadly on the under side, and coromynes purple flowers. Except in the colour of the flowers and the deadly leaves, it resembles the Helleborus niger, or Christmas rose, an alpine plant now common in gardens, where it flowers about Christmas time, whence its common name. Other species are H. vitrea and fucinum, two herbaceous plants, and H. viridiflora, of these the properties are nearly the same as those of H. orientalis, but less energetic. Their leaves are emetic and purgative, and are recommended in an astringent.

HELLEBorus OF FICINALIS (Salubry). H. Orientalis (Dec.), has been substituted in the Pharmacopoeia for the H. Niger, from a belief that it is more powerful. It is a perennial species, growing in mountainous places in various parts of Europe, and is reckoned to be collected in Bosnia, Bocotia, on Helicon, Ólta, and in the island of Anti- cyra; by the moderns it is gathered in Greece and the Levant, as mentioned in the previous article. The root, which is the part employed, is black, the caudex thick, the fibres extremely coarse.

The root of H. Niger will long continue to be employed as the officinal one, and it is to be regretted that many other roots, especially those of Asias speias and Alonius vernalis, which are of much greater value, are not cultivated. These may be discriminated by physical characters (particularly the internal structure) and by chemical tests. The activity of Hellebore seems to reside in its resinous matter, for which reason it is moderately good for the colic of the abdomen; but in large doses it is a fatal poison. It was celebrated in ancient times as a cure for various forms of insanity, which it sometimes accomplished by its drastic properties, and it has been employed occasionally in this and some other diseases in modern times. It is however a dangerous medicine, and one which it is rarely necessary to have recourse to. [H.'s Notes.]

HELLESPONT. [Dardanelles.]

HELMET, an ancient armour of defence for the head, still worn by the officers and soldiers of some of our cavalry regiments. Its proper name was dicnus, possibly borrowed from the Latin (of the lower age) helma, which latter word ever derives it from the Anglo-Saxon verb helur, to hide. "Helmet certainly occurs both in Cædmon's 'Paraphrase' and in the Saxon Gospels, as well as in Ælfric's 'Glossary.' Helmet was probably adopted, in the middle age, from the Italian elmeto.

As a part of defensive armour the helmet is of high antiquity: some sort of covering of this description for the head appears to have been worn by the warriors of every country. Helmets were found even among the inhabitants of the South Sea Islands when discovered by Captain Cook. Among the oldest specimens now remaining are probably those of the Greeks: the two helmets preserved in Sir William Hamilton's collection in the British Museum. Another ancient helmet, bearing an inscription, found at Olympia, was presented to the British Museum by King George IV.; and it has been employed occasionally in this and some other diseases in modern times. It is however a dangerous medicine, and one which it is rarely necessary to have recourse to.

HELMET, AN [Chemistry.]

HELMSTEDE, a town in the district of Schleusingen in the duchy of Braunschweig in Hanover, which has about 6300 inhabitants, who carry on a pretty considerable trade. Helmetstedt was formerly the seat of a univer-
ity, which was founded in 1575 by Duke Julius of Bruns-
wick, and was supported at the joint expense of the prin-
cipalities of Wolfenbüttel and Calenberg. It was one of the
most flourishing universities in Germany, till the foundation
of that of Göttingen in 1734. In 1735 the elector of Hanover, as sovereign of Calenberg, ceased to contribute his share towards its support and in 1740 Frederick the
parte, king of Westphalia, suppressed it entirely. Besides
the fine building formerly occupied by the university, and
now appropriated to the district tribunal, there are the gym-
nasia, the library and in the basement part, the printing
hall. The old town had a rampart, with four gates, now
converted into a promenade with an avenue of lime-trees.
In the neighbouring romantic forest of Marienberg are
much frequented medicinal springs; in 1700 Jacob Hein-ellus
became a member of the Liébisteinians, four enormous turrets
of Thor and Odin, surrounded with a circle of single stones.
(Kunhardt's Beiträge zur Geschichte der Universität H.;
and Ludwig's Geschichte und Beschreibung der Stadt H.
1821.)

HELIOSE. [Abelard.]
HELÍNÁS. [Ceyadilla.]
HELÓPÍDA (Leach), a family of Coleoptera insects
of the section Helécróna and subsection Stenélatron. Distin-
guishing characters: head short, obtusely terminated
anteriorly; mandibles notched at the apex; antennae placed
near the eyes, generally filiform, or nearly so, or slightly
tubular; maxillae composed of two terminal joints; the
joint of the antennae hidden above by a projecting margin
of the head; the third joint long; terminal joint of the
maxillary palpæ large and securiform; eyes emarginated
anteriorly; side of head not furnished with any joint of the
tarsus generally simple or but slightly emarginated; claws simple;
body usually convex, and of an oval form.

The larvae of these insects live in rotten wood, upon which
they feed; they are of a cylindrical form, hard to the touch,
and have six small legs, attached, two to each of the thoracic
segments. The perfect insects are, like the larva, also
found in rotten wood, or under the bark of trees; they are
rather slow in their movements, and generally adored with
mildness when caught.

In the genus Helops, as it is now restricted, the joints of the
antenna are somewhat compressed; the two basal joints
are short, the third is long; the two or three terminal joints
are short and oblong, the last joint is the shortest; the in-
termediate joints are moderately long and nearly cylindrical.
The thorax approaches a square form, or is slightly at-
tenuated behind, and is closely applied to the elytra: the
two sides of an oval form.

Helops Caraboides, an insect very abundant in various
parts of England, will afford an example of this genus. It is
rather less than half an inch in length, of an oval form
and of a dark brownish colour, and has six small legs, which
are furnished by the lights; the upper surface of the body
is finely punctured, and so are the strigae of the elytra. This insect is usually
found under the bark of trees, near the root.

Helops Cassini is a lepidoptera of the same genus, which is
common in many parts of England. This insect is nearly
three quarters of an inch in length, and of a violet-blue
colour. It is generally found in old pollard willow-trees.
The larva is cylindrical in form, of a yellowish-white colour,
and has two reserved books on the terminal segment of the
body.

Upwards of sixty species of the genus Helops are enum-
errated in catalogues, and these are chiefly confined to
Northern and South America.

HELOTS. [Sparta.]
Helsingfors, the capital of the Russian govern-
ment of Finland, at the mouth of the Wannah, in 60° 10'
N. lat., 25° 13' E. long. It contains a considerable
town, and a considerably trade in corn, fish,
iron, and deals; and important manufactures of sailcloth,
sacking, and linen. The town was built by Gustavus I.
of Sweden, and is the seat of his tenantry. The interior of
finland is defended by several forts, especially the strong
fortress Sweaborg, Finland having been taken by the
Russians in 1808, and ceded to them at the peace in
1809, no part of the town were more by them to render it an
important naval station. Since 1815 a plan for enlarging
the town has been carrying into effect. Masses of rock
have been blown up and inequalities levelled in order to
obtain a solid foundation for new buildings. Among the public
defences the most remarkable are the palace of the go-
vernment and the barracks; and likewise the magnificent
building for assemblies, on the Esplanade, which was
finished in 1835. After the destructive fire at Abo, the
university, called Alexander's University, was transferred by
an ukase of 21st December, 1827, to Helsingfors. It is
divided into four faculties, with 22 professors; and has a
library and botanical garden. There are now above 400
students.

HELSTON. [Cornwall.]
HELVELLYN. [Cumberland.]
HELVETIUS, born at Paris in January, 1715, and was educated at the Jesuits College
of Leipsic-le-Grand, where his earlier years were far
betokening those talents of shrewdness and observation
by which his writings subsequently exhibited. Having passed
through a course of local study, Helvetius was sent to his
maternal uncle d'Armaincourt, directeur des fermes at Caen,
in order to acquire a practical knowledge of finance, and
he shortly afterwards obtained the lucrative appointment of
forger-general, through the influence of the queen Marie
Leczinsky, to whom his father was physician. But
disgusted with the oppressive nature of its duties, which however
he discharged with singular facility, he resigned this
situation, and purchased that of chamberlain to the king's
household. At this period Helvetius led a disorderly
life, without having any elevated or moral end in view, though
his general conduct was relieved by occasional acts of the
worthy. He composed a short treatise, On the Nobility
generated respecting the French, a work which may have
been led by an inordinate vanity at first for universal
amid. Thus, in order to gain the applause of the theatre, he
danced on the public stage in the mask of Jullier (for masks
he had not yet been known), and he composed a so-called
temporary study of mathematics was stimulated by the bellowings
and attentions which were lavished by the highest circles at Paris
upon Maupertuis after his return from a scientific visit
to Lapland. Aspiring to rival the dramatic fame of Vol-
taire he composed a tragedy, The Comedy of Errors,
and upon the appearance of Montesquieu's work, L'esprit
des Lois,' Helvetius declared that he too would raise a
monument worthy to stand by the side of that of the philo-
sophical legist. Heavily as Helvetius was now
t, his
t, and an act of beneficence was as dear to him for his
own sake as the applause which he courted so eagerly.
When Saurin the academician married, Helvetius not only
made him a free gift of 200/. but also settled upon him an
annuity of 800/., and when Marivaux, to whom he allowed
a yearly pension of 1200/., forgot the deceivings of gratitude,
Helvetius mildly observed, ' How would I have answered
him if he had not, by accepting my favours, laid me under
an obligation to him?'

In 1751 Helvetius married the beautiful and accomplished
doughter of the Comte de Ligneville and niece of Mdl.
Geffrigne, by whom he had two sons. But this time he lived chiefly in retirement at a small estate at
Voré, enjoying with his wife and children the pure pic-
ures of domestic life and ameliorating the condition of his
people. He was a great lover of justice, and took an active
part in the game of his estates, and very severe against
violators of the game-laws. In 1758 he published the treatise
De l'esprit, which, while it was favourably received by the
self-styled philosophical party, was denounced by the
court and the Jesuits as dangerous to society and to religion,
and as being nothing less than a summary of all the evil
dogmas of the Encyclopédie.' A strong passion for
praise is usually accompanied by a desire to
encourage: to regain the favour of the court Helvetius thought
no concession too great, and he successively published three
letters of apology which gradually advanced in humility and
submission. Notwithstanding the confession which they
contains, however, the conduct of his mind, the feelings and
opinions inconsistent with its spirit, the doctors of the Sor-
bonne drew up a formal condemnation of the work, which
they declared to be a compendium of all the evil contained
in the Encyclopédie, and the court hastened to
lons of the game on his estates, and very severe against
violators of the game-laws. In 1764 Helvetius visited England, and in
the following year Germany, where he was received by
Frederick the Great with marks of the highest considera-
tion and esteem. Helvetius died at Abo on Tuesday,
1771, leaving behind him a work entitled De l'Homme,
Vol. XII.--Q
HEM, 114

HEM

de ses Facultés et de son Education," which was published the same year at London by Prince Gallatin. This treatise, which may be considered as a continuation of a commentary upon his earlier philosophical work, is vastly superior to it in style and diction. Among the earliest works of Helvetius is his poem "Sur le Bonheur," which, however secondary in order of intellectual importance, excites even more the admiration of men and women than the letters of Condillac, who confined himself to the exposition and derivation of the cognitive faculties. By 'esprit' Helvetius understood as well the mental faculties as the ideas acquired by them. As a poet Helvetius excels in this part of his writings, and he accounts for man's superiority over the brutes by the finer organism of his senses and the structure of his hands. Man, he considers, is the work of nature, but his intelligence and virtue are the fruits of education. The end of virtue is happiness, and utility determines the value of all actions, of which some are virtuous which are generally useful. Utility and inutility are however merely relative, and there is consequently nothing which is absolutely good or absolutely evil. The happiness and enlightenment of the people he makes to be the true end of all human government; and, denying a Divine Providence in the government of the world, he declared himself to be a blind and a deist. (Oeuvres d' Helvétius, 3 vols., Paris, 1816.)

HELVIN, a crystallized mineral of which the primary form is a cube. Cleavage parallel to the planes of the regular octahedron and indistinct; friable; fracture; 6 to 6.5; scratch glass; colour pale-blue and greenish-yellow; streak white; lustre resinous, vitreous; translucent; transparent on the edge; specific gravity 3.166. It is found at Garnigen in Scotland.

Before the blowpipe or charcoal it melts with effervescence into a globule of the same colour as the mineral: in the oxidizing flame the colour becomes deeper and the fusion is more difficult; with borax it yields a transparent glass often seen by masons.

Analysis by Gmelin—

Silica 35.272
Glacea 8.026
Glucose and Glucina 5.069
Protose of manganese 32.344
Iron 7.960
Sulphure of manganese 14.000
Loss by calcination 1.122

HEINEMANFLYS. [HOLLAND.]

HEMATIN, the colouring matter of the Hematoxylon campechianum, or logwood, discovered by Chevreul. It is prepared by evaporating a watery infusion of logwood to dryness, treating the residue with alcohol, filtering the spirit solution, and evaporating it to the consistence of a syrup. If a certain quantity of water be added to this, and evaporation be performed with a gentle heat, the hematinate crystallizes, and requires only to be washed with a little alcohol and dried. Hematin crystallizes in small crystalline laminae of a reddish colour. The taste of hematin is at first sweet and astringent, and afterwards bitter. It is decomposed by heat, and ammonia being one of the products, proves that it contains azote. Water dissolves hematin in a liquor of a bright red, at 213° Fahr., but becomes yellow on cooling. Acids saturated with oxygen turn its colour first to yellow and afterwards to red; the alkalis in small quantity render hematin purple, and when in large quantities, soluble, and eventually decomposing it, make it yellowish-brown.

This colouring principle is a constituent part of all the colours prepared with logwood, and the changes which it undergoes under this preparted and alkalis renders it useful as a reagent to detect their presence.

HEMEL HEMPSTEAD. [HERTFORDSHIRE.]

HEMERALOPIA, a word which is now used to signify 'day-blindness,' though in fact it signifies 'day-seen,' being similarly formed to the genuine Greek word 'nictea-lopia' (νικτεαλοπία), which means 'night-seeing.' Much confusion has arisen in regard to the use of the two words, in consequence of an error committed either by Hippocrates or one of his early editors. In the 2nd book of his 'Pre-
sequence of disordered digestion; and sometimes a symptom of commencing anamniasis, or gutta serena, and terminates in complete death.

A very interesting account of this disease is given in the "Philosophical Transactions" for 1824, by Dr. Wollaston, who himself suffered from it on two occasions. He endeavored to explain it by the semi-deciduous nature of the optic nerves. It is remarkable that the appearance found in his brain after death was such as on that theory might have been anticipated. But in a large proportion of the cases the affection is too transient to admit of the supposition of any organic disease.

**HEMIPLAGIA.** [Apoplexy.]

**HEMIPODIUS.** [Tetragonia.]

**HEMISPHERE.** The half of a sphere. [Sphera.]

**HEMISPERIC.** The middle portion (half) and posterior (a quarter), one of the orders of the class Insecta.

The order Hemiptera, according to the twelfth edition of the "Systema Naturae" of Linnaeus, contains insects which agree in incomplete metamorphosis (i.e. the larvae and pupa both possess the power of locomotion, and bear a great resemblance to the perfect insect), and also in having the superior wings generally coriaceous, and the inferior membranous. Thus Linnaeus included in this order the Corvices, Locusts, Grasshoppers, Bugs, Cicadas, &c.

The last-mentioned insects, the Bugs and Cicadas, however differ very materially from the former, inasmuch as they possess a a sucking stylet or mandibles, and consequently these latter characters have been considered of great importance by all the modern entomologists, the term Hemiptera has been restricted to such insects as have imperfect metamorphosis and a reflectional mouth.

The Heteroptera are divided by Latreille into two families; the first he applies the name of Heteroptera, and to the second that of Homoptera. The Heteroptera are characterized by having the corium attached to the inner part of the head; the olytra coriaceous with the extremity membranous, folding one over the other when at rest, and the first segment of the trunk (or the prothorax) the largest, and forming the most conspicuous part of the thorax. The second is subdivided by the English entomologists is regarded as an order, distinguished by the proboscis being attached to the lower portion of the head, near the chest; the olytra almost always of a uniform coriaceous texture, with their inner margins highly or very much indistinct; the three segments of the thorax are united in a mass, and the first is frequently shorter than the second. All the insects of this section feed exclusively on vegetable juices; their structure is more fully described in the article Homoptera.

We shall at present confine our remarks to the first section, or to the true Hemipterous insects.

In the greater number of the Heteroptera the head is small, situated on the same plane as the thorax, or nearly so; the fore part is somewhat produced; the eyes are of moderate size, very convex, and hence project rather suddenly from the sides of the head; between the eyes there are two pairs of ocelli, or single eyes; the antennae are of moderate size, composed of long joints, to which a few are added; and situated in front of the eyes; the part usually termed the thorax in descriptions, but which is in fact the prothorax, is of moderate size, rather broader than long, and very frequently produced on each side, so as to form an angular projection; the scutellum is large, generally triangular; but in some (the Scutelleridae, for instance) it assumes the form of the head, and is so large that it completely covers that part; the legs are either quite flat above; convex and more or less distinctly keeled beneath; when the wings are closed, the upper part of these insects generally presents a flat or slightly convex surface, and is seldom very convex. The legs are of moderate size, not unfrequently long. In certain groups (the Coreidae) the posterior tibia of the males of many of the species are remarkably large, and many have the same large ocelli, often broad and compressed.

The proboscis springs from the fore part of the head, and when not in use is suddenly curved downwards and backwards, and lies close to the under surface of the thorax and between the fore pair of legs. It consists of a jointed process (α), which is grooved upon the upper side, and in this groove there are four setae (β), or bristle-like organs, which are covered above, at their base, by another appendage (ε), which is supposed to be analogous to the upper lip or labrum of mandibulate insects; whilst the four setae probably represent the mandibles and maxillae, and the jointed process the labium. In the figure, the sete (β) are represented as disengaged from their sheath (α), and the labrum is lifted up. When in the ordinary position those organs form to gather a tube, by means of which the juices of plants or animals are extracted and conveyed to the esophagus.

The Hemiptera are divided by Latreille into two families; the first, or the Geocoricae, are characterized as having the antenna free, longer than the head, and inserted between the eyes and near their anterior margin. The tarsi are three-jointed, but the first joint is sometimes very short. The second family, to which the name of Hydrocorisae is applied, have the antennae enclosed and hidden in a groove beneath the eye; the tarsi have but two distinct joints, and the eyes are generally very large.

The Hydrocorisae, interesting, agreeable mottoes, &c., afford examples of this mode of life.

**HYDROMETRIDA.**

The insects belonging to the second family (Hydrocorisae) are, as their name implies, in the water, and they prey upon other insects.

The two families which have just been characterized are by most entomologists regarded as sections or subsections rather than families; the latter is in fact an abstruse group, the former containing by far the greater portion of the order. Regarding them therefore as sections, they may be divided into the following families:

**Geocoricae.**

4. Acanthidae.

**Geocoricae.**


**Hydrocoridae.**


**HEMITONE.** An interval in ancient music, the ratio of which is 243

256

**HEMLOCK.** [Contum.]

**HEMP.** [Canace.] This is the highest quality of hemp, and is produced in India. The quantity of hemp imported in each of the ten years from 1827 to 1837 was —

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (cwt.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1827</td>
<td>373,393</td>
</tr>
<tr>
<td>1828</td>
<td>504,120</td>
</tr>
<tr>
<td>1829</td>
<td>374,932</td>
</tr>
<tr>
<td>1830</td>
<td>606,770</td>
</tr>
<tr>
<td>1831</td>
<td>550,820</td>
</tr>
</tbody>
</table>

The price of hemp fluctuated exceedingly during the war. While the ports in the Baltic were closed against us it be—

* The third joint is to be found (as least in some of the species, not all) within the apex of the tube.
HEN

In the year 1792 the price was 23l. per ton, and in 1806 it had risen to 118l. under the restrictions imposed on the trade of this country by the Milan and Nantes decrees. The generosity of mercantile men was so stimulated, that the obstacles raised by the governments then subject to the dictation of France were overcome, and the importations, which in 1792 only amounted to 22,867 tons, increased in 1809 to 83,872 tons. In 1810, when the price fell to 56l. per ton, which was below the cost, including the exorbitant freight to which it was subjected. Some works of his kind have been translated between 24l. and 250l. per ton; during the last few years it has scarcely gone over 300l. per ton.

HEMSTERHUIS, TIBERIUS, son of a French physician, was born at Quingen, a D. of Normandy. He entered the university of that town in his 14th year, and studied theology and philology under Braun, Oriental literature under Schultens, and mathematics and philosophy under Bernoulli. He afterwards went to Leyden to hear the lectures of Perizonius on ancient history, where he was engaged to put in order the MSS. belonging to the university library. In his 19th year he was appointed professor of mathematics and philosophy at Amsterdam, and shortly afterwards undertook the editorship of the Journal de l'Émigration, which LEDERLIN had left unfinished. Bentley in two letters to Hemsterhuis pointed out the faults of this journal; which so much discouraged Hemsterhuis that he did not open a Greek book for many years. Consequently, he resolved to acquire an accurate knowledge of the Greek language, and for that purpose read through all the Greek writers in chronological order. In 1726 he succeeded Lambinus as professor of Greek. He then went to Constantinople, where he left a son and removed to Leyden, where he was also professor of the same language. He died 7th April, 1756.

Hemsterhuis did not write much; but he was an accurate, subtle, and learned scholar, and it is primarily owing to his reputation and exertions that the study of the Greek language, which had been greatly neglected in Holland, again became general in that country. He introduced what has been called the Bodmer catalogus, which previous to his time had been used as a collection of those works which are fully developed in the writings of Lehnep. Hemsterhuis was not only a good classical scholar, but he was acquainted with several of the Oriental languages, and had a considerable reputation for his knowledge of mathematics and philosophy.

The principal works of Hemsterhuis are:—the latter part of the edition of "Pollex" by Lederlin, 1766; "Lucani Collected Poems" published by Valkenker, 1784; Latin Translation of the "Birds" of Aristophanes, in the edition of Kuster; "Notes and Emendations on Xenophon of Ephesus," in a volume of "Ode and Isis," printed in Holland in 1744. He also edited the early part of the edition of Lucian, which was completed by Reitz.

The life of Hemsterhuis has been written by Röhnken. This work has been reprinted at Leipzig, together with the life of Wittenbach, edited by LINDMANN, 1852.

HENNAULT, CHARLES JEAN, born at Paris in 1665, was the son of a fermier-général. He shone at an early age as a taste for literature, and wrote several poems. Being made intendant-general of the queen's household, he became by his pleasing address and suavity of manners a great favourite with the high society of the capital. He was also appointed president of the Court of the Queen. In 1733 he was made a member of the French Academy. At the age of fifty he withdrew from the fashionable world, and gave himself up entirely to study and to practices of devotion; but never free from monastic griefs. He died at Paris in 1770. Not many years before his death he wrote to Voltaire, with whom he had been intimate terms, a serious letter representing to him the impropriety and bad taste of his continual sneers and invectives against the president of the Senate. The letter was published (as the 23rd letter of those addressed to Voltaire), "The work for which Hennault is best known is his "Abrégé Chronologique de l'Histoire de France," which is a very good model of works of that kind. It has passed through numerous editions, and has been translated into several languages. In two small volumes the author has registered under each year every event of any importance in the annals of the French monarchy, from its first establishment to the death of Louis XIV.; with a happy conciseness of expression he has cleared up many doubtful or controverted points, and he has introduced many curious and political reflections on the manners and men of times.

The arrangement is clear, and the hand of a man deeply versed in the laws and the records of his country is visible throughout the work. At the beginning of every reign he exhibits a tabular view of the principal events, the accession to the throne, and death of the monarch, the names of his wife or wives, and children, those of the contemporary European sovereigns, and those of the ministers, generals, emperors, and men of letters of each dynasty. And at the end of every dynasty he adds an interesting dissertation on the social, civil, and intellectual condition of France at the time. A good index completes the work. Hennault has had a very great influence on the compiler of the "Revue Chronologique de l'Histoire de France de 1789 jusqu'à 1819," 1 vol. s. p., Paris, 1823, in which all the multifarious events of those thirty years are registered in due order. Hennault wrote also "Histoire Critique de l'Establisement des Francais dans les Galies;" and several dramatic works collected under the title of "Pieces de Théatre," 1 vol. 1770.

HENNECARDON, a figure of eleven sides. For the regular hendecagon see Regular Figures.

HENLEY on Thames. [Oxfordshire.]

HENLEY in Arden. [Warwickshire.]

HENNEBON. [Morbihan.]

HENRI I. of France, son of king Robert, and grandson of Hugues Capel, succeeded his father in July, 1031. After about twenty years of his reign, he was succeeded by his son, who was called Henri, and who was crowned at Constance of Provence, who wished to favour her younger son, Robert, elected a civil war, in which Eudes, count of Champagne, and Baldwin, count of Flanders, took part, while the son of William of Normandy was left. At the age of twenty, he was called Henri I. of France, who had just come of age. The son of William of Normandy, assisted his competitor, who however was in the end defeated by the Bastard about the year 1047. Henri married, in 1044, Anna, daughter of Jaroslav, duke of Russia, by whom he had several sons, one of whom was Charles. He died at Rheims in 1049, at seven years of age, by order of his father, who died in the following year, leaving Philip I. under the guardianship of Baldwin, earl of Flanders. (Baldwin IV.)

HENRI I. of France, father of the Constable of France, was born 1007. He was succeeded by his father Francis I. in 1047. In 1050 he concluded the war which was then pending with England, which gave up to him Boulogne for the sum of 400,000 crowns. About this time Mary Stuart, the queen of Scotland, then a minor, came to France, under the guardianship of her uncles of Guise, and was betrothed to France, the son of Henri. In 1052 Henri assisted Margaret, sister of Saxony, and Albert, marquis of Brandenburg, who had united for the defence of the religious and civil liberties of Germany against Charles V. Henri invaded Lorraine and took Metz, Toil, and Verdun, which were from that time annexed to France. It is curious to see the French government, which persecuted Protestantism at home, taking up arms for the professed purpose of supporting the Protestants of Germany. After the abdication of Charles V. the war continued between his successor Philip II. of France, and the Constable of France, Montmorency, who were defeated by the Spaniards at the battle of St Quentin in 1537; the French arms were likewise unsuccessful on the side of Italy, where the duke of Alba commanded the Spaniards. The war ended in 1543, by the peace of Cremona, and the Treaty of Cateau Cambresis. In 1546 he married a Spanish princess of the house of Bourbon, by which he added Valencia, which had been taken the year before by the duke of Guise, remained in the hands of the French. At the same time a double marriage was concluded between Elizabeth, Henri's daughter and Philip II. of Spain, by which Margaret, Henri's sister, and the duke of Savoy. The festivals given on this occasion had a tragic end. Henri was accidentally wounded at a tournament by the count of Montgomery, with the shaft of his broken spear.
HENRI III, born at Fontainebleau in 1551, was the third son of Henry II and Catherine de Medici. At the marriage of his elder brother Charles IX, when he was called the Duke of Anjou, he fought courageously at the battles of Jarnac and Moncontour against the Huguenots. In 1573 he was elected king of Poland and the successor of Sigismund Augustus. He had been trained from a young age for the life of a king and was brought up in the strict morality of the Valois, as his father had been. After a few months his brother Charles IX had suddenly quarreled with and returned to France to lead the Catholic cause. Henri was left in power and began the work of pacification and reunification of France.

In 1596, Henri died in Paris, leaving no male heir. He was succeeded by his cousin, the Count of Blois, who became Henry IV. Henri's death marked the end of the Valois dynasty and the beginning of the Bourbon dynasty in France.
riy which has survived all the eventful changes in that country. He is the only prince in the world who has never been born in France. His brilliant qualities, his tastes, even his failings, such as his excessive gallantery, were national, and they flattered the self-love and the vanity of the people. He was, says the President Hersaint, "his own sinner," and his government re to a large extent, the frankness the most dexterous policy, to the most elevated sentiments a delightful simplicity of manners, and to an undaunted courage a most touching feeling of humanity and, above all, of forgiveness. When forgone to punish, as in the case of Biron, he did it with extreme regret. His life was repeatedly attempted by assassins who were stimulated by the old fanaticism of the League; and his greatest disgrace was to belong to death. At St. Vaupialle, on the 14th May, 1616. He was succeeded by his son Louis XIII. under the guardianship of his consort Maria de Medicis. The grief for his death was deeply felt all over France. (Mém. de Sully; Hénault and the French historians; Thomas, Essoi sur les Iluges; and a collection of Henri's most remarkable sayings and doings, entitled L'Esprit de Henri IV., Paris, 1789.) Longlet du Frenay, in the 4th vol. of his Journal de Henri IV., has published a letter, written by Henri IV. When the royal procession, at St. Denis was ransacked in the time of the Revolution, 1793, the body of Henri IV. was found in very good preservation: its features appeared hardly changed.

The death of November 16, 1610, as it appeared, was the sudden and inevitable effect of his being thrown down upon his head, in mockery or sport, at the town of L'Aigle in Normandy, by his two younger brothers, and at his father's refusal to punish them for the insult. If this incident took place at all it must have been when Henry was a mere child, not beyond his eighth or ninth year; his brother William was about twelve years his senior. In the last days of their father's reign jealousies arose between the two brothers; in a quarrel the father seems to have attached himself to the one who was on the whole most like himself in character. At his death in 1603, the Conqueror expressed his wish that his son, being his successor, should be crowned in England, and only left Henry a legacy of 5000/. of silver. 

With 3000. of this however Henry soon after obtained, from the facility of his brother Robert, the whole of the district of Cotentin, comprehending nearly a third of Normandy. Although in the first instance a quarrel between the two arose out of this bargain, they were afterwards reconciled; and in 1609, when the intrigues of William, now king of England, had excited a revolt of the Norman barons against Robert, Henry came to the assistance of the latter, and was chiefly instrumental in putting down the insurrection. Upon this occasion Henry gave a striking proof of the determination of his character. Conon, an ally of Robert, in one of the most active and powerful of those who had taken part in the treason, having fallen into the hands of his enemies, Duke Robert thought it punishment enough to entice him to perjury and imprisonment; but Henry told him it was his destiny to have better fortune against his future attempts, led the unfortunate man, on pretence of giving him a view of the surrounding country, to the highest tower of the castle in which he was confined, and there with a�� lye of St. Michael, after which he wandered about for some two years in a state of nearly complete desolation. At length, on the invitation of the inhabitants of the town of Domfront, he assumed the government of that place; and it would appear that from this point he gradually raised himself to the repossess of nearly all the territory that he had lost. He also became reconciled to Rufus, and explained himself in England, and was succeeded by a king whom he had called his 2nd August, A.D. 1109. The tumultuous and eventful reign of that king, whose name was soon given to the city in which his body was found, and which is known as the turbulent, and was so long a subject of inquiry, made Henry king of England. For a long time his government was marked by a series of petty insurrections in England, which he easily crushed, extinguishing thereby, one after another, all the persons that were most obnoxious to him, and acquiring their estates to distribute among men that were his devoted adherents. These proceedings did not fail to rouse the indignation of Robert; and Henry was not slow in taking advantage of the courses into which his irritated feelings drove him, to declare that the peace between them was for ever at an end. Circumstances were now in every
way much more favourable for the English king than when he formerly contrived to avoid a contest of arms with his brother: on the one hand, some years of possession had established him more firmly on his throne; on the other, the strength of Duke Robert was broken and wasted, and his extravagance and misgovernment had both dissipated his wealth. Hence not only was the very title to his sovereignty, King, in the first instance, called upon him to cease the duchy for a sum of money or an annual pension: he then (A.D. 1108), on this demand being scornfully rejected, crossed over to Normandy at the head of a small army. He regained many of the chief places of strength.

The following year the English king, who had returned home, again crossed the seas with a more numerous force than before. But he had only just pitched his camp on the shore, when the Norman king, with an army of twelve thousand, besieged the castle of Tencchebray; Robert, after some time, advanced to its relief; and on the 28th September a long and sanguinary battle was fought between the two brothers and their respective forces. The result of which was the utter ruin of Robert and his cause. He himself, after a splendid display of the heroism which he had always shown, was taken prisoner, with 400 of his knights. He was compelled by the king to conform to life. According to Matthew Paris, an unsuccessful attempt which he soon after made to effect his escape was diabolically punished, on the order of his merciless brother, by the extirpation of a hand and half of his foot, which were held before his eyes, which were kept open by force, until they were burned blind; and in this state the miserable prince survived for twenty-eight years, dying in Cardiff Castle in 1129. The treaty, by which he had been given twelve months before Henry, immediately after the victory of Tencchebray, was, without opposition, acknowledged his duke by the Norman barons. About the same time also was terminated by a compromise, for the present, the dispute with Anselm, the archbishop of Canterbury, and the subject of investitures, which had been proceeding ever since the commencement of the reign. [Anselm.]

The next six or seven years passed without any events of moment. The marriage of Matilda with the young earl of Flanders was followed by the match of his brother Baldwin, and his sister Matilda, with Louis VI. of France, and Fulk, earl of Anjou, acting in confederacy in support of the interests of William, styled Fitz-Robert, the son of Duke Robert, who had escaped to the court of France. This union had been arranged before the marriage of Henry's other daughter, Agnes, to Eustace, earl of Boulogne, and it was concluded in the latter part of the year 1101. A war was also engaged in between England and the March of Anjou. A union between the two counties had been concluded, but it was not formally ratified, when Baldwin was also defeated and captured by the English, who made him a prisoner. The marriage of the younger daughter, Matilda, with Fulk, and that of the heiress, Matilda, with the young earl of Flanders, became the occasion of disputes between the Norman barons, and, finally, the mediation of the pope, brought it about, as before mentioned, that a treaty, in 1120, to a termination entirely favourable to the English king.

Immediately after this peace Henry's brightest hopes were turned to a sudden night by the frightful calamity of the loss, on the 23rd November, of the ship in which his son had embarked for Barbary: with the exception of one individual, a butcher of Rouen, all on board perished, to the great distress and sorrow of the king, his wife, and his half-brother Richard, his half-sister Marie, and the earl of Chester, with his wife and her brother, who were the niece and nephew of the king, among 140 of the members of the most noble houses of England and Normandy, of whom eighteen were females. Henry is said never to have been known to smile after this blow. It did not however extinguish his spirit of ambition. Two years before this he had lost his consort, the good Queen Maud; and a daughter, Matilda, married in 1114 to the Emperor Henry V., was now his only legitimate progeny. In the hope of male offspring, he now (2nd of April 1119) married the beautiful Adelais, or Alice, daughter of Geoffrey, duke of Louvaine. Sozeely he had entered into this alliance when he found himself called to meet a new revolt in Normandy, excited by the restless Prince Eustace, earl of Anjou, who had now losing all hope of the English crown renewed his connection with Fitz-Robert, and again affiliated to him his younger daughter Sibylia, putting him in the mean time in possession of the earldom of Muns. But this movement was at once arrested; the Norman earl having contrived once more to gain over the fickle and venal earl of Anjou, and so to deprive the Norman prince of the hand of the fair Sibylia, when he had held in almost his grasp.

When four or five years of his second marriage had passed without producing any issue, Henry determined upon the bold enterprise of endeavouring to secure the succession to his dominions for his daughter, the empress Matilda, who had become a widow by the death of her husband in 1125. On Christmas-day, 1126, she was unanimously declared his heir, in a great council of the lords spiritual and temporal assembled at Windsor Castle. The following year, she married, in May, to Geoffrey, son of Fulk, earl of Anjou, to whom, although only a boy of sixteen, her father had renounced that earldom on his departure to the Holy Land, in 1101. This match was afterwards elected king of Jerusalem. Soon after this settlement of her daughter, Henry was relieved of a source of perpetual annoyance and apprehension by the death of his nephew William Fitz-Robert, which took place 27th July, 1126, in an attack on the fortress of Pontes, near a confederacy, which had been formed for the Holy Land, and which he had deserted. Henry also married to Geoffrey, represented Plantagenet, the son of Fulk, earl of Anjou, to whom, although only a boy of sixteen, his father had renounced that earldom on his departure to the Holy Land, in 1101. This match was afterwards elected king of Jerusalem. Soon after this settlement of her daughter, the enticing of the young Henry however speedily stirred up against him a revolt of a party of his Flemish subjects, who putting Thyerry, hisgrave of Aisne, at their head, endeavoured to drive him from the country; and it was in a battle at Thierry, under the walls of Aisne, that, in the moment of victory, he received the wound which proved the effect of the monkery of St. Omer. It was not however till March, 1133, that Henry's longings for a grandchild were gratified by the birth of Matilda's first child, Henry, styled Fitz-Empress, afterwards Henry II. These events led to the marriage of Henry to Geoffrey of Anjou and William, as a reward for his service in the course of the next two years.
Normandy; 11. Constance, married to Roscelin, Viscount of Beauvois in France; 12. brother, married to Verdun; 13. another, married to Mathew Montenyore, the founder of the illustrious French family of that surname; and 14. Sibylia (otherwise called Elizabeth), who was married at 1107 to Alexander I. of Scotland, who was born in 1123, by Elizabeth, wife of Gilbert de Clare, earl of Pembroke, and father by her of the famous Strongbow. (See accounts of these personages and their descendants in Fisher's Companion and Key to the History of Normandy, 1812.)

The character of Henry is sufficiently indicated by the facts that have been detailed. In a moral point of view it was detestable, but in the line of policy and craft it evinced surprising ability. In the midst of an unscrupulous ambition however he cherished a love of letters, and in his hours of leisure was fond of the society of learned men. It must be admitted also that his government, though still arbitrary and tyrannical in a high degree, appears to have been on the whole a considerable improvement on that of his father and his elder brother. He may be said to have led the way in the reformation of the law and the constitution. In his dissolution, perhaps it was, of the Saxon laws, and by his charter, the example of so many of subsequent royal concessions, the same in form though more extended in amount, which lie at the foundation of modern national liberties, can be felt. It is to be doubted that the country made considerable social progress in his reign, undisturbed as it was by any internal commotion, and enjoying, notwithstanding much oppression on the part of the crown, a more regular dispensation of justice than it had enjoyed from disorder, abuse, and violence, than it had known since the coming over of the Normans. Henry I. was succeeded on the throne of England by Stephen.

In 1137, Matilda, the eldest daughter of Geoffrey Plantagenet (so named from a sprig of broom in Latin, planta genista—'in French, plante genêt—which he used to wear in his cap), earl of Anjou, and of Matilda, countess of Poitou, to whom her late husband had been the Emperor Henry V. (Henry I.) He was born at Le Mans, the capital of his father's dominions, in March, 1133. In the struggle between Stephen and Matilda for the English crown [SHEREF], Matilda's husband Geoffrey had, by the year 1141, reduced nearly the whole of Normandy, and his infant son Henry had been acknowledged by the majority of the nobility of that country as their legitimate duke. In June of the following year it was, of the Saxon laws, and by his charter, the example of so many of subsequent royal concessions, the same in form though more extended in amount, which lie at the foundation of modern national liberties, can be felt. It is to be doubted that the country made considerable social progress in his reign, undisturbed as it was by any internal commotion, and enjoying, notwithstanding much oppression on the part of the crown, a more regular dispensation of justice than it had enjoyed from disorder, abuse, and violence, than it had known since the coming over of the Normans. Henry I. was succeeded on the throne of England by Stephen.

In 1137, Matilda, the eldest daughter of Geoffrey Plantagenet (so named from a sprig of broom in Latin, planta genista—in French, plante genêt—which he used to wear in his cap), earl of Anjou, and of Matilda, countess of Poitou, to whom her late husband had been the Emperor Henry V. (Henry I.) He was born at Le Mans, the capital of his father's dominions, in March, 1133. In the struggle between Stephen and Matilda for the English crown [SHEREF], Matilda's husband Geoffrey had, by the year 1141, reduced nearly the whole of Normandy, and his infant son Henry had been acknowledged by the majority of the nobility of that country as their legitimate duke. In June of the following year it was, of the Saxon laws, and by his charter, the example of so many of subsequent royal concessions, the same in form though more extended in amount, which lie at the foundation of modern national liberties, can be felt. It is to be doubted that the country made considerable social progress in his reign, undisturbed as it was by any internal commotion, and enjoying, notwithstanding much oppression on the part of the crown, a more regular dispensation of justice than it had enjoyed from disorder, abuse, and violence, than it had known since the coming over of the Normans. Henry I. was succeeded on the throne of England by Stephen.

In 1137, Matilda, the eldest daughter of Geoffrey Plantagenet (so named from a sprig of broom in Latin, planta genista—in French, plante genêt—which he used to wear in his cap), earl of Anjou, and of Matilda, countess of Poitou, to whom her late husband had been the Emperor Henry V. (Henry I.) He was born at Le Mans, the capital of his father's dominions, in March, 1133. In the struggle between Stephen and Matilda for the English crown [SHEREF], Matilda's husband Geoffrey had, by the year 1141, reduced nearly the whole of Normandy, and his infant son Henry had been acknowledged by the majority of the nobility of that country as their legitimate duke. In June of the following year it was, of the Saxon laws, and by his charter, the example of so many of subsequent royal concessions, the same in form though more extended in amount, which lie at the foundation of modern national liberties, can be felt. It is to be doubted that the country made considerable social progress in his reign, undisturbed as it was by any internal commotion, and enjoying, notwithstanding much oppression on the part of the crown, a more regular dispensation of justice than it had enjoyed from disorder, abuse, and violence, than it had known since the coming over of the Normans. Henry I. was succeeded on the throne of England by Stephen.

In 1137, Matilda, the eldest daughter of Geoffrey Plantagenet (so named from a sprig of broom in Latin, planta genista—in French, plante genêt—which he used to wear in his cap), earl of Anjou, and of Matilda, countess of Poitou, to whom her late husband had been the Emperor Henry V. (Henry I.) He was born at Le Mans, the capital of his father's dominions, in March, 1133. In the struggle between Stephen and Matilda for the English crown [SHEREF], Matilda's husband Geoffrey had, by the year 1141, reduced nearly the whole of Normandy, and his infant son Henry had been acknowledged by the majority of the nobility of that country as their legitimate duke. In June of the following year it was, of the Saxon laws, and by his charter, the example of so many of subsequent royal concessions, the same in form though more extended in amount, which lie at the foundation of modern national liberties, can be felt. It is to be doubted that the country made considerable social progress in his reign, undisturbed as it was by any internal commotion, and enjoying, notwithstanding much oppression on the part of the crown, a more regular dispensation of justice than it had enjoyed from disorder, abuse, and violence, than it had known since the coming over of the Normans. Henry I. was succeeded on the throne of England by Stephen.

In 1137, Matilda, the eldest daughter of Geoffrey Plantagenet (so named from a sprig of broom in Latin, planta genista—in French, plante genêt—which he used to wear in his cap), earl of Anjou, and of Matilda, countess of Poitou, to whom her late husband had been the Emperor Henry V. (Henry I.) He was born at Le Mans, the capital of his father's dominions, in March, 1133. In the struggle between Stephen and Matilda for the English crown [SHEREF], Matilda's husband Geoffrey had, by the year 1141, reduced nearly the whole of Normandy, and his infant son Henry had been acknowledged by the majority of the nobility of that country as their legitimate duke. In June of the following year it was, of the Saxon laws, and by his charter, the example of so many of subsequent royal concessions, the same in form though more extended in amount, which lie at the foundation of modern national liberties, can be felt. It is to be doubted that the country made considerable social progress in his reign, undisturbed as it was by any internal commotion, and enjoying, notwithstanding much oppression on the part of the crown, a more regular dispensation of justice than it had enjoyed from disorder, abuse, and violence, than it had known since the coming over of the Normans. Henry I. was succeeded on the throne of England by Stephen.

In 1137, Matilda, the eldest daughter of Geoffrey Plantagenet (so named from a sprig of broom in Latin, planta genista—in French, plante genêt—which he used to wear in his cap), earl of Anjou, and of Matilda, countess of Poitou, to whom her late husband had been the Emperor Henry V. (Henry I.) He was born at Le Mans, the capital of his father's dominions, in March, 1133. In the struggle between Stephen and Matilda for the English crown [SHEREF], Matilda's husband Geoffrey had, by the year 1141, reduced nearly the whole of Normandy, and his infant son Henry had been acknowledged by the majority of the nobility of that country as their legitimate duke. In June of the following year it was, of the Saxon laws, and by his charter, the example of so many of subsequent royal concessions, the same in form though more extended in amount, which lie at the foundation of modern national liberties, can be felt. It is to be doubted that the country made considerable social progress in his reign, undisturbed as it was by any internal commotion, and enjoying, notwithstanding much oppression on the part of the crown, a more regular dispensation of justice than it had enjoyed from disorder, abuse, and violence, than it had known since the coming over of the Normans. Henry I. was succeeded on the throne of England by Stephen.

In 1137, Matilda, the eldest daughter of Geoffrey Plantagenet (so named from a sprig of broom in Latin, planta genista—in French, plante genêt—which he used to wear in his cap), earl of Anjou, and of Matilda, countess of Poitou, to whom her late husband had been the Emperor Henry V. (Henry I.) He was born at Le Mans, the capital of his father's dominions, in March, 1133. In the struggle between Stephen and Matilda for the English crown [SHEREF], Matilda's husband Geoffrey had, by the year 1141, reduced nearly the whole of Normandy, and his infant son Henry had been acknowledged by the majority of the nobility of that country as their legitimate duke. In June of the following year it was, of the Saxon laws, and by his charter, the example of so many of subsequent royal concessions, the same in form though more extended in amount, which lie at the foundation of modern national liberties, can be felt. It is to be doubted that the country made considerable social progress in his reign, undisturbed as it was by any internal commotion, and enjoying, notwithstanding much oppression on the part of the crown, a more regular dispensation of justice than it had enjoyed from disorder, abuse, and violence, than it had known since the coming over of the Normans. Henry I. was succeeded on the throne of England by Stephen.
back the Welsh from those parts of the English territory which they had seized during the reign of Stephen, and even, as it would appear, compelled the princes of North and South Wales to acknowledge him as their feudal superior. His next attempt was upon the great French earldom of Toulouse, which he claimed in right of his wife Eleanor, whose grandfather William, duke of Aquitaine, had married Philippa, the only child of William, the fourth earl of Toulouse. He was here opposed both by Raymond de Guilhem, the last of the earls of Toulouse, in whose line the principality had descended for nearly a hundred years, and by Louis of France, whose sister had married Raymond, and to whom, besides, the progressive agrandizement of his ambitious vassals was every day becoming a matter of great concern. To Louis, to whom, as heir of the half of Aquitaine, he had a strong claim, a remonstrance from France in support of this claim is memorable for the introduction of the practice of communicating the military service of the vassals of the crown for a payment in money, an innovation, and the credit of which is attributed to Thomas a Becket, recently elevated to the place of chancellor of the kingdom.

In 1170 the crusade which he was about to lead was abandoned by the death of Becket, 29th December, 1170. The murder of Becket, 29th December, 1170: the blood of the martyr crying from the ground was found to be still more powerful than had been his living voice. In 1174 Henry proceeded to take the cross and to be crowned at Rheims as St. Louis, the first crusading king of France. The murder of Becket was then a matter of universal execration, and the question of his deposition did not again arise, though for several years after his murder a claim to the throne was kept up in Aquitaine, and a war was fought for the possession of the principality of Aquitaine. But at length a reconciliation was entered into, and Henry was invested with the title of Duke of Aquitaine, and the lands and revenues thereof.

Henry's war with the papacy for the next eighteen years was principally that of his contest with the haughty and intrepid churchman, who, from an obscure origin having advanced through the degrees of royal favour, prime minister of the church, and cardinal, had become, like his predecessor, an archbishop of Canterbury, forthwith proceeded to assume the bearing of a rival monarch, and made his former master feel that he was only half king in the dominions he called his own.

The struggle for supremacy between the church and the state was not even terminated by the murder of Becket. The attempt to make Henry the head of the church did not succeed. This struggle for supremacy between the church and the state was not even terminated by the murder of Becket, 29th December, 1170: the blood of the martyr crying from the ground was found to be still more powerful than had been his living voice. In 1174 Henry proceeded to take the cross and to be crowned at Rheims as St. Louis, the first crusading king of France. The murder of Becket was then a matter of universal execration, and the question of his deposition did not again arise, though for several years after his murder a claim to the throne was kept up in Aquitaine, and a war was fought for the possession of the principality of Aquitaine. But at length a reconciliation was entered into, and Henry was invested with the title of Duke of Aquitaine, and the lands and revenues thereof.

Henry, however, did not break up the unnatural confederacy of his sons. We can only notice the leading incidents of the confused and revolting drama that ensued. The cause of young Henry was supported by John, the other son of Henry, who, like his brother, was betaken to England, and was raised by William of Scotland, and by some of the most powerful barons of Normandy and England. With this characteristic energy and activity however the English king made ready to meet his rival's forces. The affairs of Henry's son Richard, and Geoffrey, who had been crowned at Rheims, were in confusion both on the Continent, whether Henry proceeded in person, and on the Scottish borders, in the summer of this same year. Occasionally suspended, and again renewed, the war continued for about two years, during which the most important event that happened was the capture of King William of Scotland at Alnwick Castle, by the famous chief-justiciary Ganville, 12th July, 1174, which appears to have been the Saturday following the Thursday on which the two princes did penance for the murder of Becket at Canterbury. Soon after this Henry, who had throughout decidedly the best of the contest, assented to the petition of his son for a peace; and he and Louis restored to each other all the dominions they had possessed. Richard, and Geoffrey were gratified with the possession of one or two castles each, and liberal allowances from the revenues of the provinces to which they had severally laid claim. By a new quarrel broke out between Henry and his eldest son the following year, but they were reconciled before they had time to betake themselves to arms. Meanwhile, in December, 1174, a treaty with Scotland had been arranged at the castle of Alnwick, in which the Commons Scots agreed to make acknowledgment of the feudal dependence of their crown on that of England, in return for the liberation of King William. The period of seven or eight years that preceded this event was, however, one of persecution, and that in which his greatness stood at the biggest. With his ancestral dominions of England, Normandy, and...
Anjou undisturbed by any rival claimant, his matrimonial acquisitions of Aquitaine and Poitou bound in the subject- tion of James, with the consent of the Pope. In the event of Ireland, his death was sudden and unexpected; the Welsh and the Scotch reduced to submission, and to the acknowledgment of his supremacy, he was undoubtedly at this time the most powerful of the European sovereigns, and the object of every European court, which, in its own way, was anxious to gain the influence of the young and turbulent prince of the first hands. This time Richard took up arms against Henry and Geoffrey, because his father called upon him to do homage to his elder brother, the King of France. A reconcile- ment between the brothers, effected by their father's interven- tion, only suspended hostilities for a few months; and as Richard had aspired to the court of France, where Philip II. was now king, and prepared for a new war; before he could carry his de- sign into execution he was, in August, 1186, thrown from his horse at a tournament, and so severely injured that he died in a few days after. No sooner was Geoffrey thus re- moved than his brother Richard hastened to the French court to take his place; but after unsuccessfully attempting to excite a new revolt in Aquitaine, he was compelled to throw himself upon his father's clemency. A project of a new crusade, at the call of pope Clement III., in the be- ginning of 1186, for a moment united Henry and Philip; the two kings actually crossed to Jerusalem, but the crusade was abandoned, the people being unwilling to give up their way of life, which thrilled all Europe on the arrival of the news of the capture of Jerusalem by Saladin in the preceding September; but before the end of the same year the unhappy father saw his only son again bearing arms against his country, and as part of his dowry he had for many years held, in his possession. Richard pretended to believe that his father wished to marry the princess Isabella, and even asserted or instanced his father had acted for his own honour and it merely was a sacrifice to pay Henry's ransom, it appears that he died a sudden death. It appears that he died a sudden death.

The title of Prince de Conches, which he claimed in France, was confirmed to him by the Pope in 1196, and he was summoned to appear at the archbishop's court of Canterbury, but he refused to do so. He died in the summer of 1197, and was succeeded by his son John, who was proclaimed king in England, and was recognized as such in France, by the Pope, in 1199. He was married to Alice, the daughter of Henry II. of England, and was succeeded by his son Henry III., who was married to Eleanor, the daughter of Louis VII. of France. He was succeeded by his son Henry III., who was married to Eleanor, the daughter of Louis VII. of France, and was succeeded by his son John, who was married to Alice, the daughter of Henry II. of England. He was succeeded by his son Henry III., who was married to Eleanor, the daughter of Louis VII. of France, and was succeeded by his son John, who was married to Alice, the daughter of Henry II. of England.

Henry's children by his queen Eleanor were: 1. William, born 1152, died 1156; 2. Henry, born 25th February, 1155, died 11th June, 1183; 3. Mand, born 1156, married to Henry V., duke of Saxony, 1185, a few days after her father; 4. Richard, who succeeded him on the throne; 5. Geoffrey, born 25th September, 1135, died 19th August, 1186; 6. Eleanor, born 13th October, 1115, married to Alphonso VIII., king of Castile, died 1214; 7. Joan, born October, 1116, married to Azemar, died 1195; 8. Isabella, born 1190, died 11 September, 1195; and 9. John, who succeeded Richard as king. His illegitimate children were: 1. by the famous Rosamund, daughter of Walter, lord Clifford, William, sur- named De Lencquesaig, because he was married to the servant girl of the King's brother, Richard, who married his wife's daughter, Elizabeth, daughter of William Devereux, and was married to 1st October, 1196. His father having died 15th October, 1121, the boy was.
obeying through the influence of the earl of Pembroke, lord marshal, acknowledged heir to the throne by those of the barony who were present. On 26th May 1218 he was solemnly crowned in the abbey-church of St Peter, at Gloucester, by the papal legate Guazo. His reign is reckoned from that day.

In the following year, at a great council held at Bristol, Pembroke was appointed protector or governor of the king and kingdom (Rector Regis et Regnys); and this able and excellent nobleman continued at the head of affairs with great advantage until his death, which happened on the 28th of May, 1226. The province of the government fell into the hands of Hubert de Burgh, who had greatly distinguished himself in the expulsion of the foreigners, and Peter des Roches, bishop of Winchester. De Burgh however, and the bishop, who was not an Englishman, but a native of Poitou, from conductors soon became rivals, and their attempts to throw each other down at length led, in 1224, to the resignation of Des Roches and his retirement from the kingdom.

Meanwhile, on the 17th May 1218, Henry had married his second wife, a daughter of Poitou, by conductors soon became rivals, and their attempts to throw each other down at length led, in 1224, to the resignation of Des Roches and his retirement from the kingdom. In 1223, the relations of peace and union were renewed between the English king and the French, and the departure of the French, who were made closer and farther by the marriage of Alexander II., the king of that country, with Jane, Henry's eldest sister, and of De Burgh with the widow of Poitou, the brother-in-law of the dauphin Louis and the French had been compelled to quit the country, their evacuation having been finally arranged in a conference held at Kingston 11th September, 1224. This expedition was fortunate and instantaneous; the government fell into the hands of Hubert de Burgh, who had greatly distinguished himself in the expulsion of the foreigners, and Peter des Roches, bishop of Winchester. De Burgh however, and the bishop, who was not an Englishman, but a native of Poitou, from conductors soon became rivals, and their attempts to throw each other down at length led, in 1224, to the resignation of Des Roches and his retirement from the kingdom. In 1223, the relations of peace and union were renewed between the English king and the French, and the departure of the French, who were made closer and farther by the marriage of Alexander II., the king of that country, with Jane, Henry's eldest sister, and of De Burgh with the widow of Poitou, the brother-in-law of the dauphin Louis and the French had been compelled to quit the country, their evacuation having been finally arranged in a conference held at Kingston 11th September, 1224. This expedition was fortunate and instantaneous; the government fell into the hands of Hubert de Burgh, who had greatly distinguished himself in the expulsion of the foreigners, and Peter des Roches, bishop of Winchester. De Burgh however, and the bishop, who was not an Englishman, but a native of Poitou, from conductors soon became rivals, and their attempts to throw each other down at length led, in 1224, to the resignation of Des Roches and his retirement from the kingdom. In 1223, the relations of peace and union were renewed between the English king and the French, and the departure of the French, who were made closer and farther by the marriage of Alexander II., the king of that country, with Jane, Henry's eldest sister, and of De Burgh with the widow of Poitou, the brother-in-law of the dauphin Louis and the French had been compelled to quit the country, their evacuation having been finally arranged in a conference held at Kingston 11th September, 1224. This expedition was fortunate and instantaneous; the government fell into the hands of Hubert de Burgh, who had greatly distinguished himself in the expulsion of the foreigners, and Peter des Roches, bishop of Winchester. De Burgh however, and the bishop, who was not an Englishman, but a native of Poitou, from conductors soon became rivals, and their attempts to throw each other down at length led, in 1224, to the resignation of Des Roches and his retirement from the kingdom. In 1223, the relations of peace and union were renewed between the English king and the French, and the departure of the French, who were made closer and farther by the marriage of Alexander II., the king of that country, with Jane, Henry's eldest sister, and of De Burgh with the widow of Poitou, the brother-in-law of the dauphin Louis and the French had been compelled to quit the country, their evacuation having been finally arranged in a conference held at Kingston 11th September, 1224. This expedition was fortunate and instantaneous; the government fell into the hands of Hubert de Burgh, who had greatly distinguished himself in the expulsion of the foreigners, and Peter des Roches, bishop of Winchester. De Burgh however, and the bishop, who was not an Englishman, but a native of Poitou, from conductors soon became rivals, and their attempts to throw each other down at length led, in 1224, to the resignation of Des Roches and his retirement from the kingdom. In 1223, the relations of peace and union were renewed between the English king and the French, and the departure of the French, who were made closer and farther by the marriage of Alexander II., the king of that country, with Jane, Henry's eldest sister, and of De Burgh with the widow of Poitou, the brother-in-law of the dauphin Louis and the French had been compelled to quit the country, their evacuation having been finally arranged in a conference held at Kingston 11th September, 1224. This expedition was fortunate and instantaneous; the government fell into the hands of Hubert de Burgh, who had greatly distinguished himself in the expulsion of the foreigners, and Peter des Roches, bishop of Winchester. De Burgh however, and the bishop, who was not an Englishman, but a native of Poitou, from conductors soon became rivals, and their attempts to throw each other down at length led, in 1224, to the resignation of Des Roches and his retirement from the kingdom. In 1223, the relations of peace and union were renewed between the English king and the French, and the departure of the French, who were made closer and farther by the marriage of Alexander II., the king of that country, with Jane, Henry's eldest sister, and of De Burgh with the widow of Poitou, the brother-in-law of the dauphin Louis and the French had been compelled to quit the country, their evacuation having been finally arranged in a conference held at Kingston 11th September, 1224. This expedition was fortunate and instantaneous; the government fell into the hands of Hubert de Burgh, who had greatly distinguished himself in the expulsion of the foreigners, and Peter des Roches, bishop of Winchester. De Burgh however, and the bishop, who was not an Englishman, but a native of Poitou, from conductors soon became rivals, and their attempts to throw each other down at length led, in 1224, to the resignation of Des Roches and his retirement from the kingdom. In 1223, the relations of peace and union were renewed between the English king and the French, and the departure of the French, who were made closer and farther by the marriage of Alexander II., the king of that country, with Jane, Henry's eldest sister, and of De Burgh with the widow of Poitou, the brother-in-law of the dauphin Louis and the French had been compelled to quit the country, their evacuation having been finally arranged in a conference held at Kingston 11th September, 1224. This expedition was fortunate and instantaneous; the government fell into the hands of Hubert de Burgh, who had greatly distingui
contrived to monopolize the whole power of the committee of government, and compelled the principal nominees of the king to acquiesce in their assumption of the supreme powers of the kingdom. Dissensions now however broke out in the dominant party, and De Montfort found a rival aspirant to the supreme power in another of the great barons, Richard de Clare, Earl of Gloucester. The quarrel of the factions enabled Henry, in the beginning of the year 1261, altogether to throw off the authority of the committee of government; and although the parliametary party was on this occasion led by Prince Edward, it was for the purposes of the adventure put down, De Montfort himself being obliged to take refuge in France. He returned however in April, 1263, and being now supported by Gilbert, Earl of Gloucester, in his late rival, proceeded to prosecute his quarrel with the crown by force of arms. Henry had now his son Edward on his side; but the success of the insurgents nevertheless was such as to threaten the complete overthrow of the royal power, when an accommodation was effected through the interference of the king's younger brother, Richard, Earl of Cornwall, called King of the Romans, to which dignity he had been elected a few years before. The result was to place De Montfort and his friends once more at the head of affairs, the king being reduced to a cipher, or a mere puppet in their hands. In the course of a few months however we find the war between the two parties renewed. The contest of arms was suspended for a time in the beginning of the following year (1264) by an appeal on the part of a number of the most influential barons and bishops to the arbitration of Louis IX. of France; but his award, which was upon the whole favorable to King Henry, was very shortly disregarded. On the 14th of May the forces of the barons, led by De Montfort, and those of the royals, commanded by the king in person, and by his son Edward, met at Lewes, in Sussex, where the former gained a complete victory, both Henry and his son being taken prisoners. This success of course once more placed all the power of the kingdom at the feet of the great baronial leader. His arrogance and assumptions were now uncheck'd; for he already alienated from him some of his most powerful adherents, and disposed them to take measures for the restoration of the royal authority, when, on the Thursday of Whitsun-week, 1265, Prince Edward was contrived to make his escape from Dover Castle, and to join the earl of Gloucester, who had now deserted the interest of De Montfort, and waited to receive him with an army at Ludlow in Shropshire. This event immediately led to the terms, known as the truce of 1st June, 1265, at which the two parties again encountered at Evesham; Edward here gave brilliant proof of the military talent which distinguished his future career; and the result was the defeat of the baronial forces with the loss of the life of the Duke of Gloucester. The king, and his son Edward, being both in the number of the slain. In this battle the king is said to have had a narrow escape; the earl, in whose camp he was, had compelled him to put on armour and mount a war-horse, from which he was thrown down in one of the charges, and would probably have been put to the sword or trampled to death had he not called out in his name, 'Harry of Winchester,' when his voice was heard by his son, who came up and rescued him.

The victory of Evesham however, although it liberated Henry and re-established the royal government, did not completely put down the defeated party. The adherents of De Montfort maintained themselves, notwithstanding all the efforts of Prince Edward, in various parts of the kingdom, for more than two years longer. Even after the parliament, in October, 1267, had passed an Act of Contumacy, known by the name of the Dictum de Kenilworth, by which easy terms of pardon were offered to all who would submit themselves, the insurrection was renewed by the people of London, with the earl of Gloucester at their head; but that rash and fickle populace almost immediately threw himself upon the king's mercy without drawing the sword, and was glad to obtain pardon through the mediation of the King of the Romans, leaving his father on the scaffold. A final and decisive engagement was at last effectcd in a parliament which met at Marlborough on the 18th of November. The short remainder of the reign of Henry after this date passed without disturbance, or any remarkable event. His son Edward was at first set out for the Holy Land in July, 1270, from which he had not returned when Henry died at Westminster on the Feast of St. Edmund, being the 16th of November, 1272, in the sixty-seventh year of his age, and the fifty-seventh of his reign.
of Hereford, he and the duke of Norfolk, formerly the earl of Salisbury, who had also participated in Gloucester's rebellion ten years before, were involved in the same ruin with their former associates, in circumstances leading to a strong suspicion that, notwithstanding the forgiveness and even honorary palliative treatment, the king, like Henry the fourth, had never forgotten their offence, but had still cherished a secret determination of revenge.

It appears that while Hereford was ruling from Brempton to London he was befriended by Norfik, entering into conversation with him, expressed his conviction, on grounds which he stated, that the king was preparing to destroy them. In some way or other, but how is doubtful, a report of this conversation reached the king. The consequence was that the same tidings of this order appeared before Richard and the parliament at Shrewsbury, January 30, 1398, and there formally accused Norfolk of having spoken to him in the terms that have been mentioned. Apparently he had been induced to take this course as affording his only chance of escape from destruction; but it did not save him, although it perfectly answered the end the king probably had in view. The charge against Norfolk was immediately forwarded to the two peers and six commoners, and eventually it was determined that it should be brought before a high court of chivalry. That court assembled at Windsor on the 30th of April, and after the due formality of having been joined by between the two dukes at Coventry on the 16th of September. When the day arrived and the combatants had entered the lists, and were on the point of advancing to the encounter, Norfolk retired from the field, which he had joined immediately after the death of his father, and was seized by his warder, and so arrested both where they stood. Norfolk was ordered to go on a pilgrimage to the Holy Land, and banished from England for life; Hereford was also sentenced to the execution of the sentence of death, and to remain abroad for the next ten years. He retired to Paris, and while he was resident in that city his father the duke of Lancaster died, February 3, 1399, on which Richard immediately quelled the insurrection of the son disqualified him from inheriting. This injury determined the latter immediately to return home, with the avowed object of maintaining his rights as duke of Lancaster, but doubtless with a real design of a higher pitch. He landed with a few attendants at Ravenspurv in Yorkshire on the 4th of July, while Richard was in Ireland. The events that followed belong to the history of the reign of that king; it is sufficient to state here that Henry, who was immediately summoned by the two peers to a committee of the commons, and was accordingly called upon to surrender his domain, put in motion and instantly by himself, and, and the deposition of Richard having been pronounced by the parliament, on the 30th of September solemnly acknowledged, was brought to Westminster Hall. The commencement of his reign is reckoned from that day.

This change was undoubtedly in the highest degree acceptable to the people, for in the face of the former king's meekness and willingness to let the people enjoy possession of their rights, it was a signal of new hope. Military operations however speedily commenced on the side both of Wales and Scotland, in the former of which countries an insurrection, headed by the famous Owen Glendower, had been in progress for several successive campaigns to put it down; while two Scottish armies, that marched across the borders pretending that they came to restore King Richard, who, it was said, was still living in the north, were defeated the first on the 22nd of June, 1402, at Neshor Moor, the second on the 14th of September, in the same year, in the most destructive fight of Holmend Hill. The victorious commands in this last affair was Henry Percy, the renowned Hotspur, eldest son of the earl of Northumberland, the nobleman to whom more than to any other individual Henry owed his throne. That great house, conscious of its power and its services, now broke with the king of its allegiance, and, on the death of that king, the son of Henry Percy's wife's brother, Sir Edmund Mortimer, who had been taken prisoner by Glendower, and whom, as the uncle and natural guardian of the young earl of March, the king had committed to his care, the wardship of Prince Henry, he had his own reasons for wishing out of the way. A most formidable rebellion followed, in which the Percies were joined by Hotspur's uncle the earl of Worcester, and Scroop, archbishop of York, and leagued both with Owen Glendower, who was now joined as a son-in-law in this rebellion by Sir Edmund Mortimer, and with the Scottish Earl Douglas, whom Percy liberated without reason, on condition of his aiding them with all his power. The mighty confederacy however was annihilated, 21st July, 1403, by the battles of Easton and Marston Moor, in which Henry Percy, the commander of the rebel forces, was himself slain. This decisive victory established the throne of Henry of Lancaster. Some further hostilities with the Scots and the Welsh, the latter being assisted by a force from France, continued to give him occupation for two or three years longer; but before the end of 1403 Owen Glendower was effectively put down, principally by the efforts of the earl of Northumberland, the eldest son of the English king, and a truce with Scotland had restored quiet for the present in that quarter. It was in the time of this truce that on the 30th of March, 1406, an English parliament was held, and in it the eldest son of king Robert of Scotland, was proceeding to France, on which Henry retained possession of the young prince, who, becoming king the following year by the death of his father, restored a prisoner in England till 1424. About the same time Henry detected a conspiracy against his life, one of the principal persons engaged in which was his cousin Edward, duke of York, whose estates were immediately reduced to a state of sequestration; and another insurrectionary attempt of the Percies, headed by Scroop, archbishop of York, who expatiated his treason by a death on the scaffold. A third northern insurrection, the last effort of the crafty old earl of Northumberland, who had some years before been deprived of his estates and outlawed, was put down, 28th February, 1406, at the battle of Barnham Moor, near Tadcaster, in which the earl himself fell.

Meanwhile an irregular war with France, which had at first been carried on principally at sea, had led at last to some military operations in Guienne, where the English possessions were attacked by the French; and this involved Henry in two great factions that then distracted France, the Bourguignons and the Orleanists, or Armagnacs. Having first sent a small body of troops to the assistance of the former in 1411, the king proceeded to the alliance of the latter, bursting the wax that had united two great factions that then distracted France, the Bourguignons and the Orleanists, or Armagnacs. Henry now took the advantage of his influence over the English parliament to insist on the provisions of the treaty of Troyes, more especially for the means by which he had acquired a crown that sat so heavy on his brow, and which he superstitiously dreaded heaven would not permit to be long worn by his descendants. He had endeavoured to soothe his conscience with the project of a crusade to the Holy Land, but death took him of it before he could execute that design. He breathed his last on the 20th of March, 1413, in the forty-seventh year of his age; and was succeeded, as it seemed, by Edward of York, his eldest son.
HENRY V.

1411, died 1413; 3. John, created earl of Kendal and duke of Bedford, 1414, afterwards regent of France, died 1435; 4. Humphrey, created earl of Pembroke and duke of Gloucester, 1414, died 1446; 5. Blanch, married successively to Lewis Barbatius, elector palatine and duke of Bavaria, to the king of Aragon, to the son of the king of Bar; and to Philippus, married to Eric X, king of Denmark and Norway. By a second wife, Joanna, daughter of Charles II, king of Navarre, and widow of John V, duke of Brittany, they had no issue.

Of the laws made in this reign the most memorable is the statute against the Lollards (the 2 Henry IV, e. 15), one of the enactments of which was that persons guilty of heresy, by written or oral admission, should be publicly burned. It is commonly supposed however that the writ "De Haretico Comburendo" was a common-law process before the passing of this statute. Several executions took place under the new law in the course of this year. In Henry IV's time the law of treason was brought back (by the 1st Henry IV, e. 10) to the statute on which it had been based by the act of the 25th of Edward III, certain new treasons created in the 14th century having been vitiating. By his first wife, Mary de Bohun, and was born in the year 1386. He was educated at Queen's College, Oxford, under the superintendence of his half-uncle, the great cardinal Henry Beaufort. With his wife Mary de Bohun, he had in 1386, a son of the late Duke of Gloucester were carried by king Richard to Ireland, and placed in custody in the castle of Trim, where they remained till the deposition of Richard. On his father's arrest, the captured prince of Gloucester, Luttrell, and Cornwall, and earl of Chester, and declared by act of parliament heir-apparent to the throne. He was introduced to arms, while yet only in his sixteenth year, at the battle of Shrewsbury, where, though severely wounded in the thigh, he fought gallantly to the close of the bloody day. Immediately after this he was sent to Wales in command of the army employed against Glendower, and for some years he was occupied in the contest with that able and valiant leader, in which he evinced extraordinary military genius, defeating his adversary in a succession of engagements,—in one of which, fought at Grosnow in Monmouthshire, in March, 1402, he took his son Gloucester driving back the forces of the Welsh till all Wales, except a small part of the north, was reduced to submission. It is said that the renown and popularity the prince acquired by these successes so inflamed the jealously of his own party, that he only escaped death and that after this, allowing the energies of his ardent mind to run to waste in riotous intemperance and debaucheries, he drew upon himself as much reproach and odium by his wild and dissipated life, as he had gained glory and favour among his countrymen by his previous conduct. The story of his being sent to prison by the lord-chief-justice Sir William Gascoigne, for striking him in open court, and other accounts of his disorderly and reckless courses, are familiar to every reader. These anecdotes of about 300 are not recorded by the more ancient chroniclers, and do not appear to have found their way into our written history before the middle of the sixteenth century, though they may have floated among the people as traditions from a considerable earlier date. It is likely that they had some general foundation, though many or most of the details are probably fictitious.

Henry V. was proclaimed king on the 21st of April, 1413, the day after his father's death, amidst universal and enthusiastic joy. He began his reign with several acts of generous stamp—transferring the remains of Richard II. to Westminster Abbey—releasing the young earl of March from the captivity in which he had been held all the preceding reign—and recalling the son of Hotspur from his exile in Scotland to be reinstated in his hereditary lands and titles, although without a year and a half of more than a year when, warmly supported by the church, the parliament, both Lords and Commons, and by the nation generally, he entered upon the enterprise of the conquest of France, which forms nearly the whole history of his reign. The claim which he advanced to the French crown was the same that had been put forward in the preceding century by Edward III., to whose rights he seems to have regarded himself as the legitimate successor in virtue of his possession of the throne, although he was certainly not the heir of that king by lineal descent, and this particular pretension was one that stood wholly upon descent by blood. After some time the king of France undertook negotiations which led to no result, Henry, having appointed his brother, the Duke of Bedford, regent of the kingdom during his absence, set sail from Southampton, 13th August, 1415, with a fleet of 35,000 men, and a fleet of from 1200 to 1400 vessels, and reached the mouth of the Seine, about three miles from Harfleur, on the second day following. Three days were spent in disembarking the troops. Henry immediately proceeded to lay siege to the strong and well-garrisoned fortress of Harfleur. It capitulated after a siege of six weeks, in the course of which time however a dysentery that broke out in their camp made a frightful devastation among the English. On the 6th of October Henry's army was crossed the Seine, and after having dispersed the French garrisons, he proceeded to the city of the Seine, and entered the town itself, with all the solemnities of a victory, and the great battle of Azincourt was fought on the next day, in which the English gained one of the most complete as well as the greatest victories on record. [Azincourc.] The battle of Harfleur was fought byHenry the 5th, being a son of the late Duke of Gloucester, and brother of the Duke of Bedford. He was received into the king's army at Dover, where he crossed the sea to meet him, all the way to London, which he entered on the 23d of November, his progress being marked by a general and tumultuous joy. All seemed to feel that the victory of Azincourt was the conquest of France. But although no nation ever received so great a blow in a single field as France did on that fatal day,—when a hundred and sixty of her greatest nobles fell, besides many more that were taken prisoners, including the dukes of Orleans and Bourbon, the commanders-in-chief in conjunction with the capable d'Albret, who was among the killed,—it was not till after some eighteen months of general peace and civil disquisitions, and left nearly without a government, that unfortunate country at last consented to receive the yoke of its invader. Harfleur was attacked by the French the 17th of March, and surrendered on the 23rd, after a great naval victory gained by the duke of Bedford. In September Henry passed over to Calais, and there had a secret conference with the head of one of the great French factions, the Prince of Waldeck, with whom there is no doubt that he came to some understanding about the employment of their united efforts for the destruction of the Orleans, who now had the government in their hands. It was by thus politically taking advantage of the dissensions of his enemies, rather than by any further very brilliant military operations, that Henry at last achieved the conquest of France. He returned to that country in August, 1417, having under his command a magnificent army of about 30,000. With this force he soon reduced the whole of Lower Normandy. He then laid siege to Rouen, 30th July, 1418, and was detained before this town till after a brave resistance it capitulated on the 16th August. In the following year, the duke of Burgundy had obtained the ascendency in Paris and at the court of the incajable Charles and his prodigate queen; and he was now so much disposed as to appear himself before Paris, two years before the project of the English king. From Rouen Henry advanced upon Paris, on which Burgundy and the queen, taking the king with them, left that city, and went, first to Liagry, and afterwards to Provins. It was at this time that a truce should be concluded between the English and the Bourguignons, and that Henry should meet the duke and the queen of France at the 30th of May. On that day the English set forth on their march to the Seine, near the town of Meulan. But after being prolonged for above a month, the negotiation was suddenly broken off.
by the French party; and then it was discovered that the duke had concluded a treaty with the Dauphin and the faction of the Armagnacs. On this Henry immediately resumed his advance upon Paris. Meanwhile the hollowness of the apparent reconciliation that had been hastily patched up between the two rival factions became abundantly manifest; the forced alliance of the chiefs had no effect in uniting their followers. At length, on the 10th of September, Burgundy having been induced to meet the Dauphin on the bridge of Montereau, there was a foully fallen upon that monarch, the least of which was the destruction of the treacherous princes. From this time the Bourguignons, and even the people of Paris, who were attached to that party, looked upon the English as their natural allies against the Dauphin and his faction. Philip, the young King, in the meantime, gave notice of his marquis's proceeding to the English, who, immediately sent to all Henry's demands, which were—the hand of Charles's eldest daughter, the Princess Catherine, the present regency of the kingdom, and the succession to the throne of France on the death of Charles. It was also arranged that one of Henry's brothers should marry a sister of Duke Philip. Several months were spent in the settlement of certain minor points; but at last the treaty of Perpetual Peace, as it was styled, was completed, signed and sealed at Troyes by Queen Isabella and Duke Philip, as the commissioners of King Charles, on the 20th of May, 1420; and on the following day the oath to observe the treaty was renewed by the representatives of parliament, the nobility, and deputies from such of the communities as acknowledged the royal authority.

Henry's marriage with Catherine was solemnized on the 2nd June. On the second day after he received his military commission, he set out on a tour of inspection and in reducing successively the towns of Sens, Montereau, Villeneuve-le-Roi, and Melem. On the 18th November Henry and Charles entered Paris together in triumph, and here the treaty of Troyes was renewed by the representatives of the two countries (19th Decem-ber) in an assembly of the three estates of the kingdom.

Henry soon after set out with his queen for England, and on the 2nd February, 1421, entered London under such pageant and heraldry as that capital had never before witnessed. He did not however remain long at home. On the 22nd March his brother the duke of Clarence, whom he had left governor of Normandy, was defeated in a battle fought at Baugé, in Anjou, by a force chiefly composed of a body of Scottish auxiliaries under the earl of Buchan, who slew Clarence with his own hand, an exploit for which the Dauphin conferred upon the Scottish earl the office of constable of France. This exploit appears to have produced a wonderful effect in reanimating the almost broken spirits and extinguished hopes of the Dauphin's party. Feeling that his presence was wanted in France, Henry again set sail for England. On the 1st of December he arrived with him a Scottish force commanded by Archibald, earl of Douglas, and also his prince, the Scottish king, to whom he promised his liberty as soon as they should have returned to England. His wonted success attended him in this new expedition; and he drove the Dauphin before him, from one place to another, till he forced him to retire to Bourges, in Berry. He then, after taking the strong town of Meaux, which cost him a siege of seven months, proceeded to Paris, which he entered with great pomp, 30th May, 1422, accompanied by his queen, who had come over to join him, after having given birth to a son at Windsor Castle on the 6th May, 1422. The triumphant career was now at hand. The Dauphin and the constable Buchan having again advanced from the south, and laid siege to the town of Conu, Henry, though ill at that part of the country, placed his horse and car, and went on a tour of inspection, but he proceeded farther than Corbeil, about twenty miles from Paris, when, resigning the command to his brother the duke of Bedford, he was carried back in a litter to the Bois de Vincennes, in the vicinity of the capital, and there, after a longer illness which commenced on the 19th of August, in the 34th year of his age, and the 10th of his reign.

It was necessary in the present day to waste a some either the injustices or the folly of the enterprise on which Henry thus threw away the whole of his reign. In estimating his character it is of more importance to remember that the folly and injustice, which are now so evident, were as little perceived at that day by his subjects in general as by himself, and that there can be no doubt whatsoever that both he and they thought he was, in the assertion of his fancied rights to the crown of France, pursuing both a most important and a most legitimate object. That motives of personal ambition mingled their influence in his views and proceedings must no doubt be admitted; but that that is perfectly conceivable, in the least, but a thorough belief in the rightness both of the object sought and the means employed to secure it. In following the bright though misleading fateful that had captivated him, he certainly displayed the loftiest and most admirable kind—energy, both of body and mind, which no fatigue could quell; the most heroic gallantry; patience and endurance, watchfulness and activity, steadiness, determination, policy, and other moral constituents, sufficient to make him the master of a country, with skill and resources. Nor does any weighty imputation dim the lustre of these virtues. His slaughter of his prisoners at the battle of Azincourt, almost the only stigma that rests upon his memory, was an act of self-preservation justified by what appeared to be the circumstances in which he was placed. No monarch ever occupied a throne who was more the idol of his subjects than Henry V.; nor is any trace to be found of popular dissatisfaction with any part of his government, from the beginning to the end of his reign.

HENRY VI., surnamed of Windsor, was born the 6th April, 1421, at Montereau, near the Loing, kingdom of Navarre, to be crowned as the king of France. He was consequently not nine months old when the death of his father left him king of England. His reign is reckoned from 1st September, 1422, the day following his father's death.

In the settlement of the government which took place upon the accession of the infant king, the actual administration of affairs in England was entrusted to the younger brother of his two uncles, Humphrey, earl of Gloucester, as substitute for the elder, John, duke of Bedford, who was appointed president of the council, but who remained in France, taking his late brother's place as regent of that kingdom, and as such had been archbishop of the Realm and Church of England. The care of the person and education of the king was some time after committed to Richard De Beauchamp, earl of Warwick, and to the King's great-uncle Bishop (afterwards cardinal) Beaufort.

The history of the earlier and longer portion of this reign is the history of the gradual decay and final subversion of the English dominion in France, house of Plantagenet, which was followed in a few weeks (22nd October) by that of his father-in-law, the imbecile Charles VI. Immediately on this event the Dauphin was acknowledged by his adherents as King Henry V. the conqueror of France, and set out in Paris, and whenever the English power prevailed, as king of France. The next events of importance that occurred were the two great victories of Crevant and Verneuil obtained by the English over the French and their Scottish allies, the former on the 21st of July, 1429, the latter on the 17th of August, 1424. In the interim King James of Scotland, after his detention of nearly twenty years, had been released by the English council, and had returned to his native country after marrying a near connexion of the royal family, the Lady Jane Beaufort, daughter of the duke of Somerset. One of the engagements made by James on his liberation was that he should not permit any more of his subjects to enter into the service of the English. This assurance was for the most part destroyed a few months afterwards in the slaughter of Verneuil.

This however was the last great success obtained by the English in France, for pursuing both an ambition to loosen and shake, and then to crumble faster and faster away, until it fell wholly to ruin. The first thing which materially contributed to unsettle it was the disaster given by the duke of Burgundy by treaty with the king of Gloucester and the Duke of Hainault, and whose subsequent invasion and seizure of her hereditary states, then held by her former husband John, duke of Brabant, who was the cousin of the duke of Burgundy. Although Burgundy, on being induced by fortune to persevere his enterprise, by whom he soon succeeded in crushing, after she had been abandoned by Gloucester, did not go the length of openly breaking with the English on account of the matter, his attachment was never afterwards to be much relied upon,
and he merely waited for a favourable occasion to change sides. Meanwhile another of the most powerful of the English allies, the duke of Brittany, openly declared for Charles VII. Other embarrassments also arose about the same time out of the mutual jealousies and opposition of Gloucester and Bedford, which latter had not lost its intense hostility and violent hostility. It required all the moderating prudence and steadiness of the duke of Bedford to break as much as possible the shock of these various adverse occurrences. For long he had been forced to do in matters of state maintaining his actual position. It was not till the close of 1428 that he proceeded to attempt the extension of the English authority beyond the Loire. With this view the expedition went out in the autumn of that year, by the earl of Salisbury, and, on his death from a wound received a few weeks after, carried on by the earl of Suffolk. The extraordinary succession of events that followed, before it was pronounced, died not great deeds on the scene; her arrival in the besieged city (29th April, 1429); the raising of the siege (8th May); the defeat of the English at the battle of Patay (14th June); the coronation of king Charles (15th June); the attack on Paris (20th September); the capture of Joan at Compiégne (25th May, 1430); her trial and execution at Rouen (30th May, 1431)—all belong to the singular story of the heroic maid. [Asc. J. Hist. C.W.

The young king of England, now in his ninth year, had in the meanwhile been brought to Rouen (May, 1430), and was about a year and a half afterwards solemnly crowned at Paris (17th December, 1431). The death of the duchess of Bedford, by the end of the day, in November, 1432, and the marriage of Bedford in May of the following year with Jaquetta of Luxembourg, aided materially in still further detaching Burgundy from the English connection, till his remaining ones gradually giving way under his resentment, in September, 1435, he concluded a peace with king Charles. This important transaction was managed at a great congress of representatives from all the sovereign powers of Europe assembled at Rouen, with the view of effecting a general peace under the mediation of the pope. On the 14th of September, a few days after the treaty between Charles and Burgundy had been signed, but before it was at this time any de facto, the English convention the same was announced. This event gave the finishing blow to the dominion of the English in France. In April, 1436, the English garrison in Paris was compelled to capitulate. The struggle lingered on for about fifteen years more; but although some partial successes, and especially the brilliant exertions of the famous Talbot (afterwards earl of Shrewsbury), in Normandy and elsewhere, gave a check from time to time to the onward progress of the English, the ever-vailing current of events ran decidedly in the contrary direction. In 1444 a truce was agreed upon, to last till 1st April, 1446; and in this interval a marriage was arranged between the young king Henry and Margaret, the beautiful daughter of René the Good of Anjou, and sister of the dukes of Anjou, Maine, and Bar. These lofty dignities however were all merely titular; with all his kingdoms and dukedoms he was till this time not destitute both of land and revenue. Thus circumstanced, in return for the hand of his daughter, he demanded the restoration of his hereditary states of Maine and Anjou, which were in the possession of the English, and the proposal was at length assented to. Nor was this concession the only one that tended from the first to excite popular feeling in England against the marriage. Margaret was a near relation of the French king, and had been in great part brought up at the French court. The English nation had to be thoroughly French in spirit, and it is no wonder that the earl of Suffolk, by whom it had been negotiated, became from this time the object of much general odium and suspicion, the more especially when it was found that Margaret, who soon evinced both commanding talent and a most imperious temper, distinguished him by every mark of her favour, and made him almost exclusively her confidential and chief minister in all his state business. The marriage now prolonged till the 1st of April, 1449. The first remarkable event that followed was the destruction of the duke of Gloucester, who, although he appears not to have openly opposed the marriage, was certainly the most formidable obstacle in the complete ascendancy of Suffolk and the queen. Having been arrested on a charge of high treason, 11th February, 1447, he was on the seventeenth day thereafter found dead in his bed. The manner how this most likely has been mistaken, his death was generally attributed to the agency of Suffolk, who, now raised to the dignity of duke, became, ostensibly as well as really, prince, or rather sole minister. Soon after, a powerful attempt to invade France, and a numerous force having been poured by king Charles into Normandy, through the adjacent country of Maine, no longer a hostile frontier, town after town was speedily repossessed, till after a battle fought at the end of October, November, 1449. Early in the next year another heavy reverse was sustained in the defeat of Sir Thomas Kyriel at Fourmigny; and at last the fall of Cherbourg, 12th August, 1450, completed the loss of the Tower. Before this catastrophe however the public indignation in England had swept away the unlikely minister on whose head all this accumulation of disasters and disgrace was laid; the duke of Suffolk, after having been committed to the Tower, on the impeachment of the House of Commons, and banished from the kingdom by the judgment of his peers, was seized as he was sailing down from Dover to Calais, and carried on board the vessel one of the officers of the Tower, detained for a few days, and at last had his head struck off by an executioner who came alongside in a boat from the shore, May 2nd, 1450. The murder of Suffolk was immediately followed by a popular insurrection, upon which the French king, in September, had issued the treaty of Wat Tyler, seventy years before. [Cade, John.] Before the close of the following year the French, in addition to Normandy, had recovered all Guienne; and with the exception of Calais, not a foot of ground remained to England of all her recent Continental possessions. Bordeaux, which had been subject to the English government for three centuries and a half, revolted the following year; and the brave Talbot, now eight years old, was left in charge of a very small and insignificant force, and regarded with advantage of that movement; but both he and his son fell in battle, 20th July, 1453; and on the 10th of October following Bordeaux surrendered to Charles. The remainder of the reign of Henry VI. is made up of the events that arose out of the contest for the crown which eventually placed another family on the throne. [Edward IV.] It is only necessary here to enumerate briefly the most important events of this chapter, and the story of Henry's personal fortunes. On the 13th of October, 1453, Queen Margaret was delivered at Westminster of a son, who was named Edward, and early in the next year, according to custom, created prince of Wales, and of Chester. It was agreed at the same time that, in the same way, the young king should be committed to the duke of York. In the contest of arms that soon ensued, he was taken prisoner by the earl of Warwick at St. Albans, 22nd May, 1455, and towards the end of that year he was again declared to be in a state of incapacity, and the duke of York resumed the management of affairs with the title of protector. Again however in a few months Henry recovered his health, and the government was conducted in his name till his second capture by the young earl of March (afterwards Edward IV.) at Northampton, 10th July, 1460. On this occasion the queen escaped with her son, and eventually married him to her cousin Sir Thomas Stafford, and the other Margaret over the earl of Warwick at Barnet Heath, 17th February, 1461, again liberated her husband; after which, and the issue of the battle of Towton, 29th March, which established Edward on the throne, he was united in marriage with the Princess Elizabeth, daughter and Prince Edward to Scotland. Here he fixed his residence in the first instance at Kirkcudbright; but it appears that he afterwards, as well as his queen, proceeded to Edinburgh, where he resided some time, till on the 23rd August, 1471, by the popular name of the "War买房 Marjory.) When Margaret again took up arms and invaded England in 1452, Henry was placed for security in the Castle of Hardlough in Merionethshire; and here he remained till the 14th January, 1454, when he was brought from Wales to join a new insurrection of his adherents on the north of England. After the two final defeats of the Lancastrians at Hedgeley Moor, 25th April, and at Hexham,
HEN

15th May, the deposed king lurked for more than a year among the moors of Lancashire and Westmorland, till he was at last recaptured by a monk of Adlington, and seized as he sat at dinner in Waddington Hall in Yorkshire, in June, 1465. He was immediately conducted to London and con-
signed to the Tower, where he remained in close confine-
ment, till the extraordinary event of Henry VII, 1485, ag-
ain, after a few months, to both his liberty and his crown. He was carried from London to the battle of Bannockburn, fought 14th April, 1471, and there fell into the hands of Edward III., who immediately ordered him to be put in the Tower. The old man survived the final defeat of his adherents, and the murder of his son at Tevershur, 4th May; and a few days after an attempt, which had nearly succeeded, was made by Thomas Nevill, called the Bastard of Plymouth, to rescue the old King, and carry him off by force. This probably determined Edward to take effectual means for the prevention of further disturb-
ance from the same quarter. All that is further known as to the son of Owen Tudor, Queen Catherine, and Richard, was exposed to public view in St. Paul’s. It was generally believed however that he had been murdered, and that his murderer was the king’s brother, the Duke of Gloucester, so near a relation as to be his des-

er redress as a martyr by the Lancastrians, and many mi-

racles were reported to have been wrought at his tomb. An attempt was made in the next century by his successor Henry IV. to have his remains translated to the grave of his father, a practice very common in the time of the Pope: the referre matter to the examination of the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was发掘ed in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Durham; but it came to nothing. The grave of his great-grandfather, John of Gaunt, was excavated in 1471, the archbishop of Canterbury and the bishops of London, Winchester, and Dur
 persed his ships as he crossed the Channel, and when, he
 reached the English coast near Portland, he determined to
 land without delay, partly with the hope that he had done so,
 and not to land. Meanwhile the hasty, illness-combined revolt
 of Buckingham himself was taken and executed as a traitor of
 his crown. He had been born in a house near York, and
 many of his supporters were related to the House of York,
 and some of the nobles who had been captured were
 another sister of Edward IV., also gave her countenance
 and effect to the scheme. The death of the heir to the
 throne, by the kindness of the Yorks, was also a secret
 which probably the friends of the House of York intended
 to make use of for effecting their first object, the ejection of
 the present king. The brief royalty of Simnel however
 terminated, June 16th, 1487, by the defeat of his ad-
 verting forces. The king, the attempt against him and his
Simnel was slain. The imposture of Simnel was followed after
 some years by the appearance of the more celebrated pre-
tender Perkin Warbeck, who was assented to by his adherents
 to be the son of Edward IV., and the heir to the throne. The
 king Richard V., and generally supposed to have been murdered
 along with him in the Tower. Warbeck arrived in Ireland
 from Lisbon in the beginning of May, 1492, and was
 afterwards engaged in projections against Edward IV., and
 took the title of king of England, not only by the duchy of Burgundy,
 but by the governments both of France and Scotland.
 This affair occurred Henry for the next five or six years;
 and it was not till the end of 1497 that the adventure
 was finally put down. Another pretender Carl of Warwick
 next arose, one Ralph Wulford, or Wyleford, the son of a
 shoemaker, whose attempt however was immediately nipped
 in the bud by his apprehension and execution, in March,
 1499. The restless succession of these conspiracies seems
 at last to have convinced Henry that his throne would never
 be secure, nor the kingdom at peace, until the persons who
 were making rebellions by points-in his way were put to
 an end. This was done by his execution of Perkin Warbeck,
 and the earl of Warwick. From this time Henry's reign
 was one of complete internal tranquillity, of which he chiefly
 took advantage for the service of his religion and
 treasures—extracting money from his subjects on all sorts
 of pretences, which were not the less oppressive for being
 generally legal in their form and colour. The English law
 of this period was sufficiently easy for the service of
 the crown; and Henry was abundant enough for the purposes
 of the most exorbitant tyranny. The chief instruments of Henry's
 capacity were two lawyers, Sir Richard Empson and
 Edmund Dudley, names immortalized by the detestation of
 their country.

Henry was early in his reign involved in the politics of the
 Continent by the quarrel which arose between Francis
 of Bretagne, and the younger of the two sisters of Edward IV.,
 who both of whom he had been connected before he came to the throne,
 and each of whom applied to him for his assistance. This
 quarrel, by the death of Francis, soon after it broke out,
 leaving only two daughters, one of whom also soon
 afterwards died, left in fact a contest for the possession
 of the young kingdom of France. [Bretagne, v. 401.]

This was an object to which the public mind in England
 was strongly opposed; but although Henry was forced to
 appear with the king of France to assist in its suppression,
 he took every steps to prevent the subjugation of the
 Bretons till it was too late. The money that was eagerly voted
 by parliament to fit out an expedition, he collected very care-
 fully; but instead of fighting, he endeavoured to
 resolve the matter by the cheaper method of negotiation.
 Afterwards, in the spring of 1492, he found himself
 compelled to equip a small force, which proceeded to Bretagne;
 but he had previously assured the French government
 that if the troops were sent they should act only on the defensive,
 an engagement which was faithfully kept. Charles
 eventually compelled the duchess of Bretagne to marry him, after
 he had been appointed to Maximilian, the King of the
 Romans; and the duchy was thus finally annexed to the
 French crown. The indignation in England at this result
 forced Henry to conduct an army to France in person,
 in the beginning of October, 1492; but he had already
 secretly arranged a peace with Charles, and before there
 was any fighting the treaty was published in the beginning
 of November. By this treaty, called the Treaty of Estaples,
 Charles bound himself to pay Henry the sum of 149,000.
 Sterling, and to make an annual instalment of 25,000. In
 1496, notwithstanding this peace, Henry joined the league
 of the pope, the King of the Romans, the king of Castile,
 the duke of Milan, and the republic of Venice, which, after
 Charles had overthrown, in 1495, the pretender Ferdinand
 of Burgundy, in a few months expelled him from his sudden
 conquest; but when Charles died, in 1498, the treaty of Estaples
 was renewed with his successor Louis XII., and continued to
 regulate the relations of the two kingdoms to the end of
 the reign.
By successive troops with James III. and James IV. the peace with Scotland was preserved till 1495, when, on the recommendation of the French king and the duchess of Burgundy, Perkin Warbeck was received in that kingdom as the rightful heir of the English crown. King James not only assisted the adventurer with money and troops, but gave him in marriage the Lady Catherine Gordon, a relation of his. After Warbeck's final discomfiture however in 1497, a new truce was concluded between the two countries, by which it was agreed that after five years' peace all kings should be dead; and this led in 1502 to a treaty of perpetual peace, cemented by the marriage of James with Henry's eldest daughter, the princess Margaret. This marriage, from which the Lords of the Council date the inordinate pride, the impiety, and insolence that followed, was performed by proxy. It was solemnized on the 8th of August, 1503. It was reported, Bacon informs us, that when the project of the marriage was discussed in the council of the English king, an objection was raised on the ground that it might possibly lead to the kingdom of England falling to the king of Scotland. 'Whereunto,' continues the historian, 'the king himself replied, that if that should be so, Scotland would be but an accession to England, not England to Scotland, for that the greater would draw the less; and that it was a safer union for England than that of France. This passed as an oracle, and silenced those that moved the question.'

Nearly two years before this, namely, 14th November, 1501, a marriage, long contemplated and agreed upon, had been solemnized between Henry's eldest son Arthur, prince of Wales, and the fourth daughter of Ferdinand the third king of Castile. Arthur however, who was a prince of the highest promise, died within six months after this time; and then it was arranged that Catherine should be married to his surviving brother Henry. The marriage of Catherine and Arthur was cemented by many treaties in its consequences than that of Margaret and James.

Queen Elizabeth died 11th February, 1503, a few days after giving birth to a daughter, on which Henry lost no time in paying respect to her by an act which was evidence of some political advantage, or in the augmentation of his riches, now his ruling passion, by means of a new matrimonial alliance. One disappointment after another however overcame him in this pursuit; and after having at first made application to the widow of the king of Naples; then concluded a treaty with the archduke Philip, husband of Joanna, queen of Castile, for the hand of his sister Margaret, widow of the duke of Savoy; and finally, on the death of Philip, in September, 1506, once more changed his ground, and proposed himself as the husband of Philip's widow, the queen Joanna, who was insane,—be died before he could accomplish his object. His death took place at Richmond, as he lay upon his bed, without his clothes on, in the twenty-fourth year of his reign, and the fifty-third of his age.

The children of Henry VII. by his queen Elizabeth of York, were Arthur, born 29th September, 1496, created prince of Wales 1498, married to Catherine of Spain (to whom he had been contracted eleven years before), 14th November, 1501, died at Ludlow Castle, 2nd April, 1502; 2. Margaret, born 29th November, 1499, married to king James IV. of Scotland, 8th August, 1503, died 1539; 3. Henry, who succeeded his father as Henry VIII.; 4. Elizabeth, born 2nd July, 1492, died 14th September, 1493; 5. Mary, born to Lucy, 2nd November, 1514, and, secondly, in 1515, to Charles Brandon, duke of Suffolk, died 25th June, 1533; 6. Edmund, born 21st February, 1495, soon after created duke of Somerset, died young; and 7. Catherine, born 2nd February, 1503, died a few days after her mother.

Bacon, in his striking and masterly 'History of the Reign of Henry VII.,' has drawn this king in the highest light of policy and state-craft, without interfering with the 'Principes of Machiavel,' if we make allowance for the greater ruthlessness and more sanguinary spirit natural to the Italian blood. It may be admitted that this great writer, in the elaboration of his character, has been guilty of some exaggeration or over-refinement; and he has probably softened the more repulsive features in Henry's moral character, as much as he has unduly exalted his intellectual endowments. But the difficult position which he occupied, and the success with which he maintained himself in it, vindicate the title of this sovereign to be regarded as at least one of the greatest masters of the dexterous art that figure in history. Bacon compares him, justly enough, to the de Vignay of France and Ferdinand of Spain, designating the three as 'the tres magis of kings of those ages.' The age in which Henry lived was characterized by that of the birth of modern policy, and that in which the foundations were laid of the still more shining state of the European states. Nothing that was then established has been greatly shaken since; all the changes that have since taken place have been but little more than the growth and development of the arrangements already sown, and the principles that were called into action. This reign therefore may be considered as the beginning of the modern history of Europe.

HENRY VIII., the second son of Henry VII., by his queen Elizabeth of York, was born at Greenwich, 28th June, 1491. On the 1st of November following he was created duke of York, and in 1494 his father conferred upon him the honorific title of Lord-Deputy of Ireland. Sir Edward Poyning was being appointed his deputy. The government of Sir Edward is famous for the enactment of the statute, or rather series of statutes, declaring the dependence of the Irish on the English crown. This design in these appearances seems to have been carried out to give his son's name to the pretensions of Perkin Warbeck, and the efforts of the supporters of that adventurer, first in Ireland and afterwards in Scotland. However this may be, the early distinguished by those and similar specious appearances, it is stated by Paolo Sarpi, in his 'History of the Council of Trent.' That Henry was from the first destined to the archbishopric of Canterbury; that prudent king his father 'kept his son's name in reserve,' 'as his Life and Reign' (choosing this as the most cheap and glorious way for disposing of a younger son;' he received accordingly a learned education; so that, continues this writer, every one in his person, his mind, and his estate, must be an authentic philosopher, and the greatest and most divine, he was (which one might wonder at in a king) a curious musician, as two entire masses composed by him, and often sung in his chapel, did abundantly witness. As the death of his elder brother Arthur, however, 2nd April, 1502, made him heir to the crown before he had completed his eleventh year, it is evident that his clerical education could not have proceeded very far, and that what he knew we may say he was untaught. He was a great king, for he was a king of the English crown; and this last account makes the interval, not half a year, but eleven months. Sir Harris Nicolas (Synopsis of the Peerage, i. 7) also, we do not know on what authority, dates Henry's creation as prince of Wales, 16th February, 1493. But there is a patent in Rymer (vol. xii. p. 11) appointing him ward of the forest of Gualdines in Yorkshire, by this title, 22d June, 1502, within three months after his brother's death. This is consistent with what we have just stated. February 14th, 1502, was his birthday, and February 20th, 1504, his death, dying young; and 8. Catherine, born 2nd February, 1503, died a few days after her mother.

Very soon after Arthur's death the singular project was started of marrying Henry to his brother's widow. The proposition appears to have originally come from Ferdinand and Isabella, who were most anxious to retain the connexion with England; and to have been assented to by King Henry in great part from his wish to avoid the repayment of the dowry of the princess. The final agreement between the two kings was signed 23rd June, 1503, and, according to the chronicles, the
parties were assigned on Sunday the 25th of the same month, at the bishop of Salisbury's house in Fleet Street, although permission was certainly not obtained from Pope Julius II. till the 26th of December following. This bull however contains a clause legitimating the marriage, although it should have already contracted, or even committed the several acts of matrimony, if nobody at this time seems to have doubted that Catherine's preceding marriage with Arthur had been followed by consummation.

Henry became king 22nd April, 1509, being then in his 16th year. On a memorial being presented by the Spanish ambassador, it was, notwithstanding the opposition of Waltham, archbishop of Canterbury, resolved in the council that the marriage with Catherine should be completed; Fox, bishop of Winchester, to whom was largely urged, that there was no room to doubt that the princess was still a virgin, since she herself affirmed it, offering even to be tried by matrons, to show that she spoke the truth. The marriage was in the 9th of September also the Scottish king, James IV., who as the son of Edward who had invaded England, was defeated by the earl of Surrey in the great battle of Flodden, he himself with many of his principal nobility being left dead on the field. This war with France however was ended the following year by a treaty, the principle condition of which was that Louis XII., who had just lost his brother, Ann of Bretagne, the same who had been in the first instance married to his predecessor Charles VIII. [HENRY VIII.], should wed Henry's sister, the Princess Mary. The marriage between Louis, who was in his fifty-third, and the English princess, as yet only in her sixteenth year, was solemnised 5th October, 1514; but Louis died within three months, and was succeeded by his son, Francis I., the only child of his first marriage, and on his death Edmund, duke of Suffolk, who succeeded in taking several towns, though only to give them up again in a few months, until the disappointment, for the second time, of Wolsey's hope of being made pope through the influence of Charles IX., is supposed to have determined that minister upon a change of politics. Before the memorable defeat and capture of Pavia at the battle of Pavia, 24th February, 1525, the Emperor Maximilian had made a treaty with the emperor; having actually commenced negotiations for a peace with Francis's ally, James V., the young king of Scotland, on condition of giving James in marriage his daughter Mary, which in the royal family of Scotland had long been promised to the emperor. In August he concluded a treaty of peace and alliance with France; and after the release of Francis, in March, 1526, Henry was declared his protector in the kingdom of France, and was confirmed in possession of the dukedom of Clarent and Mont Holy, which was formed under the auspices of the pope for the renewal of the war against Charles.

Before this date two domestic occurrences took place that especially assisted the chief personage of the expedition to France, of Edmond de la Pole, duke of Surrey (afterwards duke of Norfolk), who held the office of lord treasurer. This led to the introduction at court of the famous Thomas Wolsey, who, being then dean of Lincoln, was brought forward by Fox to counteract the growing ascendency of Surrey, and who speedily made good for himself a place in the royal favour; but it was not long before the king's ministers to insignificance, and left in his hands for a long course of years nearly the whole power of the state. [WOLSEY, CARDINAL.] The reign of Wolsey may be considered as having begun almost from his expedition to France, towards the close of the year 1513; and henceforward the affairs of the kingdom for fourteen or fifteen years were directed principally by the interests of his ambition, which governed and made subservient to its purposes his every principle and every act of the king. The history of the greater part of this period consists of Henry's transactions with his two celebrated contemporaries, Francis I. of France, the successor of Louis XII., and Charles V. of Spain, the son of Philip the Handsome, and grandson of Charles, who had been king of Spain as Charles I. by the death of his mother's father, Ferdinand, in 1516, and three years after was elected to succeed his paternal grandfather Maximilian I., as emperor of Germany. His position might have enabled the English king in some degree to hold the balance between these two irreconcilable rivals, who both accordingly made it a principal point in their foreign policy to co-operate with his kingdom; but his influence on their long contention was in reality very inconsiderable, directed as it was for the most part either by mere caprice, or by nothing higher than the private resentment of the English minister. The foreign policy of this reign had nothing national about it, either in reality or even in semblance; it was neither regulated by a view to the true interests of the country, nor by a desire of extending the English influence or sentiment. Henry had himself been a candidate for the imperial dignity when the prize was obtained by Charles; but he never had for a moment the least chance of success. For a short time he remained at peace, both with Charles and Francis, though the latter had been defeated at Guinegaste, in the end of May, 1520; and with the latter of whom he had a few days after a seemingly most amicable interview, celebrated under the name of the 'Field of the Cloth of Gold,' in the neighbourhood of Calais. Wolsey's object at this time however was to detach his master from the interests of the French king; and a visit which Henry paid to the emperor at Gravelines, on his way home, showed how little he was to count upon any effect of their recent cordialities. Before the close of the following year Henry was formally joined in league with the emperor and the pope; and in March, 1522, he declared war against France, and committed England to the war. Though the emperor flattered him by paying him a visit at London; his vanity having also been a short time before gratified in another way by the title of 'Defender of the Faith' bestowed upon him by the pope, he set himself (as we shall see by the next VI.) for a Latin treaty which he had published 'On the Seven Sacraments,' in contravention of Luther. Henry continued to attach himself to the interest of the emperor,—even sending an army to France, in August, 1523, under the duke of Suffolk, which, succeeding in taking several towns, though only to give them up again in a few months, until the disappointment, for the second time, of Wolsey's hope of being made pope through the influence of Charles IX., is supposed to have determined that minister upon a change of politics. Before the memorable defeat and capture of Pavia at the battle of Pavia, 24th February, 1525, the Emperor Maximilian had made a treaty with the emperor; having actually commenced negotiations for a peace with Francis's ally, James V., the young king of Scotland, on condition of giving James in marriage his daughter Mary, which in the royal family of Scotland had long been promised to the emperor. In August he concluded a treaty of peace and alliance with France; and after the release of Francis, in March, 1526, Henry was declared his protector in the kingdom of France, and was confirmed in possession of the dukedom of Clarent and Mont Holy, which was formed under the auspices of the pope for the renewal of the war against Charles.

Before this date two domestic occurrences took place that especially assisted the chief personage of the expedition to France, of Edmond de la Pole, duke of
Suffolk, whose mother was Elizabeth Plantagenet, sister of Edward IV. A younger son, Edward, was born in 1515, since a short time before the death of the late king, who had contrived to obtain possession of his person after he had fled to the Continent, and, it is said, had in his last hours recommended that he should be set free to lead a life of his own. Henry VIII, however, in the course of a trial or other legal proceeding, his crime, there can be no doubt, being merely his connexion with the House of York. Lord Herbert tells us that Henry's going to the Continent at this time was deemed dangerous and inexpedient, on the ground 'that if the king should die without issue, however the succession were undoubted in his sister Margaret, yet the people were so affected to the House of York, as they might take Edward de la Pole out of the Tower in which he was, and Wolsey was perhaps as yet new in office to be fairly made answerable for this state of bloodshed; in the next case the unfortunate victim is generally believed to have been sacrificed to his resentment and thirst of vengeance.

In 1521 Edward Stafford, duke of Buckingham, son of the duke beheaded by Richard III. [HENRY VII., was apprehended on some information furnished to Wolsey by a disaffected man ever since Luther had brought the reformation into the court, the pride of the all-powerful minister; and, besides, he was also of dangerous pedigree, being not only maternally of the stock of John of Gaunt, but likewise a Plantagenet by his descent. [HENRY VIII. having commenced, in the next session of parliament, to make the youngest son Thomas, duke of Gloucester. With this nobleman came to an end the great office of hereditary lord high constable.

Wolsey may be called the second part of Henry's reign begins in the year 1527, from which date our attention is called to a busy scene of domestic transactions beside which the foreign policies of the kingdom become of little interest or importance. Wolsey, bishop, and later cardinal, was the minister of the king himself, that move all things. In 1527 Henry cast his eyes upon Anne Boleyn, and appears to have very soon formed the design of ridig himself of Catherine, and making the object of his new attachment his queen. [BOLEYN, ANNE.] Anne was understood to be favourably disposed towards those new views on the subject of religion and ecclesiastical affairs which had been agitating all Europe ever since Luther had brought the reformation, by publicly opposing indulgences at Wittenberg ten years before. Queen Catherine on the other hand was a good Cathlide; and, besides, the circumstances in which she was placed were such as to render the change from her to another per was but a question of time; and as on the other hand her adversaries were driven in like manner by their interests and the course of events into dissent and opposition. This one consideration sufficiently explains all the rest. The queen was too long, generally considered Catherine's cause as their own; the reformers as naturally arrayed themselves on the side of her rival. Henry himself again, though he had been till now absolutely opposed to the new opinions, was carried over by his passion towards the same side; the consequence of which was the loss of the royal favour by those who had hitherto monopolized it, and its transfusion in great part to other men, to be employed by them in the promotion of entirely opposite purposes and policies. The proceedings for the divorce were commenced by an application to the court of Rome, in August, 1527. For two years the affair hung fire. Wolsey's friends, the pope, and the king, more or less, were on all hands placating and compromising the case, without any decided result. From the autumn of 1529 are to be dated both the fall of Wolsey and the rise of Cranmer. [CRANMER, THOMAS.] The death of the great cardinal took place 29th November, 1530. In January following the first blow was struck at the church by an indictment being brought into the King's Bench against all the clergy of the kingdom for supporting Wolsey in the exercise of his legateate powers, the archbishop and others by old statutes of pontificius and premintri. and it was in an act passed immediately after by the Convocation of the province of Canterbury, for granting to the king a sum of money, or other advantages, by the parliamentary committee on this indictment, that the first movement was made towards a revolt against the see of Rome, by the titles given to Henry of the one protector of the English church, its temporal and spiritual, and, as it might be by the law of Christ, its supreme head. She declared the conventual declaration declared the king's marriage with Catherine to be contrary to the law of God. The same year Henry went the length of openly countenancing Protestantism abroad by permitting a new translation of the Bible in the Low countries, Brandenburg and other German princes, called the League of Smalboad. In August, 1532, Cranmer was appointed to the archbishopric of Canterbury. In the beginning of the year 1533 Henry was privately married to Anne Boleyn; and on the 23rd of May following archbishop Cranmer pronounced the former marriage with Catherine void. In the meantime the parliament had passed an act forbidding all קנונות to the see of Rome. Pope Clement VII. met this by annulling the sentence of Cranmer in the matter of the marriage; on which the separation from Rome become complete. Acts were passed by the parliament the next year declaring that the clergy should in future be admitted in consecration only by the king's will, that no constitutions enacted by them should be of force without the king's assent, and that no first fruits, or Peter's pence, or money for dispensations, should be any longer paid to the pope. The clergy of the province of York themselves in concert declared that the pope had no more power in England than any other bishop. A new and most efficient supporter of the Reformation was Thomas Cromwell, who made his first appearance on the scene, Thomas Cromwell (afterwards lord Cromwell and earl of Essex), who was this year made first secretary of state, and then master of the rolls. [CROMWELL, THOMAS.] Cromwell's views on the marriage question were at this time the policy of the government, and the events of the next year were the results of his steady and unshaken perseverance. In the meantime, Cromwell, having gained an ascendancy in the council, and the last of the great officers of state to accept the new religion and to be received by the king, was raised to the dukedom of Somerset. [FISHER, JOHN: MORE, THOMAS.] In 1535 began the dissolution of the monasteries, under the zealous superintendence of Cromwell, constituted for that purpose viscount-general of these establishments. Latimer and other friends of Cranmer and the Reformation were now also promoted to bishoprics; so that not only in matters of discipline and polity, but even of doctrine, the church might be said to have separated itself from Rome. One of the last acts of the parliament under which all these great innovations had been made was to petition the king that a new translation of the Scriptures might be made by authority and set up in churches. It was dissolved on the 18th of July, 1536, after having sat for the then unprecedented period of six years.

Events now set in a new current. The month of May of this year witnessed considerable changes. Queen Anne— in less than six months after the death of her husband, Catherine of Aragon—and the marriage of the brutal king, the very next morning, to Jane Seymour, the new beauty, his passion for whom must be regarded as the true motive that had impelled him to the deed of blood. Queen Anne dying on the 14th of October, 1537, a few days after giving birth to a son, was succeeded by Anne, sister of the duke of Clever, whom Henry married in January, 1540, and put away in six months after—the subsequent parliament, Thad to this less subservient consecration of the clergy, on his mere request, pronouncing the marriage to be null, and the former body making it high treason by word or deed to accept, take, possess, or perform anything which was consistent with what had been done. Meanwhile the ecclesiastical changes continued to proceed at as rapid a rate as ever. In 1536 Cromwell was constituted a sort of lord-lieutenant over the church, by the title of vicar-general, which was held to invest with all the king's authority over the spirituality. The dissolution of the monasteries in this and the following year, as carried forward under the direction of this energetic minister, introduced a subversion of the religious life which affected parts of the kingdom, which were not put down without great destruction of life, both in the field and afterwards by the executioner. In 1538 all incumbents were ordered to set up in their churches an English translation of the Bible, and to teach the people the Creed, the Lord's Prayer, and the Ten Commandments, in English; the famous image of our Lady at Walsingham.
The most important changes made in the law during this reign were those affecting ecclesiastical affairs, of which the principal have been already noticed. Along with these may be mentioned the statute defining the degrees within which marriage should be lawful (23 Henry VIII., c. 22), which, in regard to that point, is still the law of the land.

The law known by the name of the Six Articles, or the Bloody Statute, by which burning or hanging was made the punishment of all who should deny that the bread and wine of the sacrament was the natural body and blood of the Saviour—or that the communion in both kinds was necessary to salvation—or that priests may not— or that vows of chastity ought to be observed—or that the mass was agreeable to God's law—or that auricular confession is expedient and necessary. This statute, which effected the change of the two laws under which influence which had now gained an ascendancy over the fickle king, that of Gardiner, bishop of Winchester, the able leader of the party in church and state opposed to Cranmer and Cromwell. [Gardiner, Stephen.] The new favourite was not long in effecting the ruin of the rival that was most in his way; Cromwell, who had just been created earl of Essex, and made lord chamberlain of England, was in the beginning of January, 1542, committed to Tower on a charge of treason, and beheaded in a few weeks after.

On the 5th of August this year Henry married his fifth wife, Catherine Howard, who had been born 13th February, 1542. During this interval he also rid himself by the axe of the executioner of a noble lady whom he had attained and consigned to a prison two years before on a charge of having been united in marriage with the daughter of the late duke of Clarence, and the last of the York Plantagenets. Her real crime was that she was the mother of cardinal Pole, who had offended the tyrant, and who was imprisoned beyond his reach. It was not long after the year 1542 was declared by Henry against Scotland, with a revival of the old claim to the sovereignty of that kingdom. An incursion made by the duke of Norfolk into Scotland, in October, was followed by the proclamation of war in England; so vast were the fruits of the new enemy. But this force was completely defeated and dispersed at Solway Moss, a disaster which is believed to have killed King James, who died a few weeks after, leaving his crown a daughter, the unfortunate Mary Stuart, then only an infant seven days old. The failure of the efforts of the English king to obtain possession of the government and of the young queen, owing to the successful resistance of Charles of France and the Catholic party, at length induced the king to prosecute the war. In the spring of 1544, when Scotland was invaded by a great army under the earl of Hertford, which penetrated as far as Edinburgh, and burned that capital with its suburbs and villages; in the following year also Henry had concluded a new alliance with the emperor against the French king; and in July, 1544, he passed over with an army to France, with which he succeeded in reducing the town of Boulogne, which was afterwards erected into a new county. The emperor made a separate peace with Francis; and on the 7th of June, 1546, Henry also signed a treaty with that king, in which he agreed to restore Boulogne and its dependencies in consideration of a payment of two millions of crowns.

He had some years before found a sixth wife. Catherine Parr, the widow of the Lord Latimer, whom he married 10th October, 1543, was a plain but modest maiden, who, upon him, the singleness and impetuosity of his temper acquired additional violence, and the closing years of his reign were as deeply stained with blood as any that had preceded them. One of his last butcheries was that of the amiable and accomplished Henry Howard, earl of Surrey, who, being convicted, after the usual process, of treason, was executed on the 19th (other accounts say the 21st) of January, 1543. Already Henry, says Holinshed, had been lying in the agonies of death. Surrey's father, the duke of Norfolk, was also to have suffered on the 28th; but was saved by the death of the king at two o'clock on the morning of that day.

The children of Henry VIII. were: 1. and 2. by Catherine of Aragon, two sons who died in infancy; 3. Mary, afterwards queen of England; 4. by Anne Boleyn, Elizabeth, afterwards queen; 5. a son still-born, 29th February, 1544; 6. by Jane Seymour, Edward, by whom he was succeeded on the throne.
HEN

HEN

faneness; 'Method of Prayer;' and numerous Sermons on separate subjects. These works have been little read of late years, but are now reprinted by the Edinburgh printing office, and we are indebted to Dr. Patrick for a new edition of them, remarks (Preface to the Miscellaneous Works of Henry, p. iii.) that it will be found on examination that the same commanding excellence, which have rendered him a person of great celebrity and respectability as a preacher, and have imparted to his sermons and treatises and tracts a charm not less fascinating than that which pervades the Commentary. There is throughout the same soundness of reason, and of the same unvarying attention to usefulness. The miscellaneous works were reprinted in 8vo., Lond. 1830.

The life of Matthew Henry has been written by Yong, son of the Rev. John Yong, Esq., of the town of Berwick-upon-Tweed. It was published in four volumes, 12mo., Edinburgh, 1786, as an appendix to the Memoirs of the Life, Character, and Writings of the Rev. M. Henry, prefixed to the edition of the Exposition, published in 3 vols. 8vo., Lond. 1826.

HENRY, ROBERT, D.D. was the son of a farmer in the parish of St. Ninians, Stirlingshire, where he was born in 1718. Having completed the usual course of education for the Scottish church at the university of Edinburgh, he was a minister of the church of the New Grey Friars, which he retained till 1776, and then exchanged for the easier charge of one of the parishes of the Old Church, in which he continued to fill till his death. He never left Edinburgh encouraged him to proceed with the design of his History, which was published in 1785, and the subsequent volumes of his History, extending to the accession of Henry VII, in 1786. The author, upon the second of D.D. had been conferred by the university of Edinburgh in 1770, he had been the last of the members of the university to retain the degree of doctor of divinity that had been bestowed on him. In 1772, he published another volume of his History, extending to the accession of Edward VI, which was published in 1793 under the superintendence of Malcolm Living, Esq., who supplied the observations that were added in a continuation of the work, on a less extended scale, to the accession of James I., was published in two volumes 4to., and in two volumes 8vo., in 1796, by James Pettit and Andrews, Esq., who was also the author of a History of Great Britain connected with the Chronology of Europe, coming down to the accession of Edward VI., and compiled in great part from Dr. Henry's work (though there are also many other sources used, especially for the foreign history), which appeared in two volumes 4to. in 1794 and 1795. Dr. Henry's History has, since its completion, been repeatedly reprinted in twelve volumes 8vo. The author had published the successive quartos volumes on his own account; but when the first octavo edition was published in 1796, he sold the property of the work to a publishing house for 100l., besides which the profits it had already yielded amounted to 200l. In 1781, on the unsolicited application of Lord Minto, a pension of 100l. a year was granted to Dr. Henry by the king. These facts are extracted from a biographical memoir of a year's worth which appeared with the posthumous volume of the History, and is prefixed to it as a Gentleman's account of Dr. Henry as a private member of society, in which character he appears to much advantage. His only other publication was a Sermon preached before the (Scottish) Society for propagating Christian Knowledge, in 1773. The early volumes of his History were assailed with unusual virulence as they successively appeared by Dr. Gilbert Stuart, well known as the author of various able and learned historical works. An interesting account may be found in Mr. D'Irland's 'Calmities of Authors' of the
sphere." In 1808 he published in the same work a form of apparatus adapted to the combustion of larger quantities of gas, and could be fitted in domestic tubes. In the same year he was elected a Fellow of the Royal Society, and in the year following he received, by the award of the president and council, Sir Godfrey Copley's donation, as a mark of the approbation of his valuable communications to the Society. He published various other papers, both in the 'Manchester Memoirs' and in the 'Philosophical Transactions.' His latest communication to the Royal Society was an essay; but he succeeded in overcoming the only difficulty he had not before conquered, that of ascertaining by chemical means the exact proportions which the gases left after the action of chlorine on oil and coal gas bear to each other. This effect, of determining himself the property which had been recently discovered by Döberine in finely-divided platinum, of determining gaseous combination.

Alluding to his analysis of coal-gas, other compounds of carbon, hydrogen, and various other subjects, it has been truly remarked by his friend and townsmen, Mr. John Davies, that his papers 'present a fine specimen of inducive research. His investigations on the combinations of gases by volume of a taste for liberal studies, his manner was peculiarly kind and encouraging. He was most anxious to promote, as far as was in his power, their progress in knowledge.'

The name, originally delicate, worn out by illness and distracted by loss of sleep, at last gave way, and he died on the 2nd of September, 1836, in his 61st year.

HEPSOLOVAYCE.B, a very small and little known natural order of Exogens, supposed to be related either to Stilagineae or Cubretaceae. Its fruit is unknown, and there is no possibility of forming a fixed opinion upon the subject until more species and genera shall have been described. We have in our species, all natives of the hot and damp parts of Europe, have yet been seen. They are all trees, with opposite entire exstipulate leaves, and minute racemose, apetalous flowers, with as many anthers sessile in the sinus of the calyx as there are lobes of that organ; a two-celled, many-seeded ovary, and a single style.

HEPATIC.E, a name formerly applied to a class of cryptogamie plants, part of which are popularly called liver-roots. It is now subdivided into several natural orders.

[JUNGERMANNIACE.B; MARCHANTIACE.B.]

HEPATITIS. [LIVER.]

HEPATUS, Lartetille's name for a genus of brachiurous crustaceans, placed by Mr. Milne Edwards under the tribe of Calyptogianas, and, in the opinion of the latter, establishing the passage between the Cancroids, which they approach in their general form; the Calappa, which they resemble in the disposition of their Chela (manus); and the Leucosan, from which they differ but little with reference to the method of the organization of the mouth. The Carapace is large, convex, regularly arched anteriorly, strongly narrowed posteriorly; the hepatic regions are very large, and the branchial regions very small. The front is narrow, straight, rather projecting, and placed a good deal above the level of the lateral border of the carapace, which prolongs itself under the orbits to reach the sides of the buccal frame. The orbits are small, circular, and placed on the same level with the front. The internal antenna are somewhat apart, and are bent back very obliquely under the front. The external antenna occupy the internal angle of the orbits, which they separate from the antennary pits; their basilar joint is narrow, but rather long; the second is, on the contrary, small, and their terminal stem is nearly rudimentary. The buccal frame, which is very narrow forwards, and nearly regularly triangular, prolongs itself beyond the level of the lower border of the orbits, and is entirely occupied by the external part of the third joint of which is triangular and terminated internally by a straight edge, under which are concealed the remaining joints. The external plastron is oval, and presents nothing remarkable. The anterior feet are strong without being large, and are capable of a close and exact application against the lower surface of the body, where they are entirely concealed: the hand is surmounted by a claw, and the claws are rather inclined downwards and inward. The remaining feet are of moderate length, and the abdomen is divided into seven joints in both sexes.

Geographical Distribution of the genus.—The only species known, viz. Hepatus fasciatus (Calappa angustata of Fabri); Cancer tresvirata (H. alatus) and Calappa angustata of Bose), and Hepatus Chilenus, are inhabitants of the coasts of America: the first having been found in the north.
and at the Antilles; the second on the coast of Valparaiso.
(M. Edwards.)

HER

HER

Eurytheus. They were hospitably received by Theseus, and with the assistance of the Athenians defeated Eurytheus. After the battle the Heraclidæ are said to have obtained possession of the whole of Peloponnesus; but they had not remained in the country long before a pestilence again drove them back to Attica. The Heraclidæ afterwards marched again into Peloponnesus, but were met at the Isthmus by an army consisting of Arcadian, Ionian, and Achaean. In a single battle with Echecus, king of Teges, Hyllus, the eldest son of Hercules, was slain, and the Heraclidæ promised not to invade Peloponnesus for a hundred years from that time. (Herod., i. 26; Pausan., i. 41.) They did not however observe their engagement, for both Cleodes and grandsons of Hercules, and Oxylus, renewed the attack, but without success. The Heraclidæ retreated to Doris, where they obtained a considerable army to assist them in the recovery of their dominions. With the aid of an Ætolian chief named Mantuan they crossed from Naupactus to the southern side of the Corinthian gulf eighty years after the Trojan war. (Thucyd., i. 12.) A battle took place between the Dorians under the command of the sons of Aristomachus and the Peloponnesians under that of Tisamenus, the grandson of Agamemnon, in which the latter were defeated, and all Peloponnesus, except Arcadia and Achaia, fell into the hands of the Heraclidæ. Eliss was assigned to Oystus, and the rest of the Peloponnesus was divided between Aristomachus, Temenus, who obtained possession of Argos, Cretan, Messenia, and Aristodemus, or his sons Eurytheus and Procles (for according to the general tradition of antiquity they did not live to the time of Lacedæmon). The land of the conquered country was divided among the Dorians, and the old inhabitants were obliged to emigrate, or were reduced to an inferior caste. (Pausan., i. 18. 4.) Such is the traditional account of that important event in Greek history, usually called 'the return of the Heraclidæ,' by which the Dorians obtained possession of the greater part of the Peloponnesus. Aristocrates and Aristomachus, the universal tradition of antiquity that the Dorians were led to this conquest by Achæan chiefs; but this fact has been doubted by many modern writers, who have considered it improbable that the Dorians should have been reduced by foreign chiefs. It has been supposed that the Heraclidæ were the hereditary princes of the Doric race, who were descended from a Dorian Hercules; and that the story of the Heraclidæ being descended from the Argive Hercules, who performed the commands of Eurytheus, was not invented till after the conquest of the Peloponnesus. (Millier's Dorians, vol. i., p. 57, Eng. Trans.) Though the general tradition assigned the complete conquest of Peloponnesus to the Heraclidæ, it appears probable from other traditions that the greater part of the Peloponnesus was not reduced by the Dorians till long afterwards. (Thirlwall's Hist. of Greece, vol. i., pp. 262—273.)

HERACLITUS of Ephesus, surnamed the Naturalist (φυσικός), belongs to the dynamical school of the Ionian philosophers. He is said to have been born about B.C. 500, and, according to Aristotle, died in the sixtieth year of his age. The title he assumed of 'self-taught' refutes at once the claims of the various masters whom he is said to have had, and the distinguished position that he held in political life attests the wealth and lustre of his descent. The gloomy and skeptical nature of his temperament led him to despise all human pursuits, and he expressed uncompromising contempt as well for the political sagacity of his fellow-citizens as for the speculations of all other philosophers, as having mere learning and not wisdom for their object. Of his work 'On Nature' (τεκνία φύσεως), the difficulty of which obtained for him the surname of 'the obscure' (σκέροντικος), many fragments are still extant, and exhibit a broken and incoherent style, but his opinions, how far they were carried on this theory of the cosmos, which are often conveyed in mythological and half-concealed images. On this account he will compare himself to the Sibyl, who, he says, 'speaking with inspired mouth, smileless, incomprehensible, and performed, pieces through centuries by the power of the god.' According to Heraclitus, the end of wisdom is to discover the ground and principle of all things. This principle, which is an eternal evervarying thing, and produces being and judgment in all phenomena, is the fire. By this fire Heraclitus understood, not the elemental fire or flame, which he held to
be the excess of fire, but a warm and dry vapour; which therefore, as air, is not distributed through the soul or vital energy, and which, as guiding and directing the mundane development, is enured with wisdom and intelligence. This supreme and perfect force of life is obviously without limit to its activity; consequently nothing that it forms cannot be significantly limited to an act of formation. This he thus figuratively expressed: 'No one has ever been twice on the same stream.' Nay, the passenger himself is without identity: 'On the same stream we do and we do not.'

The vitality of the rational fire has in it a tendency to contraries, whereby it is made to pass from gratification to want, and from want to gratification, and in fixed periods it alternates between the two with a regular flux. Not these opposite tendencies meet together in determinate order, and by the inequality or equality of the forces occasion the phenomena of life and death. The quietude of death however is a more semblance which exists only for the senses of man. For man in his folly forms a truth of his own, whereas it is only the universal reason that is really cognisant of the truth. Lastly, the rational principle which governs the whole moral and physical world is the law of the individual; whatever therefore is, is the wisest and the best; and 'it is not for man's welfare that his wishes should be fulfilled; sickness makes health pleasant, as hunger does gratification, and labour rest.'

The fragments of Heraclitus have been collected from Plutarch, Stobaeus, Clemens of Alexandria, and Sextus Empiricus, and explained by Schleiermacher in Wolf and Bittman's 'Handbuch der Alterthumskunde,' vol. 1. See also Brandis's 'Handbuch der Geschichte der Griech-Röm. Philos.,' Berlin, 1835; and Ritter's History of Antient Philosophy,' Oxford, 1837.

HERACLIUS, the son of the patrician Heracleus who was exiled under the emperor Phocas, assisted in dethroning the latter a.d. 610, and was proclaimed emperor in his place. He applied himself to reform the discipline of the army; he renewed the truce with the Longobards, and, by a prudent policy, brought the Persians into Egypt, in consequence of which the usual supplies of corn which country used to send to Constantinople were stopped, and the capital was afflicted by a severe famine. Anodyne this had advanced, and he was acclaimed by Asia Minor and the Chalcedon, but Heraclius induced the commander to withdraw, and sent ambassadors to treat of peace with Khusru, the Persian king, who espoused his offers, and summoned Heraclius and his subjects to abjure Christ and pay worship to the sun. Heraclius, raised by this insult, collected an army, and marched against the Persians, whom he defeated in a succession of brilliant campaigns; and pursued them as far as the Tigris, a.d. 622-27. The first year of the expedition of Heraclius against the Persians was the same in which Mohammed openly assumed the character of prophet and legislator, after his flight to Medina. Khusru was at last dethroned by his son Siroco, who concluded peace with Heraclius and restored to him the lost provinces. The Persians also, under the new approval of this emperor's claims, passed amidst theological controversies. Heraclius supported the doctrine of the Monothelites, who taught that the human nature in Jesus Christ was entirely passive, and that his divinity has been most of his divine actions. During the reign of this emperor, the Arabs, after the death of Mohammed, and under the caliphate of Abur-Omar, invaded Tyre, Palestine, and Egypt, and under the following caliphs, in the ninth and tenth, they conquered Egypt and Cyrinsia. Heraclius was unable to oppose the torrent of Arabic courage and fanaticism; he sunk into inactivity and sloth, and died of the dropy in February a.d. 641, after a reign of thirty years. From that epoch the decided though gradual decline of the Eastern empire may be dated. Heraclius was succeeded by Heraclius Constantine, his son by his first wife Eudocia, who in the fourth month of his reign was poisoned by his stepmother Martina, who had her own son Heraclonas proclaimed in his stead. An insurrection however soon after broke out at Constantinople against the new emperor, who was mutilated and banished together with his mother, and Constans II., son of Heraclius Constantine, was raised to the imperial throne. (Theophanes and other Byzantine historians; Gibbon.)

HERALD, an officer whose duty, during the middle ages, was to carry challenges or peaceful messages from one sovereign or nobleman to another, to proclaim peace or war, to lay out the lists in jousts or tournaments, to be the witness of all combats whether general or particular, and to record in writing the names of those who behaved most valiantly, to number the dead after battle, and specially to supervise all matters connected with the bearing of coat-armour, the marshalling of processions, and other state ceremonies. His trappings were something like those of the Greek heros (σπαύδ); and the Roman Foppalis; but the origin of the name is much disputed, and the actual date of the institution uncertain. The word Herald occurs in the liturgy of the institution of Frederick Barbarossa, a.d. 1159, about the same time to which the origin of heraldry is with most reason assigned. The earliest mention of a herald in England is in a pellicroll of the 12th Edward III.; but there were heralds in England at least as early as the dawn of hereditary coat-armour. The English heralds were first incorporated by Richard III. [HERALDS' COLLEGE]. There are three orders or grades of heralds, namely, kings of arms, heralds, and pursuivants. They are annually in the course of being created with much ceremony, and the mode is curiously detailed by Gerard Legh apud Upton. 'It is necessary,' says he, 'that all estates should have couriers as their messengers for the expedition of their business, whose office it is to pass and repass on foot, being clad in their prince's colours "parted upright," that is to say, half of one colour and half of another, with the arms of their sovereigns painted on the boxes in which they carried their dispatches, bearing before them the figure of the sovereign on the other side. It was not permitted to them to bear the arms of their lord in any other manner." They were knights, he adds, in their offices, but not nobles, and were called knights-callerys, because they were "startuted" (a sort of boot or gaoler) "to the middle leg." When they had conducted themselves properly in this situation for seven years, they were made chevaliers of arms, and rode on horseback to deliver their sovereign's messages, clad in one colour, their garments being only guarded or trimmed with the colour of their sovereign, and bearing their boxes aforesaid, with the arms painted on them, on the left shoulder, and "not elsewhere." From these runners and riders the three orders of heralds were supplied, the chevalier of arms, having served another seven years, being created a pursuivant in the following manner:—The herald of the province, to whom he was to be pursuivant, wearing his arms on the breast or aforesaid, was invested by the sovereign in his right a cup of silver, filled with wine and water, and leading him to his sovereign, in the presence of many witnesses duly summoned for this purpose, intrigued with what name the sovereign then desired; and upon the sovereign's answer proclaimed his style accordingly, pouring some of the wine and water upon his bare head. He then invested him with the tabard, or herald's coat, emblazoned with the arms of the sovereign, but so that the sleeves hung upon him, back and side, and left and hind parts of the tabard over his arms, in which curious fashion he was to wear it till he became a herald. Strutt has given a representation of the pursuivant so attired from the Harleian MS. 1372, without being aware of the distinction. The oath of office was then administered to him, and lastly the sovereign presented him with the silver cup aforesaid. Having once been made pursuivant, he might be created a herald, "even the next day," which was done by the princely
pal herald or king of arms leading him in like manner before the sovereign, but bearing a gilt instead of a silver cup, and turning the talard so that the sleeves hung in their proper place over the arms. A collar of S8 was then put about his neck, one S being argent, or silver, the other sable, or black, alternately, and when he was named, the prince himself poured the wine and water on his head, and after the oath was administered gave him the cup as before. The insignia of Sovereigns of Arms were created and solemnly crowned by the sovereigns themselves, and distinguished from the heralds by richer talards, the embroidery being on velvet instead of satin, and the second of a pair of a circle of gold surmounted by sixteen strawberry leaves, eight of which are higher than the rest.

Modern heralds of all classes are now made and appointed by the exarch marshal, and the functions and privileges are now abridged and disregarded. The present number in England is fourteen, viz.: four kings of arms—Garter, Clarenceux, Norroy, and Bath; the second and third being provincial kings, Clarenceux having power over all parts of England south of the Thames, and Norroy over parts north of it. Six heralds—Somerset, Chester, Windsor, Richmond, Lancaster, and York; and four pursuivants—Red Dragon, Portcullis, Blue Mantle, and Rouge Croix. In Ireland there are six senior heralds, besides the one in Ireland, named Ulster. To these regular officers are sometimes added, by command of the king to the earl marshal, a herald or pursuivant extraordinary. Such were in the time of the anonymous, and lasting; and on the occasion of the funeral of the late King William IV., Mr. Albert Woods, son of Sir W. Woods, Clarenceux king of arms, was created Fitzalan pursuivant extraordinary.

HERALDS' COLLEGE, arms, A college founded by Richard III in the first year of his reign by a charter dated the 2nd of March, 1483, in which he gives to the principal officers of the corporation a house called Cole Arbor, in the parish of All Hallows the Less, in the City, and the greater portion of the year of the reign of Henry VII., this house was seized into the king's hands under the Act of Resumption as the personal property of John Whitley, then garter king at arms; and during the reign of that king's grandson, Henry VIII., the heralds made several unsuccessful attempts by petition to obtain a restoration of it, or the grant of some other building for their general use. King Edward VI., in the third year of his reign, by a charter dated June 8th, granted to them all their antient privileges; and Philip and Mary, by charter of the 18th of July, 1554, re-incorporated them, and granted to them Derby House, then occupying the site of the present college on St. Bees's Hill, near St. Paul's Church-yard. This grant was confirmed by the subsequent reigns, but all the books, papers, etc., were fortunately saved, and removed to the palace in Westminster, where the heralds held their chapters, etc., until the college was rebuilt. The corporation consists of three king's heralds, four portcullis, and Norroy (Bath not being a member); six heralds, and four pursuivants. [HERALD.] The arms of the college are argent, a cross gules between four doves rising azure. Crest, on a duel coronet, Or, a dove rising azure. Supporters, two lions rampant gardant argent, ducally or. There is a herald's college in Scotland, composed of four heralds, six heralds, and six pursuivants.

HERALDRY, the art of arranging and explaining in proper terms all that appertains to the bearing of coats of arms, badges, and other heraldry or assumed marks of honour; also the science of marshalling processions and ceremonies of coronations, installments, creations of peers, funerals, marriages, and all other public solemnities.

The origin of heraldry, in the first and most commonly understood sense, has been attributed, by the general consent of all, to the dominions of France; but the necessity for distinguishing by some outward sign, amidst the confusion of battle, the principal leaders during the expeditions for the recovery of the Holy Land. But nothing is absolutely known to determine it beyond the fact that the middle of the 12th century is the earliest period to which the bearing of heraldic devices, properly so called, can be traced; and the commencement of the 13th, the time about which the history of heraldry begins.

The earliest roll of arms of which we have any notice is of the reign of Henry III.; and the reign of Edward I. presents us with the earliest heraldic document extant. The famous roll of Caerlaverock, a poem in old Norman French, rehearsest the names and armorial ensigns of all the barons, knights, &c., who attended Edward I. at the siege of Caerlaverock castle, a.m. 1306. [Smyth, p. 404.] Herality therein first presented to us as a science. The principal rules and terms of the art were then in existence, and from about that time the latter are continually found in the following books and rolls of England.

The oldest writer on heraldry whose work has descended to us is Nicholas Upton, whose treatise 'De Militari Officio' was composed in the reign of Henry V., and translated into Latin in the year he died, 1421, in the work known as 'Boke of St. Albans.' As Upton quotes to earlier authorities, his definitions and explanations can only be looked upon as assertions made nearly three hundred years after the origin of the practice, and consequently to be believed, or not, according to the discretion of the reader.

In the reign of Richard III. the English heralds were incorporated and the College of Arms founded, and in the following century a swarm of writers arose both in France and England, each contributing the other, and wasting a world of learning and research in the most absurd and idle controversies.

On the decline of chivalry the study of heraldry became somewhat neglected, and had for some time been a portion of the education of princes, and occupied the attention of some of the most learned men in Europe, was abandoned to the coach-painter and the undertaker, and only the student of genealogy, and those who were occupied upon some mere appendages of state pageantry, their office reduced, and their authority denied.

That the pedantic nonsense of such writers as Morgan, Perne, Mackenzie, &c., contributed to these results, there can be little doubt. A call for the criticism of antiquities generally is now however prevailing throughout Europe, and the use of heraldry as a key to history and biography is daily becoming more and more acknowledged. The rules of heraldry as first practised at the College of Arms are, as we have before remarked, comparatively modern, and vary in some points from those observed in France and Germany.

According to the received authorities there are ten classes of arms, viz.:—

1. Arms of Dominion, being those which sovereigns bear as annexed to the territories they govern.

2. Of Pretension, those heralds of sovereigns who are not in possession of the dominions to which such arms belong, but who claim or pretend to have a right to such possession, as for instance the kings of England from Edward III. to George III. quartered the arms of France.

3. Arms of Patronage, such as governors of provinces, lords of manors, patrons of benefices, &c., add to their family arms, as a token of their superiority, rights, and jurisdiction.

4. Of Assumption, such as are assumed by a man of his proper right without the grant of his sovereign, or of a king of arms. As for instance when a man of any degree whatever has taken prisoner in lawful war any gentleman, nobleman, or prince, he may bear the arms of that prisoner, and transmit them to his heirs for ever.

5. Arms of Succession, borne by those who inherit certain estates, manors, &c., either by will, entail, or donation.

6. Arms of Alliances, such as the issue of heiresses take up to show their matriline descent.

7. Arms of Association, borne by a stranger in blood, with the special permission of the sovereign, applied for in order to fulfill the will of the testator who may bequeath certain monies or estates on condition of the party's assuming his name and arms.

8. Arms of Insignia, augmentations granted by the sovereign of part of his own ensigns or regalia to such persons as he pleases to honour therewith.

9. Arms of Paternal and Hereditary, such as are trans

10. Arms of Peerage and Heraldry, such as are trans
HER

The shield, or escutcheon, contains certain points or locations, viz. A, B, C, the chief A being the dexter or right-hand chief; B the precise middle chief, and C the sinister or left-hand chief. D is the honour point; E the fess point, being the exact middle of the shield; F the nornhir or navel point; G, H, I, the dexter, middle, and sinister base points.

The colours of the escutcheon, or of its ordinaries and charges, are five:—

- Red (the heraldic name of which is) Gules
- Blue
- Black
- Green
- Purple

To which must added, or rather prefixed, yellow and white, which being ordinarily represented by gold and silver, are called metals, and named by heralds, after the French, Or and Argent.

There are also two other colours recognised by heralds, but rarely seen in English coats of arms, viz. orange, called Vair, and a dark blood-red inclining to purple, called Sanguine, or Murray, from mulberry. These colours and metals have been since the sixteenth century expressed in engravings by lines and points or dots, the ingenious idea of which is attributed to an Italian named Petrasancta. Thus Or, or gold, is known by the escutcheon being filled with small points or dots.

Argent, or silver, by the shield being left perfectly plain.

Gules, or red, by perpendicular lines from the top to the bottom of the escutcheon.

Azure, or blue, by horizontal lines.

Sable, or black, by the two former crossing each other.

Vert, or green, by diagonal lines from right to left.

Purpure, or purple, by similar lines from left to right.

Tenne, or orange, by perpendicular lines crossing lines from right to left.

Sanguine, or murray, by transverse lines from each side of the shield.

The metals and colours above mentioned are also distinguished by some heralds by the names of planets and precious stones; and there are besides, according to Sir John Ferne (Glory of Generosity), twelve other fantastical sorts of blazoning (by which word is meant, describing in proper heraldic terms, the bearings, &c., of a shield or banner); but as all these are now obsolete, we shall only allude to the fact without enumerating our columns by rehearsing them.

There are nine roundlets, or balls, also used in heraldry, the names of which are sufficient to denote their colour, without particularizing the same, viz.:

- Beanz
- Or
- Hurrts
- Azure Pellets
- Sable Plates
- Argent Pommes
- Verte
- Oranges
- Tonne
- Tortieux
- Gules
- Golpes
- Purple
- Guez
- Sanguine

To metals and colours must be added Fus, which, according to some heralds, are of ten different sorts. Those most commonly met with are however comprised under the names of Ermine and Vair, the rest being variations of colour and disposition. The first is represented in heraldry thus, the field being white, or argent, the spots and tails black, or sable.

The second is represented by figures like little cups or bells reversed and ranged in lines, thus: The colours being, of the field Argent, of the cups Azure, or vice versa; but where the matter is doubtful, the metal to possess the field by pre-eminence.

N.B. If the same figures are found in other colours, they are no longer to be blazoned or described as Vair; but 'Vairy, Or, and Gules,' or whatever else it may be.

The principal variations above mentioned are:

1. Ermines, the field of which is Sable, and the spots and tails Argent.

2. Erminoys, the field Or, the spots and tails Sable.

3. Pom, the field Sable, the spots and tails Or.

4. Erminites, the same as Ermine, with the addition of a red hair on each side the black tails.

5. Vair en point is when the point of a cup or bell is opposite to the base of another.
6. Counter Vair, when bells of the same colour are placed base to base and point to point.

7. Potent is classed as a fur, but the word signifies a crutch or a gibbet (Potence, Fr.) It is represented thus—

8. Potent-counter-potent, sometimes called Vairly counter, is when the crutches are counter placed; thus—

The principal charges or figures expressed on the shield are called the Ordinaries; they are nine in number, and styled honourable. They consist of the Chief, the Pale, the Bend, the Bend sinister, the Fess, the Bar, the Chevron, the Cross, and the Saltier.

The Chief is the upper third of the escutcheon, determined by a horizontal line; thus—

The Pale is the middle third of the field when divided perpendicularly.

This ordinary has two diminutives; the Pullet being half the width of the Pale, and the Endorse half that of the Pullet.

The Bend is formed by two diagonal lines drawn from the right or dexter chief to the left or sinister base; thus—

The Bend has four diminutives; the Bendlet, the Garter, the Cost, and the Ribbon.

The Bend sinister passes from the left to the right of the shield, and has two diminutives, the Scarp and the Baton.

The Fess occupies the middle third of the shield divided horizontally.

The Bar is similarly formed, but occupies only a fifth of the shield, and is never borne single.

When the number exceeds five, it is blazoned Barry of so many pieces, expressing the number and colour, as Barry of Six, Or, and Gules.

The Bar has two diminutives; the Barrulet, half the width of the Bar; and the Closet, half that of the Barrulet.

The Chevron is a figure formed like the rafters which support the roof of a house, and is therefore sometimes called a Spar, and in German Sparren. It has two diminutives, the Chevronel and the Compleclose.

The Cross, as an ordinary, is drawn thus. All other sorts of crosses should, in our opinion, come under the head of common charges, as they must be specially described.

The Saltier is the figure generally known in England as St. Andrew's Cross, and is indeed always so called by the German heralds, and frequently by the Scotch.

Eight of these nine honourable ordinaries give their names to the various single lines used in dividing the field of the escutcheon, where more than one metal or colour is required, such escutcheon being described as parted per pale, when divided perpendicularly; per fess, when divided horizontally; per cross, when in four squares; per saltire, when in four triangles; per bend, when diagonally, from right to left; per bend sinister, when in the contrary direction; and per chevron, when in the shape of that figure. The Chief being itself formed by a single line, they do not say parted per chief; but when the partition-line is not straight or even, its peculiarity must be specified in every instance: and of crooked lines there are eight recognised by English heralds, namely:

1. Engrailed
2. Inverted
3. Wavy
4. Embattled
5. Nebuly
6. Raguly
7. Indented
8. Dancette, limited to three indentations.

It is therefore necessary to say 'a Chief engrailed,' or 'a Cross inverted,' or 'Parted per fess, indented,' and so forth.

In addition to the nine honourable ordinaries are to be mentioned the subordinate ordinaries, the Gyrion, the Quarter, the Canton, the Fret, the Pile, the Orle, the Treasure, the Flanches, the Flasques, the Voiders, and, according to some authorities, the Lozenge, the Fessil, the Mascle, and the Rostro.

The Gyrion is formed thus: and when the shield is divided per cross and per saltire into eight similar divisions, it is called Gyrony.

The Quarter is, as its name imports, the fourth part of the shield, and is always placed in chief.

The Canton is a square figure like the quarter, but smaller, occupying only a third part of the chief itself.
HER

The Fret is formed thus: when composed of more pieces similarly interlaced, the field is said to be fretty.

The Pile is formed like a wedge, thus it is sometimes borne in bend, but must then be so described.

The Orlé is a sort of border or frame within the shield.

The Treasure is commonly supposed to be half the breadth of the Orlé, and is generally borne double, and what is called flowy and counter-flowy, as in the royal achievement of Scotland.

The Flanches are formed by two curved lines nearly meeting in the centre, thus:

The Lozenge is of the shape of the Diamond in a playing-card. A shield so divided by diagonal lines as to form several of such figures is called Lozenge.

The Fusil, called also a Spindle, is longer and narrower than the Lozenge. A shield so divided by lines as to form several of such figures is called Fusil; and if parted per pale and per bend, would be either Lozengy-bendy, or Fusily-bendy, according to the width of the space between the lines. The Mnsle is of the same form as the lozenge; but hollowed out, or, in heraldic term, Folded, so as to form a mere frame of that shape.

The Rustre is a similar figure, but pierced or voided round, instead of square, thus:

To these some heralds add the Insceutcheon, which is a small shield placed in the centre or top point of the escutcheon; but this, except when borne by an heiress as an escutcheon of pretence, may, in our opinion, be ranked amongst the common charges, as may also the lozenge, the fush, the muscle, and the rustre.

We have next to speak of differences, so called from their being particular marks borne to distinguish persons of the same family from one another. While heraldry was arbitrary, the son frequently assumed arms perfectly different from those of his father; but in the time of Edward I. we find two marks generally considered as family differences or signs of cadency,—the Border and the Label.

The Border is, as its name denotes, a guard or edging to the shield, and by the French heralds is accounted an ordinary. The border should always be in width one-fifth of the breadth of the shield itself, and stops when it encounters a chief, a quarter, or a canton, but passes over all other ordinaries. If the interior line is not plain or even, it must be described as engraven, intersected, &c. When divided into four equal parts, it is called a border quarterly. When divided into small squares of different colours, it is called a border goltoneon, or gobony, or compony. When into two rows of squares, it is called a border counter-compory. When into three rows of squares, it is called checky.

The Label, or File, as it is sometimes called, is a sort of filet from which depend generally three or five lambrequins, or points, thus:

It is sometimes however said to have been borne as a common charge, and is to be found only with one point and with as many as nine: other authorities consider it always as a difference. The label of three points is now always used as the difference of the heir or eldest son of the first house.

For the second son the difference is a crescent.

For the third, a mullet, or star of five points.

For the fourth, a martlet.

For the fifth, an annulet.

For the sixth, a fleur-de-lys.

For the seventh, a rose.

For the eighth, a cross moline.

For the ninth, a double quarrefoil.

These are called the differences of the first house; and by the six first, the six sons of Thomas Beauchamp, Earl of Warwick (temp. Edward III.) are distinguished in a window of St. Mary's Church at Warwick.

The children of the second house are distinguished by the first son bearing a crescent charged with a label; the second, a crescent charged with a crescent; the third, a crescent charged with a martlet, and so on.

The junior branches of the royal family are however distinguished by the label only, the Prince of Wales bearing it simply argent, and the rest distinguished by various charges, a practice as antient as the reign of Richard II.

In the general term charges we comprise all descriptions of figures borne in coat-armour, whether things animate or inanimate, real or imaginary, everything in short contained in or placed upon the shield; but those we have above-mentioned are to be distinguished from the common charges, by which expression are understood all other.

Many of those, such as crosses and mullets in all their variety, escutcheons, bezants (the golden coins of Byzantium, or Constantinople), Saracens' heads, &c., were assumed during the Crusades, or after the return of the Crusaders, by themselves or their families, in commemoration of those expeditions. Others, such as beasts, birds, fishes, reptiles, trees, flowers, the sun, moon, stars, &c., were borne either as types of the peculiar dispositions or qualities, or as denoting by some similarity of sound in the pronunciation the names of the bearers. Such have been called with us canting or punning arms, and by the French armes portantes. It has been the fashion with modern heralds.
ralds to decry this species of bearing; to account it of rare occurrence in antient heraldry, and less honourable where it did occur: but recent investigations prove it to have been one of the most frequent as well as most antient descriptions of charge, and worthy of respect as any other. It has indeed been suggested that the bearing frequently gave rise to the surname itself. This is however a mere conjecture; but the grants of arms which have been handed down to us prove incontrovertably that when sovereigns desired to express their approbation of noble or useful deeds by such distinctions, the name of the person to be honoured was frequently expressed by the charge, instead of the act he had performed, which would have been worthy of respect as any other. It has been considered in those days as an inferior bearing. An acquittance also with the language of the nation and time in which the arms were first granted or assumed, as also of its pronunciation, is of the greatest importance. But the question of their origin is a matter of research, and such researches may yet shed much light upon the origin and history of heraldry. The Cornish family of Godolphin bear a white eagle; but those who are acquainted with the antient Cornish language would be far from guessing that a white eagle was so called in it. A third species of allusive bearings is that which designates the place or office of the individual; and many charges appear in the arms of our nobility derived from ancestors who have held situations or occupations of great eminence. Thus, in the case of our antient monarchs; and lastly, a fourth portion have been assumed, as Camden has exemplified, in honour of the feudal lord, or most powerful neighbouring chief, or been conceded to the baronial houses of the locality, or of the regions.

The crest is the next object in point of antiquity to the shield. It was the ornament worn upon the helmet, and consequently the helmet itself was generally represented with it upon the seal of the knight or nobleman. The crest from the outset was rarely worn, except upon the tilting helmet, and then upon a wreath which was generally a twisted roll of silk or two colours, being those of the family of the wearer. Beneath this wreath was frequently placed the figure of a deer, a pelican, a dolphin, or a crane, or some other figure, which was supposed to have taken its rise from the fanciful devices of the early seal- engravers, who filled up the space not occupied by the shield with all sorts of monsters or natural animals, by way of ornament. They did not become common till the close of the fourteenth century, and Henry VIII. was the first monarch who formally granted supporters to peers of the realm and knights of the garter and of the bath. No person under the rank of a knight of the bath has a right to supporters, unless by the special grant of his sovereign.

Mottos had their origin probably in the war-cries of the different knights. There are several instances however of a motto being borne in addition to the cri de guerre.

The following is the most frequent, or that with the crest; but it was altogether independent of the armorial bearings of the family, although in many instances it became hereditary. It is frequently, but very incorrectly, placed upon a wreath.

The arrangement and description of all the above insignia in proper heraldic order and terms are styled the marshalling and blazoning of arms.

We shall speak first of Blazoning. The verb to blazon is generally derived from the German blason, to blow or sound a horn or trumpet, such being usually the practice before proclaiming the style or arms of any personage on his arrival in the camp, the lists, or the banquetting hall. The term however was soon applied to the proclamation itself, and finally used as synonymous with description generally: thus we find in the old book on hunting written by Jacques de Fouilhoux, and presented to Charles IX. of France, the description of a stag of golden hue, 'faucon, qui en âme de la Vierge, a le haut de sa haute et de sa gueule, qui en esplan de la Renommé, sauf le fourrure, de sa couleur, que celuy que soy, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, et de moi, et que luy au cul, sauf la couleur, et qui en est en sa grace, and the colours of the field are reversed upon it, it is said to be counterchanged. By marshalling we understand the orderly disposition of sundry coats, belonging to distinct families, in their proper places within one shield, by impaling or quartering;
and the joining of ensigns of honour and dominion with the paternal arms of the bearer, &c.

When he marries he impales his wife's paternal arms, by placing them upright on the left side of his own in the same escutcheon, such impalement being also called armes en baron et femme. If that wife should be or become an heiress, the husband may bear her arms on an escutcheon of pretence over his own; Legh says however that this should not be done till he has begotten an heir of that heiress. In Scotland the husband frequently quarters the arms of his own with those of his wife, when she is an heiress. In England this is only done by the children of such a marriage. If the mother be no heiress, the children cannot quarter her coat.

Another mode of impalement was by taking only half of each coat, so as to form them in one escutcheon. This was called dimidiation; but the practice has long fallen into disuse.

The complete escutcheon of a family should never, according to some authorities, consist of more than six or eight quarterings; others admit of sixteen; and the German marshals sometimes twenty and thirty coats in one shield.

The best mode of marshalling so many is to begin by placing the arms of the first heiress who married into the family next to the paternal coat, and next to them the several coats which that heiress brought in; then the arms of the second heiress brought in by those quartered, and so on in rotation. When the royal arms are brought in by any match, it is usual however to give that match the second quarter next to the paternal coat, and some say it should be even in place of that coat.

The arms of a family are composed of her husband's and her father's impaled within a lozenge.

Those of a maid are her father's only, borne in a lozenge also, without any difference, except she be of the royal family, in which case a distinction is expressly furnished by the heralds for the individual coat by the command of the sovereign.

If the widow be an heiress, she may wear her paternal coat as a mark of presence over that of her husband, the latter however being in a lozenge, and her daughter, while unmarried, may quarter her mother's arms with her father's in a lozenge; but if the mother be no heiress, then, says Legh, the daughter has no further right to the arms of her mother's family, except to set them up paleways in her house to show her descent.

If the husband be a knight of the garter, or of any other order of arms the wife must not be impaled, but placed in a separate shield.

Such are the principal rules and terms of the science of heraldry: for further detail we must refer our readers to the books of Nibbs, Nibbs, Nibbs, &c., cautioning them, at the same time, against the Sceyll and Charehbye, of the heraldic inquirer, the absurd and misguided enthusiasm of the champions of the art, and the undeserved contempt of its depreciators. By the latter it has been stigmatized the science as one of fools with long memories. It should rather be designated as a science which, properly directed, would make fools wise. It is, we repeat, a key to history which may yet unlock stores of information; at present its most learned professors have studied the art itself more than the use which may be made of it. They have wasted their time and their learning upon idle controversies, and still more idle speculations. A mysterious signification has been given to nearly every charge and tincture known in armory, and a different one by nearly every writer upon the subject. The names of the ordinaries and colours have been derived from every sort of object and through every known quarter, and yet it has been shown to be a mere jumble of which we can depend. Even the word blazon, the only one we have ventured to hint the origin of, has been hotly claimed as Arabic by some disputants, and we will certainly not extend this article one line by an attempt to dispose it.

HERAT. [Khorrassan.]
HERAULT, a department in France, on the coast of the Mediterranean, which borders upon the department of Aveyron, and Gard. The greatest length from north-east to south-west is nearly 80 miles. Its greatest breadth at right angles to the above is about 14 miles. Its area is estimated at 2417 square miles; the population in 1836 was 357,846, being about 148 to a square mile, somewhat below the average density of the population of France. The area rather exceeds the two English counties of Chester and Salop, but it has less than two-thirds of their population. Montpellier, the capital of the department, is in 43° 36' N. lat. and in 3° 52' or 3° 56' E. long.: 366 miles from Paris, and about eight right line miles south by east of the town of Aveyron.

The coast of the Mediterranean here is plain and lined by etangs, or pools; the chief of these are the Etang de Vennet, near the mouth of the Aude, and the Etangs de Thau and Mauguio, which, with the intermediate waters, form one of the longest stretches of water extending 27 miles from the mouth of the Herault to that of the Vidourle.

The north-western side of the department is occupied by the Espoune mountains, part of the chain of the Cévennes, and their branches; nearly one third of the department is of a mountainous or hilly character. Towards the Mediterranean the surface becomes more level. Many streams flow from the mountains to the sea. The Vidourle rather belongs to the department of Gard, in which it rises; but in the lower part of its course it separates the departments of Gard and Herault. The Salazin and the Les, with its feeder, the Mosson (which receives the Coulzon), are the streams which, after passing the mouth of the Herault is larger: it is generally considered to rise near Villeneuve in the department of Gard, but the head of its feeder, the Trevetez, which should be regarded as its true source, rises in the north-western part of the department of Gard, and Aveyron. It flows about 27 miles first eastward, then southward, before entering the department of Herault, through which it flows about 33 miles in a direction nearly south by west into the Mediterranean, near Aigues-mortes, which is the chief town of the department of the same name, viz. from the town of Bessan, it is navigable. Its feeders are the Vis (chiefly belonging to the department of Gard), the Lergue, and the Boyne, on the right bank, and the Landes de Thau on the left. The latter joins the other streams in the lower slopes of the Cévennes into the sea. The Orb rises on the north-western boundary of the department, and flows about 65 miles in a very winding channel to the Mediterranean; it is navigable for about 3 miles. Its tributaries are the Bausson, the Vinials, the Jeen or Jeu, and the Bernasobres, all on the right bank. The Aude forms for a short distance the south-western boundary of the department, and the Ceyss and the Brana, which belong to the system of the Aude, with the Guer and the Larn, which belong to the system of the Garonne, water the western part.

The navigable canals of the department are numerous, and of considerable extent. The Canal du Midi, or Channel lat., enters the department on the south-west, and runs nearly 40 miles to its termination in the Mediterranean, near the town of Cette. The Canal des Etangs d'Aigues-mortes is about 40 miles long; it runs from the nearest part of the Etang de Mauguio to the town of Cette. The canal which skirts the Etang de Mauguio is about 6 or 7 miles long; and that of Lunel, from the town of Lunel to the Etang de Mauguio, about 8 miles. The Canal de Graves (or the navigable of the Les) with that of the Gru du Les is about 7 miles. That portion of the Canal Radelle (extending from Aigues-mortes to the coast) is about 32 miles long. The Gru d'Aude, about 4 miles; the Catawba, 5 miles. The Canals of Lodeve, Pérény, Béziers to Narbonne in the department of Aude: the other roads lead in various directions from Montpellier and Béziers. There are seventeen routes departmentales, with an aggregate length of 300 miles; but not much more than half this extent is in repair. The
c. vinaux, or bye-roads and paths, have an aggregate length of more than 3000 miles. There is a railroad from Montpellier to Frentignan and Céte, 17 miles long, which is much used for passengers.

The greater part of the department is occupied by the strata between the chalk and the new or siliiferous red sandstones. Above the upper bed of the Ark, are found formations which intervene between these and the primitive rocks; and in the western extremity of the department, amid the Cévennes, the primitive rocks occur. The mineral wealth of the department is not great; it consists chiefly of coal, lead, and some varieties of marble, much valued for ornamental purposes, and a species of lignite which is used, under the name of 'fossil ashes,' for manure. There are mineral waters at Montpellier, Vaucluse, and a few salt-pans along the coast. The climate of the department is mild in winter; in summer it is frequently hot, but on the whole healthy.

Of the third part of the surface of the department is waste, about one fourth is arable, one sixth is devoted to the cultivation of the vine, an eighth is woodland (the forests are chiefly of oaks, cork-trees and pines), and the remainder commune; Toulouse, near the Etangs, rivers, ponds, and other waters. The quantity of grass land is very small. Wheat is the grain chiefly cultivated, then rye and oats; barley and pulse, maize, and more potatoes much grown. The quantity of grain raised is not beyond what is required for home consumption; the produce of the vineyards, both wine and brandy, the dried fruits of the vines, and those imported from the islands, of the articles of export. The olive, fig, and mulberry are cultivated, and some plants used for dyeing are produced. Horned cattle are not numerous, but sheep are; and mules. The manufactures of the department consists chiefly of cotton, silk, and other goods, especially for clothing the troops, and other woollen fabrics, cotton yarn and cotton goods, and silk hose: above 17,000 workmen are engaged in these various branches. The fishery on the coast is busily carried on, and the trade of sardines is important.

The department is subdivided into four arrondissements, of which Montpellier, Béziers, Lodève, and St. Pons, are respectively the chief towns: the area and population of the department are thus distributed:

<table>
<thead>
<tr>
<th>Arrondissement</th>
<th>Area</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montpellier</td>
<td>780 sq. miles.</td>
<td>125,656</td>
</tr>
<tr>
<td>Béziers</td>
<td>696</td>
<td>126,149</td>
</tr>
<tr>
<td>Lodève</td>
<td>474</td>
<td>57,570</td>
</tr>
<tr>
<td>St. Pons</td>
<td>497</td>
<td>48,311</td>
</tr>
<tr>
<td>Total</td>
<td>2,417</td>
<td>357,464</td>
</tr>
</tbody>
</table>

The chief towns of each arrondissement and their populations:

In the arrondissement of Montpellier are Montpellier near the Léz, population in 1836, 35,506 [MONTPELLIER]; Cette on the Mediterranean, pop. 1831, 10,539 [Cette]; Launaguet, pop. 6050; Mèze, pop. 6260; Mèze on the Etang de Thau, pop. 4278; the town, pop. 4400 for the whole commune; Ganges on the Hérault, pop. 4173 for the town, 4193 for the whole commune; Marcellargues or Massilargues on the Vidourle, pop. 4233 for the town, 3292 for the whole commune; Aniane, near the Hérault, pop. 4208 for the town, 2480 for the whole commune; Bouconne near the Etangs, pop. 1850 for the town, 1916 for the whole commune; Plomar, in Montpellier, pop. 1877 for the town, 1889 for the whole commune; Frontignan, on the line of the Etangs and Côte pop. 1856; the town, 1877 for the whole commune; St. Baudile, A. P. 1855, pop. 377 for the town; Vias, in the commune; Montpellier, pop. 1877 for the town, 3270 for the whole commune: the latter is the smaller towns of Languedoc, Mauguio, Boucassar, Caustres, Les Matelles, Celleucne, Miravec, and Vileneuve, near Montpellier.

In the arrondissement of Béziers, are Béziers, on the Hérault, population in 1836, 16,233 [BEZIERS]; Belcarieux on the P. C., No. 742.

In the arrondissement of Lodève, are Lodève on the Lèze, a feeder of the Hérault, population in 1836, 11,208 [LODEVÉ]; Clermont de Lodève, near the Lèze, pop. 3965 for the town, 6875 for the whole commune; Vues, near the Hérault, pop. 1877 for the town, 2205 for the whole commune; Vaugines, near the Hérault, pop. 1877 for the town, 2174 for the whole commune; and Vias, near Lodève, pop. 1877 for the town, 2174 for the whole commune.

The department of Hérault constitutes the diocese of Montpellier, the bishop of which is a suffragan of the archbishop of Aragon. It is in the jurisdiction of the court royal, or high court of justice, of Montpellier, and in the Vol. XII.—U.
circuit of the university of the same city. It is included in the
ninth military division, the head-quarters of which are at
Montpellier. It sends six members to the chamber of Deputies.
There are four Protestant congregations.

The proportion of those who could read and write among the
young men enrolled in the military census of 1828-29
was forty-five in every hundred, being above the average of
France.
The department is composed of the former dioceses of
Montpellier, Lodève, and Béziers, part of the diocese of Narbonne,
and part of the diocese of St. Pons, if not all: the

HERBELOT, BARTHELEMI D', was born at Paris,
the 14th of December, 1625. He commenced the study of
the Oriental languages in early life, and acquired an
accurate knowledge of the Arabic, Persian, Syriac, Armenian,
and Turkish languages. During his residence in Italy,
where he went with the hope of obtaining instruction
from natives of the East, he enjoyed the friendship and
patronage of the Cardinals Barberini and Grimandi; and on
his return to France he received a pension from Fouque,

of 1500 livres, which he afterwards lost on the disgrace of
that minister. He was subsequently appointed Oriental
secretary and interpreter to the king. During a second
visit which he made to Italy, he was retained in the most
distinguished manner by Ferdinand II., grand-duke of Tuscany,
who presented him with a great number of valuable
Oriental MSS., and wished to retain him at his court.
But D'Herbelot was recalled upon the representations of
minister Colbert to return to Paris, where he was appointed
professor of Syriac on the death of Auvergne. He also
received a pension from the king. He died 5th of Decem-

The work by which D'Herbelot is known to posterity is entitled

"Bibliothèque Orientale, ou Dictionnaire Universel,
contenant généralement tout ce qui regarde la connaissance
des peuples de l'Orient," fol. Paris, 1697. This work,
which he had to finish himself, was released, and upon
which he had laboured for many years, was published after his death
by Galand. The "Bibliothèque Orientale" was founded upon
the Arabic dictionary of Haji Khalis, and has been
decentered by scholars as a most extraordinary
work for the time in which it appeared. D'Herbelot
drew his materials from numerous other works in Arabic,
Persian, and Turkish, which are enumerated by Galand
in his preface to the "Bibliothèque." As many subjects
connected with Oriental history and antiquities the "Bib-
liothèque Orientale" supplies the only information which is
available at the present day to a person unacquainted with
those languages. But its fragments must be
received with great caution; for while the learned author
appears to have had a most extensive knowledge on all
subjects connected with the East, he certainly did not pay
sufficient attention to accuracy. It should however be re-
collected that he did not live long enough to write the work,
but that his plan embraced too great a number of subjects to
allow any one individual to do justice to them all.

The "Bibliothèque Orientale" was reprinted at Maestricht,
f., 1764, and also at the Hague, 4 vols. 4to., 1777-1789.
The latter edition contains many valuable additions by
Schultens and Reiske, and also a supplement by Visdelou
and Galand. An abridgment of the original work was
published at Paris, 6 vols. 8vo., 1782, by Désessarts.
A German translation of the "Bibliothèque Orientale" was
published at Halle, by Schulz, 4 vols. 8vo. 1785-90.

D'Herbelot also wrote several other works, which have
not been mentioned. Amongst them he devoted mentions
a Turkish and Persian Dictionary, in three volumes folio.

HERBERT, EDWARD, LORD HERBERT OF
CHERRYBURY, a profound and original thinker, but of a
temporary and fanciful character, was born in the
year 1581, at Montgomery, in the principality of
Wales. After going through the usual course of studies at
Oxford, where he was a member of University College,
Harley College, in 1604, he shortly afterwards proceeded
to the Continent, with a design of seeing the
foreign parts, but was induced by an inherent love of en-
treprise and danger to join the English auxiliaries
then serving in the Netherlands, where his soon distinguished himself as a
brave and daring officer. After
he returned to England, he was upon the accession of James I.
created a knight of the bath, and was distinguished at the
court of that pedestrian monarch by his gallantry and his
learning. In 1618 Sir Edward was sent ambassador to
France: in this situation the bold independence with which
he had hitherto acted was severely checked, and he was
brought upon him the displeasure of the French monarch,
at whose request he was recalled. The conduct of Herbert
met however with the approbation of James, who, upon the
death of his successor, sent him in 1625 to
D'Herbelot, as he had married, to

If the following grounds—The

of a work which is largely attributed to him—D'Herbelot
is the great task of the

life. Maintaining that no revelation is
credible which is imparted to a person only of mankind,
he nevertheless claims the belief of his hearers when he
tells them that his doubts as to the publication of his work
were removed by a direct manifestation of the divine will.
Notwithstanding his admission of the
danger of his undertaking, his work has been
pursued by his researches on a purely rational method
are alone sufficient, even had we not a Glanvill and a few
others to boast of, to refute the objection which has been
uyed against us of a total absence in the national mind of all pure and reflex reasoning. The doctrine that outward objects are the occasions of educating all general knowledge is the foundation of the fame of Kant, and there is much also in the writings of Jacobi which reminds the reader of the principles and method of the philosopher of Cherbury.

The theory of Lord Herbert on innate ideas is opposed generally by Locke ("On the Human Understanding," b. i. c. 2), and some special points are called into question by Gessendi, in his "Epistola ad Librum Ed. Herberti Angli," in the third volume of his works.

Herbert, born April 3, 1593, was the fifth brother of Lord Herbert of Cherbury. He was educated at Westminster, and elected thence to Trinity College, Cambridge, about the year 1608. In 1615 he became Fellow of the college, and in 1619 was elected to the office of public orator, a post in those times of considerably more importance than at present. While at Cambridge he made the acquaintance of Lord Bacon, but the pleasures of the court and some hopes of preferment led him to spend much of his time away from that seat of learning. His expectations however failed on the death of James I, he turned his attention to divinity, of which he had before been a laborious student, and took his orders. He was made prebendary of Leighton Bromswold, or Leyton Ecclesia, in 1626. He married in 1630, and in the same year accepted the rectory of Remerton; but the effects of a quotidianague, which had attacked him the year before, made him very sensible of it, and he died in 1632. His poetical works are well and deservedly known. They belong to the same school with those of Donne, Quarles, and Herrick, and remind us forcibly of certain poems which have lately appeared in the Spectator. Herbert composed his "The Temple," 1633, and the same analogy may be traced between that school of divines to whom these poems are owing and our author; there is the same zeal and energy in pastoral duties, the same love of truth and modesty, the same reverence for antiquity and for the ceremonies of the church.

Herbert's chief prose work is "The Priest to the Temple," a sequel to his work called "The Temple; Sacred Poems and Private Devotions." It was long printed, and very good rules for the life which a country clergyman ought to lead. He also wrote a translation of Cornaro on Temperance, and some Latin poems.

HERBERT, SIR THOMAS, was born at York about 1596, and entered Jesus College, Oxford, in 1612, whence he removed to Trinity College, Cambridge. In 1626 he went abroad in the suite of Sir Dolmore Cotton, ambassador from England to France, and being introduced to the king and at the expense of his kinsman William Herbert, earl of Pembroke, a man of cultivated and elegant talents, and a generous encourager of learning. He sailed to Surat, then the seat of learning of the Mogul, but returned to the Caspian Sea, and returned by Isaphan and Bagdad, down the Tigris; then proceeded to the coast of India, near Surat; visited, or (at least described) the straits of Malacca, Java, Pegu, the Moluccas islands, &c; and returned to England after four years' absence. In 1634 he published his "Some Yeaeres Travels into Africa and Asia the Great," &c, revised and enlarged by the author in 1638, which is an accurate and trustworthy work, and the best account of Persia anterior to that of Chardin. It contains a great many curious facts which the reader will barely find anywhere else. The work was translated into Dutch by Van Vilet, and re-edited by Theobald, as The Eugenia and Orgon: The English edition is ornamented with a great many cuts.

Sir John Herbert espoused the cause of the parliament, and in 1647 was one of the commissioners appointed to receive the king from the parliament. In that capacity he attended the king to Holdenby Castle, and was selected by him, on the dismissal of his former attendants, to be about his person. Though, being a Presbyterian, he was opposed in religion, as well as politics, to the opinions of Charles, still the king's respect for his brother, and his attachment to the cause of the parliament, won the regard of the royal prisoner, towards whom Herbert in his turn appears to have conceived a strong veneration and affection. He attended him to the last; and after the Restoration, in 1660, he died at the age of 72, in the title of baronet. In 1675 he published "Tremedone Carolina," an historical account of the two last years of the life of King Charles I, by Sir Thomas Herbert and others, reprinted by Nicol in 1683. He died at York in 1682. (Ahenea Oceaniensae, where there is an original account of the last days and burial of Charles I, communicated to Wood by Herbert himself.)

HEREBSTIUM. [Thalassin.] HERCULANEUM, or Herculanum (Civ. ad Att. 7, ii.), a very ancient Italian city, situated on the coast of Campania, near Vesuvius. It is said to have been of Pelasgian origin, but its history is obscure, and it seems never to have attained any importance. In the time of Titus, A.D. 79, it was overwhelmed by that memorable eruption of Vesuvius which also ruined Pompeii. (Vesu- vius.) It appeared to have been a town of small, but tolerable, size, consisting of houses and shops and gardens, subsequently overflowed by streams of lava, and is stated to be 70 feet below the present surface of the ground. It was re-discovered by the sinking of a well in 1715, when several antiquities were found. This led to further investigation; and after several years, in which little was done, the Neapolitan government undertook the work of excavation. The theatre, a chalcideum, and two temples, are the chief buildings explored; the private houses are chiefly small, and of one story, like those of Pompeii. The whole excavation is said to have been about 600 yards long by 300; but it being impossible to remove the incumbent soil, in consequence of its thickness, not as fast as one part was thoroughly searched, it was filled up with rubbish from another. A small part of the theatre is all that is now accessible. The chief advantage as yet derived from Her- cilanum is the magnificent collection, not only of statues and paintings, but of domestic objects and implements of every use and description, deposited in the Royal Museum at Portici. These are figured and described in the magnifi- cent work, 'L'Antichita d’Ercolano,' Nap., 1757, 10 vols. fol. The collection has been abundantly increased from Pompeii.

Great expectations were raised by the discovery of a large number of manuscripts, written on rolls of papyrus. The attempts to understand the hieroglyphs have not, however, been altogether successful; and those of which the subjects have been ascer- tained are of little interest. There seems to be very little hope of recovering any of the lost treasures of antiquity in this quarter. The work entitled 'Herculanean Papyri,' minum quin supersunt,' Naples, 3 vols., 1788, 1679, 1677, contains, we believe, all that has yet been deciphered. The University of Oxford published, in 1824-5, 2 volumes, 8vo., of fragments lithographed from Egyptian (apographs) presented to them by George IV.; these have been also published in the Neapolitan work. The bulk of those which have been examined contain the works of Greek philosophers and sophists, and treat of natural and moral philosophy, the elements of which the Egyptians, who have uniformly been found in a state resembling charcoal, dry, and crumbling, the lamina, for the most part, strongly adhering to each other. There is an elaborate account of the several manuscripts, and some fragments are transcribed in the last edition of 'The Encyl. Britannia,' art. "Hercula- neum."

HERCULES (in Greek, Hercules), a celebrated hero of Greek mythology, the offspring of Zeus by Alcmene, daughter of Electryon, a son of Peneus, and king of Mycenae. His reputed father was Amphitrion (son of Acadmus, another of the children of Peneus), who having accidentally killed his father-in-law Elektron, was compelled to leave Mycenae, and take refuge in Thebes. Here Hercules was born and educated, and here his early feats of strength and valor were done; such as slaying the lion of Cithæron, delivering the district of Orchomenus, and taking in marriage the daughter of Creon.

Being failed to serve Eurytheus, king of Mycenae, as he performed what are called his labours, in obedience to the commands of his master Alcæus. He did not only enumerate them:—first, to bring the skins of the Nemean lion; the second, to destroy the Hydra; the third, to catch the bird of Artemis; the fourth, to bring to Eurytheus the Erythraean boar alive; the fifth, to cleanse the Stymphalian birds; the sixth, to drive away the water-fowl of lake Stymphalus; the seventh, to fetch the Cretan bull; the eighth, to bring to Mycenae the mares of Diomedes; the ninth, to obtain the girdle of Hippolyta, the wife of Theseus; the tenth, to obtain the holy girdle of Hermione of the island of Erithia; the eleventh, to bring the apples of the Hesperides; the twelfth, to conduct Cerberus from the under world. Many other exploits did he perform,
such as the taking of Troy, which are all related by the mythologists, Apollodorus, and others. But we have already gone into somewhat unnecessary detail, as our object will rather be to point out the classes to which those traditions belong, than to give our readers information with which they can supply themselves elsewhere.

There are then three distinct kinds of tradition relating to Hercules; the first consisting of stories drawn from some Eastern or oriental source, and applied to the Théban hero. Such are his wanderings round the coasts of Greece, which exhibit in a mythical form the establishment of the worship of a wandering god of the Phenicians. Such also is his voluntary descent into the Mount Etna; and according to Müller (Dorians, i. 444), his murdering his children. Another, and the second class of traditions, are those which represent him performing labours such as would naturally be those of a young community. (Pausan, viii. 14.) A third class exhibits him in the light of a conqueror and destroyer of tyrants, and here the awkwardness of ascribing the deeds of the Pol蓬pean hero to the Théban Hercules is most striking; for while on the one hand he is serving Eurythous as a slave, on the other he appears as one who forms alliances and disposes of kingdoms.

The legends of Hercules perhaps afford a better instance than any other to the effect of the poetry of the Dorians, of the various sources from which mythical accounts spring. Hercules is represented as a half-naked man, with broad shoulders and branny limbs, resting on a club, and covered round his loins with the skin of the Nemean lion. He appears bow-shoulder and originally as a sea supernatural and buckler, or a bow and sword, the later representation having been subjoined about the time of Stischorus. (Müller’s Dorians, and the authors whom he quotes; Thirlwall’s History of Greece; Müller’s Pseudo-Phoebus; Buttmann’s Mythology, i. xi.)

HERCULES, one of the old constellations, called Πατριαρχή by Aratus, Hyginus, and Ptolemy, and described by the first as a figure like that of a man in sorrow while the second offers various fabulous significations from the stories of Hercules, Orpheus, Coetus, Theseus, Thamyris, Ixion, Prometheus, &c. The club, lion’s skin, and character of Hercules, are not so old as Aratus, who describes this figure as stretching his hands to different quarters, and makes an allusion to the neighbouring dragon, which shows that he was not painting a hero.

The constellation is situated between Draco, Bootes, Lynx, and Pegasus, and there is no star in it larger than of the third magnitude, there is nothing very remarkable about it. The principal stars α and β lie between the bright stars in the head of Ophiuchus, and in Corona Borealis.

HERCULES, PILLARS OF. [Gilbert, Stratus.]

HERDER, JOHANN GOTTFRIED Von, was born in 1744, at Morungen in East Prussia, where his father kept a little girls’ school. The only books he was allowed to read were a Bible and Hymn-book, though he secretly turned his attention to other works. A preacher named Treschina engaged him as a writer, and as he observed in him germs of talent, he allowed him to remain with his sons, while he gave them instruction in Latin and Greek. A complaint in the eyes, with which he was afflicted, was the means of his becoming acquainted with a Russian surgeon, who was pleased with him to offer to take him to Königsberg and thence to Petersburg, designing to instruct him in surgery gratis. Herder accepted the offer, but at Königsberg fainted away at the first dissection which he attended, and thereupon resolved to study theology. He heard that at the University a beautiful young lady of 19 was a student there, and he therefore attended the lectures of the Princess of Oldenburg. This princess had been educated at the Frencish College at St Petersburg, and had studied in the University of Göttingen; and her story was to Herder a great attraction. She was in her first year, and was at that time extremely popular, as her name and qualities were the talk of the whole University. Herder therefore endeavoured to get her attention, and proceeded step by step, till he was enabled to be her acquaintance, she being at that time a student in a school for young ladies at Göttingen. In 1775 he became theological professor at Göttingen, where he was enabled to pursue his favourite studies under the benign influence of the Duke of Saxo-Weimar and his wife.

He died in 1803.

The writings of Herder fill about sixty volumes, and are on the greatest variety of subjects. As a theologian he has gained celebrity by his ‘Spirit of Hebrew Poetry,’ as a philosopher by his ‘Philosophy of the History of Man,’ a work which was first translated into English. He was not so much a metaphysician as an observer. He strove to discover a point of union where science, religion, history, poetry, and art should meet; and in order to form a comprehensive view of all the tendencies of man, he made himself acquainted with the literature of a variety of countries, Oriental as well as European, ancient as well as modern. His collection of popular ballads of all nations has a high reputation; and a poem by him called the ‘God’ has been declared by the Spaniards themselves to be truly Spanish. The great influence which he exercised on German literature, by introducing his countrymen to the knowledge of an infinite variety of subjects, was undoubtedly great; and his name is never mentioned among them but in terms of high respect and admiration.

HERDERITE, a mineral which occurs in crystals embedded in flour, and is very common in Saxony, where it forms a bright rhombic prism; cleavage parallel to the lateral planes, and in the long diagonal of the prism; fracture small, conchoidal; hardness 5; colour greyish and yellowish-white; luster vitreous; nearly transparent; specific gravity 2.985.

HEREFORD, an ancient city, and parliamentary and municipal borough, situated upon the left bank of the Wye, about 11½ miles from its direct line west from London. The name is probably derived from the British Hsin-foed, signifying the ‘old road.’ The city or liberties (those words are used indiscriminately) extend far beyond the limits of the town, and their boundaries are perfectly well ascertained. The liberties comprising parishes of All Saints; part of the parish of St. John the Baptist; part of the parish of St. Martin; part of the parish of St. Nicholas; part of the parish of St. Owen; and part of the parish of St. Peter;
the township of Huntington in the parish of Holmer; another part of the parish of Holmer; part of the township of Tupsley in the parish of Hampton Bishop; and small portions of the parishes of Bullingham and Breinton. The city contains 2320 statute acres, and a population of 10,280.

The borough council consists of the mayor, six aldermen, and eight councillors. The town hall, which may be held within its limits—the Quarter-Sessions; the Petty Sessions; the Mayor's Court; View of Franchise; and Court of Pie Poudre. The income of the corporation includes two real property, tolls, and fees: in 1832 it amounted to 1176l.

History and Antiquities.—In early times this city was important as a garrison to restrain the Welsh. The principal events of its history are its pillage by the Welsh in 1093; the capture of it by the Normans in 1066, when Owain Tudor, who was beheaded here in 1461; the surrender of the city during the rebellion, in 1463, to the parliamentary troops, headed by Sir Wm. Walter; and the siege of Hereford by the Scotch under Lord Leven.

A house of Grey Friars stood at the southern extremity of the city—a house formerly belonging to the Black Friars, the picturesque arms of which have been engraved in the book of Mr. Gore and other antiquaries, may be seen in the suburb of Widemarsh St.; and adjoining it was a chapel and building belonging to the Knights Hospitallers of Jerusalem.

There was also a Benedictine cell, belonging to the monastery of St. Mary de Lacy, a part of which was at one time garrisoned, but was removed, at the time the parliamentary commissioners returned it as ruinous, and its materials worth no more than 85l.

Hereford is situated in a broad, fertile, and well-cultivated valley, and at sufficient elevation above the river Wye to be free from fogs and damp. It has always been a healthy town. The principal streets are broad and straight, and have all been macadamized. The private houses, the hospital, and the banks of the Wye are built of stone. The shire-hall was built after a plan of Sir Robert Smirke, and is remarkable for the unsatisfying beauty of its exterior, as well as the good general arrangement of the interior. Besides the courts and rooms necessary for the transaction of sease and magisterial business, it contains a large room, which is used at elections and other public meetings, and occasionally as an assembly-room. The town-hall is the most magnificent of its kind in the kingdom, being supported by oaken pillars, stands in the High Town, and the fruit and vegetable market is held underneath and around it: additional markets have also been built between this site and the guildhall, a brick building in a remote situation. The town workhouse, first inhabited in 1833, stands just beyond the north-east limits of the city. In the county gaols, which are in the same neighbourhood, the silent system is in force, the regulations rigid, and the superintendence of the visiting magistrates is vigilant and discreet. One of the gateways of the ancient walls has been fitted up as a city prison. There are several hospitals or almshouses. A large infirmary, supported by contributions and benefactions, stands south-east of the city, near the Castle-green. The principal churches are those of All Saints, St. Peter, St. Nicholas, and St. John. All Saints Church faces Broad-street on the north; the steeple is tall and well-proportioned, but its exterior is handsomely varied, and an arch of brickwork on the south side, which has been added to the original stone wall, greatly disfigures the elevation. At the vicarage of St. Martin's and All Saints, which is in the Vicar's close, the vicar has a handsome house, is paid a salary of 600l. a year, and the vicarage house, built by the pope in 1135, is valued at 40s. a year.

St. Peter's Church, founded by Walter de Lacy in 1065, is a plain building, with a spire. The annual value of the vicarage, as returned in 1833, is 45s. per annum.

The church dedicated to St. Owen, and destroyed during the civil wars, was consolidated with St. Peter's in the reign of Charles II.; that of St. John the Baptist has probably been at the same time a part of the estate of the earl of Wiltshire. The latter is a vicarage, of which the dean and chapter are patrons.

Hereford Cathedral stands upon the south side of the city, not very far from the Wye. It is probable that this situation was occupied in very early times by a church of considerable importance. Polydore Virgil mentions that there was a large church (templem magnificum) at Hereford, in the reign of Offa, king of Mercia, Euthbert, who was murdered at the instigation of Offa [HERFORDSHIRE], was buried in this cathedral, and gifts were offered at his shrine, where it was asserted that miraculous appearances had been shown. The foundation-stones may be held within its limits—the Quarter-Sessions; the Petty Sessions; the Mayor's Court; View of Franchise; and Court of Pie Poudre. The income of the corporation includes two real property, tolls, and fees: in 1832 it amounted to 1176l.

The cathedral contains many monuments of great antiquity, some of which are highly ornamented. For a minute description of this cathedral, see Duncombe's Hist. of Herefordshire, and Britton's 'Cathedrals'.

In the chapter-house are a number of tombs of the world, probably one of the oldest original maps in existence; a copy of it was made, a few years ago, for the London Geographical Society. At the east end of the church is the library, which was enriched by the donation of a large number of old manuscripts. The 'college' is a quadrangle, which contains the residences of the vicars of the cathedral. At the west end there formerly stood two chapels, the one above the other, and a cloister communicating with the bishop's palace. The elevation of these chapels, which may be seen in Gough's edition of Camden's work, is considerably higher than in the cathedral, in rotation with those of Gloucester and Worcester.

The members of the cathedral are the bishop; the dean, who holds a canonry, and is appointed by the crown; two archdeacons; one golden prebendary, whose office appears to have been that of confessor to the bishop; five other residuary canons (including the dean); also a lecturer; these are all chosen from the prevoty of the province, the bishop having the casting vote. Besides other dignitaries, there are twenty-eight prebendaries appointed by the bishop, and twelve vicars choral nominated by the dean and chapter. The dean, who occupies the apartment of the 'college', a gloomy building at the east end of the cathedral, which was built for their accommodation in the time of Edward IV.

In addition to the churches belonging to the establishment, there are places of worship for the principal denominations of dissenters. A Roman Catholic chapel of considerable dimensions is now (1838) erecting in Broad Street. No manufacture or important wholesale trade is carried on here, unless it is the manufacture of gloves, of which a considerable quantity are made. The establishment of an iron-foundry has been consequent upon the reduction of the price of coal caused by the Abercawron railroad. Before the construction of this project was begun, it was estimated that the 200 tons of coal required to produce 400 tons of iron, was worth £150 a ton; the price now varies from 17s. to 22s. Gasworks have also been established, so that the streets and shops are well lighted. A literary and scientific society having its meetings in a private house, is in contemplation of a collection for a museum is in progress; this useful institution is well attended, and if sufficient funds can be raised, it is intended to build a museum, library, and suitable apartments. A bill for the new charitable works of the county was carried through both houses of Parliament in 1864: a bill for the charities of the town was carried through the same houses on February 2, for cattle, &c.; the Wednesday in Easter week for cattle; May 19–28, for diversions; July 1, October 2, horned cattle, cheese, &c. The February and October fairs are the most largely frequented; the latter is one of the most considerable cattle fairs in England. The market-
HER

days are Wednesday and Saturday; the 'Great Market' is on the Wednesday after St. Andrew's day.

HEREFORDSHIRE, an inland county, situated in that part of the west of England which is bounded by South Wales. The counties of Worcester and Gloucester form its boundaries on the east; Shropshire, with a portion of Worcestercire, Radnor, and a part of Montgomeryshire, on the west; Monmouthshire, and Gloucestershire on the south.

There are four detached portions of this county; the first belonging to Woffard hundred, situated about 9 miles east-north-east of Hereford; the second, containing the town of Prestegion, is situated on the south of the river Teme, about 2 miles west of Tenbury; both these are separated by Shropshire from the main body of the county: the third, a portion of Huntington hundred, which contains Badnage, Badnom, and a part of Prestegion, is on the borders of Brecknockshire and Montgomeryshire, immediately west of Llanthony and the Hatterell range of the Black Mountains.

Its greatest length from the north side of Mucktree Hill to the southern portion of the Lord's Wood is about 40 miles. Its greatest breadth from the western side of the parish of Brilley, adjoining Clee Hill, to the foot of the Malvern Hills, in the east of the parish of Cradley, is 34 miles. Its area is 860 square miles, or 550,400 acres. In 1631 the gross population amounted to 111,321 persons; and the average number of habitants to each square mile was 28.2. The reduction of population compared with that of the neighbouring counties, gives the following results as to the average number of persons to a square mile:—Gloucester, 307; Hereford, 129; Monmouth, 198; Shropshire, 161; Brecknock, 123.

In extent of surface Herefordshire is exceeded by 24 English and Welsh counties, in amount of population by 44 counties in England and one in Wales. Hereford, the county town, is 232 miles distant from London by way of Wycombe, Oxford, Cheltenham, Tewkesbury, and Lebly. A more direct line from Cheltenham to Lebly, avoiding Tewkesbury and crossing the Severn at the Haw Bridge, saves three miles, and for a distance of nearly 10 miles, forms a very attractive and well-frequented road; but they are rough, and often rendered impassable by floods. Trout, greyling, trasting, and salmon, are taken; since the destruction of a weir in the lower part of the river the number of salmon has increased, and it appears probable that it will again receive further cultivation. The feeding of the fish when they are not in season. From a deficiency in the protecting laws relating to this river, persons are permitted to destroy the old fish, whilst in the summer months, when the fish are in the best season, they are legally prohibited from taking them. Nearly the whole of the county of Hereford lies within the basin of the Wye.

The Lizb. rising in Radnorshire, enters Herefordshire near the town of Leadbeut, and after passing that town takes a more southerly course through Luguwardine, a village about three miles from Hereford, to Mordiford, near which place it falls into the Wye. Barges are sometimes navigated for the show-place between Mordiford and Luguwardine Bridge. The river is not broad, and its banks are generally steep. Trout are plentiful, but salmon are rarely taken in this stream.

The Ten are likewise rises in Radnorshire, enters Herefordshire near Brompton Bryan, and is a most beautiful woods and castle at Downatton crosses the border into Shropshire. At Ludlow it again enters Herefordshire, which it finally quits near Burford, and falls into the Severn near Tenbury. It is abundantly stocked with excellent trout and greyling.

The Arrow rises in the Radnorshire hills to the west of Kington, and passing through that town takes an easterly direction, until it falls into the Lugg, not far below Leominster. In this little stream there is excellent sport for fishermen.

The Bromme rises near Wolverseh in the hundred of Browsh and falls into the Lugg at Hampton Bishop: the stream is small, but liable to be greatly swollen by floods.

The Leddon, also a small stream, rises in Radlow hundred above Bosbury, passes through Ledbury and becomes tributary to the Severn.

The Doyer rises above Dorset, drains the fertile valley called the Golden Valley, and falls into the Munnnow near Pomtrili.

The Munnnow rises in the Hatterell Hills, and after receiving several tributary brooks falls into the Wye near Monmouth. Trout abound in all these streams, but are seldom of very great weight.

Cinale. The town to the navigation of the Wye two canals have been formed through portions of this county for the conveyance of coal and other heavy goods. At the end of the last century acts of parliament were obtained for making a canal from Hereford to the Severn near Gloucester, and for a canal from Stourport to the town of Kingston. Want of funds has prevented the completion of both these schemes; the Gloucester canal has been brought no farther than Ledbury. The canal projected from Stourport to Kingston has never reached.
either terminus, but a portion of the intermediate space from Leominster through Tenbury to the neighbourhood of the Abberley Hills has been completed. In both these canals the supply of water is deficient.

Roads.—The principal turnpike roads are, from Hereford to Ross, 14 miles; Hereford to Ledbury, 15; Hereford to Hay, 20; Hereford to Kington, 19; Hereford to Abergavenny, 24; Hereford to Monmouth, 20; Hereford to Leominster, 13; Hereford to Ludlow, 24; Hereford to Bromyard, 14.

Not many years ago the roads in this county were proverbially bad; now their surface is generally good, and on the chief lines the ascents have been rendered easier, either by diversions or cutting. The Cheltenham and Aberystwyth mail coach used to strike through a wood half a mile west of Hay, and then strike to Kington; the Gloucester and Caermarsen mail passes through Ross; and the Worcester mail to Kington travels by way of Bromyard and Leominster. A mail which lately ran from Bristol to Liverpool through Monmouth, Hereford, Leominster, and Ludlow, has lately been discontinued between Liverpool and Hereford, passengers and letters from Bristol being more expeditiously carried by way of Birmingham and the Grand Junction Railway. The parish roads are often inexcusably neglected. No railway has yet been constructed in this county on which steam-power is applied. The present amount of traffic and travelling rendered seems sufficient to justify the employment of railwayドレス corn, coal, &c. have been constructed from Abergavenny to Hereford, and from Brecknock through Hay and Eardisley to Kington and the neighbouring time-rocks and stone-quarries on the borders of Radnorshire. The benefits derived from both these railways have not yet been sufficiently felt. The Abergavenny and Kington Railway has been rendered certain and its price lowered from about 30 to 15 shillings a ton; an easy transport is also afforded from Hereford to Ironbridge, whence iron is received in return. The Brecknock rail and road also lowered the price of coal in the district through which it passes, and tended greatly to the improvement of the turnpike roads by conveying a tract deficient in roadstone an excellent substitute for it, in the form of a well-distributed formation, at the foot of which the railway has been carried.

Climate.—The climate of Herefordshire varies greatly, according to the elevation and exposure. The neighbour Bhogeston Ends in the north, and the eastern part is a continuation of the valley of the River Wye, being a continuation of the valley of that river, and is of great extent. The soil is generally of good quality, and the whole county is welladapted for agriculture. The land is chiefly occupied by small, level fields, and the cultivation is chiefly by small tenants, whose united ages exceed 1000 years. (Gough's Camden.)

Geology.—The chief observable the whole of Herefordshire consists of strata of geologically old red sandstone, a formation of great thickness, which has been subdivided in the following manner:—1. red conglomerate and sandstone without organic remains; 2. cornstone and argillaceous marls containing fragments of undescribed genera, as in the northern and central parts of the county; 3. flaggy micaceous tilaceous, containing a small number of fossils, as seen in the neighbourhood of Downton Castle.

This tough of sandstone is not infrequently broken through by igneous rocks, or materially lifted or covered by their action. On the eastern side, the mean direction of the strata, as determined by the outline of the trap and of the escarpments of the northern and Midland Mountains, is north-south. But there are many aberrations from that direction, and immeasurable local disturbances, curvatures, and faults. In the neighbourhood of Eastnor Park, three of the granite outcrops and perpendicular cliffs, which they are, are so persistent in Cader, Llanvair-y-Cwm, and Millen, whose united ages exceed 1000 years. (Gough's Camden.)

Orchards are numerous, and not confined to any particular district. The labour of picking a quantity of apples and converting the osier into cider is an extensive and necessary occupation from four to seven shillings; these form a hoghead of cider, which is sold at from 30 to 42 a gallon, according to the quality and abundance of the crop; in ordinary years, the price varies from 40 to 42 a gallon. An orchard of 100 good-trees produces a good quantity of cider, as many as 12 hogheads an acre. Under the article Cider an account of its manufacture and treatment may be found. The highest wages paid to agricultural labourers are nine shillings a week; in the northern and western parts of the valley of the Wye in Herefordshire are some of the most extensive and fertile districts in the county.
6. Kingston stands upon the Arrow in the hundred of Huntingdon, 19 miles north-west of Hereford, 40 miles from Worcester, and 132 from London. The market, which is generally supplied with poultry and eggs from the county of Wales, is held on Wednesday; 7. Woolly, in Stretford hundred, is situated 13 miles from Hereford. The town has declined, and now weekly is held. Many of the houses are extremely picturesque, and the church has considerations. It was formerly a borough in the power of the marquis of Bath, and returned two members to parliament; no charter of incorporation is known, neither does the borough appear to have been governed by any municipal officers

The principal villages are Eardisland, Eardisley, Pembridge, Shobdon, Wigmore, Leintwardine, Onlin, Brimfield, Cradley, Mordiford, Abbey Dore, Malley, Letton, and Lynhales. The principal benefits are—

<table>
<thead>
<tr>
<th>Borough and Parish</th>
<th>Houses</th>
<th>Males</th>
<th>Females</th>
<th>Gross Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hereford</td>
<td>1150</td>
<td>886</td>
<td>1996</td>
<td>2044</td>
</tr>
<tr>
<td>Hereford</td>
<td>64</td>
<td>172</td>
<td>172</td>
<td>342</td>
</tr>
</tbody>
</table>

- Bromyard, 1st portion
- Borough of Hereford
- 533

- Cradley
- 927

- Kington (with chapels)
- 686

- Ross
- 181

- Whittlebury
- 533

- Lugwardine
- Dean and Chapter
- 929

- Woolhope
- 644

- Upton Bishop
- 708

- Shobdon
- Lord Buteman
- 764

- Kingland
- Wm. Evans
- 800

The churches of Kilpeck and Moccas are accounted the oldest in the county; the most distinguished for architectural beauty are those of Ledbury, Leominster, Hereford, Malvern, Pembroke, Malley, Burghill, Abbey-Dore, and Kilpeck. The principal gentlemen's residences are, Eastnor Castle, a modern building of great size, and of considerable beauty, situated near Ledbury; Hon Lacy, which belonged to the late Duke of Norfolk, now the property of the Hon R. H. Granville; Hampton-Court, which was sold by the present Earl of Exe to Mr. Arkwright, who is making extensive alterations under the direction of Mr. B. H. Physick, the architect, and has given a great deal of attention to the gardens. The castle of Hereford, which is one of the oldest in the country, is inhabited, and has a large extent of land, and a large number of eggs and excellent poultry is sent to the market in Kington, and sold to dealers who forward them to Cheltenham, Gloucester, and other large towns.

The county eight and seven, and in winter as little as six shillings a week are given; the addition of cider is allowed by all farmers in the summer, and during winter is a large portion of their earnings in 'drink' to being paid wholly in money. The wives and families suffer from the practice, but are not generally averse to it; they think the cider a luxury due to the winter months, and are ignorant of the injury to the crop. From two to four quarts of cider is the usual daily allowance; in harvest time the quantity is unlimited, and food added to it, but the money wages are not raised; some labourers as at the season will drink ten or even twelve quarts of cider in a day.

The prevalent breed of cattle is that for which this county is justly celebrated; their colour is red with white or black spots, and move about white along the back and above the legs. Good milers are occasionally found among the cows, and it is possible that a race might be reared from this stock that would be useful for the pail, but dairy farming is never practised here, and the milk of the cows, which are kept only for the purpose of breeding, is given to the calves. It was formerly the custom to work the oxen at three and four years old, and to feed and send them to market at five, but their inefficiency as beasts of draught, their high price, and an enormous return of the older oxen, and the slow return of capital, have caused a complete change of system: the oxen are no longer worked, but are commonly fed when they are two years old, and sent to market before they are three months old. The Hereford ox feeds more readily than the Devon (see 'Cattle,' 'Library of Useful Knowledge,' p. 32): and in proportion to the quantity of food consumed lays on a greater weight of flesh than a Devon. In a trial of a week or two, it may be seen in 'Cattle,' p. 34. That the flesh of the Hereford is of a finer quality than the Durhams, is proved by the superior price per stone which it obtains in Smithfield market.

The usual breed of sheep is a cross between the Leicester and the Ryeland, which is found to succeed better than the pure Leicester or Southdown; the pure Ryelands are extinct. Welsh mutton may be procured in most of the country towns. Agricultural horses of average quality are bred in considerable number. The northern part of the county bordering upon Radnorshire and Shropshire produces many useful riding and cart horses, which are highly valued. After Oxford and London and other dealers: they are highly bred, compact and active; an inferior race, fine in the bone, long in the joints, and generally with bad action, is found throughout the rest of the district. Pig and poultry are produced with great facility from Wales, where a large supply of eggs and excellent poultry is sent to the market in Kington, and sold to dealers who forward them to Cheltenham, Gloucester, and other large towns.

**Political Divisions:**—Herefordshire is divided into the eleven following hundreds:—Bromyard, Grimsworth, Great Ycre, Ewyas Lacy, Huntingdon, Radlow, Stretford, Weobley, Wormion, Wigmore, and Wolpate. These contain 221 parishes, and seven market-towns. 1. The town of Bromyard, situated in the north-east of the county, is in the hundred of Bromyard, the market-day is Monday, the distance from Worcester 14 miles, from London 125; 2. Hereford has been probably described by the inhabitants on the banks of the Wye, 14 miles below Hereford, in the hundred of Great Ycre, the distance from Gloucester is 17 miles, from London 129; the market-day is Thursday; 3. Leubey is in the hundred of Radlow, 13 miles from Hereford, 15 from Gloucester, and 16 from Worcester; the town has lately been improved by the removal of some houses which impeded the thoroughfare of the principal street; the market-day is Tuesday, which is the first Thursday after the river Lug, is situated in Wolpate hundred, 13 miles from Hereford, 26 from Worcester, and 132 from London. It is a borough and corporate town, returning two members to parliament; the church is the market place old, but in an inconvenient situation; the market-day is Friday. Several considerable cattle-fairs are held, and an agricultural society has lately been established here. The following statement respecting this borough is extracted from the population returns—

- Poor Law Unions have been formed, and workhouses
been altered or not erected at Hereford, Bromyard, Leominster, Ledbury, Kington, Ross, and Wobley; parishes belonging to this county have been included in the following unions, of which the centres are in other counties:—Abergavenny, Hay, Knighton, Ludlow, Monmouth, Newent, Presteigne, and Tenbury. The greater part, if not the whole, of Herefordshire, was comprised in the territory of the Silures, and was conquered by the Roman general Julius Frontinus, about A.D. 73. A list of Roman and British places, some of which were the king's foundations, from the Malvern Hills to Whitbourne, Thornbury, Croft, Brandon (near Leintwardine), and Cowlell Knoll (near Brampton Bryan). There are also traces of a camp on the east of Leintwardine, near the river, and of the remains of the old station belonging to the Roman localities of Magna and Arictonum, two Roman towns, which were probably comprehended within the present limits of this county; one of them doubtless was at Kenchestr. The Roman road called Watling Street entered the county near Brandon, passed through Wigmore to Kenchestr, and thence by way of Kingston and Dore to Abergavenny in Monmouthshire. A second Roman road traversed a small portion of the south of this county near Ross; a third entered it from Worcester, and passing Frome-hill, Stretton Grandison, Lugbridge, Holmer, and Stretton Sugwas, reached Kenchestr. Entrenchments exist, or are recorded to have existed, at each of these places.

During the Heptarchy, Herefordshire belonged to Mercia, and in 680 a synod was held at Hereford. This city was the principal town of Mercia in the time of Offa, whose palace was situated at Sutton, about three miles from the present city, and the king of the East Angles, whilst at the court of Offa, as a suitor to his daughter, enriched the town and increased its importance by the attraction of a number of pilgrims to his shrine, where miracles were wrought. The first pilgrimage of Offa to Rome, whither he went to expiate his crime, he consented to subject his kingdom to the payment of Peter's pence.

The Welsh, having previously obtained a temporary possession of the kingdom of Mercia, regained it about A.D. 819, and appointed Cenoloch king. Cenoloch was defeated by Alsir, king of the West Saxons, whose successor Ethelbert held the seven principalities into one monarchy. In 912 the Danes made an invasion upon the banks of the Wye, which they had navigated from the Severn, and seized the bishop of St. David's, then resident in Anehenfield. King Edward paid 400 for the ransom of the bishop, and, having attempted a landing at Lelijke near Ley Castle; his adherents Hugh de Spenser, Baldwin, and Reding, were executed at Hereford. In the following reign Lord Mortimer with many other of the principal barons and baronets marched against the Welsh, led by his cousin, Sir Richard Pembridge, and Sir Guy de Bryan, received as a reward for their military services the newly instituted order of the Garter, and Edward III., the whole of England was disturbed through the insubordination of the barons, but the insecurity of the Marches was increased by the neighbourhood of the troops of the Welsh Prince Llewelyn, who had been concealed by several powerful allies; the lands of the Marchers were ravaged and many other outrages committed. During the troubled times of Edward III., Herefordshire was the scene of many executions. The king, who had been captured in Caerleon, was brought to the Castle of Hereford, and, being subjected to continual inroads from the Welsh. A considerable part of the county was included in the 'Marches,' a term used to express no definite portion of country, but the land which the Welsh was wont to roam through, varying from time to time according to their respective successes.

In the time of Edward the Confessor such an invasion is recorded; Giffith, a Welsh prince, aided by Algar, a baron of Hereford, invaded the Marches; the king, with forces from Hereford, within two miles of this city. Seven of the canons were killed in the engagement; the town and cathedral were fired, the walls were levelled, and the marauders retired to Wales loaded with the spoils of their rich neighbours (1065). Edward sent Harold to subdue the Welsh, and Hereford was invested and fortified; in the end a treaty was concluded. The violation of this treaty by the Welsh induced Harold, after he became king to march against them and put down their power upon their territory; after reducing them to great extremities he made an ordinance that if any Briton was found on the English side of Offa's dyke (an artificial boundary which in part of its great length has been traced through the county of Hereford), his head should be cut off by the king's officers. In spite of these and other severe exactions, attempts continued to be made upon the persons and property of the Marchers. Edric, son of the earl of Hereford, and the earl of Salisbury, having been driven from the lordship of Brecknock, also suffered the same fate. In a second expedition Edric was more successful; with two Welsh princes for allies he ravaged the county as far as the bridge of the city, and returned with the spoils of great magnitude. The survey commenced in Domesday book was commenced thirteen years after this period, and completed in six years. Mr. Duncumb's 'History of Herefordshire' (vol. i., 60-62), contains a list of hundreds and other divisions into which this county was at that time divided, together with the modern names of such districts, as far as they can be ascertained. Two of these proprietors, the earl of Hereford and Lord Mortimer, in the first year of William Rufus, joined Odo, bishop of Bayeux, in an insurrection, and laid waste parts of the counties of Gloucester and Worcester. The oppressions of the Norman lords and the loss of the Norman castle gave the English subjects just cause of complaint. The king raised an army and besieged the insurgents, who had retired to Powesey. The result was that Odo consented to leave the country, and William Rufus allowed the complaints and grievances which were complained of. The king granted many lands in Wales to knights and others of the English and Norman nobility, and to the Mortimers and Lacy barons amongst those of the old family of Hereford. The sequence of the grants, and for their security, many castles were soon afterwards erected. Upon the borders hostilities commenced between the new possessors and the Welsh. With a similar intention of repressing the Welsh, a colony of Flemings, driven from their own country by an irruption of the sea, were established in Pembrokehire by Henry I. Notwithstanding these precautions hostile inroads upon the Marches still occasionally took place, but no event occurred which immediately affected this county, until the crown of England was in dispute between Stephen and Maud, the daughter of Henry I. The Earl of Worcester, who was the chief of the Welsh adherents, first appeared in Hereford, but soon quitted it, and the castle of Wobley, which had been garrisoned against Stephen, was totally demolished. Stephen afterwards invaded the city of Hereford, but the result of this enterprise was the destruction of the system. The demolition of castles enforced by Henry II., in order to limit the power of his barons, had no very beneficial effect on the security of Herefordshire: in some instances a temporary resistance was made to the king's command. These garrisons being destroyed, the Welsh, who had for a long time lived in comparative tranquillity, recommenced their depredations, which were not quelled until an English army had been raised against them. In the reign of Henry III., the whole of England was disturbed through the insubordination of the barons, but the insecurity of the Marches was increased by the neighbourhood of the troops of the Welsh Prince Llewelyn, who had been concealed by several powerful allies; the lands of the Marchers were ravaged and many other outrages committed. During the troubled times of Edward II., Herefordshire was the scene of many executions. The king, who had been captured in Caeerleon, was brought to the Castle of Hereford, and, being subjected to continual inroads from the Welsh. A considerable part of the county was included in the 'Marches,' a term used to express no definite portion of country, but the land which the Welsh was wont to roam through, varying from time to time according to their respective successes.

In the time of Edward the Confessor such an invasion is recorded; Giffith, a Welsh prince, aided by Algar, a baron of Hereford, invaded the Marches; the king, with forces from Hereford, within two miles of this city. Seven of the canons were killed in the engagement; the town and cathedral were fired, the walls were levelled, and the marauders retired to Wales loaded with the spoils of their rich neighbours (1065). Edward sent Harold to subdue the Welsh, and Hereford was invested and fortified; in the end a treaty was concluded. The violation of this treaty by the Welsh induced Harold, after he became king to march against them and put down their power upon their territory; after reducing them to great extremities he made an ordinance that if any Briton was found on the English side of Offa's dyke (an artificial boundary which in part of its great length has been traced through the county of Hereford), his head should be cut off by the king's officers. In spite of these and other severe exactions, attempts continued to be made upon the persons and property of the Marchers. Edric, son of the earl of Hereford, and the earl of Salisbury, having been driven from the lordship of Brecknock, also suffered the same fate. In a second expedition Edric was more successful; with two Welsh princes for allies he ravaged the county as far as the bridge of the city, and returned with the spoils of great magnitude. The survey commenced in Domesday book was commenced thirteen years after this period, and completed in six years. Mr. Duncumb's 'History of Herefordshire' (vol. i., 60-62), contains a list of hundreds and other divisions into which this county was at that time divided, together with
Leominster, Lynmouth, Monkland, Shobdon, Titley, Wigmore, and Wormsley. The statement of Tanner is slightly at variance with that of Mr. Duncoum: in his "Notitia Monastica," an account of these religious houses may be referred to. After the death of Henry VIII, no event of immediate local importance occurred in the district that we are treating of until the period of the civil wars; at this time, notwithstanding the great complaints that the tax of ship-money had in this inland county, the greater number of the principal families engaged on the part of the king; on the side of the parliament were those of Harley, Birch, Hereford, Westfaling, Hardwicke, &c. The city of Hereford was garrisoned for the king, but was surrendered without resistance to the parliamentary army under Sir William Waller. It was soon evacuated and again garrisoned in the royal cause under the command of Lord Sandamore, by whom it was resolutely defended. After the battle of Naseby the king marched to the relief of Hereford, and the Scotch army raised the siege. In the course of the year 1646, the city was taken by surprise, and the whole county was reduced by detachments in the interest of the parliament, under the command of Sir William Waller and Colonel Birch. Colonel Birch was appointed governor, and his regiment increased to 1200 men. During the period of his concealment, Charles II. more than once passed through different portions of this county. The castle, which was greatly out of repair, was soon afterwards sold by order of the parliament. The keep has since been levelled, and no part of the walls remain: the site of those enclosed the larger castle is now converted into a public walk.

The following is an alphabetical list of the counties which have existed in this county; in some instances the ruins are still visible, in others the demolition has been complete.—


The only druidical remains is a pile of stones called Ar-thur's Stone, situated in the parish of Dorstone.

The county was divided into the hundreds of Broxash, Ewyas-Lacy, Greytree, Grimsworth, Huntingdon, Radlow, Stratford, Weoblee, and Wolvey.

The population of Herefordshire at each of the four enumerations made in the present century was—

<table>
<thead>
<tr>
<th>Year</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
<th>Increase per cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801</td>
<td>43,836</td>
<td>45,236</td>
<td>89,072</td>
<td>65.9</td>
</tr>
<tr>
<td>1811</td>
<td>51,532</td>
<td>55,838</td>
<td>107,370</td>
<td>20.1</td>
</tr>
<tr>
<td>1821</td>
<td>58,373</td>
<td>55,373</td>
<td>113,746</td>
<td>5.9</td>
</tr>
<tr>
<td>1831</td>
<td>63,728</td>
<td>62,728</td>
<td>126,456</td>
<td>11.9</td>
</tr>
</tbody>
</table>

The present population of Herefordshire may be considered as entirely an agricultural county. In 1811 it ranked the second on the list of agricultural counties, in 1821 the third, and in 1831 the fourth. No manufacture worth notice exists in the county. Of 29,342 males twenty years of age and upwards living in the county in 1831 only 462 were employed in manufactures, about 40 of whom were engaged in making hats and gloves in Leominster; and 16,397 were occupied in agricultural pursuits.

The following table contains a summary of the population, &c., of every hundred, as taken in 1831.—

**Summary of the County of Hereford.**

<table>
<thead>
<tr>
<th>HOUSES.</th>
<th>OCCUPATIONS.</th>
<th>PERSONS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhabitants</td>
<td>Families in Agricultural services</td>
<td>Males</td>
</tr>
<tr>
<td>Broxash Hundred</td>
<td>2,315</td>
<td>2,322</td>
</tr>
<tr>
<td>Ewyas-Lacy</td>
<td>672</td>
<td>671</td>
</tr>
<tr>
<td>Greytree</td>
<td>2,374</td>
<td>2,305</td>
</tr>
<tr>
<td>Grimsworth</td>
<td>1,430</td>
<td>1,532</td>
</tr>
<tr>
<td>Huntingdon</td>
<td>1,163</td>
<td>1,175</td>
</tr>
<tr>
<td>Radlow</td>
<td>2,540</td>
<td>2,723</td>
</tr>
<tr>
<td>Stratford</td>
<td>1,706</td>
<td>1,808</td>
</tr>
<tr>
<td>Weoblee</td>
<td>1,779</td>
<td>1,908</td>
</tr>
<tr>
<td>Wolvey</td>
<td>1,101</td>
<td>1,180</td>
</tr>
<tr>
<td>Worthen</td>
<td>2,644</td>
<td>2,667</td>
</tr>
<tr>
<td>Hereford, City</td>
<td>2,069</td>
<td>2,275</td>
</tr>
<tr>
<td>Militia under Training.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>21,907</td>
<td>23,665</td>
</tr>
</tbody>
</table>

**County Expenditure, Crim. &c.—** The sums expended for the relief of the poor at the four dates of—

<table>
<thead>
<tr>
<th>Year</th>
<th>£</th>
<th>£</th>
<th>£</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801</td>
<td>46,471</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1811</td>
<td>82,991</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1821</td>
<td>62,726</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The amount expended was—

- For the relief of the poor £ 60,923 6
- In suits of law, removal of paupers, &c. 434 9
- For other purposes £ 9,061 6

In the returns made up for subsequent years, the descriptions of property assessed are not specified. In the years 1834, 1835, 1836, and 1837, there were raised 67,262/.
of depositors and amount of deposits on the 20th of No
vember in each of the following years were—

<table>
<thead>
<tr>
<th>Year</th>
<th>1832</th>
<th>1833</th>
<th>1834</th>
<th>1835</th>
<th>1836</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depositors</td>
<td>3,875</td>
<td>4,087</td>
<td>4,582</td>
<td>4,793</td>
<td>5,197</td>
</tr>
<tr>
<td>Amount of deposits</td>
<td>£117,127</td>
<td>£118,484</td>
<td>£129,104</td>
<td>£132,773</td>
<td>£145,542</td>
</tr>
</tbody>
</table>

The various sums placed in the savings' banks in 1835 and 1836 were distributed as under:

<table>
<thead>
<tr>
<th>Year</th>
<th>1835</th>
<th>1836</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposits</td>
<td>£20,755</td>
<td>£21,527</td>
</tr>
<tr>
<td>Of which</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Returns</td>
<td>1,224</td>
<td>1,462</td>
</tr>
<tr>
<td>Deductions</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>Balance</td>
<td>270</td>
<td>100</td>
</tr>
<tr>
<td>Interest paid</td>
<td>7,500</td>
<td>10,000</td>
</tr>
<tr>
<td>Reserve</td>
<td>15,000</td>
<td>17,000</td>
</tr>
</tbody>
</table>

**Education.**—The following summary is taken from the Parliamentary Returns on Education, made in the session of 1835:

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
<th>Male</th>
<th>Female</th>
<th>Sex not specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools</td>
<td>334</td>
<td>2,448</td>
<td>2,482</td>
<td>2,923</td>
</tr>
<tr>
<td>Schools</td>
<td>144</td>
<td>2,335</td>
<td>2,727</td>
<td>2,592</td>
</tr>
<tr>
<td>Sunday-schools</td>
<td>8,815</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of children at such schools; ages from 4 to 15 years:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2,335</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2,727</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex not specified</td>
<td>2,592</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If we assume that the whole population has increased since 1831 in the same ratio as it did the 10 years proceeding that date, and also that the population between the ages of 2 and 15 has preserved the same relative proportion to the whole population as it did when ascertained in 1821, then we obtain 37,903 as the approximate number of children between the ages of 2 and 15 in this county in 1834, when the educational inquiry was made. Thirteen Sunday schools are returned from places where no other school exists, and the children (437 in number) who are instructed therein cannot be supposed to attend any other school; at all other places Sunday-school children have opportunity of resorting to other schools also; but in what number or in what proportion duplicate entry of the same children is thus produced must remain uncertain. Thirty-nine schools (containing 1397 children) which are both daily and Sunday schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. Allowing for a number of children having thus been entered twice as an under-instruction, it may perhaps be fairly estimated that little more than one-third of the children between the ages of 2 and 15 are receiving instruction in this county.

**Maintenance of Schools.**

<table>
<thead>
<tr>
<th>Description of Schools</th>
<th>Number of Pupils</th>
<th>Staff</th>
<th>Annual Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Schools</td>
<td>327</td>
<td></td>
<td>£1,875</td>
</tr>
<tr>
<td>Sunday Schools</td>
<td>144</td>
<td></td>
<td>£1,120</td>
</tr>
<tr>
<td>Total</td>
<td>471</td>
<td></td>
<td>£2,995</td>
</tr>
</tbody>
</table>

The schools established by dissenters, included in the above statement, are—

<table>
<thead>
<tr>
<th>School</th>
<th>Number of Pupils</th>
<th>Staff</th>
<th>Annual Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Island Schools</td>
<td>75</td>
<td>55</td>
<td>£1,307</td>
</tr>
<tr>
<td>Daily Schools</td>
<td>12</td>
<td>8</td>
<td>£1,290</td>
</tr>
<tr>
<td>Sunday Schools</td>
<td>20</td>
<td>5</td>
<td>£1,283</td>
</tr>
</tbody>
</table>

Total | 85 | 64 | £3,880 |

X 2
HERETICS. The term 'heresy' (from Greek, "a choice") was originally used to express any opinion which a man adopted. Thus it was applied to the philosophic sects of Greece and Rome. Cicero, Paradoxorum. In the New Testament the term often simply denotes a religious sect, without implying any censure. (Acts, v. 17; 2 xvi. 5; xvii. 30; xxvii. 22.) Josephus calls the three great Jewish sects 'heresies.' (Antiq. Jud. xiii. c. 5, s. 5.) But it is also used in the New Testament as a term of reproach. Thus it was applied to the Jewish parties among the apostles: 1. The Ebionites and Nazarenes, who, upon embracing Christianity, adhered to many Jewish opinions and ceremonies. 2. The Gnostics, who, engraved upon the Christian religion certain opinions of the Greek and Oriental philosophy. Some however regard the Ebionites as a sect of Gnostics.

Most of the heresies of the first two centuries related to the creation of the world, the origin of evil, the person of Christ, and the connection between Judaism and Christianity; and some of these sects were included under the term 'heresy.' 1. The Ebionites and Nazarenes, who, upon embracing Christianity, adhered to many Jewish opinions and ceremonies. 2. The Gnostics, who, engraved upon the Christian religion certain opinions of the Greek and Oriental philosophy. Some however regard the Ebionites as a sect of Gnostics.

Both these heresies are supposed to have commenced in the Apostolic age, and to have referred to the writings of St. Paul and St. John. (Heretici; Gnostici.) The Gnostics appear to have been very early divided among themselves concerning the respect which ought to be paid to the Mosaic law, and a new sect was formed by a Jewish Gnostic named Cerinthus. (Cerinthus.) The Nicolaitans mentioned in the ' Apocalypse' (vi. 6, 15) are supposed to have been a sect of Gnostics, and some identify them with the Cerinthians. About A.D. 121, Valentine, an Egyptian, engraved some opinions of his own upon Gnosticism, and founded a new sect. His party was strongly opposed by Irenaeus and Tertullian. Another sect which took its rise from the opinions of the Gnostics was that of Cerdo and the more celebrated Marcion, who began to propagate their tenets at Rome about A.D. 130. The principal feature of this heresy was the adoption of the Oriental belief that there were two gods, the one good and the other evil. The principal followers of this Marcion or Leucici, and Apelles. About A.D. 172, Bardesan and Tatian gave rise to a new sect of Gnostics, which was chiefly distinguished by the practice of ascetic discipline. These people were called, from their habits of abstinence, Encratites, Hydroparastases, and Apatoparastates. The Docetae were a sect of Gnostics who sprang up very early. They held that the body of Christ was immaterial, and that He did not suffer on the cross, but only appeared to die. Several minor sects of Gnostics are mentioned by ancient writers, such as the Adamites, the Caeinites, the Sethians, and the Ophians, an account of which is given in Lardner's History of Heresies. He doubts the existence of such sects as the Adamites and Caeinites. The sect of Ecdeltics, or New Platonists, was founded at Alexandria in the second century; but though its tenets were embraced by many Christians, it is rather considered as a philosophical than a Christian sect. (Ecdeltics.)

We now come to the heresies which existed from a very early age respecting the divinity of Christ. This doctrine of the divinity of Christ was first proclaimed by the Ebionites. (Ebionites.) About the end of that century Praxeus founded a new sect. Denying the doctrine of the Trinity, he held that the divine nature was intimately united with the person of Christ, whom he considered as a mere man, but born of a virgin. His followers were called Monarchians, from their rejecting the doctrine of the Trinity; and Patricians, because they were supposed to believe that the Father suffered on the cross: this opinion however they seem to have disclaimed. In the opinions of Praxeus ecclesiastical historians trace the germ of the Sabellian heresy. His chief antagonist was Tertullian. His opinions were held, with slight variations, by the Gnostics, and by Theodotos. The heresies of this age respecting the creation of the world were that of Hermogenes, who believed in the eternity of matter.

The Montanists, who arose in Phrygia about the year 170 (some say 167), are considered as not having been as fanatic as heretics. Their leader Montanus claimed the character of a prophet: he appears to have differed from the orthodox in no leading doctrine, but only in some points of discipline, and his attempts perhaps to the circumstance that they were embraced by Tertullian. (Tertullian.) We find traces of this heresy down to the time of Augustin and Jerome. Some inconstant writers considered them as having formed a sect connected with the rites and ceremonies of the church, such as the Artorituates and others. (Communio.)

In the third century Gnosticism still had adherents, though it was suffering from diacritical. But a new heresy arose out of the Oriental philosophy, headed by Manes, who attempted to unite the doctrines of the Persian Magi with those of the Apostles. (Manichæans.) The controversy on the Trinity and the person of Christ continued with increased bitterness. About the end of the third century the doctrines of Praxeus were revived, with slight variations, by Novitus of Smyrna, Sabellius, an African bishop, and Beryllus, an Arabian. The last two were opposed by Diocletianus and Eucharius of Asia Minor. A heresy relating to the same subject was established by Paul of Samosata, bishop of Antioch. A new sect of Ebonites, or Jewish Christians, appeared about the middle of the third century, but it lasted only for a short time. They were called Eclesiastes, from their founder Elias. The Novatians, followers of Novatian, a presbyter of Rome, are reckoned, perhaps erroneously, among the heretics of this century. They held no doctrine different from those of the Catholic church, but maintained a greater severity of discipline; and hence they were called Puritans (sacrophos). By some historians they are regarded as austere and turbulent Schismatics, and were considered as the earliest sect of reformers in church discipline.

In the fourth century the attention of the church was chiefly occupied with the Arian controversy [Arians; Status]. Out of these disputes other heresies arose, distinguishing the person of Christ, such as those of Arelinares, Marcellus, Photinus, and Macedonius. Near the end of this century we find a new sect of Gnostics in Spain, under the name of the Priscillianists. The Donatists, who were accused of persecuting their adversaries in the pulpit, are rather to be classed with schismatics than with heretics. (Donatist.) For an account of certain minor sects in the fourth century, see Epiphanius, De Heresibus. At the beginning of the fifth century the Pelagian controversy arose. (Pelagians.) The disputes concerning the Trinity and the person of Christ continued to give rise to new sects, the chief of which were the Nestorians and their opponents the Eutychians, or Monophysites. (Eutych-
The controversy of these sects with the orthodox, and each other, continued for nearly 300 years, during which period various minor sects, such as the Monothelites [Eutychians], the Anthropomorphites (who maintained, from Genesis, i. 27, that God had a human shape), and others.

The range of the monastic system in this century was warmly resisted by Vigilantius, who thus incurred the enmity of Jerome, and has been ranked among the heretics.

In the sixth century the Monophysites continued to branch out into many sects. The question, whether the body of Christ was corruptible or incorruptible. Other minor sects are mentioned by Mosheim. (Ecc. Hist., vol. ii.) After this time most of the antient sects remained in existence in different parts of the Christian world. The heretick sect which requires a distinct notice is that of the Paulicians, which was formed in Armenia and Cappadocia in the seventh century. After suffering severe persecutions they were dispersed over Europe, in various parts of which they formed settlements about the eleventh century. The origin of the Albigenses is traced to a body of Paulicians which settled in France. [Albigenses.] The doctrines of the Paulicians have been identified by some with those of the Manichaeans, while others regard them as reformers of the corruptions of the church. (Vaughan’s Life of Wycliffe, Intro’d, c. ii.) The history of later sects merges in that of the Reformers.

(Philippinus, De Heresies; Lardner’s History of Heretics; Gibbon’s Roman Empire; Mosheim’s Ecclesiastical Empire; Neander’s Kirchengeschichte.)

HERIODES, a genus of Hymenopterous insects of the family Apidae. Distinguishing characters—body elongated, slender, almost cylindrical, that of the males with a small cavity beneath the apex; mandibles triangular; maxillary palpi two-jointed.

The little bees belonging to this genus, we are informed by Latreille, make their nests in holes in old trees; we presume that, as in the genus Chelostoma, the holes are made by the entrance of the female, and the entrance of the male is barred until the young are large enough to leave the nest. (Hermidae Canumpanum, a species very common in various parts of England, is about a quarter of an inch in length, of a black colour, and sparingly covered with greyish hairs. This little bee is by far the smallest British species known of the family to which it belongs; it is common during the summer and autumnal months in the flowers of the various species of Campanula, and apparently is never found in the flowers of any other genus of plants. The males of this species are but little distinguished from the females by the color of the body of the latter, and their wings are then doubled, so that the tuheler with which its base is armed fits into the cavity near the anus. (See Kirby’s Monographia Apum Angliae, vol. ii., p. 250.)

HERIOT, a feudal service consisting in a chattel rendered to the lord on the death of a tenant, and in some cases upon alienation of a tenant. It is stated to have originated in a voluntary gift made by the dying tenant to his lord and chieftain of his horse and armour. (Glanville.) This render became first usual, then compulsory; and at an early period we find the antient military gift sinking into the render of the best animal (at the election of the lord) possessed by the tenant, and sometimes a dead chattel, or a commutation in money. (Bracton; Flata; Coke-Elit.)

Hertis are either heriots-custom or heriots-service. Where a heriot is due from the dying tenant by reason of his filling the character or relation of tenant within a particular seigniory, honour, manor, or other district, in which it has been usual from time immemorial to make such render upon death or alienation, it is called heriot-custom: heriot-service is a heriot due in respect of the estate of the tenant in the particular land held by him. For a heriot to be held by lease, the tenant must be governor of an heriot; the selection of the best animal is however with the lord, he may determine his choice by an actual seizure, upon which the property in the animal will vest in the lord by the mere act of seizing it.

But for heriot-service the lord may either seize or distress the property as by this set of selection the property is vested in him by way of heriot, because, the land being the debtor, the lord may, by the coercion of a distress upon that land, compel the succeeding tenant to deliver or procure the delivery of the heriot.

Where the heriot has been created since the time of legal memory, it is called a heriot de location, and sometimes a suit-heriot: if its origin go back beyond the limits of legal memory, it is called a heriot by tenure.

Heriot-custum formerly prevailed very extensively in freehold lands, and the more modern custom of heriot-service, whether customary or otherwise, is still observed in many parts of the county.

Heriot-service may be reserved in respect of a freehold, a leasehold, or a customary tenure; but as, since the statutes of Quia Emptores and Praegnativa Regis, it is probable that no new sub-tenures in fee will be created in future, it has not been usual to reserve heriots upon gifts in tail, or upon the creation of freehold leases for lives, heriot-service in modern times is generally found in connection with long leasehold estates, where, in consequence of some restriction imposed upon the exercise of the leasing power, or in token of respect for ancient usages, this species of render has been retained.

Heriots, whether heriots-service or heriots-custom, are multiplied whenever the land subject thereto becomes divided amongst different tenants holding distinct parts of such lands in severalty. Where therefore land is held subject to a heriot-service to be rendered at the death of a tenant, if the alienation or demise of the tenant occurs, the heriot will be due upon the death of both the alienor and the alienee; and if such distinct heriots have in fact become due and have been rendered or compounded for during the alienation, it will be seen that the lord will have obtained actual seisin of the several heriots, the liability to pay such multiplied heriots will continue, even though all the land should afterwards be reunited, and vest again in the same person.

Inattention to these matters has lately caused some strong and contradictory decisions in the courts of Westminster.

(2 Nevile and Mann, 798.)

A distress for heriot-service must be taken upon the land in respect of the tenure, or upon the demise of which it is reserved; and where double or triple heriot has become payable by reason of alienation, the liability attaches severally upon each of the severed portions of the estate. All goods found upon the land, except such as are privileged to go with the soil, are liable to such distress taken for this reservation (so called a heriot-service, whether they belong to the tenant or to a stranger, such goods being held merely as a pledge for the performance of the service. But where a heriot-service is by the terms of the lease or the charter created for the payment of a rent or rent-charge (or rather, where the reservation of a contingent money payment is improperly designated a heriot), the reservation will be in substance a rent; and therefore the distress and demand taken in respect of the payment of the rent, if not redeemed by payment, or relieved within five days after notice, may be sold as a distress for rent under the provisions of 2 William and Mary, c. 5, § 6.

Heriots were known in England before the complete development of the feudal system which followed up the Norman conquest. The Normans introduced reliefs [Reliefs] without abolishing the antient heriot. The heriots is mentioned and fixed by the laws of Canus, &c. The Dano-Saxon ‘heregeast’ is derived by Spelman, and after him by Wilkins, from heritage (more properly here), army. A more probable derivation would be from the word heri, lord. In Scotland, what the rendering upon the death of the tenant is a pecuniary payment, it is called lord’s money, heriots, or heriots.

HERM, sometimes called Arm and Arm, one of the smaller Channel Islands, lying three miles east of Guernsey, and nine from the coast of France. For a description of Herm, see Guernsey. For a description of Herm, see Guernsey.

Hermann, the Arminius of the Roman historians, the son of Sigiem, chief of the Cherusi, was born about 16 or 17 years b.c. (Cassius.) Being sent in early youth as a hostage to Rome, probably in consequence of the victories of Drusus, who had established the supro-
macy of Rome over the Catti, Cherubni, and other tribes of North Germany; he obtained the favour of Augustus, and was induced among the Roman knights. On his return to his native country, he conceived the project of delivering it from the Romans, whose oppression had become intolerable. Quinilus Varus, a prosaic man, was then the Roman governor of Germany. Hermann pretended to be his friend, while at the same time he kept up a secret understanding with the chiefs of the Catti, Bructeri, and other tribes that lived between the Rhine and the Elbe (Eber). He was on the point of having his object. Hermann offered Varus his assistance in reducing them to subjection, and thus enticed him to advance some distance from the Rhine into the interior. Varus began his march with a large army, and he could not resist, and Hermann served him as a guide through the forests. The Romans were thus drawn into an ambuscade, and found themselves all at once surrounded by numerous bodies of Germans, who were directed by Hermann himself. The Romans fought desperately; but being unacquainted with the localities, and unable to form their ranks owing to the thickets of the forests and the marshy nature of the ground, they remained, in a body, for nearly two days to the massacre of the Germans, who destroyed them in detail. At last, Varus, being wounded and seeing no chance of escaping, ran himself through with his sword, and the other chief officers followed his example. The Romans were entirely destroyed, and the cavalry alone cut their way through the enemy and regained the banks of the Rhine. By this defeat the Romans lost all their conquests beyond that river; and although, as is conjectured, ten years after, Varus carried their remains to the Weser, they never established anything like a solid dominion over those regions. The defeat of Varus occurred, according to various chronologists, in the year 753 of Rome (A.D. 9). The scene of the defeat is conjectured to have been in the country of the Bructeri, near the sources of the Ems and the Lippe. The news of this calamity, the greatest that had befallen the Roman arms since the defeat of Crassus, caused much alarm at Rome. The commanders, to which were entitled the title of Gallicus, who might invade Gaul, were not rewarded. L. Aspasia guarded the banks of the Rhine, and the Germans were too little united among themselves to attack the Empire. Augustus in the following year sent Therius to the Rhine with a fresh army, who does not seem to have effected anything of importance. Hermann meantime quarrelled with Segestes, chief of the Catti, whose daughter Tuseleda he had carried off; and, in a battle that followed, was defeated and killed by the Romans. The story of the death of Hermann was afterwards sung in triumph of Germanicus. Germanicus having reached the scene of Varus's defeat, paid funeral honours to the remains of the legions; but Hermann, who was hovering about his line of march, without coming to a pitched battle, harassed him in his retreat, and occasioned a great loss to Cæcina, the lieutenant of Germanicus. (Tacitus, Annal., 1.) In the following year Germanicus advanced again as far as the Visurgis, or Weser, where he found Hermann encamped ready for battle. A desperate fight took place, in which Hermann, after performing prodigies of valour, was defeated, and escaped with difficulty. When Germanicus, he observed that the Cherusc, Bructeri, and other unsubdued tribes might be left to their own internal dissensions. He seems to have guessed right, for a war broke out between the Danubes and Hermann, who was killed by his own relatives, being accused, as it would seem, of aspiring to absolute dominion. He died at the age of thirty-seven, in the twenty-first year of our era, after being for twelve years the leader and champion of Germany.

**HERMANSTADT.** [Transylvania]
Hermes is usually represented with a chlamys, or cloak; a petasus, or winged cap; talasia, or winged sandals; and a caduceus, or wand, with two serpents twined about it, in his hand.

The Egyptian god Thoth was also called Hermes by the Greeks. His attributes correspond in many respects with those of the Greek deity. According to Plutarch (Sympos. Poec. 258 E), Hermes was associated with the oracles, but his image was not preserved on stone.

The Egyptian Hermogenes, the son of Ptemander, is a well-known name in the history of medicine. He was the inventor of most of the arts and sciences (i.e., p. 159, 41), and among them is the school of gymnastics.

A great number of philosophical and astrological works, purporting to be written by the Egyptian Hermes, were in circulation in the early part of the Christian era; most of them appear to have been written at Alexandria by Gnostic Christians or philosophers of the Aristotelian or of the new Platonic schools. Clement of Alexandria mentions (Strom. iv., p. 630) forty-two works which bore the name of Hermes; and the number became greatly increased. As a work of these is still extant and is entitled, 'Pomander, on the power and wisdom of God.' The Greek text of this work was first published by Turnebus, Paris, 1551. The Latin translation of this Pseudo-Hermogenianus, by Ficinus, 1472, 1483. The Greek text has also been published by Rosellius, Cologne, 1630, the best edition; and by Patricius, in his 'Novæ de Universa Philosophia.'Venice, 1456, 1458, 1493, 1497. This work has been translated into Italian by Benci, Florence, 1548; into French by De Foix, Bordeaux, 1579; into English by Everard, London, 1659; into German, Anonymous, Hamburg, 1586; and by Tiedemann, Berlin and Stuttgart, 1754. Tiedemann thinks that the 'Pomander' was not written before the fourth century.

A 'Asclepius' is a dialogue between Hermes and Asclepius, the son of the inventor of medicine, on the deity, mankind, and the world. This work was published at Basel, 1559. The Latin translation extant, which is attributed by some critics to Apuleius. 'The 'Asclepius' is printed with most of the editions of the 'Pomander.' 3. 'Arithmetica,' in which the origin and termination of diseases are taught by astrology. The Greek text of this work was first published by Camerarius, together with other astrological works, 4to., 1532; it was reprinted by Hoochelius, 8vo., 1597. 4. 'Two Books on Nativity,' supposed to have been written by Arab, published at Basel, 1559. 5. 'Astrological Aphorisms,' published at Venice, 1492; Basel, 1533 and 1551; Ulm, 1651 and 1674. 6. 'Curandis,' on the medical and medicinal establishments of Phœnicis and Persians, published by Ruvianus, 8vo. Leips., 1638, and 12mo., Frankfurt, 1681. There are also several works, attributed to Hermas, on the virtues of metals and the secrets of the philosophers; the authenticity of which an account is given by Fabricius, in his 'Bibliotheca Graeca,' vol. i., book i., c. 10.

Hermias. [ARISTOTLE.]

Hermes Crab, the common English name for the well-known crustaceans that occupy the empty turbellated shells of testaceous mollusks. [PAGURIANS.]

Hermogenes, surnamed Xystis, one of the first rhetoricians of antiquity, was a native of Tarsus, and lived under the emperors. At the age of fifteen, it is said, he was professor of Greek eloquence at Rome, where his lectures were attended by that emperor. At the age of eighteen he wrote his work on the oratorical art, consisting of four series, c. 1. De Institutione Oratorum. 2. De Inventione. 3. De Formis Oratorii. 4. De Eloquentia Methodos. His illustrations and quotations are chiefly taken from the 'Orations' of Demosthenes, repeated in his own style. He has acquired a high esteem, and became a standard book in all Greek schools. It has been repeatedly printed in the Greek text, and Gaspar Laurent published it with a Latin translation and commentary, 8vo., 1614. Hermogenes had joined to his work a book of 'Proper Preparations,' or specimens of oratorical exercises, which Priseianus translated into Latin, the Greek text of which has remained inedit till the end of the last century, when it was first published by A. H. L. Hertel, 8vo., Nurnberg, 1812, and by others. At the age of twenty-five Hermogenes is reported to have entirely lost his memory, and to have lived to an advanced age in a state bordering on idiocy. (Philostorus, Lives of theSophists; Suidas; Fabricius, Bibliotheca Graeca; Schoell, History of Greek Literature.)

Hermion, or HERMOGENIANUS. [CORPS JURIS.]

Hermund, or HELMUND. [AFGHANISTAN.]

Hermus. [ANATOLIA.]

Herpan, or the father of HERMAN DE PULGAR. [PULGAR.]

Hernea (from herpe, a branch), signifies the protrusion of any organ from its natural position in the body; as hernia cerebri, hernia pulmonis, when the brain or lung protrudes through an aperture in the skull or chest. But when used alone, this term means what is commonly called a rupture, that is, the protrusion of any portion of the intestinal canal from the cavity of the abdomen. Hernia sometimes form without any evident cause, the intestine being gradually protruding that more frequently they result from some violent bodily exertion, as lifting heavy weights, excessive coughing or straining; or from sudden jars or shocks, as in jumping or falling; or from blows on the abdomen.

The general characters distinguishing a hernia are, a tumor, neither red nor hot, and often not painful, situated at some part of the abdomen, most frequently in or near the groin; largest in the standing posture; disappearing entirely when he lies down; distended by coughing or other violent exertion, and liable to variation in size by exercise or rest, by abstinence or taking food; often producing with the digestive canal, as diarrhea, colic, &c. In the cases in which the hernia forms suddenly, as in consequence of a great exertion, the patient feels as if something had given way at the groin or other part of the abdomen, and is choking. A tumor may vary in size from that of a nut to that of his fist, is elastic, hard, and tense, and soon after the accident becomes painful and tender. In the other class of hernia, which may be called spontaneous, the tumor forms or disappears almost imperceptibly to the patient, remaining stationary, gurgulantly but slowly; is attended with no pain, but merely a sense of weakness about the part; and decreases greatly or entirely disappears in the recumbent posture. If a hernia can be returned into the abdomen at pleasure, it is not by itself a dangerous disease; but if it becomes strangulated, that is, if the intestine is so constricted by the parts through which it has passed that its contents cannot pass through it, and its vessels are so much compressed that active inflammation is excited, it constitutes one of the most serious accidents to which the human body is liable. The symptoms indicating strangulation of the intestine are oblique, where the intestine is constricted, to such an extent that the intestine is protruded, which requires to be noticed in connection with the mode of returning each into the abdomen and of retaining it there.

The most frequent kind of rupture is the inguinal, and it is far more common in males than in females. It forms a tumor, occupying either the groin alone, or extending thence more or less obliquely downwards between the thighs. To retard it the patient should lie on his back with his loins lower than either his shoulders or his hips, and the knee of the side on which the hernia has formed should be raised and turned a little inwards. The operator grasping a cornu of the tumor with his right hand, should press it in the direction contrary to that in which it has protruded, and then retain it, while with his left finger and thumb placed at the narrowest part of the swelling he moves the intestine from side to side, alternately pressing and relaxing it, so as to empty some of its contents, and force it into the abdomen. If any portion
be passed through, a slight gurgling noise will be heard, and by continued efforts the whole will most probably follow.

An inguinal hernia may attain the size of an adult's head or more; but a Femoral hernia, which is the kind most common in females, is rarely more than two inches in diameter, and generally much less. It is usually of a rounded form, situated just below the groin, about two inches from the middle line of the body, and always feels hard and tense. The principal constitution is deep in the thigh, behind the tumour, as far as it is possible to pass it, but if it cannot be grasped, it should be pressed in the same direction, with the balls of the thumbs placed side by side upon it.

It is possible and ventral hernia, which come straight out from the front of the abdomen, the globeral and pendent tumours which they form, and which often attain a coniderable size, should be grasped with one hand, and pressed lying the intestine from the pressure of the muscles, which, as in inguinal hernia, guides the successive portions through the aperture.

Whatever be the situation or condition of a hernia, it should be grasped as directly as possible so that the patient should go to bed, and, after lying a short time on his back, with his knees raised, the intestine will often of itself recede into the abdomen, especially if it has been frequently procted, or if the patient has already been made to pass on the stool, or if any bleeding has occurred. The operation described should be employed. The force used in it should never be so violent as to give much pain, and in old hernia little or none should be caused; nor should the manipulation be continued for more than a quarter of an hour at a time, nor so long as to cause the tumour or make it tender. If it fail, there are several auxiliary means that may be employed, of which a selection must be made according to the circumstances of each individual case. The warm bath should be first tried in all cases; the patient should be placed up to the neck in water at a temperature of from 94° to 100°, and remain there till he becomes quite faint. Any pain or irritation that previous attempts at reduction may have produced will be greatly relieved by these means, and the state brought on by the bath is peculiarly favour- able for the return of a hernia, both by relaxing all the tissues surrounding it, and, when faintness occurs, by rel- eving the intestine from the pressure of the muscles, which are thus left to bring the hernia near the return, but which in that state become powerless. As soon therefore as the patient complains of faintness, or after he has been in the bath, or a quarter of an hour, an attempt should be made to reduce the hernia by manipulating it as already directed under water. In strong and robust men, and especially in cases where the hernia has recently formed, bladder or faeces may be either before or while in the bath, be employed, and the same effect is obtained by taking out one ovum and other by doing the same to the intestine in order to replace the intestine. The abstraction of blood will be useful, not only by the faintness which it produces being a favourable state for reducing the hernia, but by relieving the inflammation which always arises when the intestine is strangulated, and by checking it in its fatal progress. If the warm bath and bleeding fail, the patient should be placed between warm blankets to recover from the depressing effects, and no more manual attempts should be made at some time. The next means employed should be the continued application of cold by ice or a rapidly evaporating lotion laid over the tumour, and kept there, unless it pro- duces an effect. From all these means the patient should be quite recovered, and the tumour has disappeared, with the struc- ture of the operation is the tobacco enema. Great caution is necessary in employing it; it should never be used except in other- wise in the hands of a very skilled surgeon, and the strong means have failed. A draught of tobacco being steeped in a pint of boiling water for ten minutes, half the infusion thus made should be used first; and if it produce no eviden- ce of heart is considered, another half may be given two hours afterwards. The usual consequence is an extreme degree of languor and sinking, a kind of deadly coldness and paleness, and the last stage of depression: in this state a last attempt at reduction should be made; and if still unsuccessful, an operation must be resorted to. The tobacco enema should not be employed unless the symptoms of strangu- lation be quite evident. If the hernia seem merely irridebile, but not strangulated, and if cold, and warm bath and bleeding (if deemed advisable), have failed, the patient should be left, and an active dose of apertent med- icine given him, for sometimes the bowels will, under the ope- ration of these means, return themselves into the abdomen. When bleeding occurs by this means, its occurrence must be prevented by the wearing of a truss. A truss consists of a circular pad, having one side convex and soft, and the other flattened and made very firm by a plate of steel, which is set upon the ankle, and a narrow band, which is a narrow band of highly tempered and very elastic steel, forming when extended somewhat more than a semicircle. In applying a truss, the soft convex surface of the pad should be placed square on the upper part of the tumour. The super- venion of the tumour was situated, that is, over the ring through which the intestine first protruded, and which may be felt by the weakness of the abdominal walls, so that the finger irridebile, but not strangulated, and if cold, and warm bath and bleeding (if deemed advisable), have failed, the patient should be left, and an active dose of apertent med- icine given him, for sometimes the bowels will, under the ope- ration of these means, return themselves into the abdomen. When bleeding occurs by this means, its occurrence must be prevented by the wearing of a truss. A truss consists of a circular pad, having one side convex and soft, and the other flattened and made very firm by a plate of steel, which is set upon the ankle, and a narrow band, which is a narrow band of highly tempered and very elastic steel, forming when extended somewhat more than a semicircle. In applying a truss, the soft convex surface of the pad should be placed square on the upper part of the tumour. The super- venion of the tumour was situated, that is, over the ring through which the intestine first protruded, and which may be felt by the weakness of the abdominal walls, so that the finger
HERO. The Heroic age, properly so called, appears however to have terminated with the immediate descendants of the Greeks who returned from the battles of the Iliad and Odyssey. The extended backwars for a certain length, estimated by Mr. Thirlwall at six generations, or about 200 years. This is the fourth or Heroic age of Hesiod, in which Zeus made the divine brood of gods. The names are: 1. The挝 ban of the gods (Days and Weeks, 157), the princes and warriors of mythological history, such as Theseus, Perseus, and those who fought in the siege of Thebes and of Troy. In Homer they are practically used in this sense: it is applied collectively to the whole body of fighters, Argei, Danai and Achaei, without reference to individuals of peculiar merit; and indeed often appears to be used for heroic, as in the warrior and hero, or soldier, would have done equally well. Indeed the application of the word is not even limited to warriors; but is applied to heralds, wise counsellors, kings, &c. It has been suggested, with considerable plausibility, that the word originally denoted the members of those roving bands who in the earliest times overran Greece, issuing forth from the south of Thessaly and giving extension to the name, first of Achmeans, and afterwards of Hellas, as we learn from the legends in Pausanias and Thucydides; so that in the same sense the Normans who colonized Italy, or the Saxons who settled in England, might justly be called heroes. 2. To the name of the Roman hero to the Greek hero, the latter being the same name, of the Latin and German forms of heros and her (master), here, heres, heracles, vivus, virtus, &c. The same root seems to exist in the word Arminn, which denoted a particular love, a dividing line, and a division of the world. The name of the empire after the Lombard conquests. There seems little doubt that this class originated in the warrior caste of the Lombard invaders; and the origin of the name thus furnishes an analogy to the theory suggested above as to the origin of the Homerica use of the word hero. Even the name of German, and the meaning of brother attached to the word in Latin, may originate in the same sense of a member of the family. 3. The word used to involve the notion of might or mastery. The Sanscrit word vrtra appears to contain the same element as heroes. The promiscuous (or Homerice) use of the word hero disappeared in the age succeeding the Homeric poems. It seems probable that the Hellenic invasion, commonly called the Return of the Heracled, put an end to it. The new conquerors of Southern Greece do not seem themselves to have borne or used the title, and afterwards, when they, or their descendants, looked back to the warlike legends of the ear times that had borne the title, the lays, exploits, and persons were called heroes; and from the combined effort of the two, the word began to be used more in the way of a proper name, and less as the common term of homeric usage. It is true, the Homeric age of the world arose, carrying with it notions of mythical dignity, and of superiority to the later races of mankind. The custom of showing respect or affection by making precious offerings, and celebrating costly sacrifices at the tombs of the dead; the imaginative temper of the Greeks, which, as it loved to ascribe a divine genealogy to the great, was equally willing to admit them to a share of the divine nature and enjoyments after death; and the love of magnifying past ages, common to all nations, will sufficiently explain the change of earthy leaders into protecting genii or demons, who were believed immortal, invisible, though frequenting the mortal scenes of human life. But he soon found that he could not be appeased or propitiated, like the gods themselves. In the age of Hesiod, as is evident from the passage above referred to, the age of heroes was past, and they were already invested with their mythological character, and by their companionship, furnished with, among other reasons, for believing him to have lived after the Homeric age. (Thirlwall's History of Greece, ch. v.) Phileg. Mus. No. 4. "On the Homeric use of the word Hero in the Iliad."

HERODES. The name of several Jewish princes. 1. HEROD THE GREAT was the second son of Antigonus, by whom he was appointed governor of Galilee at the age of twenty-five. In B.C. 43 he obtained from Sextus Caesar the government of all Coile-Syria. From this time he became the chief supporter of Hyrcanus II. against the attempts of Antigonus, the son of Aristobulus. By large presents he obtained the friendship of Antony, who appointed him and Phasael tetrarchs of Judea. In B.C. 40 he was appointed with Phasael and set Antigonus on the throne, making Hyrcanus and Phasael prisoners. Herod escaped to Rome, where, by the influence of Antony, he was appointed king of the Jews; but the Roman generals in Syria assisted him so feebly, that it was not till the end of the year 38 B.C. that Jerusalem was taken by Sossias. The commencement of Herod's reign dates from the following year. In the year 38 he married Mariamne, the grand-daughter of Hyrcanus, hoping to strengthen his power by this match with the Amsonne family, which was very popular in Judea. On ascending the throne Herod appointed Anael of Babylon high priest, to the exclusion of Aristobulus, the brother of Mariamne, and Phasael, the nephew of Aristobulus. Mariamne and the artifices of her mother Alexandra, to depose Anael, and appoint Aristobulus in his place. Not long after, Aristobulus was secretly put to death by the order of Herod. But the general in command of Herod, Antigonus, which of the murder, Herod was summoned to answer the accusation before Antony, whom he pacified by liberal bribes. When setting out to meet Antony, he had commanded his brother Joseph to dress him in his coronation robes. On the approach of Antony, Herod joined the latter, and undertook, at his command, a campaign against the Arabs, whom he defeated. After the battle of Actium he went to meet Octavianus at Rhodes; having first put to death Hyrcanus, who had been released by the Parthians, and placed at

HERO. The country of the younger Hero is uncertain; in a work attributed to him (on geology) he states that the precarious of the cyclopes (some seven degrees of effect since the time of Ptolemy, so that he must have been about 500 years later than Ptolemy: he is generally placed under the reign of Heracleus, a.d. 610—641.

Here the story must have enjoyed great reputation, since he is mentioned, if not praised, by the machines of (Ingeher Ptolemy; but he is now principally known by some fragments of his writings on mechanics, which are to be found in the Mathematica Veterr., Paris, 1693. His extant writings are: 1. "A machine," which is in the 'Math. Vet.' already cited. 2. 'Barulcus,' a treatise on the raising of heavy weights, which is mentioned by Pappus, and which was found by Gollus in Arabic, but not translated. 3. "The manufacture of darts, published by Baldi, with an account of Hero, at Aupsurg, in 1616, and also in the 'Math. Vet.' 4. 'Pneumatici,' published by Commandino, Urbino, 1575, and also in the 'Geometriae' with the additions of Aldatti, who had previously published an Italian version, Bologna, 1644, and Ferrara, 1659. 5. 'On the Construction of Automata,' which is in the 'Math. Vet.,' and was translated into Italian by Bernardino Baldi, with an account of the rise and progress of mechanics in Venice, 1589, 1601, 1661. 6. 'On Dioptrics,' a work said to have been in manuscript in the Vienna library. Other works of Hero, now lost, are mentioned by Petrus Eutocius, Heliodorus of Larissae, &c., for which see Helbroner, who is the authority for the preceding summary (see also J. A. Schmidt. 'Herois Alexander Vita Scripta of quaedam inveterata,' Venice, 1628.

The writings of Hero the younger are: 1. a book 'On Machines of War," edited in Latin by Barocius, Venice, 1572; together with 2. a book of 'Geodesy,' a term then meaning the art of strategic, which immediately succeeded and also in the 'True Tactics," said by Lambecius to exist in manuscript in the library at Vienna. 3. 'On the Terms of Geometry,' printed at Strasburg, 1571, and also edited by C. F. F. Haenkel, Stralsund, 1621; the "Greek Exemplars," printed by the Benedictines in the first volume of the 'Analecta Graecae,' Paris, 1658, from a copy in the Royal Library at Paris. 4. A Geometrical Manuscript, stated by Lambecius to exist in manuscript at Vienna.

There was another Heron, the teacher of Proculus.

HEROD, HERODES, the name of several Jewish princes.

HEROD THE GREAT was the second son of Antipater, by whom he was appointed governor of Galilee at the age of twenty-five. In B.C. 43 he obtained from Sextus Caesar the government of all Coile-Syria. From this time he became the chief supporter of Hyrcanus II. against the attempts of Antigonus, the son of Aristobulus. By large presents he obtained the friendship of Antony, who appointed him and Phasael tetrarchs of Judea. In B.C. 40 he was appointed with Phasael and set Antigonus on the throne, making Hyrcanus and Phasael prisoners. Herod escaped to Rome, where, by the influence of Antony, he was appointed king of the Jews; but the Roman generals in Syria assisted him so feebly, that it was not till the end of the year 38 B.C. that Jerusalem was taken by Sossias. The commencement of Herod's reign dates from the following year. In the year 38 he married Mariamne, the grand-daughter of Hyrcanus, hoping to strengthen his power by this match with the Amsonne family, which was very popular in Judea. On ascending the throne Herod appointed Anael of Babylon high-priest, to the exclusion of Aristobulus, the brother of Mariamne, and Phasael, the nephew of Aristobulus. Mariamne and the artifices of her mother Alexandra, to depose Anael, and appoint Aristobulus in his place. Not long after, Aristobulus was secretly put to death by the order of Herod. But the general in command of Herod, Antigonus, which of the murder, Herod was summoned to answer the accusation before Antony, whom he pacified by liberal bribes. When setting out to meet Antony, he had commanded his brother Joseph to dress him in his coronation robes. On the approach of Antony, Herod joined the latter, and undertook, at his command, a campaign against the Arabs, whom he defeated. After the battle of Actium he went to meet Octavianus at Rhodes; having first put to death Hyrcanus, who had been released by the Parthians, and placed at
H E R

himself under Herod's protection some years before. He also imprisoned Maramme and Alexander, commanding their keepers to kill them upon receiving intelligence of his death. Octavius received him kindly, and re-instated him in his kingdom. On his return Maramme reproached him with his inventions towards him, which he had discovered. This led to an estrangement between Herod and his wife, who was artfully increased by his sister Salome; till on one occasion, enraged at a new affront he had received from Maramme, Herod assembled some of his friends and accused her of adultery. She was condemned and executed. After her death Herod suffered the deepest remorse, and shut himself up in Samaria, where he lay in a state of mourning till the season opened. In the year 26 a. c. he put to death the sons of Babas, the last princes of the Astartomian family. He now openly disregarded the Jewish law, and introduced Roman customs, a conduct which increased the hatred of the people towards him. Ten men conspired against his life, but were detected and executed with the greatest cruelty. To secure himself against rebellion he fortified Samaria, which he named Sebasto, and built Caesarea, and other cities and fortresses. In the year 17 B.c. he began to rebuild the temple at Jerusalem. The work was completed in eight years, but the decorations were not finished for many years after. (John, ii, 20.) Herod's power and territories continued to increase, but the greatness of his reign was checked by the manifold violent dissensions in his family, of which a minute account is given by Josephus. He died in March, a. c. 4, in the thirty-fourth year of his reign and the seventieth of his age. Josephus speaks of him shortly before his death, that he shut up many of the principal men of the Jewish nation in the Hippodrome, commanding his sister Salome to put them to death as soon as he expired, that he might not want companions, an order were released however by Salome upon Herod's death.

The birth of Jesus Christ took place in the last year of Herod's reign, four years earlier than the era from which the common system of chronology dates the years a. d. (Cicero, in Cat. Helvet.)

II. HEROD ANTIPAS, son of Herod the Great, was appointed by his father's will tetrarch of Galilee and Peraea. [ARCHELAUS.] He built the city of Tiberias. About a. d. 26 he divorced the daughter of Aretas, king of Arabis, and married his sister-in-law Herodias. John the Baptist, having renounced against this marriage, was imprisoned in the castle of Machmurus, and afterwards put to death. (Luke, iii, 19, 20. Mark, vi, 17—29.) About the same time Aretas marched against Antipas and defeated him. In a. d. 39 Antipas was accused by Agrippa, king of Judea, of a secret understanding with the Parthians, and was banished to Lyons.

III. HEROD AGrippA, son of Aristobulus and grand-son of Herod the Great, after experiencing many vicissitudes in early life, was appointed, upon the accession of Caligula, king of Arabia, to the dominions formerly held by Philip, namely, Gaulanitis, Batanea, and Trachonitis. Herod added the tetrarchy of Lysanias; and afterwards, when Agrippa was banished, the tetrarchy of Galilee and Peraea. Claudius added Judea and Samaria to his dominions. His government was popular with the Jews, to whom he persecuted the Christians. (Acts, xi, 1—3.) He died of a loathsome disease at Caesarea, in the third year of his reign over all Palestine, a. d. 44. (Acts, xii, 20—23.)

Agrippa, son of the latter, was seventeen years old at the time of his father's death. Upon the death of Herod, king of Chalees, four years afterwards, Claudius bestowed that kingdom upon Agrippa. He did not leave Rome till a. d. 43, when Claudius gave him the tetrarchies of Gaulanitis, Batanea, and Trachonitis. His dominions were enlarged by Nero. It was in a. d. 60 that the trial of Paul before Agrippa took place. (Acts, xxvii.)—Agrippa exerted himself to keep up the spirit of the revolt which was now constantly increasing among the Jews. When war broke out, Agrippa joined the Romans. After the taking of Jerusalem he retired with his sister Berenice to Rome, where he died at the age of about seventy years. (Josephus, Antiquities of the Jews, and Jewish War; John's Hebrew Commonmwealth; Prideaux's Connection.)

HERODIAS CLAUDIUS ATTICUS, a native of Marathon, in Attica, and one of the eunuchs which numbered among its members several officers and magistrates of the latter period of the Athenian commonwealth, was born under the reign of Trajan. He inherited from his father a very large property, which is said to have been originally acquired under curious circumstances. His grandfather Hipparchus had lost his property by confiscation during the civil wars. His son called Atticus by the historians, and the father of Herodias, supported himself by means of his wife's property. Atticus discovered one day in his grounds, in or near Athens, a vast trunk of a tree which had been cut down under the so-called civil wars. He informed the then emperor Nerva of what he had found, and inquired what he was to do with it? The emperor's answer was short: 'Utire invento' ('Make use of what you have found'). This tree, with its trunk, was much above his wants and his station in life; upon which the good-natured emperor replied again in the same laconic style, 'Eiam abutere' ('Do with it as even you list'). In consequence of this Atticus left his son and possessions of enormous wealth. Herodias was educated by the best teachers of his time; she studied under Favorinus and Polemon, and he became an accomplished scholar, rhetorician, and philosopher. He was made by Antoninus Pius proconsul of the great towns of Asia. Herodias was removed to Rome, his wealth, his connections, and his extraordinary eloquence, which is spoken of as wonderful, gave him a considerable degree of importance, and he was soon declared to be the oracle of the age. Herodias was also one of the preceptors of the younger Verus, the adopted son of Antoninus. Herodias married, at Rome, Anna Regilla, of an illustrious and wealthy family. She was the mother of his two other sons; the younger, the fifth. His brother-in-law suspected Herodias, who was of a violent and jealous temper, of foul treatment of his wife, and he brought him to trial on the charge of murder: but Herod was acquitted. Herodias displayed an excessive and, as some believed, an assumed grief for the loss of her husband, and he dedicated her estate to Minerva and Nemea. An inscription, which he wrote, or caused to be written, in Greek characters, records the fact. There is another place, likewise one of the imperial residence, in which the poet invites the Roman women to honour the memory of Regilla, descanting upon her beauty, virtue, and high lineage: he speaks of the Emperor Marcus Aurelius, whom he compared to Jupiter, for the consolation which he administered to the widower in his old age, left with two young surviving children, upon one of whom, named Atticus, the emperor bestowed the patrician and senatorial salsas, or hours stamped with social ornamentation, with a crescent, which custom of the Roman patricians the poet derives from Mercury. He then launches out into mythological allusions, and speaks of his own descent from the Athenian family of the Cephisodotidae, and descamnol and, as well as the one previously mentioned, is curious as a memorial of the Greco-Roman style of poetry in the age of the Antonines. These two inscriptions, which are on two large slabs of Greek marble, and were discovered near the Janiculum, at the command of Pope Paul V. (Borghese), have given much employment to critics and philologists. (Visconti. Iteriizii Trspes ora Borghesi- ne, 410, Rome, 1794.) Herodias, after the loss of his wife, returned to Greece, and died at Marathon, in the 77th year of his age, towards the end of the reign of Aurelius, or the beginning of that of Commodus. He erected monuments, temples, baths, and aqueducts, in Italy, Greece, and Asia. (Eutropius.) Pausanias, the Greek geographer, who visited Attas, by him called, the Theatre of Regilla, after his wife: he also embellished the stadium near the Ilissus, which was originally constructed by the orator Lycurgus, and was afterwards adorned with a fine statue of the goddess Polemon, (Borghese, 1801.) Herodias is said by Plutarchus to have written orations, epistles, and epimerides; but none of these compositions have come down to us, except a fragment of an address to the Thebans, published by Reiske, Leipzig, 1775, but its genuineness is doubted by the critics. In the inscription above mentioned, in honour of his wife, he is styled 'the living language of Athens' and 'the king of oratory.' His son Atticus is said to have been a nephew of Augustus, and the father of all his family.

HERODIANS (Hephaistii, Matt. xxii. 16; Mark, iii. 6;
(xvi. 13; see also Mark, viii. 15), were in all probability a political party in Judea, who were anxious to preserve the government in the hands of Herod's family. Many critics consider the Herodians to have been a religious sect. Torutilian, Jerome, Epiphanius, Chrysostom, and Theophylact maintain, without any sufficient reason, that the name was given to those Jews who owned Herod for the Messiah, and Cyrus (De Veritate Christi. Relig., v. s. 14; Notes upon Matthew, xvi. 6) and other modern critics hold the same opinion. The Herodians are not mentioned either by Philo, or by Josephus in his enumeration of the Jewish sects; in the curious opinions they probably belonged to the sect of the Sadducees; since that which is called by Mark (viii. 15) ‘the leaven of Herod’ is styled by Matthew (xvi. 6) the ‘leaven of the Sadducees.’


HERODIUS, A Greek author, who wrote a history, in eight books, of the Roman emperors who reigned successively in his lifetime, beginning with the death of Marcus Aurelius, a.d. 180, and ending with the accession of the younger Gordianus, a.p. 238. This history comprehends a period of little more than half a century, but it is a most eventful one in the history of the empire, on account of the numerous and violent changes in the government, the elevation of the sovereign power, and also with respect to the domestic and foreign wars, the depravity of manners, and the public calamities which characterized that age. The series of emperors which the history of Herodius embraces commences with the name of Commodus Perinax, Julianus, Niger and Albinus, Severus, Caracalla and Geta, Macrinus, Elagabalus, Alexander Severus, Maximinus, the two Gordiani, and Balbinus. The style of Herodius is plain and unaffected, and his narrative in general seems written in a spirit of sincerity, but it has no claims to philosophy or critical art. (F. A. Wolf, Narratio de Herodiano et libro ejus, prefixed to his edition of Herodiusan, Halle, 1792.) Of the private history of Herodius we know nothing, except that he had been three years in Rome, and to have been well acquainted not only with the political events, but also with the court intrigues and scandal of his time. He is the last of the Greek historians of antiquity who lived before the partition of the Roman empire. Among the editions of his history that of Irminich, in 5 vols. 8vo, Leipzic, 1789—1805, in Greek and Latin, contains numerous notes, chronological and genealogical tables, and several curious indexes. The last edition and the best translation is in Kekker, Berlin, 1826, 8vo. There are several German translations of Herodius.

HERODII. [HERODS.]

HERODOTUS ('H'porcolos), a native of Halicarnassus, a Dorian city in Caria, Asia Minor, which he is said to have cultivated the Ionian dialect of the Greek, which was the language of that island. Before he was thirty years of age he joined in an attempt, which proved successful, to expel Lydias. But the banishment of the tyrant did not give tranquility to himself. He was the son of Lykus and Dryo, and of an illustrious family in his native state. Not liking the government of Lydias (the grandson of the heroic Artemisia), who was tyrant of Halicarnassus, he retired for a time to Samos, where he is said to have cultivated the Ionian dialect of the Greek, which was the language of that island. Before he was thirty years of age he joined in an attempt, which proved successful, to expel Lydias. But the banishment of the tyrant did not give tranquility to Heraclus, who himself had become an object of dislike again in his native country, and joined, as it is said, a colony which the Athenians sent to Thurium, and which was situated in South Italy (n.c. 443). He is said to have died at Thurium, and was buried in the Agora. (Suidas, 'H'porcolos, Heraclus, Sestos, Strabo, xiv. p. 656; Photius, Bibl.)

The Nine Books of Herodotus contain a great variety of matter, the unity of which is not perceived till the whole work has been thoroughly examined, and for this reason, on a first perusal the History is seldom well understood. But the subject of the story was so explained by both the ancient and the modern historians, that it is certain that without such advantages he could never have written it, and that his travels must have suggested much inquiry, and supplied many valuable facts which afterwards found a place in his History. The Nine Books of Herodotus contain a great variety of matter, the unity of which is not perceived till the whole work has been thoroughly examined, and for this reason, on a first perusal the History is seldom well understood. But the subject of the story was so explained by both the ancient and the modern historians, that it is certain that without such advantages he could never have written it, and that his travels must have suggested much inquiry, and supplied many valuable facts which afterwards found a place in his History.
There is no translation of Herodotus which has yet done justice to the original, and no commentator has yet exhausted one-tenth of the matter which admirable and requires illustration.

The first edition of Herodotus was the Latin translation of L. Valla, Venice, 1474, fol. The first Greek edition was made by J. Trithemius, printed at Speyer, 1496. The German translation of Hervigius, Basel, 1541, 1557, fol., under the superintendence of Camerarius. The edition of Hervigius is very correct and useful. The most complete edition of Herodotus is the modern one, edited by L. Albrici, Venice, 1724. But at that time, Professor Gaisford has again collated the Sanskrit manuscript (one of the best manuscripts of Herodotus) for his edition of Herodotus, Oxford, 1824, but the text of Albrici is more trustworthy. In the text of Schleicher, Hervigius and Gaisford are shown in the reprint of Schleicher, by Taylor and Walton, London, 1830 and 1838. The Lexicon to Herodotus, by Schleicher, is a useful aid to students, though it is far from being complete. Rennell's "Geography of Herodotus" is a valuable work, which will enable a young traveller to appreciate the merits of the old traveller and Niebuhr's "Discertation on the Geography of Herodotus," of which there is a notice in the "Westminster Review," No. 26; Dahlmann's Essay above referred to, and that of Heyse, "De Vita et Itineribus Herod.," Berlin, 1821, are worth the student's attention. The Apology of Herodotus, edited by the late Dr. A. J. Godwin, prefixed to L. Albrici's edition of Valla's translation, Frankfort, 1555, is a clever and amusing vindication of Herodotus against the charge of falsehood, made on the ground that many of his stories are the fabrication of" his immediate contemporaries. Review of Paris, H. vols., with the Commentary, is a useful book; and Creuzer's "Commentations Herodot.," Leipzig, 1819, may be consulted with profit. The German translation by Creuzer, 4 vols., with an apparatus of fidelity, and to a considerable degree is a successful attempt to convey a notion of the literary character of the original. There is no English translation that deserves to be recommended for its accuracy, but it does very respect the text. (Journal of Education, vol. i. p. 322.)

A Life of Homer, which bears the name of Herodotus, is subjoined to most editions of the text; but evidently comes from another hand.

HEROICACE. [Hero.] HEROIC VERSE in its antique sense means that which was the vehicle of Greek, and subsequently of Latin epic poetry, of which the actions of the heroes were the appropriate subjects. (See EXAMETER.) A hexameter verse, that is, a line of ten-syllable couplets passes under this name, chiefly, it should seem, because it is the measure into which the epics of antiquity have been most frequently translated. The Alexandrian poet, Theocritus, about 280 b.c., has made it a favorite form with his older writers for this purpose, as by Chapman in his translation of the "Iliad."

HERONS. Under this head it is our purpose to treat of the Cranes (Grus) as well as the Herons (Ardea,) including the Storks, &c.

Willingly thus generally defines his section of Cloven-footed River-birds. These have very long necks; their bills also are long, strong, ending in a sharp point, to strike fish, and select them from under stones or bricks: long legs to wade in rivers and pools of water: very long toes, especially the hind toe, to stand more firmly in rivers: large crooked talons, and the middle serrate on the inside, to hold eels and other slippery fishes the faster, or because they sit on trees; lean and carion bodies, because of their great fear and watchfulness. He makes the section to correspond to the Herons, Bitterns, &c., the Storks, the Ibis of Belinnus (Bolen), and the Spoonbills.

Ray places at the head of the Aves Aquaticae, the Frustipes (cloven-footed), "quae circa aquas versatur, et tamen non imnant" (which haunt the waters, but do not perch on them). He means the Heron (Ardea), "Maxima, singulari et sui generis," contains the Crane (Grus, including the Grus Indicus and Grus Balaetricus, the Jabirux, the Cariama, and the Anhima). Then come the Ardeae aquaticae (i.e. the Herons), which are a more true philosophical way than many so-called philosophers, considering them as various forms of social existence under which happiness might be found. He treats with decent respect the religious observances of every nation, a decisive proof, if any were wanting, of his good sense.
A crowded of other birds, are brought under Brisson's 17th order.

The genus Ardea, in the 12th edition of the *Systema Naturae*, embraces the Herons, the Bitterns, and the Cranes (including the Baleric Crane and the Demoiselle, *Ardeogoides*); the Jabiru, Boaibib, and Spoonbill are generally distinguished under the names of *Mysteria, Canorea*, and *Platalea*. They form part of Linnae's fourth order, *Grallatae*.

Dr. Latham's seventh order, *Grallae*, embraces the *Ardeidae* and *Gruidae* among the rest of the wading-birds.

The same families are scattered through M. Lacépède's *Oeconomie de Régie* (*Grallatores*), *Gruidees*, *Echassiers* (*Waders*), containing his 16th, 17th, 18th, and 19th families. The Oyster-catcher is included in the 16th (*Pressirostres*, or Ramphastosenes); the open-beak, Bec-oemeri, (Anastomus of Illiger), the Heron, the Stork, the Crane, and the Ibises (Tantalus), form the 17th family, the *Culturisores*, or Ramphocopes. The Spoonbill and Boaibib belong to his 18th family, the *Lairotres*, or Ramphopleiates.

Among the *Graulatores* of Illiger the Herdui contain the genera *Grus, Ciconia, Ardea, Euryzyge, Scopus, Canerea*, and *Anastomus*. The genera *Tantalus* and *Ibis* form the *Falacia*, and *Platelia* is placed among the *Hygrobores*.

Cuvier's *Echassiers* comprehend the *Brevipennes*, the *Pressirostres*, the *Culturisores*, the *Longirostres*, and the *Macroptyles*.

*Gruidae* consist of the Cranes, the Boaibib, the Herons, the Storks, the Jabiru, the *Ombrette*, the Openbeaks, the *Tantali*, and the Spoonbills.

M. Vieillot's *Eobistris* are divided into two tribes: the 1st, the *Di-tridactyles*; the 2nd, the *Tetractylides*. The 6th family of this wader (Lathresaires) consists of the Spoonbills and Boaibib; the 7th (Herodiones) comprehends the *Ombrette*, the Open-beak, the Herons, the Storks, and the Jabiru, &c.; and the 8th (*Erophones*), the Cranes (Genus *Grus*).

The *Ardeidae* and *Gruidae* are placed by M. Temminck under his 2nd family of *Grallae* (waders).

In M. De Blainville's method the *Ardeidae* and *Gruidae* are comprehended under the *Ciconiidae*, his third family of *Graulatores*, and in the same method as further developed by M. Lherminier, the 23rd family (first subclass or Normal birds), consists of the Cranes (Genus *Grus*); and the 24th family (*Gruinae*) (same subclass) of the Herdui of Illiger.

M. Vigors considers that the *Graulatores* are naturally divided into these five families:— *Gruidae*, *Ardeidae*, *Scopologie*, *Calidrines*, *Charadrideae*; and he places the *Ardeidae* in the 6th group, and the *Charadrideae* in the 13th group. He remarks that the species enumerated under the family of *Gruidae*, most of which were comprised originally in the genus *Ardea* of Linnaeus, are separated from the remainder of that group by their foot, which is chiefly vegetative, and that their toes are nearly to those of the land-birds; and by the formation of their bills and feet, the former of which are more obtuse at the end, and the latter shorter than is observable in the true *Ardeidae*.

In these characters, M. Vigors observes, as well as in their general appearance, more particularly with respect to their plumage, they have a near alliance with the *Struthiones*, *Porphys* [Acag., vol. 1], of Linnaeus is the first genus of this family to which Mr. Vigors calls our attention.

This genus, in the comparative shortness of the bill, is considered by Mr. Vigors to be connected with the *Ardeogoides* of M. Vieillot; the Numidian Demoselle, while he considers the Baleric Crane and the *Demoselle* of which I have little doubt, its situation will most probably be in the present family, to which it bears a nearer resemblance in plumage and general structure than to any other division of the wading-birds, that I have observed.

The *Charadrideae*, which meet at the corresponding extreme of the order; its shorter and more elevated hind-limb forming the main road, and the tarsal or tibia, foot of the *Gruidae* and the triangular foot of the *Charadrideae*.

The generic name of this bird, *Porphyra cristata*, is erroneously printed in the article referred to, where it stands as *Tropizia cristata*.

We have seen [Carliana, vol. vi] that the habits of *Dicholophus* are not those of the wading-birds, although in the whole of the visceral arrangement a close affinity may be observed to the *Gruidae*.

Mr. Vigors remarks further that Mr. Cuvier has noticed the union that takes place between the last groups alluded to by Mr. Vigors and those of the *Ardeidae* by means of the genera *Aramus* of Vieillot and *Euryzyge* of Illiger. These, he observes, lead to the extensive assemblage of species contained under the genus *Ardeidae* and *Charadrideae*, from which we conclude the toes are observably in the other waders, which join them on each side; and in one of them, the *Phoenicopterus*, this character, he remarks, is carried so far to the extreme as to have occasioned some systematists to place the birds of that genus among the *Natasores*. [Flamingo, vol. x] But, says Mr. Vigors in conclusion, 'the whole of the family have a membrane more or less extensive at the base of the wings; and if we remove the foot of the genus *Aramus, alba*, of the *Platalea*, and the *Phoenicopterus* together, we shall see a gradual increase of this membrane in extent until it reaches the extreme in the latter genus. Among the species that form this branch of the family, viz. the *Ciconia, Canerea*, and *Aramus* which resemble it in general character, but deviate from it in the form of the bill. Among these we may particularly *Scopus, Linn.*, distinguished by its more compressed and furrowed mandibles; the *Mystere, Linn*, where the point of the bill turns upwards; and the *Anastomus, Illiger*, where the mandibles, united at the base and at the point, leave an open space in the centre. The genus *Tantalus, Linn*, bears an evident affinity to the same group, and has consequently been united with it in the systematic arrangement. It differs chiefly by the downward curvature of the bill. To this genus may be united the *Ibis* of M. Lacépède, which, in its more slender bill, bears a closer affinity to the *Eurodees*, from whence we conclude their inquiries into the family.

The same author unites the *Scopologie* with the *Ardeidae* by means of *Numenius* of Brisson, as approaching *Ibis* most closely in its bill.

The Prince of Musciano's [C. L. Bonaparte] makes the *Herdui* the third family of the order of *Grallae*, and includes under it the genera *Grus, Ciconia, Ardea*, and *Aramus* the fourth family of *Falacia* consists of the genera *Tantalus*, *Ibis*, and *Eurodees*.

Mr. Swainson ('Natural History and Classification of Birds,' vol. ii.) is of opinion that the 'Ardeodes,' or Herons, by means of the Cranes, show the strongest affinity to the *Atrichae* and *Hirundinea* while the races of the two families are in different orders. Nearly all the cranes, writes Mr. Swainson, 'are large birds, with short and powerful wings, long and frequently naked necks, and more terrestrial in their habits than any of their congeners. The beautiful genus *Phoebus* (Porphyra), if truly belonging to this family, is more of a gallinaceous than a wading bird. After referring to the genus *Anthropoides*, Mr. Swainson thus continues:—'The more typical cranes (*Grusa, Falasa*) are large birds, few indeed in species, but dispersed over Europe, America, and Asia: they seem to prefer the seclusion and security of marshes, and feed both upon seeds, herbs, worms, and small reptiles. The *Ardeodes*, or typical herons, differ from the last in the gracefulness of their graceful, and prolonged feathers which ornament nearly all the species. They build in societies, but generally feed and live solitary. Like the Kingsbears and many of the flashtailed birds, they are furnished with a fixed station: a sheltered rock by the side of a river, or a projecting rock by the sea-side, over deep water, frequently serve them as a convenient spot; here they watch for passing fish, which they dexterously spear or transfuse by

* The genus *Scopus* is Brisson's, and there is no such genus in Linnaeus's last edition of the *Systema Naturae*. *Grallae* adopts it in his edition, and places it between *Canerea* and *Ardea*.
HERONS

M. Temminck thus defines the Herons properly so called:— Bill much longer than the head, as large as it is high, or larger, at the base; upper mandible nearly straight; a great portion of the tibia naked. Food, fish principally.

Our limits will not permit us to give more than a sketch of the leading forms of this group, we proceed to illustrate M. Temminck's first section of the True Herons by the Common Heron, which all authors consider as the type.

The Common Heron then is, in the opinion of Belon and some others, the Argus (Erodus) of Aristotle, but we do not consider this as certain: the term Argus is doubtless selected by Aristotle for the form (Hist. Anim. b. viii. c. 3), but what species is meant by him is not so clear; for he says (b. ix. c. 1), Τον τ' ἐρυθων λευκ' τρια γυν' ζωτον άργους, και δ' λευκως, και δ' ἀστεριας εκλαμηνως (There are three kinds of Erodus, the blackish and the white, and that called Asterias'); the latter being most probably the Buttern. Now the term ερυθως is hardly applicable to the plumage of the Common Heron, Ardea cinerea. But the bird is, without doubt, the Ardea of the ancient Italians, and the Becassine, Ardea Oca negra, and Garza, of the modern Italians; Garza of the Spaniards; Regier and Rheter of the Germans; Heron of the French; Crêt gîte of the ancient Britons; and Common Heron, or Heronias, of the modern British.

Description.—Plumage bluish-ash; middle toe, the nail included, much shorter than the tarsus. Males and females after the third year.—Long, loose black feathers (plumes effilées) on the back of the head, similar plumes of a lustrous white depend from the lower part of the neck; the equally elongated and subulate scapulars are of a silvery ash. Forehead, neck, middle of the belly, border of the wings and thighs, pure white; occiput, sides of the breast, and flanks, jet black. On the front of the neck are large longitudinal black and ash spots. Back and wings very pure bluish-ash; bill deep yellow; iris yellow; naked skin of the eye bluish-purple; feet brown, but of a lively red towards the feathered part. Length three feet and upwards. In this state M. Temminck, whose description we have given, states the bird (see the Ardea cinerea (M.) of Latham (Ind.); Ardea Major of Gmelin; Le Heron Huppeg of Buffon; Heron commun of Gervar; Common Heron (male) of Latham (Syn.); Pennant (Brit. Zoöl.); and Albin, Aechmophorus Rheter of Mayer and others; and Sgarza centinena of the Stor. degl. Ucc. Young up to the age of three years.—No crest, or, at most, the plumes composing it very short; no long loose feathers at the lower part of the neck, nor above the wings; forehead and top of the head ash colour; throat white; neck clear ash, with numerous spots of a deeper colour than the ground; back and wings bluish-ash, mingled with brown and whitish; breast marked with longitudinal spots; upper mandible of the bill blackish-brown, with yellowish spots; lower mandible yellow; iris yellow; skin round the eyes greenish-yellow; feet blackish-brown, but yellownish towards the feathered part. In this state M. Temminck considers the bird to be the Ardea cinerea (Femina) of Latham (Ind.); Ardea Rhenana of Sandor; Le Heron, Buff.; Common Heron (Syn.); Latham Syn.; Sgarza marina, Stor. degl. Ucc.; and Del Biauausii Reiger (being the young in the first year) of Sepp. The edge of the bill is serrated near the point, and the nail of the middle toe pectinated, as in the Herons generally.

Variety.—Nearly perfectly white. A variety of this description is figured by Frisch (t. 204); but it is very rare. Habits, Food, Reproduction, &c.—The solitary habits of the Common Heron, excepting at the season of reproduction, are well known. At that period they congregate at their breeding stations, or heronries, for which the loveliest trees are generally chosen. Pennant says that at Cresil Hall, near Gosberton, in Lincolnshire, he counted more than eighty nests in one tree. Montagu notices a heronry on a small island in a lake in the north of Scotland, whereon there was only one arable oak. The nests were too small to contain all the nests, the herons, rather than abandon their society and a favourite station, had many of them placed their nests on the ground. In the south and west of England the heronries at Nettlehay, in Somersetshire, and at Bowlerham Castle, in Devonshire, are worthy of notice. The nest is built of sticks, and is large and flat. It is lined with...
wool or other soft materials, and on this lining are deposited four or five bluish-green lustreless eggs. The young are less prepossessing in appearance than the adults in general, but few of which are pleasant to look upon, and they remain in the nest for five or six weeks, during which time the old birds incessantly supply them with fish, &c. There are sometimes days when the young are entirely left unattended in the nests. In general, but at times, a pair is found in the same tree, and others the same rate to a penny. At a marriage-feast in the reign of King Henry VIII., we find Heron-nuses noted at the same price, and at another marriage-feast in the same year two dozen Heron-nuses marked at twenty-four shillings.* In the first of these records no mention is made of pheasants, but in the second they appear at that earlier time to have been rather more highly valued than Herons, for eighteen pheasants are priced at twenty-four shillings, the amount placed against the two dozen Herons. And in the charges of Sir John Neville of Chete (the knight in whose family the marriages above alluded to took place), at Lammas assizes, in the twentieth year of the reign of King Henry VIII., the pheasants appear to have cost somewhat more than the Heron-nuses, thirty of which are priced at thirty shillings, while twelve pheasants cost twenty shillings. The heron-plumage, made up of the fine large feathers, especially those above the wings, was highly valued.

In the present day the bird seems to have sunk into comparative insignificance. Mr. Selby however considers that 'the low estimation in which the flesh of the heron is now held would seem to be in a great degree the effect of prejudice, or the fashion of taste, as under proper treatment and good cookery the Heron, when fat and in fine condition, is but little inferior to some of our most approved wild-fowl.'

The well-known adage expressive of ignorance, 'He does not know a hawk from a handsaw,' is a corruption of 'He does not know a hawk from a heron-shaw.'

Temminck's section of Herons consists of the Bitterns, including the Night Heron. As an illustration of this section we must refer to Bittern, vol. iv., and Nycticorax.

Next to the Bitterns we may notice the Boat-bills. The form of the bill is indeed widely different; but the habits and food of the bird approach very nearly to those of the Herons and Bitterns.

**Spoonbills.**

Another extraordinary form of the bill, joined to the general appearance of the neck and head, is the decided piscivorous habit, is to be found in the Spoonbills, genus Platalea, Linna.

**Bill of Spoonbill.**

*Marriage in the family of Sir John Neville, of Chete, Knight.*

**Generic Character.**—Bill very long, strong, very much flattened, point dilated and rounded into the form of a spoon or spatula; upper mandible channelled, transversely furrowed at its base. *Nostrile* at the surface of the bill. *Wings* moderate, ample; the first quill nearly as long as the second, while the longest.

**Habits of the Genus.**—The Spoonbills live in society in wooded marshes, generally not far from the mouths of rivers, and are rarely seen on the sea-shore. Their food consists of small fishes, barn, and small fluvial testaceous mollusks, as well as small reptiles and aquatic insects. According to circumstances they build their nests either in high trees, in bushes, or among rushes. Their young are...

---

*HER 167 HER*

---

**Geographical Distribution.**—Very extensive, and embracing the great part of the old world (except Africa). In permanent in England. Dr. Latham says, 'In England, and the milder climates, this species of heron is stationary, migratory in the colder, according to the season; is rarely seen in the north of England and in the Cape of Good Hope, Ceylon, and other parts of India, and is found in America from Carolina to New York.' With regard to the American locality, Dr. Latham appears to have taken the Great Heron, Ardea Herodias, Linna., for the Common Heron, which last is described in the Ornithology of any of the ornithologists who have made the birds of America their study, as an inhabitant of the New World. Dr. Von Siebold mentions this our European species among the birds which he observed in Japan.

**Utility to Man.**—In days of old, when the Heron was a principal feature in the noble sport of hawking, and when the destruction of its eggs was visited with a penalty of twenty shillings, it seems to have held as high a place at the tables of the great as it did in the field. Thus, at the 'intronization' of George Nevell, archbishop of York, in the reign of Edward IV., we find in the bill of fare 400 Heronshawes and 200 Fessantnes (pheasants); and it seems, at one period, to have been valued as a dish at the table of the latter bird, for from the prices in the household-book of the fifth earl of Northumberland, we find Heron-seongs (Herons) marked at twelve pence, and pheasants at the same rate to a penny.

---

**Boat-bill.**

*Material in the family of Sir John Neville, of Chete, Knight.*
simple and ordinary, but the young bird does not take the confirmed livery of the adult till the third year; the bill is gradually developed, and appears covered with a membrane. The crest makes its appearance at the second season, but the characters are but slightly marked. (Temminck.)

We select as an example the Common White Spoonbill, *Platalea leucorodia,* Linnaeus.

We have, therefore, little doubt, the *leukorodia* (Leucorodia) of Aristotle (Hist. Anim., book viii., c. 3), of which he says that it haunts πεστὶ τῆς λίμνης καὶ ῥωτὶ σωροσελικτοί ("about the lakes and rivers"); and which he thus describes: "it is less than the other, the *kourot,* (one of the Herons, perhaps Ardea cinerea), and has a broad and long bill; a description which, when coupled with the white colour indicated by the name, can hardly be deemed applicable; nor can the term 'broad' be with any propriety referred to the bill of any of the true Herons. It is the Bucepharoeuglia (Belon) and Cucicharione (Bonaparte) of the modern Italians; *Fule, Peco, Cueller, Trulble* (Belon), and *Spodile* of the French; *Weisser Laffer* and *Laffil Gans* of the Germans; *Lepetar* of the Nether-

landers; *V Lydon big* of the Antient British; and *Spoon-
bill* and *White Spoonbill* of the Modern British.

*Description.*—A very full long occipital crest, formed of loose and subulate feathers.

*Very old Maes.*—All the plumage pure white, with the exception of that of the breast, where there is a large patch of reddish yellow; the extremities of this patch lessen in breadth which unit towards the upper part of the back. No skin about the eyes and throat pale yellow; but slightly tinged with red on the lower part of the throat. *Bill black,* but bluish in the hollow of the furrows; apex ocreous yellow; *iris* ash-coloured; *naked part tarnished white.* The yellow sternal patch does not begin to appear till the second or third year. (Temminck.)

Mr. Selby observes that in its anatomy it shows an affinity to the Cranes in the form of the windpipe, which, previous to entering the thorax, under goes a double flexure to the extent of about two inches, as in the convolution similar to the figure 8. The flexures touch, but do not cross each other, the points of contact being united by fine membranes. This double flexure, according to Wullthey and Temminck, is supposed peculiar to the males, but Mr. Selby remarks that Montague disapproved that idea, as the specimen he dissected was a female, and yet possessed the flexure to the extent above described; and this indiscriminate character was corroborated by the dissection of the specimen which Mr. Selby obtained.

*Food.*—Very small fish, spawn, testaceous mollusks, insects and aquatic worms, small reptiles, and the roots of some weeds and grasses.

Habits, Reproduction, &c.—The Common Spoonbill haunts the mouths of rivers. Its nest is built sometimes on lofty trees, sometimes in rushes and reeds, according to circumstances, and the eggs are from two to four in number, generally three, sometimes four. They are entirely white, but not frequently white marked with obscure red spots. They brood annually in the month of May in a wood at Sevenhuyzes, not far from London, but the wood has been long destroyed.

Geographical Distribution.—Broadly speaking, Holland appears to be a principal place for their summer meetings, and Temminck states that it has two periods of passage along the maritime coasts, and that it journeys with the storks. As winter approaches it migrates to more southern regions till the milder weather recalls it. Mr. Bennett states that in winter it takes up its quarters in various parts of Africa, extending southwards even to the Cape of Good Hope, and it is rarely met with in inland countries except on the banks of the larger rivers; but it is by no means uncommon during the season on the coasts of the great extent of country which it embraces in its visits.

In England it only appears occasionally; Pennant mentions a large flight which arrived in the marshes near Yarmouth in April, 1774. Montagu records it as having been sometimes seen during winter on the coast of South Devon, and mentions the receipt of two specimens from that part of the country, one in November, 1864, and a second in 1867. Mr. Harrell records two specimens which were shot in Lincolnshire in 1836, and Mr. Selby, when in London in 1839, obtained a male and female, in fine adult plumage, from Norfolk. Dr. Latham states an instance of its occurrence on the Kentish coast. The old quairain in the 'Portraits d'Oeuvres,' speaks of the Spoonbill under the name of *Fule,* as living 'es marches de Bretagne.'

*Platalea Leucorodia.* Common Spoonbill.

*Utility to Man.*—The flesh of the Spoonbill, when well fed and fat, is said nearly to resemble that of the goose in flavour.

STORKS. (Ciconia, Brisson.)

Generic Character.—*Bill long, straight, subcyllindrical, in form of an elongated cone, pointed, trenchant, butt (arête) rounded of equal height with the head; lower mandible a little curved upwards. Nostrils slit longitudinally in the horny substance of the bill, placed near the base. Eyes surrounded with a naked space, which does not communicate with the bill; the face, the space round the eyes, or a part of the neck, often naked. Feet long; three toes forward, united by a membrane up to the first joint, the posterior toe articulated on the same level with the others; *nails* short, depressed, without dentilations. *Wings* moderate; the first quill shorter than the second, which is rather shorter than the third, fourth, and fifth, which are the longest. (Temminck.)

*Bill of Stork.*

M. Temminck observes that the Storks live in marshes, and feed principally on reptiles, frogs and their spawn, as well as fishes, small mammiferous animals, and young birds. They are, in all the countries of the world where they occur, a privileged race, on account of their utility and of the havoc they make among noxious animals. Their migration takes place in great flocks; they are easily tamed. The moult is annual. The sexes do not differ.

The species best known are the White Stork, *Ciconia alba,* and the Black Stork, *Ciconia nigra.* We select the former as an example of that part of the genus which consists of the Storks properly so called.

*The White or Common Stork is the Hoary of Aristotle and the Greeks; Ciconia of the Antient Italians;*
Ciconia, Ciconia Bianca and Zygornia of the Modern Italians; Zygornia and Ciconia Bianche of the French; and Winter Stork of the Germans.

**Description.**—Bill straight, smooth naked skin of the cheeks very small, and not communicating with the bill; plumage white. Head, neck, and all the parts of the body pure white, excepted the bird in the more genial climates, where the naked skin around the eyes black; iris brown. Length 3 feet 5 or 6 inches.

**Young.**—The tawny blackness of the wings is tinged with brown in the young birds, and the bill of a reddish black.

**Habits, Food, Reproduction, &c.**—Assured by the kindliness with which it is treated in requital for its services in clearing the land of dead as well as living nuisances, the White Stork approaches the dwellings of man without fear. In Holland and Germany especially the bird is treated as a welcome guest, and there, as indeed elsewhere, it annually returns to the nest which has cradled many generations on the steeple, on the turret, on the false chimney that the Hollanders have erected for its site, in the box, or on the platform which the German has placed for its use. The stomp of a decayed tree is sometimes chosen by the bird, and the nest is made of sticks and twigs, on which are laid from three to five cream-colored, or yellow-white eggs, about the size of those of a goose. The incubation continues for a month, at the expiration of which period the young are hatched and carefully attended to by the parents until they are fully feathered and able to procure food for themselves. Frogs, lizards, snakes, and other reptiles, mice, moles, worms, insects, eels, the young of ducks and other water-fowl occasionally, and even partridges, according to M. Temminck, are devoured by these birds. In the Continental towns domesticated Storks which have been taken from the nest when young may be often seen parading about the markets, where they are kept as scavengers to clear the streets of filth and other offal, which they do to the satisfaction of their employers.

**Geographical Distribution.**—The arrival of the Stork in Europe takes place in the spring. In Seville it is very common; but, according to the Prince of Musignano, it is very rare and only an accidental visitor near Rome. Though so common in Holland, it very rarely arrives in Britain. The general drainage of our marshes may have something to do with this, but it is hardly sufficient to account for so striking a difference in the migratory distribution of the bird, more especially as it proceeds to higher latitudes; for it regularly visits Sweden and the north of Russia, and breeds there. The winter is passed by the bird in the more genial climates of Asia, and in the northern part of Africa, Egypt especially. Those who have seen these birds in the act of migration, speak of their numbers as very large: thus Belon remarks that Storks are never seen in flocks, except when they are in the air; and he relates how, being at Aby-

Vol. XII. 7-2
Description of the African Marabou, and differences between that species and the Indian Argula.—M. Temminck has clearly pointed out the differences between these two species. The African Marabou is less in size than the Indian Argula, the latter sometimes reaching six or even seven feet in height, while the former seldom exceeds five, even when the neck is elongated. The bill of the Argula is enlarged in the middle, the culmen of the upper mandible and the edges of the lower form a curved line from the base to the apex; in the Marabou the lines are straight and the bill is regularly conical: the nostrils of the Indian bird are ovate; those of the African species are oblong. The iris of the former approaches to pure white; that of the latter is dull-brown. The cervical or sternal pouch often hangs down more than a foot in the Argula; in the Marabou it is much shorter. The back and wings of the Argula are dull-black; in the Marabou there is a greenish tinge on the black of the back, with the exception of the larger wing-coverts and secondaries, which are of a more decided black, edged more or less broadly and distinctly, according to the age of the individual, with pure white bands. In the young birds these last distinctions are imperceptible. In both species the bill is inclined to vivid yellow in colour, and is more or less spotted with black towards the base, as is the head, which is dusky. When the bird is at rest the pouch as well as the neck are of a pale flesh-colour, but when it excited they acquire a redder tinge. These parts are sparingly covered with a few scattered brownish hairs, most numerous in the young birds, and resembling down in the early stages of its growth. The tail is black; the under parts pure white, more especially the under tail coverts, which afford the beautiful plumage. These are sometimes of a greenish-bluish tinge in the Indian species; but while the white of the African feathers is not so clear and brilliant as that of the Indian plumes, to which a decided and just preference is given. The natural colour of the legs is dusky-black, but in living birds these limbs are generally whitened by the dust shaken out of the plumage and other circumstance of the Indian. The bill of the Argula is elongated. In the latter species the bill is conical; the nostrils of the Marabou are ovate; those of the African species are oblong. The eyes of both species are black, and the feathers of the inner edges are white, so that a well-developed individual which roots very high among the silk-cotton trees and would destroy the servants bringing the dishes to the dinner-table from a distance of two or three miles from its perch. It stood behind its roaster's chair waiting to be fed, and occasionally helped itself, notwithstanding the guardianship of the servants who carried switches to prevent its matching the meat, which it nevertheless sometimes contrived to do: in this way it had been known to swallow a boiled fowl at a single mouthful. Besides the pouche the skin at the back of the neck can be inflated so as to have somewhat the appearance of a counterpane to the former. When the skin is contracted, the bird, we have observed this latter pouche, if pouche it may be called, very prominent, apparently from the rarefaction of the air. The bird flies high and roosts high, probably for the purpose of avoiding the warm air, which tends to enable it to perceive those objects on which its feed. May not these pouches assist, balloon-like, in supporting or balancing the great head and bill?}

CRANES.

Genus Pallas.

Bills of the length of the head or rather longer, strong, straight, compressed, the point in the form of an elongated cone, obtuse towards the end; lateral base of the mandible deeply channelled; base of the bill elevated. Nostrils in the middle of the bill, pierced through and through in the groove, and closed backwards by a membrane. Region of the eyes and base of the bill often naked, or covered with very excrecences (mamillons). Feet long and strong, a large naked space above the knee; three anterior toes, the middle one united to the external by a rudiment of a membrane, interior toe divided, posterior toe articulated on the tarsus. Bill greenish black, horn-coloured towards the point, and reddish at the base; red-brown between. Feet black. From the bill to the end of the tail, 3 feet 6 or 10 inches.

Old Birds.—These have a large whitish space behind the eyes and along the lateral part of the upper portion of the neck.
Young Birds before their second autumnal moult.—No nakedness on the top of the head, or the space hardly visible. The blackish ash colour of the front of the neck and occiput non-existent or only indicated by longitudinal spots.

This is the *Grus* (Geranus) of the Greeks; *Grus* of the Antient Italians; *Grus* and *Griva* of the Modern Italians; *Grue* of the French; *Grella* of the Spanish; *Kranich* and *Anhgrauwer Kranich* of the Germans; *Trane* of the Danes; *Garan* of the Antient British; and *Crane* and Common Crane of the Moderns.

Habits, Food, Reproduction, &c.—The habits of the Crane are migratory and gregarious. Mr. Selby remarks that in its contour and gait it bears a considerable resemblance to some of the *Struthiones*, and that we are reminded of the ostrich by the long flowing plumes that overhang the tail. He is of opinion that through this and other families its affinity to the Rinosaur birds is readily traced; and he observes that in its internal conformation it differs very essentially from the more typical families of the *Grallatores*, and that its strong and muscular stomach indicates a different general economy from that of the *Ardeidee*. This is quite true; but whilst the Crane frequents open and cultivated lands for the sake of the newly sown corn and seeds to be found in such tracts, it is far from averse to small testaceous mollusks, worms, frogs, and other reptiles. Temminck says that the nest is placed among the rushes, &c., and sometimes on the walls of isolated houses. The pale bluish-green eggs, marked with brown, are two in number.

*Anthropo'ides.* (Vieillot.)

Mr. Bennett remarks (Gardens and Menagery of the Zoological Society) that the name of the *Anthropo'ides*, conferred upon this genus by its founder, M. Vieillot, owes its origin to a mistaken reading of a passage in Athenaeus, which the French academicians of the seventeenth century improperly applied to the Demoiselle, or Numidian Crane, regarding the resemblance to man as the true reason of the name. *Anthropo'ides* as a convincing proof that the *Oitos* of the Greeks was a synonym of the bird, which they were themselves describing under the name of Demoiselle, from its elegant attitudes. "It is difficult," he says, "to conceive how these learned men, with Mr. Perrault at their head, could have stumbled on so gross a misapprehension; for the passages cited by them from the Greek and Roman authors, and those very passages which have been quoted to show the identity of the *Oitos* and *Oitos* of the former and the *Aris* of the latter were in truth nothing else than owls, and had consequently no connection with the Numidian Crane. M. Savigny, on the other hand, refers the latter bird to the *Oitos*, and Aristotle and other classical authors; but we must confess that we entertain considerable doubt of this opinion also. The scattered notices of the ancient *Orios* appear to us by far too scanty and indefinite to admit of their proper appropriation; and they combine moreover several traits which are quite irreconcilable with the identity of the two animals. With the exception of this distinguished naturalist, almost all the modern authors who have spoken of the Demoiselle have literally copied Buffon, who with singular inconsistency, at the same time that he corrects the error of synonomy into which the academicians had fallen, adopts all their quotations founded upon this very misconception. The truth is, that the real history of this species cannot be traced with certainty beyond the period of M. Perrault's memoirs, in which it was for the first time described under the fanciful denomination which it has since attained. We have frequently given the correctness of the name *Anthropo'ides*?a name that is not only well founded, but in which the character of the animal is still retained, the only question being what species should be arranged under it. The Demoiselle and the Baratarian Crane were the only two species of *Anthropo'ides* (Vieillot), till a third and most elegant species, *Z 2*.
The Demoiselle (Anthropodites Virgo, Ardea Virgo of Linnaeus) is about 3 feet 6 inches high, measured to the top of the head; from the point of the bill to the tip of the tail it is about 3 feet in length. Upper part of the head light grey; sides of the head, neck, and depending breast feathers, blackish; head and neck fully feathered. A tuft of pure white loose-barbed feathers, three or four inches long, directed backwards with a curvature downwards behind each eye. General tint slaty-grey; outer portions of all the quill-feathers dingy-black. Secondaries longer than the primaries, forming when the wings are folded dependent downward-curved plumes. Bill yellowish or flesh-coloured; iris reddish-brown.

Habits, Food, &c.—The habits of the Demoiselle are migratory, and its food consists in great measure of grain and seeds, though it occasionally takes small fishes, mollusks, and insects. Gizzard muscular. The Demoiselle produced young in the menagerie at Versailles, and one which was hatched and bred there lived twenty-four years.

Geographical Distribution.—Africa. It has been observed in the north, along the Mediterranean, the west from Egypt to Guinea, in the interior, and in the south near the Cape of Good Hope. It has been killed in Nepal, according to Mr. Gould; is found on the southern coasts of the Black Sea and Caspian, and has been observed at Lake Baikal. It is occasionally seen in Europe, and appears about Constantinople in October. At the inundation of the Nile great numbers arrive in Egypt.

The Stanley Crane, Anthropoides Stanleianus (so named by Mr. Vigors in honour of the Earl of Derby, then Lord Stanley, President of the Zoological Society of London), Anthropodites Paradisus of Bechstein, is in its general plumage bluish-grey, the top of the tumid head, which is well covered with soft feathers, is whitish, and there is a brownish post-ocular hand; the irides are chestnut-black, and the points of the quills, tail, &c., are brownish-black. Length from the tip of the bill to the end of the tail 3 feet 6 inches. Mr. Vigors mentions particularly the greater length and development of the hallux in this species, in which character, he observes, the bird seems to be intermediate between Anthropodites Virgo and the more typical Gruidæ. He considers the Balearic Crane as according with this species in this particular, and, by the additional character of the naked cheeks and caruncle under the chin, as exhibiting a still nearer approach to the true Grus Anthropodites Virgo, on the other hand, by the slight development of the hallux, appears to him to possess the nearest affinity of all the birds in the group to the Charadrius.

Habits, &c.—'In manners and gestures,' says Mr. Vigors, 'the Anthropodites Stanleianus appears to conform most intimately with the Demoiselle, displaying the same delicacy and elegance of attitude, and the same majesty, together with a grace and animation. I once had the good fortune to see it when released from the place of its confinement and set at liberty into an adjoining yard; and it was scarcely possible to witness a scene of more grace and animation. The bird, when after a few movements it felt itself free, bounded into the air, and traversed the yard with singular velocity, and a peculiar motion which could neither be termed running nor flying with its wings expanded, and its long quill-feathers streaming just above the ground, it sailed and swept along the open space, without regard to the numerous spectators who watched its movements, luxuriating in all the buoyancy and easiness of new-felt liberty. I understand that it is particularly eager in its pursuit after insects, which it takes when they are upon the wing; and that they seem to be its natural and most acceptable food. We may readily conceive what myriads of winged creatures it would encircle within its wings as it swept along its native marshes, in the manner observed above, and which it would thus bring within the compass of its prey.' (Zool. Journ., vol. ii.)

Locality.—East Indies.

The Balearic or Crowned Crane (Anthropodites pavoninus of Vieillot and others; Balaeniceps pavoninus of Brisson and others; Ardea pavonina of Linnaeus) received its English and French common name from its being supposed to be the Balearic Crane of the ancients. Its height when fully grown is about four feet. We select Mr. Bennett's description: 'Its plumage is of a bluish-slate colour on the neck and on both surfaces of the body; the quill-feathers of the tail and the primaries of the wings of a beautiful black; the secondaries, which extend beyond the base of the tail, of a bright and glossy brown; and the wing-covers pure white. The cheeks and temples are entirely naked, and are coloured of a bright rosy red, which sometimes over spreads the whole of the naked surface, and sometimes is confined to a portion of it, the remainder in this latter case becoming perfectly colourless and of a dull white. Beneath the upper part of the throat a similar naked space is gradually developed, which terminates in a dependent fold of the skin, like the wattle of a turkey, but more uniform on its surface, and of a brilliant red. As this prolongation is not always met with, it has been considered by some writers as a mark of sex; but of the two birds examined by the
French academicians, the one possessed it and the other, not and yet both were females: it may therefore with greater probability be considered as the result of age. The fore part of the head is covered by a close tuft of velvety feathers of a deep black; and behind these rises a very remarkable crest, consisting of a large number of flat yellowish filaments, each twisted spirally on itself, fringed along its edges with a series of black-pointed barbs and ter- ning in a blackish pencil. These filaments are of nearly uniform length, and measure four or five inches from base to tip. They take their origin from a roundish space on the back of the head, and expand equally in all directions, by a circularly larger diameter than the head itself. The bill, legs, and feet are of a dusky black; and the iris is remarkable for being almost destitute of colour. As in most of the birds of this family, the feathers of the lower part of the neck are long, narrow, and gracefully dependent over the breast.

This description is so good in the main that we have given it in the author's own words; but his observations in general are from himself, as secretary to the Zoological Society, subsequently (1833) brought under the notice of a meeting of its members specimens, from the Society's museum, of Crowned Cranes from Northern, and from Southern Africa, with the view of illustrating the characters which distinguish as species the birds from those several localities. Their specific distinction, he stated, on the authority of Professor Lichtenstein, was first pointed out, thirty years after that time, by the Professor's father, who gave to the Cape bird the name of Grus Regulorum. This distinction had not however, Mr. Bennett remarks, been generally known among ornithologists, although, to the author's knowledge, it had for some time been familiar, from observation both of numerous skins and of living individuals. In the bird of North Africa, for which the specific name of Pavoninus will be retained, the wattle is small and there is much red occupying the lower two-thirds of the naked cheeks: in that of South Africa the wattle is large, and the cheeks are white, except in a small space at their upper part; the neck also is of a much paler colour than that of the North African species. Mr. Bennett added that the latter characters had been observed to be permanent in an individual presented to the Society in April, 1829, from the collection of the late Marchioness of Londonderry, then still living at the Gardens. They existed also in both the individuals presented by Sir Lowry Cole.

Mr. Gray at the same time took occasion to remark that the ornamental crest in the Crowned Crane, added to other distinguishing characters which had frequently been pointed out, might be regarded as indicating a generic difference between them and the Demoiselle and Indian Cranes, of which the crest of the male is of a form usual in the genus Grus, a genus from which they scarcely differ, except in the comparative shortness of their bill. For the group including the Crowned Cranes the name of Balaeniceps might he thought, in the first, as a genus of Anthropoides be appropriated to the one comprehending Anthropoidea Virgo, Viell., and Anth. Paradisiaceus, Bechst. (Zool. Proc., 1833).

The species with the small wattle and different characters will, according to this proposition, stand as Balaeniceps pavonia: Locality, Northern and Western Africa. The species with the large wattle, &c., will stand as Balaeniceps Regulorum: Locality, Southern Africa.

Hhabits, etc.—Presumed to be migratory; but little is known of them, except in captivity, to which the birds are easily reconciled, living in friendship with the domestic poultry, and other captives, and even, as we have heard, of those of nature they are said to frequent swampland places, and to subsist partly upon fishes, worms, and insects, and partly on vegetable substances. They run with the wings expanded, and with great rapidity. One note is of a musical unison, and hoarse. In the catalogue to the African Museum, now (June, 1838) just coming to the hammer, one of the species, there called the Kaffir Crane, is said to be held sacred by the Kaffirs bordering on the Cape colony; and if one should happen to be killed, even by accident, a calf or young cow must be slaughtered as an atonement. Mr. Swainson (Classification of Birds) notices specimens of Ardea pavo- nina, Linn., as having been brought to him when in Malta,

from the little island of Lampidosa, where, says he, they are by no means scarce.
twelve fingers in length, and from this fact proposed for it the name (duodenum) by which it is still called.

Herophilus practised surgery as well as medicine, but it is probable that very soon after his time the division of surgery and medicine was distinctly practised. On his knowledge of medical practice there is no sufficient evidence in the extracts which Galen makes from his works to enable us to form an accurate idea, and his fame must rest rather on the numerous assistants by which he was afforded by his anatomical researches, than on any immediate addition to the means of curing disease. He does not appear to have drawn many pathological conclusions from his knowledge of the healthy structure, but his observations on the pulse, of which his master Praxagoras had taught him some of the value as a means of discriminating diseases, were important and interesting; and it was he who first showed that paralysis is the result not of a vitiated state of the humours, as was generally supposed, but of an injury to the nerves. Herophilus seems to have founded a school which took its name from him. According to Strabo (xxi. p. 589) there was a great school (Δαισακαλε) of Herophilists in his time, and situated in a temple between Lacedaemia and Cyrus in Phrygia.

HERPES. The word herpes was employed in a very vague sense, and applied to many eruptions of different kinds. The term was generally used after the manner of the skin, characterised by the eruption of clusters of transparent globular vesicles, situated on a red and inflamed base extending some lines beyond them. The vesicles of the ear are generally small and pear-shaped; of the skin, very small; the clusters themselves are distinct, being separated by portions of perfectly healthy skin, and they generally rise in quick succession. This eruption is attended, and accompanied by a degree of constitutional disturbance which generally varies with the extent of the local affection, being often slight and attractive no notice, when this is limited and consists of a few clusters only; in the more general cases, and especially of fever, when the clusters are numerous and spread over an extensive surface in a young and plethoric subject. The local affection is announced by a sensation of heat and tingling experienced in the part, and first appears as a small red spot, appearing in a few days as a very minute vesicles. These vesicles, which contain a transparent colourless fluid, rapidly enlarge, and, in the course of some hours, attain the size and present the form and aspect of very small peas; in the thickest part of the cluster two or three of the vesicles coalesce, forming one of irregular figure and larger size. There is a sensation of prickling and smarting pain experienced in the part. The vesicles gradually become confluent, and the base, together with a portion of the skin, are succeeded by brownish scabs: the herd and irritation of the portion of skin on which they are situated subsides; and the scabs fall off, leaving a tender and reddened state of the skin. The eruption is far from the most disgusting; the dual clusters, from their first appearance to the falling off of the scabs, varies from one to two weeks. When there is a succession of clusters, they all follow the same march; the feverish state persists as long as fresh vesicles continue to arise, and the affection may be prolonged to three or four weeks. In some cases the fluid is absorbed, the vesicles shrivel, and, at the end of four or five days the affection terminates in desquamation; in others, the fluid in the vesicles becomes purulent, and they are succeeded, especially when seated on the back, by superficial ulcers, which prolong considerably the duration of the disease.

The eruption of Herpes is, though in all cases the same characters, and follow nearly the same march, are sometimes confined to a particular locality, justifying the designation, H. labialis, H. preputialis or assume a particular arrangement, giving rise to the varieties, Herpes zoster, when they are situated on one half of the body and extend in a line or hand; H. phlyctenodes, when they are disseminated; and H. circinatus, when they occur in circles or rings.

In H. labialis the clusters are disposed irregularly about the mouth, generally on the external surface of the lips, in some cases extending to the cheeks and also naso, and in rare instances occurring also in the pharynx. It is occasioned by an irritation of the mouth, or unusual exposure to cold winds, or to the atmosphere, as in travelling; at the termination of the hot stage, in auberge; and during the course of scarlatinal fever and pneumonia. It is always a slight affection in itself, requiring no treatment beyond that of the disorder which it accompanies.

H. preputialis. In this variety there are one or more small clusters of vesicles, either on the external or internal surface of the scrotum. When situated externally, they follow the ordinary march or terminate in desquamation, and require no treatment, with the exception of the application of lint soaked in the lotion of acetic acid, for the purpose of alleviating the itching and preventing the rupture of the vesicles and the consequent formation of an ulcer. When they occur on the internal surface of the prepuce, the vesicles are kept continually moist, break at the end of four or five days, and often give rise to an excoriating or suppurative ulcer, which by an inattentive observer may be mistaken for a syphilitic sore. It soon heals under the influence of cleanliness, the local application of the lead lotion, and the administration of a few alteratives.

In H. zoster, familiarly known by the name of shingles, there is a succession of clusters of white silvery vesicles, forming an oblique line or band, limited to one side, and situated near the midline of the body. It is generally ushered in by severe febrile symptoms, and bysmarting or deep-seated pains, which indicate the future course of the eruption. Each cluster follows the march of the ordinary affection, but may terminate in desquamation or with the formation of small sloughy ulcers as long as there is a succession of vesicles. It is unattended with danger, excepting in old persons, where the clusters are occasionally followed by gangrenous and sloughy sores. In the young and vigorous, the eruption terminates in the formation of bleeding, saline purging substances, and the application to the part of a sedative lotion. This treatment alleviates the sufferings of the patient, but has very little influence on the duration of the eruption. The course of the eruption is often met with in children during durtion.

In H. circumnatus, or herpetic ringworm, the eruption is limited in extent, frequently of a circular form, and consists of extremely minute vesicles which terminate in exfoliation, leaving a scurfy area. It occurs frequently on the cheeks in children and in women of delicate complexion, and is often confounded with a disease of the skin, entirely different in its nature, known as the vulgar pellagra, and denominated ringworm. This form of Herpes soon disappears under the influence of the local application of almost any astringent solution.

None of the above named eruptions are contagious, and all occur most frequently in the young, during spring and autumn, and in warm climates.

The existence of distinct groups of vesicles on red and inflamed bases is sufficient to distinguish Herpes from every other cutaneous affection.

HERPESTES. [Ichneumon.] HERPETOLOGY, that branch of science which treats of the organisation, natural history, and aliment of reptiles. The term, literally construed, means a discourse upon reptiles, from Ερπετος (Herpeton) a reptile, and Ἄγος (Logos) a discourse.
Moors), painter and architect, son of the preceding, inherited his father's talents. The father being a man of a tyrannical disposition, his son left him, and went to Rome to pursue his studies. After his father's death he returned to Seville, and in 1660, he made sub-director; but being too proud to brook the superior authority of Murillo, he went to Madrid, where he roused the most eminent artists. He painted in all oil or fresco; and his style was that of St. Philip, who pleased King Philip IV., that he commissioned him to paint the chapel of the Madonna de Atocha, where he painted the Assumption of the Virgin. This and other works are said to have been prepared by the Duke of Alburquerque, who was married to Queen and superintendent of the royal edifices. He died in 1685, aged 63.

HERRERA, ANTONIO, coronel mayor de las Indias y Cazalla, born at Cuéllar, 1499, died at Madrid on the 19th March, 1528. He is extolled by Robertson (Hist. of Amor, h. v., note 70), and many other distinguished writers. Quintana (Vida de Pizarro, appendice vii.) points out some inaccuracies, which however he extenuates in an unavoidable in that work, the chief and still the best source of information which Herrera left for subsequent writers on American history from 1492 to 1534. The first and now rare edition of that description of the Spanish colonies which bears the title of 'Historia General de los Hechos de los Castellanos en las Islas y Tierra Firme del Mar Oceano, en 8 décadas,' 4 vols. fol., Madrid, 1601. A second edition, that of Antwerp, 4 vols. fol., 1762, is very incorrect. A highly approved edition was published by Firma de las Indias Occidentales,' 4 vols. fol., Madrid, 1730. Bartheu published this history in his 'Novus Orbis,' 1622; and Nicolaus Coste, in his 'Histoire Générale des Voyages dans la Nouvelle-Hispanie,' 2 vols. fol., Paris, 1655.

HERRN, or HERRNUTH, a small town in the Saxon province of Upper Lusatia, the original and principal seat of the Moravian brethren. It lies between Tittau and Lohau, on the southern declivity of the Huthburg, from which it has its name. It was founded in 1722 by Count Zinzendorf. The situation is pleasant, and there are several handsome houses, especially the house of the Brothers, and that of the Sisters, very neat. The inhabitants, about 1500 in number, are very simple and pious, and order and cleanliness prevail even among the lowliest of them. The school should look for such an account of his life and labours as shall be worthy of the sagacious activity of the first, and the enormous extent and value of the second.

Herschel, William. William Herschel, the second son of a musician at Hanover, and was born November 15, 1738. His father brought him up to his own profession, with four other of his sons, giving them at the same time a good education in other respects. At the age of fourteen, he was placed, it is said, in the band of the Hanoverian regiment of guards, which regiment he accompanied to England at a period which is variously stated from 1757 to 1759. Another account states that he came to England alone. After his first arrival, he was placed in a band of the Guards which he was to have superintended the formation of a band for the militia, and afterwards was for several years an organist at Halifax, where he employed himself in teaching music and studying languages. Then he was ordered to attend on the court of the Greek and Roman empresses, and was placed at their court, and was appointed a Jesuit elsewhere, and was finally made a professor of mathematics at the University of Jena. That, and the employment of a musician, by which he was placed upon holding notes, which he dexterously removed in time—that in Italy, to procure money to pay his passage home, he gave a concert, at which he played at once upon harp and two horns, and was fastened to each shoulder—the fame of his professional talents was ever employed in a band. About 1768 he was organist of the Octagon chapel at Bath; in which capacity he began to turn his attention to astronomy. How well his talents suited that pursuit was afterwards seen, and his preliminary studies had been amply sufficient for the purpose. Though not a mathematician of the first order, his attainments in that science were more than respectable, and the power of his observation was, like that of Young, so great as to make it a source of regret that he did not pay special attention to the exact sciences. The earliest writings of Herschel which has come down to us are a translation from the French edition of the 'Ladies' Diary' for 1775, proposed by Peter Puzleem (a name which the celebrated Landen always adopted in his contributions to that work), namely 'The length, tension,
HER

and weight of a musical string being given, it is required to find how many vibrations it will make in a given time, when such a given weight is fastened to its middle and vibrates with it.

His astronomical pursuits led him to desire a telescope, and as the purchase of a good reflector was 'fortunately' xed to be resolved to. After many trials he succeeded in making a Newtonian telescope of five feet focal length, and we nd him before long not only in possession of adequate means, the work of six years attaining those objects with a true celestial conception of the field in which his services were wanted, and a persevering determination to throw light upon our knowledge of the organization of the universe.

Of the great branches of astronomy; the rst consisting of those investigations, theoretical and practical, by which the ming clockwork of the heavens is made our measure of time, and our means of settling the relative positions of places on the earth, and of guiding a vessel from one port to another; the second consisting of inquiries, theoretical and practical, into those phenomena which guide us to such knowledge as we can obtain of the constitution of the heavenly bodies. The study of the science of optics, the instrument of telescopes, the prize, since it is not every one who would know what he had got hold of, even when the writing was in his hands; but if the same person were to make the same discovery while voluntarily engaged in the study of mathematics, the credit due to the discovery would be very much increased. This case is analogous with that of Herschel. Apart from a more diligent and assiduous volunteer carrying on with no great pecuniary means a laborious and useful train of investigation.

The announcement of this comet or (as it turned out) planet drew Herschel immediately into the full blaze of fame; and George III. honoured his reign by immediately attaching the new astronomer to his court under the title of private astronomer to the king, and with a salary of 400l. a year. Herschel nded his residence rst at Datchet, and afterwards at Slough, near Windsor, and his abode became, as Fourier remarks, one of the remarkable spots of the civilized world. His family consisted at rst of one of his brothers, and his sister, Miss Caroline Herschel, who was his coadjutor and assistant in his computations and reductions, and also actively employed in observation, having been among other things, the discoverer of more than one comet. This lady retired to Hanover at the death of her brother, and is still alive, though much past eighty years of age.

Herschel married a widow lady, Mrs. Mary Pitt, and left on her name has long been known to the public as one of the most active and successful adherents of science that our day has produced. We write this on the eve of the public dinner given to Sir John Herschel on his return from India. The hope had been entertained for the last four years engaged in making a survey of the southern hemisphere similar to those which his father made of the northern. Amidst the gratification with which all who are interested in the progress of astronomy will regard this highly memorable work, it may subserve to bring to the clear and powerful results of William Herschel's mind lie buried in the Philosophical Transactions, inaccessible to the larger portion of those who might learn from them to form a taste for him.

The de ciency of authentic information leaves us little more to say on the private life of Herschel. He was knighted, and received the degree of doctor of laws from the university of Oxford, but we cannot nd the dates of either. He was soon in afuent circumstances, partly by the sentiments with which the whole community regards his recent expedition on the one in continuation of the labours of the other.

Herschel must be remembered by the number of bodies which he added to the Solar system, making that number seven as large as any man of his age; his discovery of the asteroids and other objects; and the great comet, and the four satellites of Jupiter and of Saturn, the number previously known was eighteen; to which he added nine, namely, Uranus and six satellites, and two prominent clusters of stars, and Saturn's rings, and the measurements of the rotation of Saturn and Venus, his observations of the belts of the former, and his conjectural theory, derived from observation, of the rotation of Jupiter's satellites, with a large number of minor observations, prove that no one individual ever added so much to the facts on which our knowledge of the solar system is grounded. To this we must add, that his announcement (in 1803) of the motions of binary stars, each other was accompanied by the rst proof that there exist in the universe organized systems beside our own; while his magnificent speculations on the Milky Way, the constitution of nebulae, &c., &c., rst opened the road to these subjects; but even that daring faculty would have rejected the ideas which, after Herschel's observations, became sober philosophy. On matters of detail the views of Herschel are beyond enumeration in an article like the present; the list given below will furnish some notion of them.

The instrument by which this great work was achieved was the reflecting telescope, the second re ecting surface which is found in the constructions of Newton, Gregory, and Cassegrain having been rejected, and the eye-piece applied directly to the image produced from the large mirror, which is the distinguishing feature of the Herschelian telescope. Herschel had constructed more than one such instrument of 20 feet focal length before he attempted the enormous one of 40 feet, the apparatus for supporting and directing which strikes the eye of the traveller passing through Slough. The instrument was begun in 1785, and Herschel dates the completion from August 28, 1789, on which day he discovered with it the sixth satellite of Saturn.

The comet was double stars, nebulae, &c., and of the comparative brightness of stars, would alone constitute a title to the name of a distinguished astronomer; and the optical researches, with those on the re frangibility of heat, would have highly con trasted with the papers on the use of telescopes should be read by all who wish to understand those instruments. But we have no further room for spe-
Herschel's great telescope at Slough.

List of Sir William Herschel's Papers in the Philosophical Transactions, specifying the year and volume in which each appeared.

1780, vol. 70. Astronomical observations on the Periodical Star in Cobo Ceti. In his abridgment of the Phil. Trans., Dr. Hutton adds the following note to this title of Herschel's work: 'See some authentic memoirs of this extraordinary character in the European Magazine for January, 1780.'

1780, vol. 70. Astronomical observations relating to the Mountains of the Moon.

1781, vol. 71. Astronomical observations on the rotation of the planets round their axes, made with a view to determine whether the earth's rotation is perfectly equal.

1781, vol. 71. Account of a Comet. This supposed comet was afterwards found to be the planet now called Uraeus [Uranus], discovered on Tuesday the 13th of March, between 10 and 11 in the evening.

1781, vol. 71. Description of a Micrometer for taking the angle of position.


1782, vol. 72. A paper to obviate some doubts concerning the great magnifying powers used.

1783, vol. 73. On the name of the new Planet. Herschel called it Georgium Sidus, 'as an appellation which will conveniently convey the time and country where and when it was brought to view.'

1783, vol. 73. On the diameter and magnitude of the Georgium Sidus, with a description of the dark and lucid disc and periphery micrometers.

1783, vol. 73. On the proper motion of the Sun and Solar system, with an account of several changes that have happened among the fixed stars since the time of Mr. Flamsteed.

1784, vol. 74. On the remarkable appearances at the polar regions of the planet Mars, the inclination of its axis, the position of its poles, and its spheroidal figure; with a few hints relating to its real diameter and atmosphere.

1784, vol. 74. Of some observations tending to investigate the construction of the heavens.


1785, vol. 75. On the construction of the heavens.


1786, vol. 76. Investigation of the cause of that indistinctness of vision which has been ascribed to the smallness of the optic pencil.


1787, vol. 77. Discovery of two satellites revolving round the geocentric planet.


1788, vol. 78. Of the Georgian planet and its satellites.


1790, vol. 80. Discovery of a sixth and seventh satellite of the planet Saturn; with remarks on the construction of its ring, its atmosphere, its rotation on an axis, and its spheroidal figure.

1790, vol. 80. On the satellites of the planet Saturn, and the rotation of its ring on an axis.

1791, vol. 81. On nebulous Stars, properly so called.

1791, vol. 81. On the ring of Saturn and the rotation of the fifth satellite on its axis.


1794, vol. 84. Discovery of a Comet, by Miss Caroline Herschel.

1794, vol. 84. Observations of a quintuple belt on the planet Saturn.

1794, vol. 84. On some particulars observed during the late eclipse of the Sun.

1794, vol. 84. On the rotation of the planet Saturn on its axis.


1795, vol. 85. Description of a 40-feet reflecting telescope.

1796, vol. 86. Discovery of a new Comet, by Miss Caroline Herschel, with remarks by Sir W. Herschel.

1796, vol. 86. On the method of observing the changes that happen to the fixed stars; with some remarks on the stability of the light of our Sun: to which is added a catalogue of the comparative brightness, for ascertaining the permanency of the lustre of Stars.

1796, vol. 86. On the periodical star a Herculis, with remarks tending to establish the Rotatory Motion of the Stars on their axes. To which is added a second catalogue of the comparative brightness of the Stars.

1797, vol. 87. A third catalogue of the comparative brightness of the Stars; with an introductory account of an index to Mr. Flamsteed's observations of the fixed stars contained in the second volume of Historia Caelestis; to which are added several useful results derived from that Index.

Vol. XII.—2 A
1797, vol. 87. Observations of the changeable brightness of the Satellites of Jupiter, and of the variation in their apparent magnitudes; with a determination of the time of their rotary motion on their axes; to which is added, a measure of the diameter of the second satellite, and an estimate of the comparative size of all the four.

1798, vol. 88. On the discovery of four additional Satellites of the Geometric Sidus: the retrograde motion of its old Satellites announced; and the cause of their disappearance from the planet explained.


1800, vol. 90. On the power of penetrating into space by means of a colossally magnifying, or refracting telescope, to discover the rays which occasion them, are subject, in order to determine whether they are the same or different. Two papers in the same volume.

1801, vol. 91. Observations leading to investigate the natural causes of the apparent or sickness of its variable emission of heat and light; with remarks on the use that may possibly be drawn from solar observations.

1801, vol. 91. Additional observations on the same, with trials to set aside darkening glasses, by transmitting the solar rays through liquids; and a few remarks to remove objections against the former paper.


1803, vol. 93. Observations of the transit of Mercury over the disc of the Sun, to which is added an investigation of the causes which often prevent the proper action of mirrors.

1803, vol. 93. Account of the changes that have happened during the last twenty-five years, in the relative situation of the Planets; with an investigation of the cause to which they are owing.

1804, vol. 94. Continuation of the last paper.

1805, vol. 95. Experiments for ascertaining how far telescope tubes made by measuring various angles, are fitted to distinguish the real from the spurious diameters of Celestial and Terrestrial objects; with an application to Mr. Harding's lately discovered star (June).


1806, vol. 96. On the quantity and velocity of the Solar Motion.

1806, vol. 96. Observations and remarks on the figure, the climate, and the atmosphere of Saturn and its ring.

1807, vol. 97. Experiments for investigating the cause of the double ring discovered by Sir Isaac Newton, between two object-glasses laid on one another.

1807, vol. 97. Observations on the nature of the new Celestial Body (Vesta) discovered by Dr. Olbers; and of the Comet which was expected to appear last January in its return from the sun.


1809, vol. 99. Continuation of the last paper but two (Newton's rings).

1810, vol. 100. Supplement to the last.

1811, vol. 101. Astronomical observations relating to the Construction of the Heavens, arranged for the purpose of a critical examination, the result of which appears to throw some new light upon the organization of the celestial bodies.

1812, vol. 102. Do. of a second Comet, with do. do.

1814, vol. 104. Astronomical observations relating to the Sidereal part of the Heavens, and its connexion with the Nebuloid part, arranged for the purpose of a critical examination.

1815, vol. 105. A series of observations of the satellites of the Georgian planet, including a passage through the node of their orbits; with an introductory account of the Telescopick Apparatus that has been used on this occasion; and a few remarks on the results of some calculations particular deduced from the observations.

In the first volume of the Memoirs of the Astronomical Society (1823) is to be found (with the date 1821) a paper entitled "On the discovery of 114 new nebulae and star clusters," by Dr. Hertford, who, in the reign of Edward I., let it out to clerks. Chalmers, in his 'History of the University of Oxford,' traces the conveyance of the building to Oxford through a grant of land of the property of De Hertford. Its situation was then nearly on the site of the hall of the college, in New College Lane. In A.D. 1315 it was conveyed to Walter Stapledon, bishop of Exeter, and founder of Exeter College, who procured a licence from the king to grant this and another messuage, called 'Arthur Hall,' to twelve scholars studying in Oxford. The scholars of these halls, which appear to have been incorporated in the corporation of the Two Double Stars, or Hart Hall, were, with their rector, removed to Exeter College, of which the hall became a dependency. The principals were appointed by the authorities of Exeter College, except during a short period, when the scholars of New College, which was then building, were admitted, and the society was governed by the wardens of that college.

In 1719 Dr. Richard Newton was inducted as principal. This gentleman, having conceived the project of raising Hart Hall to the rank of a college, settled a yearly annuity as an endowment for four senior Fellows, at the rate of 13l. 6s. 8d. each per annum. He also expended about 1500l. in building a new chapel and in adding to the previous buildings very many windows, and a new staircase, and adding the halls. In 1739 he completed the body of statutes which he had drawn up for his intended foundation; and on August 27, 1740, obtained a royal charter for raising Hart Hall into a perpetual college for the usual salaries and academic employment to consist of four senior fellows or tutors, whose allowance has been mentioned above; eight junior fellows or assistants, who were to have 20l. 13s. 4d. each; twenty-four actual students, with an allowance of 13l. 6s. 8d. each, which might be augmented by an allowance of sixpence per diem for commons; and four scholars.

The statutes of Dr. Newton appear to have been injurious to Oxford. The regius reader of the Reid and him to fix the maximum of remuneration was inconsistent with a consideration of the rise of markets; and the benefactions which were added subsequent to the foundation of the college were insufficient for its support.

The society subsisted for some years on its scanty funds; but upon the death of the principal, Dr. Bernard Hodgson, A.D. 1775, the office was not filled up. The foundation was then dissolved, and some portion of the corporate funds, reserved for the use of the then only surviving Fellow, was, on his death, appropriated to the establishment of a university scholarship for the encouragement of Latin literature. The election is yearly. The greatestificent in 1866. *"Reform the foundation of all colleges all education in the university was carried on in certain houses, or sets of buildings called halls, lines, or hostels, which were generally the residences of Oxford students, or 'villas,' generally to societies connected under one roof, in which case they were denominated 'halls.' When they thus became halls, though the professors still retained the ancient rents, and to the same extent, yet they could not divert them from the purposes of education; nor does it appear they could raise the rents at pleasure."* (Chalmers.)
the Latin language" among the candidates is elected, and no scholar is admissible for re-election.

Among the eminent men who were scholars of Hart Hall may be enumerated Lord Buckhurst, Selden, Dr. Donne (afterwards of Gresham College), Whiston, and the compiler of the well-known "Chronicle." Among those who were scholars of Hertford College are Edward Lye, the Saxon lexicographer; Thomas Hutchinson, the editor of Xenophon; Dr. Thomas Hunt, professor of Arabic; Dr. Caesar Chicheley, author of a treatise on Jewish antiquities; and Charles James Fox. Dr. Newcome, archbishop of Armagh, translator of Zarekil, the Minor Prophet, and the New Testament, is also claimed by this college.

Hertfordshire, being a part of the county of Essex, is bordered by the county of Middlesex, situated between 51° 36' and 52° 5' N. lat., and 0° 3' E. and 0° 45' W. long. It is bounded on the north by Cambridgeshire, on the east by Essex, on the south by Middlesex, on the west by Buckinghamshire, and on the north-west by Bedfordshire. Its greatest length is from north-east, near Royston, to south-west, not far from Rickmansworth, 39 miles; its greatest breadth is from the neighbourhood of Hitchin to Waltham Cross, 28 or 26 miles. Its area is estimated at 560 square miles. The population, in 1831, was 143,341, being about 228 to a square mile. It is in point of size the thirty-fifth of the English counties, in number of inhabitants the thirty-fourth, and in density of population the thirty-sixth. The county of Hertfordshire is 20 miles north of St. Paul's, London, in a straight line, or 21 miles from Shoreditch Church, London, by the road through Cheshunt, Hoddesdon, and Ware.

The West Country.—Hertfordshire has no lofty hills. The highest elevations are the Chalk Downs, which form the continuation of the Chiltern Hills north-eastward into Essex and Cambridgeshire. Kems womb Hill, just within the border of the county, near Luton in Bedfordshire, is 385 feet above the sea. The surface of the county is generally undulating, and from the abundance of woods presents a variety of pleasing scenery.

The rivers for the most part belong to the basin of the Thames. This line all the rivers of the Lea, the Hiz and some other streams in the northern part of the county belong to the system of the Ouse. The Lea rises in Lutewine or Leagrave Marsh, near Luton, in Bedfordshire; and flowing first east and then south-east for ten miles, enters Hertfordshire on the north-west side of the county, and flows 9 miles south-east to the neighbourhood of Hatfield: from thence it flows east-north-east 9 miles by Hertford to Ware. At Hertford it receives the Marian or Hertford Navigation. The surfaces of the county is generally undulating, and from the abundance of woods presents a variety of pleasing scenery.

The rivers for the most part belong to the basin of the Thames. This line all the rivers of the Lea, the Hiz and some other streams in the northern part of the county belong to the system of the Ouse. The Lea rises in Lutewine or Leagrave Marsh, near Luton, in Bedfordshire; and flowing first east and then south-east for ten miles, enters Hertfordshire on the north-west side of the county, and flows 9 miles south-east to the neighbourhood of Hatfield: from thence it flows east-north-east 9 miles by Hertford to Ware. At Hertford it receives the Marian or Hertford Navigation. The surfaces of the county is generally undulating, and from the abundance of woods presents a variety of pleasing scenery.

The rivers for the most part belong to the basin of the Thames. This line all the rivers of the Lea, the Hiz and some other streams in the northern part of the county belong to the system of the Ouse. The Lea rises in Lutewine or Leagrave Marsh, near Luton, in Bedfordshire; and flowing first east and then south-east for ten miles, enters Hertfordshire on the north-west side of the county, and flows 9 miles south-east to the neighbourhood of Hatfield: from thence it flows east-north-east 9 miles by Hertford to Ware. At Hertford it receives the Marian or Hertford Navigation. The surfaces of the county is generally undulating, and from the abundance of woods presents a variety of pleasing scenery.

The rivers for the most part belong to the basin of the Thames. This line all the rivers of the Lea, the Hiz and some other streams in the northern part of the county belong to the system of the Ouse. The Lea rises in Lutewine or Leagrave Marsh, near Luton, in Bedfordshire; and flowing first east and then south-east for ten miles, enters Hertfordshire on the north-west side of the county, and flows 9 miles south-east to the neighbourhood of Hatfield: from thence it flows east-north-east 9 miles by Hertford to Ware. At Hertford it receives the Marian or Hertford Navigation. The surfaces of the county is generally undulating, and from the abundance of woods presents a variety of pleasing scenery.

The rivers for the most part belong to the basin of the Thames. This line all the rivers of the Lea, the Hiz and some other streams in the northern part of the county belong to the system of the Ouse. The Lea rises in Lutewine or Leagrave Marsh, near Luton, in Bedfordshire; and flowing first east and then south-east for ten miles, enters Hertfordshire on the north-west side of the county, and flows 9 miles south-east to the neighbourhood of Hatfield: from thence it flows east-north-east 9 miles by Hertford to Ware. At Hertford it receives the Marian or Hertford Navigation. The surfaces of the county is generally undulating, and from the abundance of woods presents a variety of pleasing scenery.

The rivers for the most part belong to the basin of the Thames. This line all the rivers of the Lea, the Hiz and some other streams in the northern part of the county belong to the system of the Ouse. The Lea rises in Lutewine or Leagrave Marsh, near Luton, in Bedfordshire; and flowing first east and then south-east for ten miles, enters Hertfordshire on the north-west side of the county, and flows 9 miles south-east to the neighbourhood of Hatfield: from thence it flows east-north-east 9 miles by Hertford to Ware. At Hertford it receives the Marian or Hertford Navigation. The surfaces of the county is generally undulating, and from the abundance of woods presents a variety of pleasing scenery.
lessness in quantity than might be desirous, and by no means so

clean as it ought to be. Draining has been resorted to by

some spirited proprietors and lessees; but where farms are

let at rack-rent, and from year to year, the expense of

improvement can be expected. Even if the

landlord is liberal, and offers to furnish draining tiles, the

tenant has not a sufficient interest to avail himself of the

offer, or to put them down in the most efficacious manner.

The chance there are many an Hertfordshire tenant tends to

introduce a high state of cultivation around their immediate

residences; but, as the mansions are generally erected in the

drier and hest situations, the cold wet clays are not so

ideal on the clay; the fences are not so well kept; and a more slowly hus-

bandry is observed. The old heavy plough with four horses

in a line may still be seen; and in some places the heavy

load carried with flints and stones can scarcely be moved

with less power: but a great improvement might be made in

the construction of the plough; and effectual draining, with

the use of the subsoil plough, would greatly lighten the

texture, and enable lighter ploughs and fewer horses to

stir them sufficiently.

Hertfordshire has been remarkable for its high banks and

hedges. In many of the lanes, where two carriages could

converge, one on each side, it is difficult for a man

standing on a waggon to see over the hedge. This makes the

surface of the country look rich when seen from the

hills, especially when there are woods and coppices inter-

spersed amongst the fields, and many trees in the hedge-

row. These hedges are a great evidence of the proper

cultivation of the soil. They are left to grow till

the wood in them is valuable for fuel, and they are cut

down more for the sake of the faggots than to keep up the

fence; many of them are levelled, which are stopped up

by cutting half through some of the stems in the hedge,

and laying them down, which is called phalasing. [Hirkok]

Wherever the old high banks have been levelled, and neat

quick hedges have been planted in their stead, and kept

in trim, and trimmed, the ground which has been gained, together

with the earth of the old banks, to mix up with lime and

vegetable matters in a compost, have soon repaid the

expense. This can be done by a hedge in a growth of ten or twelve

years is poorly repaid by a few faggots sold to the bakers or

brick-hurners.

It cannot be said that there is any peculiar system of cul-

tivation in Hertfordshire. Every system may be occasion-

ally met with. The resident proprietors, many of whom

hold considerable farms in their own hands, employ bailiffs,

who come from various parts of the country, and introduce

the systems which are accounted so in Norfolk, others from Northumberland or Scotland. But

before the common fields were enclosed, as they are now

almost universally, a fixed rotation was unavoidable, as

there were rights of pasture over certain portions of the

field in which the crops were to be grown, and as soon as the

fields were freed from this impediment to good cultivation,

each proprietor introduced his own method, whether good or

bad. The consequence has been a very great difference in

the crops of adjoining farms, according as they have

fallen into the hands of industrious men with science and

capital, or remained with those who follow the example of

their forefathers. The crops are reaped as close to the

ground as possible, in order that the straw may be sold in

London and manure brought back in return. The corn is

threshed chiefly by hand, the straw thus produced being of

greater value for horse litter. Fewer cattle are fed in

which parts than in the larger counties, as manure can be

obtained without them.

A species of rough garden hushandry has been introduced on

the best soils nearest to London for the growth of early

potatoes, cabbages, peas, and other culinary vegetables,

which are succeeded in the same year by other crops, the

whole being forced by an abundance of manure. The

plough is used, but a great portion of the labour is done by

hand.

There are many orchards in Hertfordshire, chiefly for

apples and cherries, which are sold in London. No cider

is made. A good cherry-tree full-grown will give in a
good year fifteen bushels of cherries, and occupies nine

square perches of land. The grass growing under these

trees is generally fed off. Many old orchards have ceased to be pro-

ductive, although young trees have been planted where the

old were past bearing. This is caused by the deterioration

of the soil. But good orchards might be made by planting

a succession of young trees in fresh soil, and converting old

orchards into arable land. The old orchards will be ad-

vantageously calculated to produce luxuriant or any other valuable crop.

There are many woods and coppices in the poorer soils,

but they are fast diminishing in number, and the land is

gradually brought into cultivation as arable or pasture.

Where they are left, the wood generally tends to be

Spanish chestnut, which is valuable for hurdles and rough

fences, the produce is considerable, while the timber-trees are

improving in value every year; but unless they are

well managed these are not sufficiently to earn any income to them.

There are no breeds of cattle peculiar to Hertfordshire. The

Suffolk cart-horses are esteemed for farm-work, being

active and tractable. But farmers buy young horses of the

black Northampton or Lincolnshire breed, which they

sell again with a good profit for dray-horses in London when

they are six years old. Few horses are bred in the county.

The grass-lands are reserved for hay, and there are few

rough pastures. A few pigs are bred, as they are on most

well managed farms; the breeds are the Essex or Berk-

shire, and crosses of these with the Chinese and Nepa-

litan, than which there are none more profitable. By

judicious crossing the principal qualities of the hog may be

kept up to a high degree, uniting prolific breeding with early

fattening.

The principal fairs in Hertfordshire are the following.—

St. Alban's, March 5, October 1; Baldock, March 7, last

Tuesday in May, August 5, October 2, December 11; Barnet, April 8, 9, and 10, September 4, 5, and 6 (both these are great cattle fairs); Berkhamsted, August 4, September 23, October 1; Aldenham, November 20; Hemplestead, Thursday after Whits-Wednesday; Hertford, May 12, July 5, November 8; Hitchin, Easter Tuesday, Whits-Tuesday; Redburn, first Wednesday after Easter; Hadley, March 4; Northaw, January 26; Walthamstow, July 20, November 24; Royston, Ash-Wed-

nesday, Easter-Wednesday, Whits-Wednesday, Wednesday after October 11; Sawbridgeworth, April 23, October 20; Tewin, July 21; Baldock, September 23 to October 2; Hendon, Saturday after Ash-Wednesday; Watford, March 28, August 31, September 3; Duxton, Towns, &c.—The county is divided into eight

hundreds, namely —

Name.      Situation.      Pop. in 1831.

Braughing E. 17,827
Broadwater Central 17,043
Cashio Central and S.W. 33,292
Decorum W. 28,572
Edwinstree N.E. 9,237
Hertford S.E. 10,217
Hitchin & Pirton N.W. 7,143
Oxhey N. 143,341

The foregoing table we have given the general situation

of each hundred; but it is to be observed that very few of

the hundreds of this county are most irregularly formed.

Cashio hundred, in particular, has detached or outlying por-

tions in various parts of the county, as the parishes of

Norton and Norton near Baldock, Hexton near Hitchin, and others. Decorum and Broadwater hundreds have also outlying portions.

Hertfordshire has no city: it contains two boroughs and

market-towns only, namely, Hertford, which contains

twelve other market-towns, namely, Baldock, Barnet, Berke-

hamsted, Bishop Stortford, Hatfield, Hemel Hempstead, Hitchin, Hoddesdon, Royston, Tring, Ware, and Watford. The market at Buntingdon and Rickmansworth have

fallen into disuse; but these places are still frequently emu-

lerated as market-towns. Of some of these an account is

given elsewhere. [ALBAN'S ST.; BARNET; BERKHAMSTED; BISHOP STORTFORD.]

Hertford, the county-town, is in a low valley below the

junction of the Maran or Minam, and just above that of the

Beane with the Lea, which last-mentioned river runs through

the town. It is in the hundred of Hertford. The

limits of the borough are determined by the Boundary Act

and the Municipal Reform Act, include parts of the parishes of

St. Andrew, St. John, and Bengeo, the parish of All Saints, and parts of the liberties of

Bick-
London, on the great North-road. The parish contains 200 acres; the town occupies a low situation, bounded on all sides by an open chalky country. It is said to have been built by the Knights Templars before the time of Henry III. The church is a large and handsome Gothic edifice, with a square tower, surmounted by a range of six almshouses in the High-street. The population of Baldock in 1831 was 1704, on one-fifth agricultural. A considerable trade is carried on in malt, the barley of the surrounding district being of excellent quality. The market day is on Thursday. The town is a revery of the yearly value of 1264, in the deanery of Baldock, the archdeaconry of Huntingdon, and diocese of Lincoln. There are places of worship for Methodists and Independents.

There were in 1833 nine day or boarding and day schools, with 277 children; and three Sunday-schools, with 361 children; a school-room was then being built for a national school, to contain 200 children.

Hatfield, distinguished as Bishop's Hatfield, is in Broadwater hundred, on the high North road, 193 miles from London. The parish comprehends 12,700 acres, or, according to others, 12,312 acres, 2 roods, 27 poles; it is subdivided into five hamlets, of which the 'town quarter' is one. The manor of Hatfelle (as it is called in Domensay) was granted by King Edgar to the abbey or monastery of St. Edhelred at Ely, and united to them, with the manor of Hatfield, in the a.d. 1108, is supposed to have acquired the designation of Bishop's Hatfield. The town lies on the slope of a hill, and consists of a principal street intersected by a smaller one. The bishop had a palace and a park here; the manor, was made over to the crown in the time of Henry VIII; the palace was the residence of Prince Edward, afterwards Edward VI, immediately before his accession. The palace and manor, were, soon after the accession of James I, made over to the bishop of Lincoln, and afterwards to Robert Cecil, afterwards earl of Salisbury, in whose family they have ever since continued. The gateway and west end of the palace are still standing. Hatfield-house, the residence of the earl (and now of the marquis) of Salisbury, was built by Sir Robert Cecil, and is a fine specimen of the architecture of the Elizabethan period. It was almost destroyed by fire in the month of November, 1835. The grounds are beautifully laid out, and comprehends a circular road, with the church in the centre. There is an independent chapel. The population of the parish was, in 1831, 3593, three-fifths agricultural. There is a weekly market on Thursday for corn and hay; and a market fair on Tuesday, and a corn fair on Wednesday. The town is mainly engaged in the clothing trade, and is united with the chapelry of Tottoridge in the deanery of Hatfield, the archdeaconry of Huntingdon, and the diocese of Lincoln, of the yearly value of 2097. There were, in 1833, thirteen day-schools (one with 18 children, and one with 158 children, a national school), containing altogether 485 children; and three Sunday-schools with 83 children.

Hemingfield is in the hundred of Bredwarden, 22 miles from London, through Watford. The parish comprehends 7310 acres, with a population in 1831 of 4759; including the dependent chapellaries of Bixtoting and Flambury, it comprehends 12,446 acres, with a population of 6457. The town is situated on the left bank of the river Gade, in the vale of the Gade, consists chiefly of one long street. The houses of the town are much engaged in making the straw-plait, and there are corn and paper mills in the neighbourhood. The river Gade runs through the town, and is crossed by a bridge. The Grand Junction Canal pass near the town. The town is a long narrow building with an open space under for the market, which is held on Thursday, and is one of the largest in the county. The town is surrounded by rich cultivated land, and is partly of Norman architecture, of which the west door is one of the richest specimens in the county. The living is a vicarage with the dependent chapellaries mentioned above, in the deanery of Chelmsford, and subject to the archdeaconry of the same, the bishopric of London, and diocese of Lincoln, of the yearly value of 700. There were in 1833, in the parish and two chapellaries, three infant-schools with 56 children, three national schools with 99 children, two schools of industry with 67 children; ten other day-schools and four boarding-schools with 374 children.

The church is a large and handsome Gothic edifice, with a square tower, surmounted by a range of six almshouses in the High-street. The population of Baldock in 1831 was 1704, on one-fifth agricultural. A considerable trade is carried on in malt, the barley of the surrounding district being of excellent quality. The market day is on Thursday. The town is a revery of the yearly value of 1264, in the deanery of Baldock, the archdeaconry of Huntingdon, and diocese of Lincoln. There are places of worship for Methodists and Independents.

There were in 1833 nine day or boarding and day schools, with 277 children; and three Sunday-schools, with 361 children; a school-room was then being built for a national school, to contain 200 children.

Hatfield, distinguished as Bishop's Hatfield, is in Broadwater hundred, on the high North road, 193 miles from London. The parish comprehends 12,700 acres, or, according to others, 12,312 acres, 2 roods, 27 poles; it is subdivided into five hamlets, of which the 'town quarter' is one. The manor of Hatfelle (as it is called in Domensay) was granted by King Edgar to the abbey or monastery of St. Edhelred at Ely, and united to them, with the manor of Hatfield, in the a.d. 1108, is supposed to have acquired the designation of Bishop's Hatfield. The town lies on the slope of a hill, and consists of a principal street intersected by a smaller one. The bishop had a palace and a park here; the manor, was made over to the crown in the time of Henry VIII; the palace was the residence of Prince Edward, afterwards Edward VI, immediately before his accession. The palace and manor, were, soon after the accession of James I, made over to the bishop of Lincoln, and afterwards to Robert Cecil, afterwards earl of Salisbury, in whose family they have ever since continued. The gateway and west end of the palace are still standing. Hatfield-house, the residence of the earl (and now of the marquis) of Salisbury, was built by Sir Robert Cecil, and is a fine specimen of the architecture of the Elizabethan period. It was almost destroyed by fire in the month of November, 1835. The grounds are beautifully laid out, and comprehends a circular road, with the church in the centre. There is an independent chapel. The population of the parish was, in 1831, 3593, three-fifths agricultural. There is a weekly market on Thursday for corn and hay; and a market fair on Tuesday, and a corn fair on Wednesday. The town is mainly engaged in the clothing trade, and is united with the chapelry of Tottoridge in the deanery of Hatfield, the archdeaconry of Huntingdon, and the diocese of Lincoln, of the yearly value of 2097. There were, in 1833, thirteen day-schools (one with 18 children, and one with 158 children, a national school), containing altogether 485 children; and three Sunday-schools with 83 children.

Hemingfield is in the hundred of Bredwarden, 22 miles from London, through Watford. The parish comprehends 7310 acres, with a population in 1831 of 4759; including the dependent chapellaries of Bixtoting and Flambury, it comprehends 12,446 acres, with a population of 6457. The town is situated on the left bank of the river Gade, in the vale of the Gade, consists chiefly of one long street. The houses of the town are much engaged in making the straw-plait, and there are corn and paper mills in the neighbourhood. The river Gade runs through the town, and is crossed by a bridge. The Grand Junction Canal pass near the town. The town is a long narrow building with an open space under for the market, which is held on Thursday, and is one of the largest in the county. The town is surrounded by rich cultivated land, and is partly of Norman architecture, of which the west door is one of the richest specimens in the county. The living is a vicarage with the dependent chapellaries mentioned above, in the deanery of Chelmsford, and subject to the archdeaconry of the same, the bishopric of London, and diocese of Lincoln, of the yearly value of 700. There were in 1833, in the parish and two chapellaries, three infant-schools with 56 children, three national schools with 99 children, two schools of industry with 67 children; ten other day-schools and four boarding-schools with 374 children.
HER STEWART and five Sunday-schools with 250 children; there were also twenty-five schools in which about 247 children were taught to read and write. The town of Hemel Hempstead was incorporated under Henry VIII.; but the corporation is not noticed either in the Commissioners’ Reports or in the Municipal Corporation Returns.

In the 19th century curious Roman relics were discovered by the Rev. J. F. Girtin in the burial-ground of Box Lane Chapel near Hemel Hempstead. They consist of two glass vases (one globular and thin, the other square and of thick glass with a handle) an eastern ‘pitcher’ and some nails. The square vase, which is entire except a slight chip off the handle, is three times as thick as the globular vase, and is a good specimen of glass. This square vase is of the style of two similar ones which are only partially filled. For these facts and a drawing of the different objects we are indebted to a communication from the Rev. J. F. Girtin.

Hitchin is in Hitchin and Pirton hundred, 34 miles from London, on the little river Hiz. The parish comprehends 6150 acres, and had in 1831 a population of 9211, about one-third agricultural. The town, which consists of several streets, is irregularly laid out. It was formerly the seat of a woman, the Prioress; there is now a corn and malt, of which latter a considerable quantity is made. Much straw-plait is made; there are some breweries, and also a silk-mill. The church is a handsome edifice near the centre of the town, built upon the foundations of a more ancient structure. The south porch is a remarkably fine specimen of Gothic architecture in the perpendicular style, and there is a font of the same character; also numerous sepulchral and memorial tablets and brasses. There are meeting-houses for Independents, Baptists, and Quakers; and several small almshouses. The town is divided into three wards, for each of which constables and other officers are elected at a court-leas. There was formerly a small priory for Carthusian nuns in the town.

The market is on Tuesday, and there are three yearly fairs. The living is a vicarage in the deanship of Hitchin, the archdeaconry of Hertford, and the diocese of London, of the value of £100 per annum. The town is the site of a hospital, the remains of which are a large building with a bell-shaped subterranean vault, 30 feet high, and nearly 20 feet in diameter, cut out in the solid chalk, and ornamented with rude carvings of sacred subjects, supposed to have been constructed in the time of Henry II. The town is frequented by ‘the hooded-crow,’ a species not found in other parts of England, and popularly called the Royston crow: it is a migratory bird, and passes the winter there.

There were in Royston parish, in 1833, one infant school with 53 children, a Lancasterian school with 53 girls, eleven day or boarding and day-schools with 194 children, and three Sunday-schools with 229 children.

Tring is in Dacorum hundred, 35 miles from London on the road to Aylesbury. The parish comprehends 7590 acres, and had in 1831 a population of 3488, nearly one-third agricultural. The town is neat, and contains several good houses. The church is an ancient building, with a massive tower, and the remains of a weekly market on Saturday, and two yearly fairs. There are several dissenting meeting-houses. The living is a perpetual curacy united with the chapelry of Long Marston; the joint annual value is £112 10s., and the clergy are meeting-houses at Berkhamsted, the archdeaconry of Hertford, and the diocese of Lincoln.

There were in the parish, in 1833, six day-schools with 240 children, and five Sunday-schools with 659 children.

Ware is in Braughing hundred, on the east bank of the Lea, 20 miles from London on the road to Cambridge. The parish comprehends 4430 acres, and had in 1831 a population of 4214, including the population of Amwell End; of which the rural part, which is one-third agricultural. Up to this place the Dunes, in the reign of Alfred, brought their vessels, and protected them by a dam or weir across the river, from which the town is said to have obtained its name; but this is disputed. Ware consists of one long street and several smaller ones. The church consists of a chancel, with a chapel on each side; a nave with two aisle sides, and two projections resembling transepts; with a square belfry tower: the font is of perpendicular architecture, with considerable enrichment, a glass in the east window, and a large painting of Queen Elizabeth. It is alluded to by Shakspere (Tzephth Night), act ii. scene ii.), and is popularly known as the font of Ware. The living of Ware is a vicarage united with that of Thundridge, of the yearly value of £331, in the deanship of Braughing, the archdeaconry of Middlesex, and the diocese of London.

There were in the parish, in 1833, two infant or dame schools with 26 children, an endowed grammar school with 28 boys, a Lancasterian school with 120 boys, a national school with 75 boys, two charity schools with 94 girls, ten day or boarding and day-schools with 190 children.

Watford is in Camulodun hundred, 15 miles from London, on the road to Aylesbury, near the Coln. The parish comprehends 10,809 acres, and is divided into four hamlets: the population in 1831 was 4593, more than one-third agricultural. The town, which is neat, consists of a main street, about a mile in length, near the centre of which stands the church. There are considerable silk-mills, and also a paper-mill. The market is on Tuesday. The living is a vicarage united with that of Amwell, of the yearly value of £370, with a glebe-house.

There were in the parish, in 1833, an endowed school with 60 children, another endowed school with 11 boys, two national schools, two dame schools, and a Sunday-school, with 174 children, and five Sunday-schools with 279 children.

Buntingford and Rickmansworth are still frequently spoken of as market-towns.
Buntingford is in Edwinstree hundreds, in the parish of Layston, on the road to Cambridge, 31 miles from London. It has a brick chapel built about two hundred years ago. There are also some almshouses, forming three sides of a quadrangle. The population of the parish in 1831 was 1063, two-fifths agricultural. The market was on Monday, but has been discontinued. The living of Layston is a vicarage in the deanery of Braughing, the archdeaconry of Middlesex, and the diocese of London, of the yearly value 149£. There is an Independent congregation. There were in the inhabited houses 18 with 36 children, one charity-school with 36 girls, and one Sunday-school of 70 children.

Rickmansworth, or Rickmenworth, is 18 miles from London, in Hertfordshire, in the parish of Willesden, on the road from London to Waltham 

**Divisions for Ecclesiastical and Legal Purposes.**—Hertfordshire is comprehended in the dioceses of London and Lincoln, which are here contumacious. That part which is south of the River Thames is divided into the archdeaconry of Braughing, in the archdeaconry of Middlesex, containing 37 benefices; and the deanery and archdeaconry of St. Albans, containing 22 benefices. That part which is in the diocese of Lincoln constitutes the deaneries of Baldock, containing 24 benefices; Berkhamsted, 21 benefices; Hertford, 18 benefices; and Hitchin, 15 benefices: all in the archdeaconry of Huntington. Of the whole 137 benefices, 65 are rectories, 22 vicarages, 4 donatives, 14 chapellies, and 2 curacies. The number of parishes is only 136; some of the benefices not being distinct parishes.

Hertfordshire is included in the Home circuit. The assessors and quarter sessions are held at Hertford, except for the hundred of Cashio, the quarter sessions being held at St. Albans. The county returns three members to parliament. The place of election is Hertford: the polling-places are at Hertford, Stevenage, Buntingford, Bishop's Stortford, Hoddesdon, Hattfield, and Ware. There are two members each returned for the boroughs of Hertford and St. Albans.

**History and Antiquities.**—At the time of Caesar's invasion of Britain in 55 B.C., Hertfordshire has been habited, in the Catuvellauni (Kautuvelägo, Plu) or Catuvellani (Kautuvelägo, Dion), of whom we have elsewhero supposed Cassivellanus, the antagonist of Caesar (n.c. 54), to have been the chief. The name of the county is supposed to be derived from the tribe of the Hertfordshiremen, or Hertforders, who, together with Essex and perhaps Middlesex, possessed any portion of Essex is not clear. Camden would place the Cassii, a tribe which submitted to Caesar before the final defeat of Cassivellanus, in the hundred of Cashio; but as the natural

**St. Albans.**

Several of the ancient British roads or trackways crossed this country: the Tring Street crossed it in a north-west direction not varying from the line through London to St. Alban's, and Ermin Street nearly coincided with the present road from London by Enfield, Hoddesdon, Ware, and Buntingford, to Hertford (it was divided near Ware into two branches which reunited near Buntingford); Icknield Street ran all the downs from Dunstable toward Royston. The traces of the British Watling Street are obliterated by the Roman road afterwards carried along the same line. Traces of Ermin Street and still more of Icknield Street may yet be recognised. There were probably some smaller British roads branching from these. The Verulamium of the Romans is supposed to have been the site of the old Saxon town of Camulodunum; but it has been conjectured that there were British towns or posts at Royston, at Braughing a few miles beyond Ware on the Ermin Street, in the neighbourhood of Berkhamsted, and about two miles west of the Ermin Street near the Icknield Street, and perhaps at other places. The Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium of the Romans included Hertfordshire in the province of Flavia Caesariensis. They fortified the town Verulamium, near St. Albans's (St. Alban's, St.), on which they conferred the rank of city. They also built roads and fortified Roman towns along the more important roads of Hertfordshire and Ermin Streets, and in other directions. A Roman post or town, Ad Fines, on the Ermin Street between Londonium (London) and Durolipons (Godmanchester), was supposed to have been the site of the Verulamium.
Severn. Edward the Elder, son of Alfred, built Hertford Castle, probably with the view of checking the incursions of the Northmen who had been allowed to settle in East Anglia. An ancient castle at Bishop's Stortford was probably built at the same time.

When William the Conqueror, after the battle of Hastings (A.D. 1066), advanced into the interior of the kingdom, his march was impeded near Berkhamsted by the bold conduct of Hereward, a chief of St. Albans, who destroyed the banks that grew by the road-side to be cut down. The same spirited ecclesiast placed himself at the head of a confedera
c tion, with which the Conqueror found it necessary to come to terms by marrying, in a grand assembly of the clergy and nobles at Berkhamsted, to govern according to the ancient laws of the realm, and especially those of St. Edward the Confessor: but when he thought himself strong enough, he succumbed not to break his oath.

In the civil broils of the reign of John, Hertford castle was defended for the king by Walter de Godarvill, a retainer of Fulk de Breton, against the revolted barons and the dauphin Louis of France; and in the troubles in the reign of Edward II. the barons confederated against Gaveston, the king's favourite, assembled their troops at Whethestham, a few miles from St. Alban's, A.D. 1312. After the general rising of the peasantry under Wat Tyler and Jack Straw, mayhems and massacre of the latter were tried and executed at St. Alban's, the king being there at the time with a guard of 7000 men.

In the war of the Roses this county was repeatedly the scene of strife. In the year 1455 three thousand men from the north, under Richard duke of York and the earls of Salisbury and Warwick, advanced towards London in order to seize and bring to trial the duke of Somerset, who had been impeached of treason by the House of Commons, but released by the influence of the queen, Margaret of Anjou. The insurgent nobles reached the neighbourhood of St. Alban's, which was occupied by the king, who had advanced from London with a body of two thousand men to impede their progress. After a vain attempt at negotiation the town was stormed by the Yorkists; the duke of Somerset and several other nobles and gentlemen of the royalist side fell in the battle, and the king himself was severely wounded and taken prisoner. In the year 1461 a second battle was fought at St. Alban's. The queen, who had just vanquished and slain the duke of York at Wakefield in Yorkshire, was advancing to London when she was met near St. Alban's by the Yorkists under the earl of Warwick, having the king with them. The battle was bloody, but the Lancastrians prevailed, and the king was restored to the keeping and use of his own faction. The battle of Barnet, A.D. 1466, in which Warwick fell in battle against Edward IV., whom he had been mainly instrumental in seating on the throne, was fought in Mid Sussex just beyond the boundary of Hertfordshire.

Of the monastic or castellated buildings of the middle ages Hertfordshire possesses but few remains. St. Alban's Abbey [Alban's, Sr.] is the chief; to which may be added Royston church, formerly conventual, and some remains of the priories at Hitchin and Ware. There are castles at Hertford and Berkhamsted [Berkhamsted?]; some slight remains of a castle at Bishop's Stortford, and the earthworks of Audley or ANCASTLE, between Royston and Bishop's Stortford. Waltham Cross and Hadley Palace have been noticed; there are some remains of a palace built by king Henry III. at King's Langley, between Wat
tford and Berkhamsted.

In the breaking out of the war between Charles I. and the Parliament, this county was the scene of one of Cromwell's earliest exploits. While yet a captain of a troop of horse which he had raised, he arrested the high-sheriff of Hertfordshire, and the Earl of Essex, had read the king's proclamation declaring all the parliamentary commanders traitors. There has been no public event since of any moment connected with the county; but a circum
cstance in which occurred in April of the year 1654 deserves notice as marking the extent of popular ignorance and bar
dary at that period. A publican near Tring being troubled with fits, conceived that he was bewitched by an old woman named Osborne. Notice was given by the crier that two witches were to be tried by ducking; and in consequence a vast mob assembled at the time appointed. The old woman and her husband, who had been in Tring workhouse, were removed into the church for safety, but the mob obtained possession of the old man and old woman, who were dragged two miles to a muddy stream, ducked them, and otherwise so maltreated that the woman died on the spot, and the man with difficulty recovered. Thomas Col
ter, one of the commandant's officers, was even so angry that he raised the infatuation of the populace that it was thought necessary to have a guard of more than 100 troopers to escort the cavelade to the place of execution.

Population.—Hertfordshire is principally an agricultural county; of 34,910 males twenty years of age and upwards, only 270 are employed in manufactures, while 15,617 are occupied in agricultural pursuits; of those engaged in manufactures, 168 are employed at Tring, Watford, St. Albans', and Titterd
taghe (collectively) in spinning and winding silk and cotton, and in making ribbons; there are 49 machine-makers at Hemel Hempstead, and a few are employed at Royston in making wire-foils for matting. This county ranks the 13th in the list of agricultural counties.

The population of Hertfordshire at each of the four fol
ing periods was:

<table>
<thead>
<tr>
<th>Period</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801</td>
<td>40,817</td>
<td>20,812</td>
<td>19,547</td>
</tr>
<tr>
<td>1811</td>
<td>42,500</td>
<td>21,500</td>
<td>20,000</td>
</tr>
<tr>
<td>1821</td>
<td>46,997</td>
<td>23,497</td>
<td>23,500</td>
</tr>
<tr>
<td>1831</td>
<td>52,997</td>
<td>26,497</td>
<td>25,000</td>
</tr>
</tbody>
</table>

showing an increase between the first and last periods of 47,784, or not quite 48 per cent., on the whole population; being 9 per cent. below the whole rate of increase throughout England.

The following table contains a summary of the population, &c., of every hundred, as taken in 1831.

Summary of the County of Hertford.

<table>
<thead>
<tr>
<th>Hundres.</th>
<th>Cities, or Boroughs</th>
<th>Houses</th>
<th>Occupations</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhabit.</td>
<td>Families</td>
<td>Build.</td>
<td>Unin.</td>
<td>Families</td>
</tr>
<tr>
<td>Braughing, Hundred</td>
<td>3,307</td>
<td>3,614</td>
<td>156</td>
<td>1,327</td>
</tr>
<tr>
<td>Broadwater</td>
<td>3,107</td>
<td>3,006</td>
<td>8</td>
<td>1,931</td>
</tr>
<tr>
<td>Cashio</td>
<td>5,221</td>
<td>5,029</td>
<td>22</td>
<td>1,257</td>
</tr>
<tr>
<td>Dacorum</td>
<td>5,542</td>
<td>5,590</td>
<td>25</td>
<td>1,463</td>
</tr>
<tr>
<td>Edowestree</td>
<td>1,792</td>
<td>1,991</td>
<td>2</td>
<td>1,164</td>
</tr>
<tr>
<td>Hertford</td>
<td>2,650</td>
<td>2,626</td>
<td>23</td>
<td>1,064</td>
</tr>
<tr>
<td>Hitchen and Piton</td>
<td>1,991</td>
<td>2,179</td>
<td>6</td>
<td>41</td>
</tr>
<tr>
<td>Osey</td>
<td>1,308</td>
<td>1,272</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Hertford, Borough</td>
<td>1,261</td>
<td>1,292</td>
<td>32</td>
<td>92</td>
</tr>
<tr>
<td>Albans, St.</td>
<td>800</td>
<td>1,105</td>
<td>32</td>
<td>92</td>
</tr>
<tr>
<td>Totals</td>
<td>26,549</td>
<td>29,250</td>
<td>119</td>
<td>699</td>
</tr>
</tbody>
</table>
The number convicted was 59; 71 and 109.

Discharged by proclamation 24; 15 and 29.

In 1837 there were 235 persons charged with crimes at the assizes and sessions in Hertfordshire. Of these, 9 were charged with offences against the person, 5 of which were for common assaults; 21 for offences against property committed with violence; 283 for offences against property, committed without violence; 1 for killing and maiming cattle; 8 for uttering counterfeit coins; 10 for poaching; and 2 for other misdemeanours. Of the whole number convicted, 243 were convicted, 68 were acquitted, 6 were not prosecuted, and no bill was found against 18. Of those convicted, 4 were sentenced to death, the sentence of 3 of whom was commuted to transportation for life, and of 1 for 7 years; 17 others were transported for life, 1 for 15 years, 4 for 14, 11 for 10, 29 for 7 years, and 1 for some other period; 2 were imprisoned for three years or above 2 years, 7 for two years or above 1 year, 8 for 1 year or above 6 months, and 154 for 6 months or under; and 5 were fined. Of the whole number of offenders, 306 were males, and 29 females; 194 could neither read nor write, 91 could read and write imperfectly, 45 could read and write well, and the degree of the remaining 5 could not be ascertained.

The number of persons qualified to vote for the county members of Hertfordshire is 5909, being about 1 in 38 of the whole population, and about 1 in 7 of the male population twenty years of age and upwards, as taken in 1831. The expenses of the last election of county members to parliament were to the inhabitants of the county £4962. 1s. 1d., and were paid out of the general county-rate.

There are 5 savings' banks in this county. The number of depositors and amount of deposits on the 20th November in each of the following years were—

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of depositors</th>
<th>Amount of deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1822</td>
<td>3,055</td>
<td>£130,449</td>
</tr>
<tr>
<td>1823</td>
<td>3,209</td>
<td>£134,415</td>
</tr>
<tr>
<td>1824</td>
<td>3,320</td>
<td>£2,483</td>
</tr>
<tr>
<td>1825</td>
<td>2,073</td>
<td>£2,073</td>
</tr>
</tbody>
</table>

Education. — The following summary is taken from the Parliamentary Returns on Education made in the session of 1835—

<table>
<thead>
<tr>
<th>Approximate number of schools</th>
<th>Scholarly Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant schools</td>
<td>461</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of children at such schools; ages from 4 to 14 years:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
</tr>
<tr>
<td>310</td>
</tr>
<tr>
<td>Sex not specified</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total number of schools</th>
<th>Total of children under daily instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>506</td>
<td>14,723</td>
</tr>
</tbody>
</table>

Daily schools —

<table>
<thead>
<tr>
<th>Approximate number of children at such schools; ages from 4 to 10 years:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
</tr>
<tr>
<td>8,704</td>
</tr>
<tr>
<td>Sex not specified</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total number of schools</th>
<th>Total of children under daily instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>191</td>
<td>14,723</td>
</tr>
</tbody>
</table>

VOL. XII.—2 B
Assuming that the population between the ages of 2 and 15 is in the same proportion to the whole population as it was in 1821, and that it has increased in the same ratio since 1831 as the whole population did in the ten years preceding that date, we find by approximation that there were 49,214 children between the ages of 2 and 15 in the county of Hertfordshire, in 1834, the time the Educational Inquiry was made. We have therefore opportunity of comparing to other tables also; but in what number, or in what proportion, duplicate entry of the same children is thus produced, must remain uncertain. Forty schools (containing 2291 children), which are daily and Sunday schools, are returned from various places, and duplicate entry is here known to have thus far created. Making allowance from this cause for a number of children having been entered twice as under instruction, we may perhaps fairly conclude that about half of the children between the ages of 2 and 15 are receiving instruction in this county.

Maintenance of Schools.

<table>
<thead>
<tr>
<th>Description of Schools</th>
<th>By endowment</th>
<th>By subscriptions</th>
<th>By payments from National Schools</th>
<th>Subscriptions and pay. from other sources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infant Schools</strong></td>
<td>46</td>
<td>60</td>
<td>39</td>
<td>247</td>
</tr>
<tr>
<td><strong>Daily Schools</strong></td>
<td>110</td>
<td>13</td>
<td>12</td>
<td>433</td>
</tr>
<tr>
<td><strong>Sunday Schools</strong></td>
<td>110</td>
<td>13</td>
<td>12</td>
<td>433</td>
</tr>
</tbody>
</table>

The schools established by Dissenters, included in the above statement, are:

Infant schools: 4

Daily schools: 12, containing 433

Sunday schools: 51

The schools established since 1818 are:

Infant and other daily schools: 240, containing 7,574

Sunday schools: 110

Forty-six hoarding-schools are included in the number of daily-schools given above. No school in this county appears to be confined to the children of parents of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists, together with schools for children of Roman Catholic parents.

Lending libraries of books are attached to 32 schools in Hertfordshire.

HERTHA, or HERTHUS, the Goddess of Earth among the Etruscans (Mor. Lard. 40) says that she was worshipped by the Suavi, and that her sanctuary was in a grove in an island of the ocean, and was served by a single priest. A cart, covered by a cloth to conceal the goddess, was taken out of the sanctuary on certain occasions, and was drawn by cows about the country with great solemnity. This was a time of general rejoicing, especially for those places which were honoured by the visit of the goddess. During that time a cessation of war took place, arms were laid aside, and peace reigned over the land, until the priest thought proper to restore the goddess to her sanctuary, where the cart and the clothing, and the goddess herself, or her image, it was said, were washed in a secret pond, and the attendants who assisted at these ablutions were immediately after swallowed up by the flood. The report of these mysterious circumstances served to inspire the ignorant people with a dread of the power of the goddess, and to lead the beholder to respect her deity.

HERVEY, JAMES, born in 1714, was educated at Lincoln College, Oxford, where he became acquainted with the first Methodists, whose views and society, though he did not enter into their tenets, influence his course through life. He took orders in the Established Church, devoted his whole life to acts of piety and beneficence, and the sedulous discharge of his clerical duties, and died early, of a decline brought on by labouring beyond his strength, in 1758. For some years preceding he had been resident at Weston-Prince in Northamptonshire. His works are numerous, and all religious: his style is metaphorical, flowery, diffuse, abounding in turgid declamation and strained fancies, Faulty as it is, it enjoyed its season of extensiveness popularity; and probably has won the notice of many who would have been less attracted by a purer writer. In doctrine he leaned towards the Calvinistic school. The most popular of his works were, 'Meditations among the Combs,' 'Contemplations in a Flower-Garden,' 'On the Night,' &c., 1746-7; and 'Theron and Aspasia; or, a series of Dialogues and Letters on the most important Subjects,' 1753. (Watt, Bibl. Brit.)

HESIOD (in Greek, Hēsiodo) was a native of Asca, a village at the foot of Helicon, whether his father had migrated from Cumæ in Æolis. From thence he went to Órecómón to study and to edit the 'Theogony,' who thinks that by theline 'Asca, foul in the cold, opposite in the warm, both bad at all times,' he expresses resentment at the inquisitorial conduct of the Æscean judges with respect to the division of his paternal estate. He well doubts the truth of the interpretation, although Goettling gives a passage of Paterculus (i. 7), which might possibly refer to it. These facts are collected from the 'Works and Days,' a poem which there is no reason not to ascribe partially, although only partially, to Hesiod. Plutarch tells us that he met his death in consequence of the suspicions of some young men regarding their sister's honour, and we learn from Pausanias that he was revered in later times as a hero.

The only points remain under the name of Hesiod are, 'The Theogony,' 'The Shield of Hercules,' and 'Works and Days.'

The Broetians themselves are said to have considered the last as a Homer. Though they doubted as to the authorship of the other works assigned to him; but the ingenuity of modern times has discovered interpolations even in this poem, which consists of advice given by Hesiod to his brother Perses, on subjects relating to the land, agriculture and the general conduct of life. Whatever may be the decision which is arrived at regarding the authorship, we think one thing must be very evident to all who read the poem, that in its present state it shows want of purpose and of unity, too great to be accounted for upon the supposition of its fragmentary nature. Ulrici considers the moral and the agricultural instruction as genuine, the story of Prometheus and that of the Five Ages as much altered from their original Hesiodic form, and the description of Winter as latest of all.

The 'Theogony' is perhaps the work which, whether genuine or not, most emphatically expresses the feeling which is supposed to have given rise to the poem. It consists, as its name expresses, of an account of the origin of the world, including the birth of the gods, and making use of numerous personifications. This has given rise to a theory that the stories of creation, from which Hesiod drew without understanding them, were in fact philosophical and not mythological speculations; so that the names which in after-times were applied to persons, had originally belonged only to qualities, attributes, &c.; and that their inventor had composed a poem on this subject without consulting his system. This much we may safely assert respecting the 'Theogony,' that it points out one important feature in the Greek character, and one which, when that character arrived at maturity, produced results of which the 'Theogony' is at best but a feeble promise; we mean that speculative tendency which lies at the root of Greek philosophy.

The 'Shield of Hercules' is a fragment, or rather a cluster of fragments; some of them by the late Rhapsodists who copied, according to Aristophanes the grammarians, from Homer's description of the shield of Achilles.

Those who are desirous to pursue the subject of the 'Theogony,' will find a full discussion Ulrici's 'Hesiod. Hekesi, 1, 360; 199; Hermann and Creuzer's Briefe über Homer and Hesiod; Creuzer's Symbolik; and especially Mr. Thirlwall's 'History of Greece,' and Müller's 'Prolegomena.'

The best modern editions of Hesiod are Goettling's (in 1 vol. 8vo, published in the Bibliotheca Graecas, and Dindorf's, Leipzig, 1825, 8vo.)

HEISON (Zoology), the name of a genus of Dor. strict crus, and of a genus of Dors. strict crus, is 3, with a short but rather stout body, composed of a few ill-defined rings. A very long cirrus, which probably executes the

* We use the word Hieratic with reluctance, but we are not aware what other single word would express what we mean, namely, that school of early poetry which is connected with the primitive state of life of the Greeks in the same way as Homer and the heroic poets were with the political.
function of branch, occupies the upper part of each foot, which has also another lower one and a packet of fine bristles. The proboscis of Hestome is large, and without either jaws or tentacles. Those parts are introduced by the side of a mouth, which, though there are differences between them, especially in number (the Atlantic being usually reckoned seven, and the Hesperides three in number), which we must leave to be accounted for by the general uncertainty of the subject. The great appendages, 

HESPERIDES, in Greek mythology, a family of nymphs, of the same parents. Hesperus, introduced in the middle of the first century of the Christian era, by the emperor Claudius. The apples were guarded by a fierce dragon named Ladon, which never slept. Hercules killed the dragon and carried off the precious fruit. Some authors make the treasure to consist of apples instead of apples, both being called by the same Greek word, meta. Some think them citrons or oranges. The Gardens of the Hesperides are variously placed, in an oasis of the African desert, in Cyreneas, at the foot of Mount Atlas in Africa.

HESPERIDEAE (Skippers), a family of Lepidopterous Insects of the section Lepidoptera Diurna of Latreille. Distinctive characters—Antennae terminated by a distinct club, generally with a minute hook at its extremity; tibiae with spur on the side opposite the elbow; the eye kept in the middle; claws very small, bifid, body thick, wings small, the posterior pair with a groove to receive the abdomen. The larvae are pubescent, or naked, and have a large head; purplish, or orange, and when smooth, enclosed in a cocoon, which is covered with the usual fruit of the orange, which is the type of the Hesperidium.

HESSE, an extensive country of Germany, which, in ancient times, was inhabited by the Catti, part of whom however emigrated before the Christian era to the Low Countries, where they were called Batavi. The Catti were mentioned under the emperors Augustus and Tiberius. Germanicus burnt their chief seat, Mastium (probably Maastricht), and the title of countship was bestowed on to the great empire of the Franks, losing their name in the third or fourth century. The Christian religion was introduced even before Charlemagne's reign by Boniface, the apostle of the Germans, archbishop of Mainz (Maison), who preached there; and Christian churches were planted, and flourished in the seventh century at Hersfeld, Fulda, Franconia, &c. Till about the middle of the thirteenth century the Hesse was blended with that of Thiiringen, without children, in 1247, a war for the succession took place, which was terminated in 1663 by a compact, by which Hesse was separated from Thiiringen, and assigned to Hessen, the son of the late landgrave's brother, who was the common ancestor of all the succeeding landgraves of Hesse. It is beside our purpose to detail the various changes that occurred in consequence of the alternate partitions of the territory among the sons of the sovereigns, and the reunions on the extinction of one or two of them. In the great war on Egypt, figures and descriptions of Hestome splendida, Sav. and H. festiva, Sav.

HESSE-CASSEL, from the time of William IV., 1592, suffered, in the successive wars which desolated Germany, but did not sustain any loss of territory; on the contrary, it made several acquisitions. After the Thirty Years' War Hessian mercenaries in the service of other Continental powers were employed in almost all the European and Turkish wars; a system which indeed enriched the princes of Hesse, but did not tend to promote the prosperity of the country. Frederick II., who succeeded to the government in 1760, though he embraced the Roman Catholic religion, agreed in the management of his possessions with the Electors of Hesse, under the guarantee of England, Denmark, Sweden, Prussia, and Holland, not to change the constitution in church and state, and he also had his children educated in the schools of the Roman Church. He permitted the Hesse to die his capital, Cassel, and liberally promoted the arts and sciences. All this he was enabled to do by increasing his military force, of which he let out several thousand men to England in the American war, and received from them 1776 to 1784, above three millions sterling. He died in 1785, and was succeeded by the landgrave William IX., who, in the war of the French revolution not only furnished his contingent as a part of the empire, but also bore the cost of troops in the pay of England. In 1796 he joined in the treaty of Basel, and allied himself with Prussia. For the loss of his territories beyond the Rhine he received ample indemnities, and on the 24th February, 1803, obtained the dignity of elector, on which he took the title of William I. When war broke out between Prussia and France in 1806, both parties recognised the neutrality of Hesse; but within less than a month afterwards Napoleon, pretending that the elector was partial to the Prussians, seized on Cassel; and by the peace of Tilsit the greater part of the electorate was incorporated with the new kingdom of Westphalia. A secret article reserved to the elector, as an indemnity for the extinction of his dukedom of Westphalia, which he refused to accept, and retired first to Holstein, and then to Prague, where he lived as a private individual. After the battle of Leipzig, 1813, he returned to his capital, where he was enthroned with the title of prince, and then appointed his son, who had consented to his residence with the allied powers, and subsequently became a member of the German Confederation. Unfortunately he did not live on good terms with his subjects, to whom he thought of giving a new constitution, but could not agree about it with the ancient Estates. He alienated the affections of the people by reviving old monopolies, by refusing to recognise the validity of any act of the late government, and by harassing those who had served under it. He died in 1831. His son and successor, William II., has embroiled himself still more seriously with his subjects; in the first instance, by the scandal of his connexion with the countess of Reichenbach, who took the title of countess of Eutingen, and subsequently became his mistress in Moravia. A pseudonymous letter, threatening both with death, unless a constitution were given to the country and the influence of the countess in the government put an end to, gave occasion to arbitrary inquisitorial proceedings, which increased the public terror, and caused a disturbance in the elector's own family. The fermentation increased, serious riots took place in 1830, the countess left Cassel, the elector consented to assemble the Estates, and the constitution being presented to him, he passed it on 17th August, 1831, with general joy prevailed, which was interrupted by the return of the countess on the 11th. Fresh disturbances arose, and the countess left Cassel; but the elector was so angry that he left Cassel and retired to his estate of Herchen. He appointed his son, the electoral prince, regent, who entered on his functions October 1, 1831. Fresh discontent still
and new troubles were caused by the accession of the electorate to the Prussian commercial league.

**Situation; Extent; Boundaries.**—The electorate of Hesse is situated between 50° 6' and 52° 25' N. lat. and 8° 25' and 10° 45' E. long. It consists of three distinct portions, of which the largest, extending only to 50° 40' N. lat. and 10° 15' E. long., is bounded on the north-east by Hanover and the Prussian province of Saxony, on the east by Weimar and Bavaria, on the south by Bavaria, on the west by Nassau and Hesse-Darmstadt. The detached portions of the electorate are: the principality of Nassau, and the lordship of Schmalkalden to the east, surrounded by the Saxon principalities and the Prussian circle of Schleswig. The area of the whole is 429 square miles.

**Divisions.**—The electorate is divided into four provinces, with a total population, at the end of 1835, of 716,585 inhabitants.

I. **LOWER HESSE** (337,400 inhabitants), divided into ten circles, with 34 towns, 8 market-boroughs, and 519 villages. The chief towns are: Castell, the capital of the electorate (Castell), with 79,931 inhabitants (garrison included); Eschwege, 5056 inhabitants. There are also a number of market-places, among the principal being: Fritzlar (2882 inh.), Hofgeismar (3195 inh.), Melsungen (3341 inh.), Rothenburg on the Fulda, with a palace, the residence of the landgrave, and 4 churches in the town; Rutenhausen (2899 inh.), Altenberg (2583 inh.), Wollfingen (2761 inh.), Volkmarsen (2766 inh.), Homberg-on-the-Eder (3067 inh.).

II. **UPPER HESSE** (114,765 inh.), divided into four circles, with 16 towns, 4 market-boroughs, and 206 villages; chief town Hiinfeld (4332 inh.), seat of the university; Frankenberg (2868 inh.).

III. **FULDA** (133,775 inh.), 5 towns, 7 market-boroughs, and 198 villages. It consists of: 1. the grand-duchy of Fulda (48,314 inh.); chief town Fulda; 2. the circle of Hersfeld (31,414 inh.); chief town Hersfeld (3507 inh.); 3. the circle of Hünfeld (2896 inh.); chief town Hünfeld (2008 inh.); 4. the lordship of Schmalkalden (23,749 inh.); chief town Hiinfeld (4332 inh.).

IV. **HANAU** (114,727 inh.), 7 towns, 14 market-boroughs, 189 villages, divided into 4 circles; chief towns: Hanau, capital of the principality (Hanau, according to the most recent account, 14,824 inh.) [Hanau]; Gelnhausen (2317 inh.), Steinbach (2317 inh.).

**Hesse-Cassel** as a member of the German Confederation, is the eighth in rank, has in the full council 3 votes, one in the minority council, and a contingent of 3400 men, which forms part of the second division of the eighth corps of the army of the Confederation, and contributes 1500 florins annually to the treasury of the Confederation.

**Face of the Country, Soil, Climate.**—The country is in general level, and in some places extends into extensive plains. On the south-east and south the Thuringerwald, the Röhn, and the Speesaart, extend their branches into the country from the Saxon duchies and Bavaria, and the province of Hanau, and the whole tract between the Werra and the Fulda. Schmalkalden is situated on the mountain called the Thuringerwald, on the northern frontier of which is the Inselberg (2392 feet high). The mountain is thickly-wooded, chiefly with red pine and fir. The other principal chains are the Hunsrück, the Wesergebirge, and the Vogelsberg. The soil of Hesse is not indeed distinguished in general by great fertility; but it can by no means be called sterile. The finest parts are the beautiful valleys of the Fulda, the Schalm, the Edder, and the Werra. The climate is on the whole temperate, and everywhere cool in the shade of the banks of the Main, and more severe in the Fulda, on the summits of the Rhön. The principal rivers are the Main, the Weser, the Werra, the Lahn, and the Fulda. The last, though not the largest, is the most important river of Hesse, and is the largest only when there is a confluence of the circles of Fulda, Hersfeld, Rothenburg, Melsungen, and Cassel, becomes navigable at Fulda, and joins the Werra at Mühlend, in the kingdom of Hanover, both together forming the Rhine. The boundary, which only just touches the south-west corner of the country, and is joined by the König near Hanau, flows into the Rhine. The Lahn, traversing the circle of Marburg, joins the Rhine below Coblenz. There are no lakes, but numerous large ponds, of which there are forty of various sizes in the district of Dineken alone.

**Natural Productions.**—Corn, maize, pulse, and potatoes in great abundance, especially in the mountainous parts, are cultivated. Flax and timber are staple articles: tobacco, hemp, madder, a few hops, and rapseseed, are also among the products. The vine is cultivated only in some parts of Hanau. The pasturage is in general good. Garden produce of excellent quality is raised about Cassel and Hanau, and in some parts of the province, fruits are cultivated chiefly in Upper Hesse, Hanau, and Hersfeld, whence large quantities of dry fruits are exported. The breeding of cattle is pretty general, but much neglected. The forests are in some parts very extensive, and the wheat, rye, barley, oats, potatoes, meadows, and great quantities, saltpetre, vitrol, and alum. There are also coals, marble, very fine white alabaster, porcelain, potter's, and pipe clay, &c.

**Manufactures and Trade.**—The manufactures, which are chiefly in Cassel, Hanau, and Fulda, are insufficient for home consumption. The principal are linen, mostly coarse, which is exported to the value of 300,000 livres; flax, annually 4 fine linen is made in Cassel and Hersfeld. Cotton spinning has been introduced in late years, and is become pretty general. Schmalkalden manufactures almost all the steel and iron of the country; Grossalmerode is celebrated for its crucibles, which are exported to all parts of the world. With respect to commerce, Hesse-Cassel, and the two fairs at Cassel are of little importance. The exports are corn, dried fruits, timber, leaf tobacco, wrought iron, linen, earthenware, crucibles, salt, &c. The imports are colonels, hemp, tallow, wines, silk, cotton, and several articles of all kinds, but not to a large amount, the inhabitants being very simple in their habits and mode of living. The proximity of Frankfort favours a profitable transit trade with the North of Germany, and this trade is now confined between Holland and the States of the Rhine; the doubters doubtless tend to promote the foreign commerce of Hesse.

**The Revenue.**—By the biennial budget for 1837—1839, the expenditure is estimated at 3,334,670 dollars, and the receipts at 3,314,810 dollars; leaving a deficiency of 15,060 dollars; but there is reason to expect that there will be a surplus. On the 1st of January, 1837, the public debt was 1,540,850 dollars, at 4 per cent. interest, of which however 900,000 dollars are in the hands of the government. The interest of the debt has been reduced to 3½ per cent.

**The army consists of six regiments of infantry, 2 battalions of life, 2 battalions of light infantry, and 2 regiments of cavalry.**

**The Constitution of January, 1831, is one of the most liberal in Germany.** The estates form only one chamber; the electoral dignity is hereditary, to the exclusion of females. though there be no representative, women, an estate of nobility, but, on an estate of nobility, an estate of nobility, an estate of nobility, an estate of nobility, an estate of nobility. The election of the sovereign is by assembled chamber; the sovereign of Hesse-Cassel has thought fit to retain the title of elector. Since the introduction of the constitution, many good laws have been passed, and many important improvements have been made unhappily, there have been serious differences between the government and the states, some of which have been compromised, but one of much importance remains undecided. It arose on the extinction of the collateral branch of Hesse-Rothenburg by the death of the landgrave Victor Amadeus, in Nov. 1834; the revenue of his domains (250,000 dollars) is claimed by the Estates as public property, whereas the sovereign claims it to belong to the private property of his family.

**Religious Education.**—The greatest majority of the inhabitants are Protestants (for the most part, with the church, Calvinists), the Roman Catholic Church having a very limited number of adherents. A law for the emancipation of the Jews was passed in 1833. The Protestant Church is under superintendents; and the Roman Catholic under the bishop of Fulda, who was consecrated into that see by the pope in 1831. Marburg: 1 lyceum, 6 gymnasium, 13 a seminary, 13 a seminary, 13 a seminary, 3 seminaries for scholars, 2 academies of drawing and painting, and 63 town schools, and elementary schools in all the provinces. HESSE-DARMSTADT, the grand-duchy of which is governed by the second main branch of the house of Hesse, was founded in 1657, as stated under HESSE-Cassel, by George L., youngest son of Philip the Generous, of whose dominion he ascended one-eighth with Darmstadt, and a small addition on the death of his brother Philip without issue. On
the death of George III's dominions were divided among his three sons. Louis V. succeeded him in the principal line; Philip obtained Butzbach, which reverted on his death to the main line; and Frederick, the youngest, was the founder of the junior line of Hesse-Darmstadt, namely, that of Hesse-Homburg. Excepting the ruinous effects of the Thirty Years War, the reign of the succeeding princes were on the whole prosperous, and various acquisitions of territory were made. Louis IX., who reigned from 1768 to 1790, was a friend of peace and conciliation. He found the country burdened with a large debt, which he paid off, and left to his son, Louis X., an improved territory with 300,000 inhabitants. This prince, during his long reign of forty years, was a greater gainer than almost any of his predecessors, and he was the last of the French princes to accept the revolution; that is to say, he acquired very large additions to the extent of his dominions and the number of his subjects. By the treaty of Luneville, 1801, and by the settlement of the affairs of the empire, in 1813, he lost territories containing above 100,000 inhabitants, and obtained instead, provinces more than double the extent, with 218,000 inhabitants. In 1806 he joined the Confederation of the Rhine, and obtained from Napoleon all further additions of territory, with 112,000 inhabitants, and the dignity of grand-duke, on which he took the title of Louis I. In 1809 his troops acted against Austria, and the peace brought him 25,000 marks. As he was not obliged to let his troops serve with the French; but after the battle of Leipzig he joined the allies, on their engaging to let him retain his newly-acquired provinces. In 1813 the grand-duke joined the allies in the first campaign of the year. By the treaty of Vienna he indeed made large cessions on the right bank of the Rhine, with 185,000 inhabitants, to suit the convenience of Prussia and other states, but obtained on the left bank a part of the then late French department of Mont-这件事情与德国的扩张有关，但在文本中没有进一步的细节。

The grand-duchy of Hesse, as a member of the German Confederation, is the ninth in rank, has three votes in the full council and one in the minor council, furnishes a contingent of 6150 men to the 2nd division of the 6th corps, and contributes 1200 florins annually to the treasury of the Confederation.

The grand-duchy of Hesse is on the whole an agricultural country. The chief productions are corn of all kinds, likewise maize and spelt; wheat and rye chiefly in Rheinhess and the Wetterau; flax, hemp, hops, and tobacco are grown on a large scale; the cultivation of potatoes, vegetables and fruit, and timber. Rheinhess is nearly destitute of timber. The valleys of the Odenwald and Vogelsgebirge are well adapted to the breeding of cattle, of which there are about 250,000 horned cattle, and 200,000 sheep. Swine are kept chiefly in Upper Hesse and Starkenburg. The breeding of horses is much neglected. Domestic poultry is abundant; game is not scarce, but it is not plentiful. Mining is not carried on so extensively as might be expected: it is confined to copper, iron, coal, salt, and brown coal. Cobalt, basalt, limestone, marble, and slate, are found in different parts of the grand-duchy. The chief rivers are the Lahn (3200 feet broad at Mainz), and the Main, and next to these the Lahn, the Schwalm, the Nidda, the Ohm, and the Heterter. Manufactures and Trade.—Though the manufactures have greatly increased of late years, there is still much to be done. The chief manufactures are of woollens, cottons, and linens (of which latter 500,000 ells are annually made in Schiltz), leather, and hardware. Wine is produced chiefly in Rheinhess and the Wetterau, the vineyards of which extend from the Atlantic to the Rhine, and raise 250,000 florins annually. The revenue is estimated at 5,676,150 florins, and the expenditure at an equal sum, including the interest of the debt, which is above ten millions of florins. Provision is made for the gradual extinction of this debt. The military establishment in time of peace is fixed at
6238 men, namely, 968 cavalry, artillery 308, infantry 4965, a company of sappers and miners 61, general staff 6. The war establishment is 9496 men.

Religion. — Of the 716,000 inhabitants, 516,000 are Protestants (in 1852 the Lutherans and Calvinists in Hessen-Hesse united in one Evangelical church), 177,888 Roman Catholics, about 1200 Mononmites, and 22,174 Jews. In education Hesse is not so far as some other German states; but considerable improvements have lately been made. There is one university (Giessen), a philosophical seminary, an episcopal, 5 seminaries for schoolmasters, eight gymnasia, 4 schools of arts and sciences, one military school, one midwifery school, 16 schools of industry, and at least one elementary school in every town.

HESSE-HOMBURG was formerly a part of the landgraviate of Hesse-Darmstadt, till it came, in 1596, into the possession of Frederick I., youngest son of George I., who was the founder of the still flourishing line of Hesse-Homburg. Frederick Charles Louis, who succeeded to the government in 1751, experienced various vicissitudes in his long reign. In 1806, on the foundation of the Rhinish Confederation, he was obliged to give up the sovereignty of Hesse-Darmstadt, on which he became dependent. The Congress of Vienna however, in 1815, not only restored to him the sovereignty of ancient principalities of Hesse-Homburg, but also to it the lordship of the Meisen, the mines of the Rhine. The landgrave therefore is now a sovereign prince, and was unanimously received in 1817 as a member of the German Confederation, and as such has one vote in the full council, making the whole number 70. Besides, his son, the present on the throne of the Princess Elizabeth of England, and dying without issue in 1829, was succeeded by the reigning landgrave, Louis William Frederick.

Division — The lordship of Homburg, which contains about 58 square miles and 8800 inhabitants. The chief town, Homburg, vor der Höhe, with 3600 inhabitants, is situated on an eminence, on which the palace of the landgrave was erected, and commanding such an extraordinary situation. Homburg is divided into the old and the new towns, the latter of which is open, and regularly built.

11. Lordship of Meisenheim, which contains 126 square miles and 15,200 inhabitants. It lies between the Prussian province of the Lower Rhine, the Bavarian circle of the Rhine, and the principalities of Liechtenberg and Birkenfeld. The chief town is Meisenheim, with 1750 inhabitants, in a fertile and hilly country, and contains a considerable proportion of arable land. Meisenheim, which is occupied by the offsets of the Hundsruck, has mines of coal, iron, stone-quarries, and considerable forests. The landgrave has built on the high ground, Hembergen, and Oesefelshe, in the Prussian province of Saxony, and some other private estates. The revenue, including 34,000 florins from the Prussian breweries, and an annuity paid by Hesse-Darmstadt, is 160,000 florins (18,000 L.)

The public debt is 450,000 florins, for the gradual extinction of which provision is made. The military consists of a contingent of 200 men, furnished by Hesse-Darmstadt to the reserve of the army of the Confederation.

Religion. — 14,000 Calvinists, 6000 Lutherans, 3000 Roman Catholics, 150 Jews. The supreme power is vested in an hereditary landgrave, and descends only in the male line.

The castles of —

HESSE-PHILIPPSTHAL, the younger collateral line of the house of Hesse-Cassel, was founded in 1682 by Philip, the sixth son of Landgrave William VI., and was divided into two new flourishing branches of Hesse-Philippsthal and Hesse-Philippsthal Barcefeld; the residence of the former prince is at Kreuzberg or Philippsthal, that of the second at Barcefeld, both on the Main; they are both of the Calvinist religion, and are neither of them a castle.

HESSE-ROTHENBURG. This line was founded by Ernest, the youngest son of the Landgrave Ernest, born 1524, and died 1633, who embraced the Roman Catholic religion.

The line died out under the two new flourishing branches of Hesse-Philippsthal and Hesse-Philippsthal Barcefeld, by the extinction of the former prince at Kreuzberg or Philippsthal, that of the second at Barcefeld, both on the Main; they are both of the Calvinist religion, and are neither of them a castle.


HESSE, WILLIAM, LANDGRAVE OF, was born at Cassel about the middle of the sixteenth century, and died in the year 1597. He immortalized his name by the encouragement which he gave to all kinds of philosophical research, and more particularly by the zeal with which he endeavored to advance the science of astronomy. With the assistance of the celebrated astronomer Juste de l'Empire, he erected an observatory, and furnished it with the best instruments that were then obtainable. His observations, which are said to have been of a very curious nature, were employed by Hutton, and later by Gregory (Leyden, published 1719) to determine the ages of the earth and moon. The son of William, was born one year after his death, by Willebrord Snell, and was spoken of by Tycho Brahe, both in his Epistles, and in the second volume of 'Prognosystama.' (Martin's Biographia Philosophorum Lend., 1764, p. 249.)

HESSE, commonly called ESSENES, one of the three great sects into which the Jews were divided in the time of Christ. They are not mentioned in the New Testament; but it has been conjectured that they are alluded to in Matt. xix. 12, Col. ii. 18, 23. Many particulars concerning the customs and religious opinions of this sect are given by Josephus and Philo. Their statements differ in several points; but both these authors appear to have obtained these accounts from the Jews, and have passed some time among the Essenes. (Life of Josephus, c. 2.)

The Essenes generally lived at a distance from large towns, in communities which bore a great resemblance to the monasteries of the middle ages. The members were sworn to live by their own industry, not to possess any slaves, and had no coined money. They had all things in common, ate at a common table, and were exceedingly abstemious, never partaking of food before sunset. They wore long white garments, and generally lived a life of celibacy. They sent gifts to the Temple, but never offered any sacrifices there. They were divided into four classes, according to the time of their admission into the sect; and by this means were preserved from a corruption which might have5 come over them in a prosecution of three years: those who were admitted had to take solemn oaths that they would worship and serve God, and be just towards their fellow-creatures; that they would love and speak the truth, and that they would never disclose the mysteries of the sect. The Essenes were exemplary in their religious duties, and were particularly distinguished by their rigid observance of the Sabbath-day. They believed in the immortality of the soul, but not in the resuscitation of the body; and it is this last point that has made historians consider them as the prototype of modern sectarianism. It is contended that the Essenes were the destination of all events: they held the Scriptures in the greatest reverence, but considered them as mystical writings, and explained them allegorically. They also appear to have possessed a considerable number of books, which were zealous of the doctrines and practices of their sect. (Philo, De Vita Contemp., vol. ii., p. 475.)

The origin of this sect is uncertain. Some writers consider them the same as the Assassins, or Chrestians, or it is mentioned in 1 Mac. ii. 42; vii. 13. It would appear from the account of Pline (Nat. Hist., v. 17) that their principal society was on the western side of the Dead Sea; and that from this society other smaller ones afterwards proceeded, and spread themselves over Palestine, Syria, and Egypt. Their numbers were never considerable; according to Philo and Josephus, there were only 4000 in Palestine. The Essenes of Egypt were the practical Essenes, whose manner of life was the same as the Essenes of Palestine; and the contemplative Essenes, who were also called Therapeutae. Both sects maintained the same doctrines, but the latter were distinguished by a more rigid mode of life. From a passage in Eusebius (Hist. Eccles., i. 17), it has been argued by Bellarmine, Baronius, and other Roman Catholic writers, that the Therapeutae were Christian in religion, a conjecture which is based on the identity of the sect of the Essenes with that of the Assassins, being a society by Simon the Syrian, a founder of the Christian church at Alexandria. But it is evident from the account of Philo, that the Therapeutae were not Christians, but Jews. It has not been decided, be considerable probability, that the early Christians derived many of their customs and opinions from the Essenes. Mr. Taylor, the editor of Calmet's 'Dictionary to the Bible,' gives many reasons for believing that John the Baptist belonged to this sect. (Josephus, Antiquities of the Jews, xili., c. 5; xv., c. 10.)
HESYCHIUS. There is a valuable Greek Lexicon extant, bearing the name of this author, of whom however nothing except his name is certainly known; he is supposed to have lived in the fifth or sixth century after the Christian era. That which has come down to us is said to be only an epitome of the original, but of his own proper composition. A peculiar appearance of rough notes put down in the course of reading, rather than of a finished work; and consists chiefly of short explanations of unusual Greek words, or forms of words, and technical terms. It was inserted into the first edition of his book, which was printed in the library of St. Mark at Venice, is said to be preserved, and that is full of abbreviations, and has many erasures; which accounts for the great corruption of the text, in spite of the labours of many able editors. The first edition was that of Aldus, 1513, fol.; the most complete, that of Alberti, 1746. 2 vols. fol., of which the second volume was published by Ruhnken in 1766. This edition has a copious body of Prolegomena, containing all that can be said concerning the MS.

HESYCHIUS, named the Illustrious, of Milethus, lived in the sixth century, and wrote a universal history in six parts, from Belus down to his own age. Some extracts of it have been preserved; which, with an abridgment of the Lives of the Philosophers, chiefly from Diogenes Laertius, are edited in one volume by Mercerus, 1613; he also wrote the reign of Justinus. (Philotus, Bibli. 85.) Ascidians, whose name was a common one under the Greek empire: we find many ecclesiastics and martyrts so called. For a list of those concerning whom something is known, see Fabricius, Bibl. Gr. No. 5 c. 4; and the Prolegomena to Alberti's edition, the Lexicon.

HETEROBANCHIATA, M. De Blainville's name for the fourth order of his Aephelophora.

The 1st Family (Ascidiidae) is divided into two tribes: 1. the Simple, (Biporida; &c.); 2. the Aggregate (Pyrocoma). [SALPA.]

HETEROCERCAL, the term chosen by M. Agassiz to denote a peculiar form of the tail of fishes, which affords a very obvious, and, as far as yet appears, a very correct indication of the geographical age of formations. Among existing fishes the tail is either simple, as in the eel, but the tunny and salmon, expanded to round figure, as in the wrasse, or unequally bilobate, as in the shark. It is to this latter irregular form of tail that the term Heterocerical is applied; the others, by way of distinction, are called Homocerical.

The peculiarity of the Heterocerical fishes is that the vertebral column runs along the upper caudal lobe: in the other forms of tail it is symmetrically placed with respect to the posterior finny expansion. M. Agassiz has found this peculiarity of the tail, which is least common among living fishes, and confined to particular groups, to belong to every species of fishes, of whatever group, and however differing in other respects, which occur in strata other than the Pliocene system, while in and above that system Homoceriform fishes appear. It is therefore a characteristic of geological time; and among the groups, as to the relations of this form to physical conditions of the surface, or laws of the animal economy, we prefer the opinion that it is one among several marks of the saurian character of the fishes, which attained in early geological periods. Some of the fishes of the oolite rocks exhibit a slight inequality of the lobes of the tail, and some difference in the arrangement of the scales thereon, but without (we believe) the characteristic continuation of the vertebral column into the upper lobe. These may be thought to mark the gradual transition from the Heterocerical to the ordinary types of structure. Lepidosus, with sharks, and other cartilaginous fishes of the existing creation, which were therefore somewhat in transition, thus appear the few surviving representatives of organic forms which, in earlier periods of the history of the globe, were exclusively predominant. (Agass., Recherches sur les Fossiles Poissons, 155.)

HETERODON, M. De Blainville's name for a genus of Dolphines. [Whales.] The term Heterodon had been applied by M. De Beauvois to a genus of serpents placed by Cuvier under his great genus Coluber.

HETEROGONIATTA. The Heterogoniats of Professor Owen comprise all the Mollusca of Cuvier, with the exception of the Carippe.

HETERORGONOUS. [Homogneous.]

HETEROMYS, a genus of Rodents, which, in M. Lesso's opinion, may be advantageously used, though M. Desmarest proposed it without adopting it. The genus is described as having the cheek-pouches of the Hamsters, the general form of body and tail of the squirrel, so called, and the dorsal flattened spines of Echimys, Geoff. (Lonchera, Illiger.) Dental system unknown; feet with six calllosities below, and five toes, the internal toe very small. (Less.)

HETEROSTEGLESS. HETEROSPERMUS, HETE.

HETEROSCII (other-shadowed), an old astronomical term for persons living in such parts of the earth that their shadows at noon are always turned contrary ways. Thus the only heteroseii are those who are situated without the tropics, and in different hemispheres; since in the northern hemisphere those who are situated north of their tropic have the shadow at noon always turned northward, and those south of the southern tropic, southward.

HETEROSTEGINA. [foraminifera, vol. x. p. 348.]

HEYLIUS, JOANNAE, or more properly JOANNES HEVEL, a Polish astronomer of great eminence, was born at Danzig, or Gdansk, 1613; returning from visiting the principal counties of Europe (1630—1634), he returned to his native city, and was occupied in business or public affairs till 1639, when, by the advice of Cruger, whose pupil he had been, he applied himself almost exclusively to the study of astronomy. In 1641 he built an observatory in his own house, and furnished it with a quadrant and sextant of three and four feet diameter, together with large telescopes constructed by himself. His scientific pursuits did not however preclude his being elected consul in 1651, to which distinction his rank in society and philosophic character entitled him, and of which he continued to discharge the duties to the time of his death. In 1647 he published an account of the motion of the moon, under the name of 'Selenographia' (Gedani, fol.), to which was added a representation of the other planets as seen by the telescope. In 1654 appeared his treatise 'De motu Lunae Istoricore' (Gedani, fol.), in the form of a letter to Reheus, wherein he gave an explanation of the liberation of the moon. (Montucla, Hist. des Math., tome ii., p. 536.)

To these succeeded an account of the eclipses of 1654; a treatise 'De Naturae Phaenomenis' (1658); a new appearance of the Transit of Mercury in 1661, to which he added an account of the transit of Venus in 1639, as observed by Horroz (Gedani, 1661); Observations of the Comets of 1654 and 1666, published in 1655 and 1666; and in 1668 appeared 'Cosmographia.' In 1673 appeared 'Observations on the Transit of Mercury' in 1661, to which he added an account of the transit of Venus in 1639, as observed by Horroz (Gedani, 1661); Observations of the Comets of 1654 and 1666, published in 1655 and 1666; and in 1688 appeared 'Cosmographia.' In 1673 the first part of the 'Maehina Conelis' was published. It was this last work which gave rise to public controversy between Hevelius and Dr. Hoef. who pub-
HIBISCUS, a genus of plants of the natural family of Malvaceae, so named from one of the Greek names (disea) of the Mallow. The species, upwards of 160 in number, of this genus are arboreous, though of a large size, but a few are perennial and arborescent. They abound in the hot parts of Asia and America, and also in Africa and the tropical islands; a few extend into Europe, North America, and parts of the New World. The characteristic peculiarity of this genus is the large number of seeds which occurs in each fruit of it. In Europe, it is also found in Cashmere. The genus is characterized by having an exterior many-leaved calyx; carpels united into a five-celled capsule; valves with the partitions in the form of the Cape of Good Hope; and every capsule containing only a single seed. The species are remarkable, like the family to which they belong, for abounding in mucilage, and for the tenacity of the fibre of their bark, whence several are employed for various purposes in the different countries where they are indigenous.

The abundance of mucilage in some of the species renders them useful as articles of diet, as the unripe fruit of H. esculentus, the obo or gomel of the West Indies, which is employed both for thickening soup and as a vegetable; so in India H. longifolius, there called ram turai, is similarly employed, and much approved of by many Europeans, but objected to by others on account of its camallness. The calyces of H. Subedaris, as they ripen become of a red colour and are pleasantly acid, whence in the West Indies the plant is called red sorrel. The calyces are employed there, as for making tarts; and a decoction of them, sweetened and flavoured with rose-water and Brown's Jamaica, as a cool and refreshing drink, much used in many of the sugar islands. H. syriacus and H. Rosa sinensis are known as ornamental plants; the flowers of the latter are employed for blackening the eyebrows, as well as for dressing, both in India and China.

The species of Hibiscus are chiefly useful for the tenacity of their fibre, and hence several are employed in rope-making. Thus H. cannabinus is much employed everywhere in India in the rainy season for this purpose; and its fibre is often imported into Europe as a substitute for hemp. It is known by the name sun in Northern India, ambare in Western India, and is a kind of Odhatee rope and string are manufactured from the bark of H. tiliaceus, which is also made into matting of a white colour, and of different degrees of fineness. Forster states that the bark is also suited to an article of dye, which the breed-fruit fails there; it is also so employed in New Caledonia. Indeed the mucilage which all these plants contain will no doubt afford some nourishment. In the West Indies, the wages with which the slaves are lashed are made from the fibre of this plant. Another 300 miles south of the river Tigris there is a kind of Gutem grass, which occurs in so many species of this genus being used for its tenacity, it is impossible to enumerate all. Dr. Roxburgh particularly recommends the cultivation in India of H. syriacus, in consequence of its finely-drawn fibres, a beautiful glossy white appearance, and as likely to be an advantageous substitute for such as are already cultivated for this purpose.

Hibiscus mutabilis, so called from bab-al-moosch, the Arabic name of its muc-scented seeds, is now often named Abelmoschus moschatus, and formed into a new genus. Its seeds are said to be added to coffee in Arabia, and are in India employed as a coriandium. The plant abounds in mucilage, and is employed in the process of clarifying.

HIBULITHUS, one of De Montfort's subdivisions of Belenenses.

HIC, GEORGE, an eminent English divine and philologist, was born June 20th, 1642, at Newsham, in Yorkshire, where his parents were settled in a large farm. He was first sent to the grammar-school of North Allerton, and in 1654 to Mr. John's College, afterwards removed first to Magdalen College, afterwards to Magdalen Hall, and in 1664 was chosen Fellow of Lincoln College. In 1663 he became M.A., and was admitted into orders in 1666. In 1672 he travelled with Sir George Wheler to France. In 1676 he was made chaplain to the duke of Lauderdale, whom he accompanied in the following year to Edinburgh, where his grace was appointed high commissioner to the church of Scotland. In 1679 he was created D.D. at Oxford, having resided at Cambridge degree the year previous from the University of Glasgow.

Between 1679 and 1683 he had several preferments, and in August of the latter year was made dean of Worcester. In 1680 he refused to take the oaths of allegiance, fell under suspicion in 1689, and in the month of February following was deprived. He was subsequently consecrated suffragan bishop of Thetford by archbishop Sancroft. He died of the stone, Dec. 15, 1715.

Dr. Hicke was a man of general learning, deeply read in the fathers, and particularly skilful in the northern languages. His controversial pieces on politics and religion, and his valuable book on the proper use of the confessional, are so much esteemed and quoted by all parties, that he has been in the highest repute.

Dr. HICKE. [Hyerex.]

HICERO, the name of several Greeks:

1. Hiceroes, a rhetorician of Alabanda, in Caria, lived in the beginning of the first century before the Christian era. He excelled in what Cicero termed the Asiatic style of eloquence. (De Orat. ii. 22; Brutus, c. 55.)

2. Hiceros, a stoic philosopher, lived in the time of Hadrian, or perhaps later. (Gell, ix. 5.)


4. Hiceros, who probably lived in the sixth century, was the author of the sacred Scriptures (τινος ἐν θεῷ), that is, a travelling companion, which gives an account of the provinces and towns of the Eastern empire. The 'Synecolimos' is printed by Wesseling in his 'Vetera Romanorum Insectorum,' 1725.

5. Hiceros, preceptor of Bithynia, and afterwaters of Alexandria, is said by Lactantius (Inst. Divin. v. 2; De Morti Perseu. c. 17), to have been the principal adviser of the persecution of the Christians of the time of the emperor Diocletian. He also wrote two books against Christianity, entitled ἔροι φιλαθλνίς πρὸς τοὺς χριστιανοὺς, truth-loving words to the Christians; in which, according to Eusebius, he endeavoured to convince them to the sacred Scriptures over themselves by the contradictions with which they abound; but he particularly insisted upon several texts as inconstant with each other; and indeed on so many, that one might suppose he had sometime professed the religion which he now attempted to expose. He chiefly reviled Paul and Peter and the other disciples as provocators of falsehood. He said that Christ was banished by the Jews, and after that got to the Roman emperor. Under the pretence of overthroning Christ's miracles, though he did not deny the truth of them; and aimed to show that like things, or even greater, had been done by Apollonius. (Inst. Divin. v. 2, 5.)

6. Hiceros, a celebrated Alexandrine philosopher of the fifth century, wrote a Commentary upon the Golden Verses of Pythagoras, which is still extant; and also a Discourse on Foreknowledge and Fate, of which Bodinus has preserved large extracts. Stobaeus has also preserved the fragments of several other works, which are ascribed to Hiceros. The Greek text of the Commentary on the Golden Verses of Pythagoras was first published by Curterius, Paris, 1583; reprinted at London, 1654; and has also been published at London, 1742, and Padua, 1741.

The fragments of the Discourse on Foreknowledge and Fate, in which the attempt is to reconcile the free-will of man with the foreknowledge of God, have been edited by Morelli, Paris, 1593, 1597; and by Pearson, London, 1655, 1673; the latter edition contains the fragments of the other works of Hiceros. A complete edition of his works was published by Needham, Cambridge, 1709. The Discourse on Foreknowledge and Fate was translated into French by Regnault (Lyon, 1560). Grotius translated part of this work into Latin, in his 'Sententiae Philosophorum de Fato,' Paris, 1624; Amat, 1648; and reprinted in the 3rd vol. of his theological works, 1679.

The Commentary on the Golden Verses has been translated into English by Hall, London, 1637; Norris, London, 1682; Rayner, Norw., 1797; and into French by Sartorius, Paris, 1700.

There is also another work, entitled Astica (άστεια), which contains an account of the ridiculous actions and sayings of pedants, frequently printed with the editions of Hiceros; but it was probably written by another individual.
same. This work was translated into English in the "Encyclopaedia Britannica." (See page 741.)

HIEROGLYPHICS, a compound Greek word which means "sacred engravings," is the name given to the well-known figures of animals, plants, and other material objects sculptured on the Egyptian obelisks, temples, and other objects. They were used as a kind of hierographic writing among the people. The name "hieroglyphics" has been applied to other figures of a similar kind, used likewise for historical records on the monuments of various nations, and which are known as "picture-writings." This way of writing, when conducted with the simplest method of recording events seems to have been that of picture-writing, that is, by a rude delineation of objects, such as that by which the Mexican saints in former times were portrayed. Montet可用于...first and his hand of followers, by sketching as faithfully as they could the appearance of the Spaniards, their ships, horses, and fire-arms. This however was only resorted to by the Mexicans on extraordinary occasions, in order to depict new objects. For ordinary purposes they had symbolic or conventional hieroglyphics to express historical events and other occurrences as time passed on and events recur, and the relations of society increase, picture-writing becomes more and more inadequate, and some method must be contrived for shortening and facilitating the task. This is effected at first perhaps by sketching only a part for the whole, such as a scaling-ladder, tent and flying horse, &c. The path of figurative imagery being once entered into, leads to the symbolic or simple signs, in which one thing may be put for another on account of some real or supposed resemblance. Such an ancient hieroglyphical letter denotes the king or kingly power; a hawk's head surrounded by a disc represents the sun and, &c. By a combination of such symbols an event may be recorded, and, with proper reference to the mind of him who has the key of the system, without the assistance of words. In fact even to many of us Europeans who are in the constant habit of reading, the written or printed words often appear as mere hieroglyphics, as a sight of a group of certain characters to whom we have been long accustomed immediately conveys to our minds the idea expressed, without any reference to sound or alphabetical spelling. Herodotus and Diodorus say that the Egyptians had two kinds of written characters, Demotic and Sacred. The Rosetta inscription calls the common or vulgar character Enchorial. Clement of Alexandria, in a celebrated passage (Stromata v), says that those who are not initiated into the mysteries of Egyptian writing are "all learning a kind of Egyptian writing as is called epistolographic; next the hieratic, which the sacred registers use, and last of all the hieroglyphic. Of the hieroglyphic there are two kinds. One expresses its meaning by means of figures, and the other is symbolic. Of the symbolic, one part expresses its meaning by imitation, a second part as it were tropically, and the third is purely allegorical; represented by a kind of signs. Accordingly when they wish to represent the sun they make a circle; for the moon they make a crescent, the form of the object indicating the meaning. In the tropical mode of representation, following a certain analogy in the transfer and change, they use the symbols, modifying some and in many ways altering others: consequently when they record the praises of their kings in sacred myth, they express them in anagrams. Of the second or symbolic mode of representation the following may serve as example. Being on the west or western side of the stars (planets), on account of the obliquity of their course, by serpents; but the sun is indicated by a beetle. Clement gives the Rosetta inscription of the first-mentioned sort of hieroglyphics, which express its meaning directly. First element of the phrase sufficiently obscure, but which is now generally supposed to refer to the phonetic use of the hieroglyphics. This phonetic system, the discovery of recent times. Zoega first suspected that some hieroglyphics were, on account of the similarity of the sounds, and Dr. Young, having observed that certain groups of characters which were repeated in the enchorial text of the Rosetta inscription corresponded to the name of Ptolemaios in the Greek text, soon discovered corresponding groups of signs in the hieroglyphic text of the same inscription, enclosed in a kind of ring or cartouche. Dr. Young then endeavored to fix the alphabetical or syllabic value of each sign, so as to produce the name of Ptolemaios. This was the beginning of the discovery of the phonetic use of hieroglyphics by the Egyptians, who, it is supposed, has affected its phonetic alphabet. And this was the manner of the names of foreign sovereigns, Persian, Greek and Roman authors, and those which were ruled over them in succession. It appears that they employed each hieroglyphic to express the initial letter of the spoken name by which the material object represented was known, and that the proper name was written with the European proper name, but with them each character represents the entire syllable or sound which it expresses in ordinary use. Thus to write Maria or Marly, as they were called, they traced the hieroglyphs meaning "spear," which means in their language "jasper" and stands for ma, the second is the character which expresses profit, and it stands for Hi, and the third, which means "second in rank," stands for sa. For a further account of the phonetic hieroglyphics, and the respective merits of Dr. Young and Champollion in discovering them, and the extent and value of the actual discovery, see Champollion and the authorities quoted in detail. Various hieroglyphics appear to have been used in different instances to express the same letter, or a circumference which increases the difficulty of deciphering the names written phonetically. There are, according to Champollion, 864 distinct hieroglyphical signs; Zoega reckons 958; of the first 134 have been identified, and one half of the 134 have only a conjectural value which has not been tried by a sufficient test. Besides this, the arrangement of the signs themselves is very capricious; and even when once the system has been established and down, at other-times they seem to be thrown pell-mell together. And then it must be remembered that in many instances we do not know the ancient Egyptian name of the object which is hieroglyphically represented, and we cannot trust much to the word in the modern Coptic, which is a corrupt dialect mixed up with many foreign words. Still something has been done, and proper names of Persian, Egyptian, or Ethiopian origin, and the signs of such signs have been traced on the monuments of Egypt by means of the phonetic interpretation. Whether the discovery will extend much further is a matter of doubt. We do not know (at least we do not consider it proved) whether the Egyptians wrote other works phonetically besides proper names, and their language being in great measure lost, it is not very likely that we shall be able to solve the question.

The hieratic or sacerdotal character appears to have been a tachygraphy, or abridged form of the hieroglyphic signs, adopted for the sake of convenience and expedition, and used by the priests in their records. The enchorial or epistolographic, appears to be a further abridgment of the hieratic. The signs, having lost nearly all trace of their original hieroglyphic form, have the appearance of a running alphabetical writing, and are written from right to left. The distinct characters on the enchorial writing appear hardly to exceed forty. Ackroyd and Dr. Young have composed alphabets of them ("Rudiments of an Egyptian Dictionary, in the ancient "Enchoral character," London, 1831, and article "Hieroglyphics" in the last edition of the "Encyclopaedia Britannica.") Whether the enchorial was used entirely alphabetically is perhaps a question. We are told however by Plato, that Thoth, an Egyptian, invented the alphabet, and this in describing neither to his countrymen, characters, or to the enchorial characters which may have been derived from the hieroglyphies themselves. The writer of an article on the enchoral language of Egypt, in No. 3 of the "Dublin University Review," 1832, tells us that they were employed in a fashion quite distinct from that expressed by the hieroglyphics, and that both are different from the Coptic. (See various of hieratic and enchoral characters in HIEROGLYPHICS, collected by the "Encyclopaedia Britannica," London, 1823 and 1824, where, by comparing the enchoral writing found on fragments of earthenware at Elephantine, plates 53, 54, and 55, with the enchorial inscriptions from Sakkarah, plates 75, 76, we are enabled to trace a language which the enchorial character dwindled into a running and almost indistinct hand. See Robiano, Studie sur l'Écriture, les Héroglyphes, et la Langue de l'Egypte, Paris, 1834; and Young, Account of some recent discoveries in Hieroglyphical Literature and Egyptian Antiquities, Lon-
Hieron I., succeeded his brother Gelon, as tyrant or ruler of Syracuse, 478 B.C. He committed many acts of violence, encouraged spies, and kept a mercenary guard about his person. He was ambitious of extending his dominion, and his attempts proved successful. After the death of Theron, prince of Agrigentum, Hieron defeated his son Thrasylalus, who was soon after expelled by his countrymen. Hieron took Naxus and Catana, and having driven away the inhabitants from both towns, he replaced them by Syracusan and Peloponnesian colonists. He changed the name of Catana into that of Zitna, and he himself assumed the title of Eunus. Having joined his fleet to that of the people of Cumæ, he succeeded in clearing the Tyrrhenian sea of the Trasimoneans and other pirates which infested it. His chariots repeatedly won the prize at the Olympic games, and his success on those occasions formed the theme of some of the odes of Pindar, who was his guest and friend. Mæcylus, Simonides, Bucephylus, and Epicarmus, were also well received at the court of Hieron, who was fond of the society of learned men. Hieron died at Catana, 467 B.C., and was succeeded by his brother Thrasylalus, who had all his faults, without any of his good qualities, and was at last driven away by the Syracusans, who restored the government of the Commonwealthe. (Diodorus, x. 45. 66.) Atlantis (i. 1.) gives Hieron credit for a much better character than Dion- dorus; probably the latter part of his reign, after he had firmly established his authority, was better than the beginning.

Hieron II., son of Hierocles, a wealthy citizen of Syracuse, and a descendant of Gelon, distinguished himself in early youth by his brilliant qualities; and he served with distinction under Pyrrhus in his Sicilian campaigns. After Pyrrhus had suddenly and unexpectedly left the Syracusans found themselves threatened on one side by the Carthaginians, and on the other by the Mamertines, a band of Campanian mercenaries, who had treacherously taken possession of Messana. The Syracusan troops, being in want of a trusty leader, chose Hieron by acclamation, and the senate and citizens, after some demur, ratified the choice, 275 B.C. By marrying the daughter of Leptines, a man of influence among the aristocratic party, he secured their support. Having led the army against the Mamertines, he divided it into two bodies, in the foremost of which he placed the mercenaries in the pay of Syracuse, who had of late shown a mutinous disposition, and ordered them to begin the attack. They did so, but were overpowered by superior numbers; and Hieron, instead of supporting them with his Syracusan soldiers, withdrew, and left them to be slaughtered by the Mamertines. He then recruited his army among his own countrymen, and having deceived the Mamertines, who were waiting for him at the pass of Thuramenum, he marched round the western base of Areté, Tyndack, Akhore, Cylon, and other towns, before the main body of the enemy could come to their relief, and lastly defeated the main body itself in a pitched battle on the banks of the river Longanus. He was on the point of taking Messana, when the Carthaginian commander in Sicily, who was then in the island of Lipara, came to offer his mediation, but in fact for the purpose of introducing a Carthaginian garrison into Messana. In this he was successful; and Hieron, unwilling to bring on himself the blame of the loss, returned to Carthage, returned to Syracuse, where, through the influence of Leptines, he was proclaimed king, a. c. 270. Shortly after, the Mamertines at Messana quarrelled with the Carthaginians and drove them out of the citadel, upon which the Carthaginians invited Hieron to join their forces to theirs, in order to drive the Mamertines out of Sicily. Hieron Claudius marched to Agrigentum, and having contrived to pass the strait in the night, unobserved by the Carthaginian cruisers, he surprised Hieron's camp, routed the soldiers, and obliged Hieron to seek for safety in flight. The consul next attacked the Carthaginian camp with the same success, and this was the beginning of the first Punic war.
to forsake the Roman alliance for that of Carthage, and messengers for that purpose were sent to Hannibal in Italy, and also to the senate of Carthage, which gladly agreed to an alliance with Syracuse, in order to effect a diversion against the Romans. The Procurator Claudius, who governed that part of Sicily which the Romans had taken from the Carthaginians, sent messengers to Hieronymus to exhort him not to forget the old friendship existing between Rome and Syracuse. The messengers were received contemptuously, and the young king secretly asked them for some details concerning the battle of Cannae, which had occurred not long before. War being at last declared by Rome, Hieronymus took the field with 16,000 men; but he was soon defeated and took refuge among the Carthaginians, and he was murdered, after a reign of only thirteen months. On this news a popular insurrection took place at Syracuse, the daughters and grand-daughters of Hiero were murdered, and the nobility and the people were disturbed by factions and by the mercenaries in their pay, and revolution succeeded revolution until two adventurers of Syracusean extraction, but natives of Carthage, who had been siding with Hannibal to keep possession of the Carthaginian party in Syracuse, became possessed of the chief power, and so provoked the Roman Consul Marcellus, that he laid siege to Syracuse.

**Hieronymus**, a native of Cardia, or Cardinopolis, a town in the Chersonese of Thrace, lived in the times of the immediate successors of Alexander. He wrote a work entitled 'Historical Memoirs' concerning the successors of Alexander and the great and the wars which followed the death of that conqueror, which is mentioned by Suidas, and also by Dio Chrysostomus in his preface to his history. The work of Hieronymus is unfortunately lost. Dio Chrysostomus appears to have made use of it in several parts of his work. Gerard Vossius (De Historiis Graec, h. i. ch. xi.) distinguishes Hieronymus of Cardia both from Hieronymus of Rhodes, a disciple of Aristotle, and from Hieronymus the Egyptian, who was governor of Syria under Antiochus Soter, and who wrote a History of Phoenicia, quoted by Josephus, Antiqu. Jud., b. 1. (See also Recherches sur la Vie et les Ouvrages de Jeronime de Cardie, by l'Abbé Serres, in the Mémoires de l'Académie des Inscriptions et Belles-Lettres, vol. xii.)

**Higden, Ranulph, or Ralph**, author of the Polychronicon, was a Benedictine monk of St. Werburgh's monastery, in Chester, where he died at a great age, after having lived in the convent sixty-four years; according to Balo, in 1367; according to Pits, in 1373. Dibdin, in his edition of Herbert's 'Ames,' and Chalmers, in his Geographical Dictionary, say Higden died about 1360. Gale published a portion of Higden's original work in the 'Scriptores', xv., fol. Oxford, 1691. John de Trevinas's translation of the 'Polychronicon' was printed by Caxton in folio, in 1492, in seven books, to which Caxton added an eighth. The Caxton Mss., exhibited in that city in 1328, at the expense of the several trading corporations, have been ascribed to Higden. That a monk of the name of Randin, or Ranulph, contemporary with Higden, had some concern in the latter part of the 14th. It is not quite so clear that Higden was himself the person. (See Tanner, Bibl. Brit. Hist., p. 403; Pref. to Maryland's Chester Mss.)

**Higgins, or Higins, John**, was born about 1544, according to the author of a note in a late edition of 'The Mirror for Magistrates.' He was educated at Oxford, but whether he took a degree is uncertain. He was one of the contributors to the book above mentioned, to which he supplied forty legends, relating mostly to the mythical history of England. In one of the 'envoys' he tells us that he did not 'take the pain to learn the tongues and write' until he was twenty; that French and Latin were his chief studies, and that he published his part of the 'Mirror for Magistrates' when thirty. One stanza from the introduction will give a fair specimen of his manner, and at the same time an idea of the nature of the poem.

He tells us that he bought the book to which he was then employed in making additions, and goes on to enumerate those who were celebrated therein:

- Some peevly were kings of high estate,
  As Cambro-Normand, of Powis, and Boyard,
- Some princes, lords, and judges great, that
  In Canaan's hill, deriving every place;
- Some other, knightly, that vies did embrace;
- Some gentlemen; some poor asralled high;
- Yet evermore, to show in his tragedy
  In a tale of the principality of the age.

The 'Mirror for Magistrates' went through many editions from its first appearance as Lidgate's 'Fall of Princes' to its latest shape in the impression of 1610. Its importance has, we think, been little seen; but the very evident application to what particular person or to what vice they were severally subject. Hilarion afterwards went to Egypt, and successively visited Sicily, Dalmatia, and Cyprus, where he died about the year 371. We are informed by Jerome, that 'by the influence of Hilarion's example immemorial monasteries began to be founded through all Palestine.'

The life of Hilarion has been written by Jerome, and is printed in vol. iv., part ii., pp. 74-90, of the Benedictine edition of Jerome's Works.

**Hila'rius**, a native of Sardinia, was made deacon of Rome about A.D. 354. He is frequently mentioned by Jerome (Adv. Lucif.) as a rigid Luciferian, a sect which derived its name from Lucifer, bishop of Cagliari, in Sardinia, who separated from this church on theological points. An absolution that had been granted to those Catholics who had become Arians during the reign of Constantius. Hilarus wrote several works in favour of the opinions of Lucifer; in which he maintained, among other things, that Arians and all other heretics ought to be baptized again when they were converted to the orthodox faith. Hilarus is generally supposed to have been the author of a Commentary on St. Paul's Epistles, which is usually printed with the works of St. Ambrose; and also, though this is more doubtful, of 'Questions in Vetus et Novum Testamentum,' usually joined with St. Augustine's works. The Benedictine Dictionary informs us that the MSS. of the Commentary on St. Paul's Epistles differ considerably, and that in some parts there appear to be interpolations of long passages. This commentary is held by few, plain, and literal, and to give the meaning of the text of St. Paul, as far as enough; but it gives very different explanations from St. Augustine in those places which concern predestination, provocation, grace, and the like.


**Hila'rius, Saint**, was born at Poitiers, of which place he was afterwards made bishop about A.D. 354. He is distinguished in ecclesiastical history by the active part which...
HILARIUS, the native of Sardinia, succeeded Leo I., or the Great, as bishop of Rome in the year 462. He had been employed by Leo in important affairs; among others, he was sent as legate to the metropolitan of Venice, a.d. 449, against the Eutychians, and was well versed in matters concerning the discipline of the church, which he displayed great zeal in enforcing. He interfered in the election and consecration of bishops by their metropolitan in France and Spain, and he justified his interference by alleging the preeminence of the see of Rome over all the sees of the West, a preeminence which he however acknowledged, in one of his letters, to be derived from the Emperor's favour. He also forbade bishops nominating the candidates of their own choice, which was then frequent. He however did not declare elections or nominations to be illegal merely from his own authority, but assembled a council to decide on those questions. Hilarius died at Rome, a.d. 467, and was succeeded by Simplician.

HILBRUGHAUSEN. [Saxe Meiningen.]

HILDESHEIM, a principality in the kingdom of Hanover, forming with Braunschweig a portion of which it is separated by the river Weser. It is bounded on the north by Calenberg and Lüneburg, on the east by Brunswick, on the south by Göttingen and Brunswick, and on the west by Calenberg. Its area is 761 square miles, and its population, which in 1812 was 125,938, is now 135,014, of whom 30,000 are Roman Catholics, 167 Calvinists, and 1000 Jews: the remainder are Lutherans.

Hildesheim is, in the south-west of Germany, in the Harz. The soil is stony and not generally fertile. In the centre and north the surface is undulating, and the soil rich and fertile. The principal rivers are the Innerste, Lune, Oker, Eckach and Fulde. The climate is healthy. The agricultural products are corn, garden vegetables, fruit, flax, hops, and timber. The mineral products are iron, coal, and salt. The trade is very considerable. The exports consist of the natural productions, and of some manufactures, chiefly flax. Hildesheim has 4 bishoprics and 22 abbeys.

Hildesheim was formerly a bishopric, founded in 825 by Louis the Pious. The town was plundered several times, and in 1519 the bishop engaged in an unsuccessful contest with the duke of Brunswick, who was defeated and taken captive. The town has, in consequence, been able to maintain its independence.

Hildesheim is a town of considerable importance, being situated in 52° 9' 31'' N. lat. and 9° 55' 38'' E. long., is a place of considerable extent, and, like most of the ancient German cities, very irregularly built. It is divided into the old and the new town, by a river, the Inn; both banks of which have been levelled and converted into public walks. The city is situated at the foot of the Gallaberg, near the Innerse, in which river there is a beautiful island converted into gardens. The inhabitants are nearly all Lutherans; but many, with the bishop, are Roman Catholics. The principal public buildings and institutions are, a palace, 4 Roman Catholic and 8 Lutheran churches. 12 Roman Catholic and 8 Protestant hospitals, 3 orphan houses, a convent (7 others have been secularized), a synod, a
HILL

198

Roman Catholic and a Protestant consistory, a Lutheran
gymnasium, with a good library, schools of industry, and an
admirably-regulated poorhouse, where nearly 600 children
receive gratuitous education, beggars and infirm are employed,
the sick are relieved, and the dead are buried. Founded in 1818 by Louis
the Bourgeois, this institution is run by a board of directors, elected by
the inhabitants, and managed by a priest and a layman. The school
is attended by over 200 students, who are taught read-
ing, writing, arithmetic, history, geography, and
natural science. The institution is supported by
public subscriptions and endowments.

HILL, AARON, was born at Boufert Buildings in the
City of London in 1719. He had been destined to
study law, but became a merchant. He was
educated at Westminster school, and in his sixteenth year went to
Cambridge to study Divinity. He was later
to become a tutor in the household of the English
diplomat, Lord Paget, who was a relation of his mother.
The nobleman received him kindly, and provided him
with a tutor, whom he travelled through a great part of
the East. Having subsequently lost his family's favour,
he was engaged by Sir William Wentworth, of Yorkshire,
as his travelling companion through Europe. On his re-
turn he wrote in 1749 A History of the Ottoman Empire,
compiled from materials collected at the Turkish court, and
about the same time was made 'master' of Drury Lane Theatre.
At this time he wrote his first tragedy of 'El-
frida.' He started several commercial projects with indif-
terent success, and in 1755 established a new, in Europe,
which he called himself. Here he translated
Voltaire's tragedy of 'Merope,' and lived just long enough
to see it produced. He died in 1749-50.

HILL, SIR JOHN, was born about 1716, and began
life as a merchant, with a view to adopting London
as his home. In 1755 he was made a ban-
ner of knowledge of botany which is his only
claim to honourable notice: though being possessed
of lively parts, industry, and impudence, he managed to
obtain in his life nothing but notoriety. He pushed his
way into fashionable life; published a fashionable and
scandalous newspaper called the 'Inspector;' made a
puff, and sold quack medicines; and yet found time to compose
a work of great merit, many very voluminous, prin-
cipal and botanical subjects. The 'History of the
Admission to the Royal Society; but being rejected, on
account of his equivocal character, he published in revenge
a 'Review of the Works of the Royal Society,' 4to. 1751,
in which he attacked the members of the Society.
No doubt subjects enough for satire might be found in
their voluminous Transactions; but the Review is said to have
shown as much unfalseness as ingenuity, and no little
of both. Hill obtained a Scotch diploma of medicine,
and assumed the title of Sir John in virtue of a Scottish
order of knighthood presented to him by the king of
Sweden in exchange for a present of his botanical pub-
llications. He died in 1770. He was one of the
most considerable works:—'History of the Materi-
Medica,' 4to. 1751; 'General Natural History,' 1749-53, 8
vols. fol; 'British Herbal,' 1755, fol; 'Vegetable Sys-
tem,' 4to. 1758, fol; 'System of Botany,' 1760, fol; 'A COMP.
1600 plates, published at 36 guineas plain, and
160 coloured; 'Constitution of Timber from Its Early Growth,'
fol. 1760, a work highly praised by Haller. (Watt, Bibl.
Britannica, and a short Account of the Life, &c., of Sir J. H.
Hill, 1779.)

HILLAH. [BABYLON.]—Hillel, one of the most celebrated of the Jewish
Rabbis, is said to have been born on the banks of the river
Jalysus into the tribe of Levi. He is said to have been a
bencher of the New Grocers' Hall at London, and to have
lived for a considerable time in the East. He is
said to have been a bishop in the church of
Bethlehem, but this statement is not supported by
any authority. Hillel is said to have been a
member of the Synagogue at Jerusalem, but this
information is not supported by any authority.
Hillel is said to have been a
member of the Synagogue at Jerusalem, but this
information is not supported by any authority.

HILKAN. [HILKAN.]—Hillel, the great

pointed president of the Sanhedrim at the age of eighty.
He continued to discharge his duties as president for forty
years; and died at the advanced age of 120.

Hillel is not mentioned by Josephus; but it has been
said that he must have been the same as Pollio, or the
high-priest Hamean. The disciples of Hillel were
very numerous, amounting, according to tradition, to a thousand, of whom one of the
most distinguished was the Rabbi Shammai, and the
Chaldean paraprosdokian on the proverbs. The decisions
of Hillel on several points in the Jewish law differed
from those of Shammai, vice-president of the Sanhedrim; and the
separation between the two arose from their
sentiments and divisions and quarrels. Hillel's party at
length prevailed, in consequence it is said of a bath koll, that
is, a voice pretended to come from heaven. The decisions
of Hillel are supposed to have been the ground-work of the
Mishna.

Another rabbi of the name of Hillel, the son of Rabbi
Judah Nasi, and a descendant of Hillel, of whom we have
spoken above, who lived in the fourth century of the Chris-
tian era, is said to have established the present calendar of
the Jewish year.

HIMALAYA, or HINNALEAH MOUNTAINS, ex-
tend along the north-eastern boundary of Hindustan, and
constitute likewise the northern boundary of the valley of
Asia. They are situated between 27° and 33° N. lat. and
73° and 98° E. long. The most western portion (between
Hindustan, and 73° and 98° E. long.) lies in a general direction
west to south, and forms a slightly curved line, so that the
north-western extremity runs north-west and the
south-eastern nearly due east. The eastern portion (be-
 tween 80° and 95° E. long.) runs west and east, in the first
portion of the range, 600 miles in the last about 600; its
length is 1500 miles. Its breadth, as far as it is known,
varies between 80 and 120 miles. The whole range may therefore occupy a surface of
150,000 square miles.

This extensive mountain-range lies between two plains, a
low and level one, which is drained by the Ganges and
the Brahmapoora, and extends along its south-western and
southern boundary, and the

mountain-land of Tibet, which lies to the north-east and
north of the range. The plain of the Ganges and Brahmapoora, at
its southern extremity, is little elevated above the sea, and
where it is further on from the shore its elevation does
not exceed 1000 feet. The table-land of Tibet, as far as it
is known, rises to the elevation of 10,000 feet and more. The
Himalaya Mountains may therefore be considered as
an extensive slope, by which the elevated table-land of Tibet
descends to the plains of Asia. In the cases where two plains of different elevations lie near one
another, the descent by which the higher sinks down to
the level of the lower is partly occupied by a mountain-
range running parallel with the higher, and is called the
Himalaya Mountains. So, the Himalaya Mountains rise far above the level of the
table-land of Tibet, and where they are contiguous to it, they
constitute an interrupted range, covered with snow in its
whole extent, with the exception of a few mountain-passes,
which are partly free from snow during the hottest months.

They terminate on the plain of the Ganges, in a wall-like
range from 4000 to 5000 feet high, which however is
freely broken by gaps through which the rivers escape
The Himalaya Mountains are separated from the extensive mountain-range of Eastern
Persia, which from its highest mountain-range has obtained the
name of Hindu Coosh, by the narrow valley of the Indus.

The water carries away the snow from the
mountain-land of Tibet, and traverses the Himalaya between
31° and 32° N. lat. in its winding course from east to west.
That portion of the mountains which lies between the
valleys of the Ganges and Brahmapoora, is known as the
Himalaya.
The principal tributary to the Sutlej, the Ganga, begins from the junction of the two Prabodhini (or Prabodhini) rivers, which join one another near the town of Haridwar. The Ganga flows through a number of large and small cities, including Haridwar, Allahabad, and Patna, before it enters the Ganges delta, where it is joined by several other tributaries, including the Yamuna and the Ghaghara. The Ganges delta is one of the most fertile and heavily populated regions in the world, with a large number of agricultural and industrial activities. The river is known for its rich biodiversity and is home to a variety of flora and fauna. The Ganges delta is also a popular tourist destination, with many visitors coming to experience the local culture and natural beauty.
ciplar range into the interior of the mountain-region, as to occupy more than one-third of it, when they descend with a rapid declivity. The other two-thirds of it are of a very different character. The general elevation of this lower portion may be between 4000 and 5000 feet above the sea. Almorah, the capital of Kumaon, on the river Kosia, and only 15 miles in a straight line from the lower edge of the mountain-region, is at 2272 feet above the sea. On the other side of this valley, which are drained by the Bhagirathic and Alakananda, the two principal branches of the Ganges, sink considerably below this level; Tiri, on the Bhagirathic, being 1800, and on the Alakananda, 1800 feet below the sea. Though the surface of this portion of the mountain-region is extremely uneven, and consists of continual elevations and slopes, with narrow spots of level ground between them, the summits which rise above it are not numerous; they also generally lie considerably below the snow-line, as they generally do not rise above 8000 or 9000 feet. They are either isolated, or united by lower ridges, above which they rise 1000 feet and more. But these ridges do not give the general mountainous character, which is so conspicuously exhibited in the higher region. Heber tells us that in this part of the hill-country, as in Egypt, the climates is peculiarly adapted to flocks and herds. The mineral wealth of that portion which belongs to the British, or under their protection, is unknown; but Nepal contains, according to Sir Francis Hamilton, rich mineral coal, and other minerals, which are not yet so well known as they should be. In such a mountainous country the climate must of course vary extremely. We shall confine ourselves on this point to observing that the snow-line rises much higher on the north-eastern than on the south-western declivity; on the former it occurs at about 15,000 feet, and on the latter at 12,500 feet above the sea-level. It follows that the vegetation also must be different at the same elevation on the two sides. [Asia, vol. ii., p. 467.]

The Himalaya between the Sutlej and Bootan is partly immediately subject to the British, or under their protection, and partly subject to the independent raja of Nepal. The British dominions comprehend the Kailash Mountains, or mountains proper, and about half of the country between the Sutlej and Kali Gogra. The Kailash Mountains are among the highest in the world; they are also among the most savage. The country near the Sutlej river is occupied by thirty-two petty rajas, among whom the raja of Indur, who resides at Ramgar, and the raja of Kultur, who resides at Buhaspur, on the Sutlej, are the most powerful. But the territories of these rajas do not extend to the table-land of Tibet. The higher mountain-region is possessed by the raja of Bissiah, whose territories extend along both sides of the Sutlej river and beyond the Jumna, to the Jumna mountains, over which ought to be considered as a part of the table-land of Tibet, and approach the town of Shipkée on the Sutlej. He resides in Rampur, on the Sutlej. The raja of Sirmur governs the country situated in the middle of the lower region west of the Jumna river. His residence is at Nahun, a town built not far from the edge of the mountains towards the plain extending between the Ganges and Indus. The territories occupy about half of the countries which are under British protection. The other half belongs to the raja of Gurwal, whose territories stretch over the whole breadth of the Himalaya range, comprehending all the countries drained by the Bhagirathic, and by the upper course of the Jumna and Surin. He resides in the town of Tiri, on the banks of the Bhagirathic; but the most important place is Dhera, a large town not far from the lower edge of the mountain-region, in a low and warm valley. North of this place, on the mountains of Masoura-ke-kanta, an establishment has been made for Europeans who have lost their health in the sultry climate of the plains on the Ganges, at Lundiur, 7000 feet above the sea-level (59° 40' N. lat., and 78° 27' E. long.). The British province of Kumaon is annexed to the presidency of Allahabad; its capital is Almorah. [Almorah.]

The countries within the Himalaya range, extending from the mountain-region to the sea, are subject to the independent raja of Nepal, with the exception of a very small portion contiguous to Bootan, which is possessed by the raja of Sikhim, an ally of the British, with a capital founded by Heber, at which place a British residency also a sanitary is established for the presidency of Calcutta, at Dargiling, near the Teesta river, an affluent of the Ganges. Its mean temperature is about 36° lower than that of Calcutta.

The eastern portion of the Himalaya range, extending from the western boundary of Bootan to the very sources of the Brahmapootra river, is almost entirely unknown. We are only acquainted with it as far as it is contiguous to the territory of Nepal, and Bootan, in the district of Tassiusund, the capital of Bootan, to the table-land of Tibet. [Bootan.] Further east the range has never been visited by Europeans. When seen from the valley of Assam it does not appear as a range, but as a number of parallel mountain-ridges, which rise above the snow-line, and appear to form a very great elevation near the sources of the Brahmapootra. [Assam.]

The word Himalaya is a Sanscrit word, compounded of hima, 'snow', or 'ice'; and alaya, 'a dwelling'. [Wilson's Sanscrit Dict.] The resemblance of the first part of the compound to the name of the Haumea (Balkan), to the Greek cheima (xipha), and the Latin hems, is obvious. The Greek cheima signifies a range, or mountain chain. This enormous mountain-range under the general name of Imusa or Emodus, though their geographical knowledge does not allow us to consider that term Imusa comprehended the entire range of the Himalaya. It is known to Pliny that the word 'Imusa' signified, 'in the language of the natives, snow'. [vi., p. 17.]

(Hodgson, Webb, Herbert, Wilcox, and Traill, in Asiatic Researches ; Calveroles, and Rodney Blane, in Trans. Asiatic Soc. Weli and Hind. in India, Longe Geogr. Journal; Fraser's Journal of a Tour through Part of the Snowy Range of the Himala Mountains; Gerard's Journal of a Journey in the Himalaya Mountains; Mundy's Journal of a Tour into the Interior of India; Johnson's Journal through the Himala Mountains; Arrow's Tour in Upper India, Richter's Erdkunde II. and III.; Berghaus, Karte von Assam und Spezial- karte von Bootan und Kali-Gogra, by von Karte; Bontem. —The vegetation of the Himalaya Mountains is particularly interesting, whether we consider it in a special or in a general point of view.

These mountains have their south-west or Indian base clothed with a dense and almost impenetrable jungle, which separates them from the plains of India. This belt diminishes in breadth as we proceed northwards, until at length disappears to the north of the Jumna, where, in the country of the Sikhs, cultivation is carried on close to the foot of the mountains. From the proximity of water to the surface of the soil, this tract of country is usually called the Tarnai, or Wetlands, between the Ganges and the Jumna rivers, Khadar-lands. The moisture is maintained by the want of free evaporation from the surface of the soil, and is increased by the great quantities of watery fluid transmitted by the humid leaves of this dense forest; its dispersion being prevented by the want of free ventilation. With this uniformity of moisture we have also greater equability of temperature than in the open plains; for as less solar heat is absorbed during the day, so less moisture is radiated during the night. This uniform covering, as it is called in the open plains in cloudy weather. Accordingly we have the characteristics of tropical climate, and with it tropical or Indian vegetation, which therefore extends much further northwards than in this uniform covering, as it is called in the open plains, where great heats alternate with great cold. In the south-east parts, as in Silhet, Chittagong, and Lower Assam, the forests are composed of giant trees, with
extensive climbers reaching to their tops, epiphytes covering the branches, and tall grasses on the trunks as well as the elephant larch which are found throughout the finest description. The trees are composed of Actinopanax, Tere- 

hymenopax, Euphorbias, arborescous Leguminosae and Malvaceae, Compositae, Ebenaceae, Arecaceae, Con- 

chaveae, &c. Species and genera with the exception of 

the tree of Siléet, occurs in great abundance and of gigantic 

size, as well as the Theeete, or Varnish-tree, of the 

Burmeese (Melanorrhousia of Dr. Wallich). Biplage 

may not vary 10", and yet, firmly rooted, they form 

the climbers, with species of Caffearcarpus, Eryth- 

rox, Butea, Bombax, Hibiscus, and Coohochorum Angi- 

osympium, with large and showy flowers. Here splendid 

tree debris, with roots running, with thick grass plants 

mixed with the plantain and peppers. Great uniformity 

extends along the whole of this tract, as many of the 

species of southern parts are found as far north as 30°, as 

the Dipterærseae, Shores robusta, Ebenaceae, Disperosy 

glutinosa, Lauraceae, Cynanotamus albiflorum, Piperace- 

ae, Piper longum; a dwarf shrub Phoenix, P. humidis, 

and a trailing Calamus, represent the Palms.

In the forest of the islands of the Ganges and Jumna 

are found many species which occur also beyond the limits 

of India, as Cossia elata, at the mouth of the Irrawady, in 

the Birman empire, Maries begonia in Java, and Deer- 

ringia cesidiosila in New Holland. In the most northern 

parts of the Himalayas, on the outer banks of the rivers, 

it is as on those watercourses in the north of Africa. 

In this tropical forest the elephant reaches his most 

northerly limits, even before the banks of the Jumna, where a 

Paradoxosom is common: the rhinoceros does not extend 

beyond the eastern banks of the Ganges. Many tropical 

birds travel even farther north in the rainy season. A huge 

Pycnus exceeds even the hills in size. Most of the 

insects also are those of hot and 

moist climates: Papilio Paraketa, found by Dr. Horsfield 

in Java, is also common at the foot of the hills in 30° N. 

lat. There are recorded many trees, and trees shrubs 

soon disappear. On reaching the region of Rhododendron 

arbo- 

reum and Quercus lanata, at about 5000 feet, scarcely any 

but European forms are visible. But as a few species of 

tropical genera travel into northern latitudes, so we 

find some such among the European genera in the eleva- 

tion with 6000 and 7000 feet of elevation, in 30° N. lat., as a 

few laurels and some Acanthospermae, with species of Loranthus, 

even on an oak. But annuals which require only a few 

months to complete their cycle; the modern periods of tem- 

perature of the season, and not of the year. Thus many 

tropical plants may be cultivated in the summer of 

European countries, and European plants and cultivation 

may be able in the same periods of time. The nature of 

the soil, and plant of such a tree. The fall of the sun 

therefore we see annuals charac- 

teristic of Indian or tropical vegetation at a much higher 

elevation in the Himalayas in the summer months than 

appears compatible with the prevalence of snow and great 

cold in winter. This anomaly presents itself at much 

greater elevations than would be expected, or indeed possi- 

ble, were it not that the whole of the southern face of the 

Himalayas is always covered with a film of moisture, dur- 

in the same time enveloped in clouds. The air, as it rises from 

the heated plains loaded with moisture, deposits it on reaching 

the higher regions in the form of snow. This moisture 

warm temperature; for the 

cloudy covering prevents much absorption of heat during day, 

as it does radiation during night. The cooling besides of a 

ridge makes the cloud form itself more influenced by the 

atmosphere by which it is surrounded. Hence we observe 

but little change in the thermometer from night to morning, 

or from day to day, or week to week, and the temperature 

does not vary 1° of Fahrenheit for three months in succession 

from the middle of June to the end of September. During 

this season therefore we see many plants in luxuriant growth 

which could not exist here for even a single day if either 

the moisture were less or the cloud greater, as bal- 

sams, Begonias, some Melastomaceae, numerous Cystra- 

cree, tropical Orchis and Scitaminneae. The branches of 

the trees become covered with mosses and ferns, as well as 

epiphytes, such as Arum or Philodendron, together with a 

species of arum, which is one of the principal articles of 

the chiefly vegetable diet of the hill-people.

The climate however of these mountains at about 7000 

and 8000 feet of elevation is greater uniformity, with a 

less range of the thermometer, from about 25° to 60°, supports a European-like vegetation, as 

has already been mentioned in Asia, Botany of Himalayan 

grown, to which the reader is referred. Instead however of 

all the species being Indian, but of European genera, 

stated, many species are identical with those found in 

the plains of European countries. Of such there are several 

instances in the families of Crucifera and Labiatae plants, 

also among the Composite and Zygophyllaceae. The 

men as Arum, as mentioned as Ranunculus arvensis, common thyme, 

marjoram, and some of the mint; shepherd's purse, 

Prunella vulgaris, and the widely diffused Sinapis alba, which 

sufficiently reduces the identity of species is not confined to herbaceous plants, as 

we have the yew and the walnut, with the ivy and Rubus 

fruticosus. The apricot and pomegranate may be supposed to 

have been planted outdoors, but the apricot is native. The 

Pyrus haecata is a small Siberian tree found also in these 

mountains. Several of the Casuarina genera are also met 

with; and there is great similarity between the vegetation 

of the Indo-Himalayan and of the Himalayas in general, 

and probably also in species. 

It is curious to find among the above many which have hitherto been thought the peculiar genera of China 

and Japan, as Rhododendron ferrugineum and Melia 

mellina. These itself has now been found in Upper Asam, 

but probably escaped from cultivated places; even some of 

the same species occur in the Himalayas and these countries; 

Cleyera obtusifolia, Kadsura lanata, Lonicera Japonica, 

Houttuynia cordata, Ophioglossum, Par- 

danthus chinensis, and many others. Hence 

observations were made that many parts of these mountains were 

fitted for the cultivation of the tea, long before it was known 

that it was already there. The most interesting to try 

to find here some North American genera and species; us 

Triostem, Osmorhiza, and Phryma; and even identical 

species, as O. brevistyla and F. lepistachya, with Des- 

pandias, P. americanus, and possibly allied to the Chinese 

P. Ginseng and American P. quinquefolium, which 

Dr. Wallich has named P. pseudo Ginseng. 

The vegetation of the upper belt has also been noticed 

vol. ii. (p. 473), as well within as beyond the limit of the 

of the snow. Here the climate bears some resemblance to that of polar 

regions in the same season, as the peaks are covered with 

snow for nine months in the year, which only melts when 

the sun has great power and the lights height in the 

arid atmosphere of these elevated regions. Junipers, 

dwar-f willows, and Rhododendrons, with Andromeda fasti- 

gia, closely allied to the Sierian A. tetragona, reach the 

highest limits. Along with showy Primulas we may 

see plants which are very similar to those of Arctic regions; 

Ranunculus polyestellatus to the Sierian R. glacialis of 

Fischer; a species of saxifrage, S. stenophylla, hardly to 

be distinguished from S. stelliferum, brought from Melville 

Island. This similarity in Arctie flora and Follong is 

far distant regions is not however confined to genera containing 

numerous species, but is observable in others where two or 

three only constitute the genus, and of which one is found 

here, and the other in these mountains; as of Sieria which occurs also 

on Melville Island and Kungstchata, and Dalibards in North 

America and the Straits of Magalhaens, where many of 

the same genera are found as on these lofty peaks. The genera 

Dacrydium, Gynophragma, Wolfsia, Dictamus, and Chama- 

staphies, afford other instances, though some are found at 

a lower elevation. Ourisia is found in these mountains as 

well as in Van Diemen's Land and the Straits of Magal- 

haens.

The snowy passus exhibit many of the phenomena cha-

Vol. XII.—2 D
restering these lofty peaks. The resemblance in form however is not confined to the vegetable kingdom. The Himalayan fox can scarcely be distinguished from the European species. Many birds are identical in species with those found in Europe: the woodcock may be added as an instance. Many insects also do not differ from those found in Europe. At still greater elevations the Alpine hare, or Lagomys, is found, which hardly differs from the Siberian Pika. A jay (Garrula bispecularia) is of an American form, as is the genus Paussus among insects, which, until recently, the Himalayan Jay, (Royle's Puce, Dusky Jay, and grey, was thought to be confined entirely to North America.

In crossing the snowy mountains by the passes, which are flanked by snowy peaks usually 3000 or 4000 feet more elevated, and which prevent the passage across of the air loaded with moisture, we have a very marked set of phenomena presented. The district of Kunawur may be considered a portion of Tartary, or Tibet, instead of India, though some Indian forms still show themselves in the bed of the Sutlej, in Lower Kunawur. The climate is extremely dry, and evaporation very rapid. Very little rain falls at any time. The country is covered with snow from the end of October until April, but the layer is never very thick, from the great dryness of the climate. The cold is intense during winter, but the thermometer in July and August ranges from 55° to 68° in the morning, and rises even as high as 89° or even 95° during the day, in villages elevated 10,000 feet above sea level. The elevated towns are surrounded and confined by towering mountains, absorb heat as readily during the presence of the sun, as they radiate it freely during his absence; and becoming, like the sun, of an extraordinary heat, the whole of the heat received from the sun is dispersed to exalt the temperature of the surrounding objects, they cause the line of perpetual congelation (and consequently of vegetation) to rise higher and higher in proportion to their own elevation. Peaks and pinnacles, on the contrary, are frozen into the centre, and are warmer to the surface than the mountain to the summit. The temperature of the air inside the ocean, participate rather of the equality of the media into which they intrude, than impress on them, like plains and table-lands, their own extremes of heat and cold. (Royle, Illust. p. 16, p. 17.)

Kunawur is everywhere intersected by elevated ridges which are crossed by passes varying in elevation from 12,000 to 18,000 feet; on some of those to the eastward, even at the latter height, snow is seen in summer, and only that in streams. Vegetation extends to 16,600 or even 17,000 feet. Junipers are found at 14,500 feet, Rhododendron lepidothum below them, but above the birch, which is found at 14,000 feet. Pine and firs extend beyond 12,500 feet. The highest cultivation was seen by Dr. Naumann near Dabulg, at 13,600 feet, consisting of barley, buckwheat, and turnips.

The town of Hungar is situated one mile north of Kunawur, but separated by a lofty range which is crossed by a path at an elevation of 14,800 feet, coinciding here with the limit of snow. The mountains have rounded outlines with gentle recessions. The country is destitute of trees, and presents everywhere a picture of arid barrenness. The villages are at elevations of 10,000 to 12,000 feet. Nako is at the latter height, on the western face of lofty mountains, yet there are produced luxuriant crops of wheat, barley, buckwheat, and turnips 700 feet higher, rising by steps or terraces, enclosed by hedges of gooseberry, barberry, and juniper. Caragana Gerardiana and versicolor extend to 13,000 feet, and are the plants called Tartarian Furfur by travellers. Dr. Naumann visited this at a village at a height of 14,700 feet, where the barometer gave 14,900 feet as the elevation of the highest field of cultivation.

The vegetation of the northern face of the Himalayas has been noticed in detail, p. 476, under the head of Tartaric region. The cultivation has been indicated above; the fruit trees consist of species of Pyrus and Persica, with the apricot, of which the fruit is dried, and the grape-vine, from which wine is manufactured. The families and genera of plants which flourished, and are similar to those occurring in the Alpian Mountains, as described by Ledebour in his 'Flora Alpina,' also in the south of Siberia and on the Caucasus, as amongst them we not only find such species as are common to all parts of the world, but several which are remarkable and peculiar, as well genera as species. Among the latter we find Lithospermum amplexicaule, Cuminum Cymrinum, and Hyoscyamus niger (the last found both in Caucasus and in Europe); Biebersteinia odoris, in Persia and on the Altai range; Crambe cordifolia and Tauchaeres desertorum of the Caucasian Flora, the latter also found on the deserts of the Kirghis and the banks of the Irtish. Many others might be enumerated, but the above are sufficient as examples, and it is impossible within our limits to attempt a complete view of so extensive a subject. Notwithstanding the apparent barrenness of much of the country on the northern face of the Himalayas, nowhere are the flocks of cattle more conspicuous for number and variety. The cold and dry atmosphere is particularly advantageous to the Horses, and, to a less degree, oxen, sheep and goat are both used as beasts of burden, and the dog is of large size, and, like the others, furnished with fine wool under the upper shaggy hair. The Blural (Asiatic Argali), the Yak, the Yuez, or wild ass, and the Deigat, or Equus Hemionus of Pallas, are all found here, and obtain nourishing food from the grasses of European genera, and the Languinosus Astragali and Caraganas. Among birds, Gypaetus barbarus and the chough, or red-legged crow, are common, with three species of pheasants, and the Chukor, which is most frequently seen on the most barren hills. (Dr. Royse's Illustrations of the Botany and other branches of the Natural History of the Himalayan Mountains.)

HIMANTOPUS, the generic name for the Long-legged Fowl, Longshanks or Stilt. (Plovers.) The term is also applied by Müller to a genus of Microscorpions.
H I N

H I N

Yestus Arianus (Ora Martiana, L. 90), in which the Hiberni and Albionii are mentioned, and a promontory, Clyrama, and islands, Olistromes, are mentioned. These may be considered to be Cornwall and the Scilly Islands. (Gosselin's Recherches sur la Géographie des Anciens, vol. iv., pp. 164, 165.)

3. Himilcon, who commanded the Carthaginians in their wars with Dionysius I., tyrant of Syracuse, A.C. 405-365. Himilcon was an able and successful general. He took Gela, Messana, and many other cities in Sicily, and at last, after several years was defeated by Dionysius, who burnt most of the Carthaginian ships. (Diodor. Sic., b. xiii. xiv.)

5. Himilcon, a supporter of the Barcine party at Carthage (Juv. xix. 43), excepted by the Carthaginian government in opposition to Marcellus in Sicily. (Livy, xxiv. 35-39; xxv. 23-36.)

HINDUSTAN, that is, the country of the Hindus, in the Persian language. This term has been adopted by geographers to designate that part of India, or the East Indies, which was formerly called the Peninsula within the Ganges, and which extends from Cape Comorin, its most southern extremity, to the foot of the Himalaya range and the mountain tract, which separate the high table-land of Iran (Persia) from the low plains traversed by the Indus, or Sind, after this river has issued from the Himalaya mountains. As the long declivity of the last-mentioned extensive mountainous region extends along the plains of which it forms the base, and as the rivers originating within this range descend towards those plains, the Himalayan mountains are commonly and properly included in Hindustan.

The coast of Hindustan, from the mouth of the Ganges to the mouth of the Soomram or the Brumbi, along the plains of Bengal, the boundary-line is uncertain; but we may fix it at 92° 30' E. long., to which meridian the possessions of the East India Company now extend, if the coast of Arakan, which properly does not belong to Hindustan, is omitted. The boundary-line of Hindustan extends from Cape Comorin, 8° 4' N. lat., to Attock on the Indus, 34° N. lat., and from Cape Monze, west of the delta of the Indus, 67° 30' E. long., to the meridian of 93° 30'. Its length, in geographical numbers, is about 1,800 miles, and its greatest breadth between Cape Monze and Silhet, on the Soomram river, along the parallel of 22° N. lat., about 1,500 miles. Its surface is stated to be 1,500,000 square miles, or three times the extent of France and Austria taken together; but this statement is exaggerated, and it probably does not exceed 1,000,000 square miles.

The coast-line of Hindustan amounts, according to a rough computation, to about 3,200 miles. About 1,380 miles are washed by the Indian Ocean, and 1,290 by the Bay of Bengal; about 160 miles, or somewhat more, extend along the Gulf of Mannar and the Palk Strait. Beginning with the innermost corner of the Bay of Bengal, at Chilteengoo, or Calicut, the coast for about 300 miles is traversed by the numerous mouths of the Ganges, all of which admit small vessels; the Hoogly branch admits vessels of good size, and the Henegrohat branch vessels of any size. Conspicuous to the Hoogly is the open Bay of Balsore, with a coast of 120 miles, terminating at Cape Palkmyras. From this point the coast stretches in a south-west direction to the mouth of the Kistna for about 450 miles, and is without harbours of any kind. Between Cape Calymere and Cape Cane, about 160 miles, there is nothing but the plains and shallow harbour of Tuticorin. The coast, which stretches north-west, and afterwards nearly north, between Cape Comorin and the innermost corner of the Gulf of Mannar, is about 1,140 miles, and has a great number of small and several very good and safe harbours. The coast-line of the peninsula of Gujerat, which, exclusive of the Lessor Rumm, is about 380 miles in extent, has several harbours of considerable magnitude. The coastline of the island of Cutch, exclusive of the Rumm, but inclusive of the Korse, or eastern mouth of the Indus, extends about 150 miles. The coast intersected by the several mouths of the Indus extends as far as Cape Monze, about 160 miles, but it cannot be approached by vessels of more than 30 tons burthen, except at the harbour of Cutch, which admits vessels of moderate size.

The surface of Hindustan is characterized by very marked features on a large scale. From the mouths of its two great rivers, the Ganges and the Indus, two low and level plains extend in a converging direction along both sides of these rivers till they meet between 21° 30' and 21° 45' lat. and 75° and 77° E. long. Near 28° N. lat. the country begins to rise rather abruptly, constituting between the two plains, and afterwards between the two seas (the Indian Ocean and Persian Gulf), the Bay of Bengal, which is formed by two well-marked terraces, which rise higher and higher as they advance southward, until they attain their greatest elevation in the table-land of Mysore, at the foot of the Nilgherry mountains (between 11° and 13° N. lat.). South of this range a low plain, in some parts, is almost intersected by a series of low lakes, which may be added to the southern boundary of the peninsula. This narrow portion of the land is called the Gap of Coimbatore; and south of it is a mountain region which occupies about half the breadth of the peninsula in this part, but as it advances southwards grows narrower till it terminates at Cape Comorin in a narrow ridge. The table-lands do not extend to the shores of the sea, but are divided from it by flat tracts varying in breadth. The table-lands themselves are divided into two unequal portions by two deep valleys which traverse them obliquely, beginning on the west near 28° and terminating on the east near 25° N. lat. In these valleys run the rivers Nerbudda and Sona, which drain west into the Gulf of Cambay, and the latter joins the Ganges north of 25° 30' N.

Following this natural division we shall give a general description of the surface, soils, rivers, climate, and principal produce of Hindustan under the following divisions:—

1. The Southern Region—The narrow sea which separates Hindustan from the island of Cober is traversed by a chain of islands and sand-banks called Adam's Bridge.

2. The Arabian Sea—The island of Rameserum is low, sandy, and not cultivated, but celebrated for its great parestas, the extent and splendour of which has called forth the admiration of many travellers; it is still visited by seamen from all parts of Hindustan. At the western extremity of the island is a small place called Paumen, where travellers cross the Paumen Passage to the continent. It is about a mile wide, and there is a salt water well. The east coast is low and sandy, but at a short distance from the sea some sand hills occur, between and behind which are numerous salt swamps and lagoons, whose exhalations render these tracts unhealthy. These swamps often extend several miles inland. Behind them the country rises but very slowly to the foot of the mountains on the west, a distance of from 40 to 60 miles. This tract is very well supplied with water, numerous small rivers descending from the mountains, and supplying plentiful means of irrigation. It is accordingly well cultivated and presents a succession of rice-fields and palm-groves. Among its rivers is the Yew, which, formerly containing a population of 40,000 inhabitants, but now has hardly half that number. Further south is the town of Timneckly, in a very well cultivated country not far from the mountains, and in the month of May has no shower, with the exception of that of Tuticorin, which however is small, in its neighbourhood pearls are fished.

At the foot of the mountains the plain may be about 300 feet or less above the sea. The mountain-regions which border on it are of various extent. Between 9° 10' and 10° 20' N. lat. they occupy a considerable surface. Their elevation seems to be considerable. Mount Pemra, north-west of Dindigul, which appears to be the most elevated, is stated by Colonel Lambot to be 7364 feet high, and it is conjectured that much higher summits may occur farther west.

According to a native account they even attain the snowline. This isolated mountain-region therefore may be con-
sidered as the highest land in Hindustan south of the
Malabar coast and an alternative to the
Himalaya range. The Alyinge Mount, south-west of
Palayamkottai, rises to 4219 feet. South of 9° 10' the
mountain-mass runs out southwards in
one single range, which is lower, but continues at a
considerable elevation to a distance of about 20 miles from
Comorin, where it suddenly dies out, and about 2000 feet
The remainder is a low ridge of granite overgrown with
thick forests of a vigorous vegetation, in which are
numerous large boulders of granite. As these mountains are
exposed to the full maritime effects of the monsoons, there
is everywhere covered with trees, among which the teak is
abundant, and forms one of the chief sources of wealth to
the country. In these forests pepper-vines and cardamom-
plants are abundant, but much of the best products of the
regions are yet undescribed. Two passes are at present known
to exist across these mountains. The northern, called the
Ariangalav Ghaut occurs near 9° N. lat., and leads from
Tuneerely to the cast to Quilon on the west, through
Cotailam. The southern, the Amboli Ghaut, lies about 20
miles from Cape Comorin, near the place where the moun-
tain-range suddenly lowers.

The country which lies to the west of the mountains
exhibits a most diversified surface than that to the
east of them. Numerous offsets consisting only of low
hills advance towards the coast and leave a level tract
along the sea some miles broad. Between Quilon and
Amboli Ghaut, even to the sea, these are scarce, and
mostly covered with cocopalms. At a short distance
from the coast are lakes, among which that is particularly
remarkable which extends from its branches from Cochin
on the south to the Dutch factory on the south.

The tract in question forms a table-land, which is
exposed means for the transport of goods. The low country,
which extends east of the lakes some miles inland, is
in many places swampsy, and used as pasture-ground in
the plains, which are chiefly forest trees; but the
higher tracts produce rice and other grain in abundance.

These tracts are mostly uninhabited. The villages are
built farther inland on the low ranges of the hills, where
the extensive plantations of pepper, jack, plantains, and
mangos. Still farther inland the mountains rise with a steep ascent, and are covered
with forests, especially of teak. The navigation along this coast
is very pleasant from November to March, but
during the south-west monsoon no vessel ventures to
approach. A very heavy surf always runs along this coast,
and renders landing difficult.

This tract is subject to two native princes, allies of the
Europeans. One of them is the native king of Travancore, in the southern
portion, which is about seven-eights of the whole; and
the raja of Cochin is in possession of the most northern
districts. The English and Dutch have some settlements. Travancore
is a country of Travancore, 40 miles distant from
the sea, is a large and well-peopled place with a castle.
Anjengo is a small harbour, where the English had a
factory up to 1813, when it was abandoned. Between it and
Quilon is the Dutch factor ot Edapila. Quilon was for-
merly in possession of the Portuguese, and afterwards of
the Dutch, but it has been abandoned. It has a small
harbour, but a considerable population. Cochin, which was
first possessed by the Portuguese, and afterwards by
the Dutch, is now in possession of the English; it has a good
harbour, and a considerable commerce with Bombay, Surat,
Arbais, the Sunda Islands, and China. It exports pepper,
cardamoms, teak, and sandal-wood, cocoa-nuts, coir, cassia,
and the produce of the monsoon plantations of pepper,
which is obtained from the rain which falls in the
months of July and August. The Dutch factory at Edapila,
attained to along this coast. No place is better adapted for
the exportation of teak than Cochin, as the timber is floated
down the various small rivers which fall into the lake, and
then carried to the sea. It is one of the most
cheerful and fertile parts of the country. North of it is
Cranganore, where a Catholic bishop resides.

The Gulf of Panay or Coimbatore, which extends
between 9° 30' 49" and 10° 11" N. lat., is a long and narrow
inlet on the western side of the
Malabar coast. It takes its name from the town of Coimbatore,
which lies near its eastern extremity, but without it, or
from the river Panay, which drains it in at its temperate
end. The most elevated part near the sources of the river is only
about 400 feet above the sea, and not sufficiently high to
hinder the north-east monsoon from penetrating through
it. It is observed that vessels sailing in the fine
weather along the coast of Malabar always experience a
stronger eastern wind when they approach the mouth
of the river Panay. It is also stated that Coimbatore partic-
ularly suffers from the monsoons. Between the larger peninsula
town and the fortress of Paligash is the narrowest part
of the valley, which is only from 12 to 15 miles across.
Its surface is encumbered with a great number of boulders of Cardamom,
but is everywhere low and level, and about 2000 feet
during the south-west monsoon the greater part of it is
converted into a swamp. It is not cultivated, and almost
exclusively frequented by immense herds of wild elephants
and other quadrupeds. The mouth of Paligash, where the Panay river becomes navigable
for canoes, and the culture of rice and other productions
increases on the banks of the river as it advances towards its
mouth, which is 14 miles from the sea, is from the town a
harbour and a population of about 10,000 souls. It carries
on a considerable commerce with the towns along the Mal-
abar coast, Arabia, and Bengal. Its rich merchants are
mostly Mohammedans.

II. Decr. — This term, which is derived from the Sans-
crit Dakshina (the south), was originally applied to the
whole peninsula south of the river Nerbudda, including
also the land south of the Gap of Coimbatore. It was
afterwards used to indicate that portion of the peninsula
which had become subject to the Mongol emperors. We
have here, however, applied it, in a geographical view, to
the peninsula north of the Gap of Coimbatore, and we fix its
limits in the northern mountainous ranges, which are
vast table-land of Omerruntux, and the range of mountains
which, branching off from the table-land to the east, termi-
nates in the Nelligore mountains, in the neighbourhood of
Pondicherry. The tract is divided into two parts, one of
which runs across the whole peninsula between 21° and 22°
N. lat.

The interior and by far the greater part of this extensive
region is an elevated table-land, which is enclosed on all
sides by plains extending each to the
mountains of the table-land are here, as in every other part of the
world, raised above the surface of the table-land itself, and
appear in the form of mountains or high hills, and the
mountains divide the plains of the table-land. There are
passes by which the mountains which divide the Payn-
ghaut from the Bals-Ghaut are traversed. The resem-
bance of the word in form and meaning to our word ghat
does not appear to be a form of the Sanscrit gati, a way or path.

The elevation of this table-land varies to a certain extent.
The country south of 15° N. lat., which is called the table-
land of Mysoor, is the highest part, and it is highest near the
east than towards the west. Bangalore is 3026 feet, and
Colar 2900 feet above the sea; but Seringsapatam is
only 2412 feet, being built in a deep depression on the river
Cavery. North of 15° N. lat. the table-land grows lower,
and the greatest depression seems to occur between 15°
and 17° in the region drained by the Kistna and its tributaries.
In this part the country slopes slowly from west to east.
Dharwar, near the western edge, is 2352 feet above the sea;
Bellary, in the vicinity of the lastly mentioned and Gooty, to the
rivers Penn-ai and Kistna, 1182 feet. Further north it
again rises higher, and the western and higher districts,
farther east as 27°, may vary between 3000 and 3500 feet. But
east of 77° 30', which is as high as 3000 feet, the
part east of the table-land, or south-east, is more rapid. Hydrabad is 1696 feet, and
Nagpore only 900 feet above the sea.

The surface of this table-land is a level plain, on which
hills rise in a broken form, and in a few places ridges of sands appear, but these are not
continuous; they are frequently interrupted by depressions,
which sink to the level of the plain. These eminences rise
from 300 to 900 feet, where they are disconnected. Among the
hills which constitute the western edge of the table-land
the surface is much more uneven; numerous short spurs
branching off from the mountains and advancing about 30
or 35 miles into the plain. The isolated hills, as well as
these spurs, are of very steep aspect, and on them are built
the numerous strong fortresses called droogs or durgas,* which served for a long time as places of retreat to those who longed to evade the table-land and its inhabitants. They are now mostly in the hands of the English, and are going rapidly to decay.

Here, as in other countries between the tropics, the year is divided into a dry season and a rainy season. The rainy season does not occur, as on the eastern coast, during the north-east monsoon, but during the south-west monsoon, as on the western coast. It begins however not later than the middle of June on the south-west coast, in Madras, in which month only small showers fall. In June or July they become more regular and continuous, and they last till October. But the quantity of rain is not great, being estimated to amount on an average to 30 inches. On the south-west coast it is 116 inches, and on the eastern 45 inches. It is further observed that more rain falls in the districts which skirt the Western Ghauts than further east; and likewise that the quantity of rain also decreases towards the coast. On the whole, the rainfall is divided into two portions, one of which is quite sufficient for irrigation, as on the north-west coast, while the other is insufficient for any purpose whatever.
The Northern Ghauts may be said to begin in 22° N. lat., between 78° and 79° E. long., with the high lands, on whose eastern declivity the upper branches of the Whuradh, an affluent of the Godavery, and on whose western declivity those of the Tafty rise. These mountain-masses, which extend from north to south, have probably an elevation of 4000 feet above the sea, and send off a very distinct and elevated range westward between the two upper branches of the Tafty. This last-mentioned range, called Mahadeo Pahar, is a large mass of the highest elevation of the range, and extends 4000 feet near the fortress of Gaugulur. The remainder of the Northern Ghauts, from the neighbourhood of Oommutty (20° 55' N. lat. and 77° 42' E. long.), rises in a general line along the south side of the head of the bay of the Tafty, and, joining the Western Ghauts between Chandore and Soolgams, west of 74° E. long. It rises with a very steep ascent from the valley of the Tafty, where it presents the appearance of a mountain-range, between 2000 and 3000 feet high, but its descent on the south is short and easy, the table-land of the Deccan being on an average perhaps only 500 feet lower than the range. The mountain-passes are very difficult, especially those leading from the valley of the Tafty to the table-land. The most frequented is the mountain-pass of Ajumeth, through which the road runs which leads from Boorhamoor to the Tafty to Dowlatabad and Aurungabad. Near the mountain-pass are several inlets to the sea.

The Western Ghauts, which constitute the boundary of the table-land of the Deccan towards the Indian Ocean, begin about 10 miles from the southern bank of the Tafty and about 20 miles from the north side of the river in 13° and 14° N. lat. The highest portion of the range preserves the same distance from the sea, but somewhat north of the parallel of Bombay it approaches within about 30 miles. At about this distance the road, which continues along the coast as far as the town of Bhoodore, or Baroor (13° 30'). South of this place these mountains again recede farther inland, so that opposite Mangleore they are more than 30 miles from the sea. Further south the distance is less, and between Chandorherry (12° 30') and Mount Delli several elevated masses appear near the sea. The Western Ghauts terminate a little south of the parallel of Colicut, about 11° N. lat., where they constitute the northern border of the Gap of Poonay.

This range varies considerably in elevation and width. North of Bombay it is stated not to exceed 3000 feet in height, and to be only about 1000 feet above the table-land on the coast. But south of Bombay it rises higher, and the Mahadeo Pahar, which appears to begin in about 18° N. lat., rises to the elevation of 5036 feet. A sanctuary has been established on them for Bombay. It is not known how far south this elevation is continued, but one sees how the mountains are covered with the most abrupt descends and mountain-passes, which only are 2774 feet high, and hardly more elevated than the contiguous plain of Darwar. The pass, which leads from Sadashevagur to Yellapoor and Soonda, seems to be still lower. The small difference observed in the temperature between the coast and the summit of the pass induced Dr. Fr. Buchanan to think that the difference of the elevation could not exceed 1000 feet, but probably it is much less. Opposite Bednore (south of 14° N. lat.) the mountain becomes less lofty, and farther south it continues with the elevation to the Hosso Angady Ghaut (13° 42') south of which they rise to between 5000 and 6000 feet in the Alpine region of Coorg, and at their termination they probably descend to less than 5000 feet. The height of the Western Ghauts inconsiderable, and perhaps nowhere except towards its southern extremity exceeds 12 miles, if the low spurs, which advance from them eastward into the plain to the east, and are not taken into account. South of the Hosso Angady the mountains extend near 40 miles east and west, and fill up the country between the upper branches of the Cavery river.

The Cavery, the western branch of the river, which later farther the Western Ghauts descend to the sea renders it very difficult to ascend the table-land of the Deccan on this side. The mountain-passes or ghauts are not numerous, and most of them are not passable for beasts of burden, excepting where they are used for passage to or from the sea, as the following:—1. The Bor Ghaut, which begins at Panwelly, opposite Bombay, and leads between steep rocks over Khandools to the excavated templets of Carli, which are on the table-land; 2. The Colpar Ghaut, which leads from Fort Victoria (17° 56' N. lat.) along the river Bautur to the town of Mharr, and hence through the pass northward to Poonah and southward to Sattur; 3. The Ghaut of Bulagari, which leads from Goa to Darwar, and rises to 2477 feet; 4. The Kutkai Ghaut, which begins on the coast at Sadashevagur (south of 15° N. lat.), and leads through the mountains to Yellapoor on the table-land; 5. The Hosso Angady Ghaut (13° 42') south of which rise to between 5000 and 6000 feet. The Western Ghauts, keeps up the commercial communication between Bednore and Mangalore; but we have no particular account of it; 6. The Kordicol Ghaut (13° 8') leads from Man- galore and advances to the town of Chudangul, or Delli Droog (5000 feet above the sea), to Wustera; 7. The Besseay Ghaut (12° 49') connects Mangalore with Uc- cottah on the table-land, traversing Bessely, situate at the foot of the northern declivity of Mount Subramani (5611 feet above the sea); 8. The Yallann Ghaut runs along the southern declivity of Mount Subramani, between Mairari, the capital of the raja of Coorg, and Mangalore; 9. The Manamotdy Ghaut (11° 45'), through which the road passes, which leads from Tellicherry on the coast to the table-land on the banks of the river Cubany, and hence to Seringapatam. The highest point on this road rises to 3000 feet, and seems to be hardly more than 100 feet higher than the sea; to which it is 15 miles.

These mountains, which are merely the broken and abrupt declivity by which the table-land of the Deccan descends towards the Indian Ocean, are entirely covered with thick and dense forests of the wild sambar and the highest masses are too steep to permit any accumulation of earth. In all other parts the mountains are covered with a thick layer of earth, capable of maintaining a rigorous vegetation. Many of the large trees are evergreens, and are forests of bamboo, which grow to the height of trees. Lower down the sandal-wood tree is abundant, and supplies an important article of exportation to China, Japan, &c. It becomes very common between 15° N. lat. and 15° 30'; during the rainy season, when the numerous torrents descending from the mountains acquire a great volume of water, the teak timber is floated down to the several harbours on the coast, especially to Mangalore, and thence to the other parts of Hindustan. On these mountains alone in Hindustan sandal-wood grows (Buchanan), and it occurs only between 12° and 14° N. lat. Causia and cardamoms are also collected in these forests, but the latter not north of Goa.

The whole of the narrow coast which intervenes between the Western Ghauts and the Indian Sea is sometimes comprehended under the name of Mahalab. But properly the northern coast of Malabar is the mouth of the river Conac; the middle part, between 15. N. lat. and 15° 30', of Canar; and only the southern part, as far as Cape Comorin, is named Mahalab. The surface of this narrow tract of coast is almost entirely one vast sand beach changed into a sea by the waves of the sea. It is covered by a few low hills, the most distant of which is at the utmost five miles from it. But the low hills which are offsets from the Ghauts frequently approach nearer the sea. The level tract along the sea-shore is covered with sand, and overgrown with cocus-palms; near the termination of the hills the soil is better, and planted with rice. The sandy coast is indented with numerous small inlets, which during the rainy season are the receptacles of torrents, most of which, as they flow only for a short distance. The small valleys which lie farther inland are either drained into the low ranges of hills which are converted into swamps by the abundant rains, but when the water has run off they are cultivated, and give a fine grain of rice. There are few villages on the coast, which separate these valleys from one another are situated numerous villages, enclosed by extensive plantations of fruit-trees. The top of these ranges of hills is level, but dry and sandy.

This coast experiences the full effects of the south-western monsoon, more especially in the southern part. It begins there at the end of May or at the beginning of June, but it is not before July that it comes to its maximum. In July it attains its maximum. It begins to decrease in August, but slowly, more rapidly so in September, and in October the rain and the
monsoons depart with thunder-storms. The annual quantity of rain in Malabar amounts to 116 inches, of which 36 inches fall in July; at Bombay it does not exceed 64 inches; and farther north the quantity is still smaller. The mean annual temperature of Bombay is between 80° and 85°, but observations on that of Malabar are wanting. The climate of this coast is considered very healthy, notwithstanding the immense quantity of rain and the cultivation of cocoa-nuts.

No kind of grain is cultivated except rice, for the growth of which no artificial irrigation is required, as the soil is saturated by the abundant rains. This country contains a vast variety of fruit-trees, especially different kinds of mangoes, which are the chief food of the elephants and of the wild inhabitants of the island itself. The sugar-cane is also extensively cultivated. Cattle and buffaloes are the only domestic animals, and both are distinguished by their size. Poultry, geese, ducks, and turkeys are only raised by the Portuguese families which are settled along the coast. Wild elephants are numerous; and also tigers, leopards, hyenas, and jackals.

The whole of this maritime tract, as far south as 10°, is now in possession of the East India Company, with the exception of that portion which lies between 15° and 16°, which is nearly equally divided between the Portuguese and English. The table of longitudes, of which the first belongs to the French, and the second to the Portuguese, the English possessions north of 16° N. lat. are annexed to the presidency of Bombay, and the south of 15° to that of Madras. Damuam, the Portuguese settlement on the island of Negombo, which is the most important, has lost much of its commerce since the rise of Bombay. It lies nearly halfway between Surat and Bombay, and has a safe harbour for vessels of small size, there being 15° 39', 6000 feet long, and 6000 feet deep. Vessels of teak-timber are built here. Farther south (18° 46') is Bombay (Bombay); on the neighbouring islands of Saambique and Elephanta temples are excavated in the rocks. [ELPHANT.] Near Fort Victoria, the deer are comparatively small, and are hunted with, 14,000 inhabitants. It has a harbour for small vessels, and carries on a considerable commerce with Punah and South. Goa, the Portuguese settlement, is situated about 15° 15', very properly named, as the mouth of the river 15° 26', which is built on the banks of a salt lake, into which several rivers discharge their water, was destroyed by Tipoo in 1784, but has risen again since it came into the hands of the English. Ships drawing less than 10 feet water can enter the harbour at high tides. The town is thriving, and derives its importance from being situated not far from the Hooso Angady Ghaut and other mountain-passes, by which it carries on a considerable commerce with the table-land, and is the resort of all those mountain-passes from the interior of India to the coast and mountains to the town. It now contains more than 40,000 inhabitants. [CANAARA.] Cananore (11° 22') is built at the bottom of a small lake, which is one of the best harbours on the coast, and only know the country bordering the mountain, and the harbour of Hindustan, and contains about 10,000 inhabitants. Tellicherry (11° 44'), which was long the chief settlement of the English on the coast of Malabar, but is much neglected at present, has about 5000 inhabitants; it has still a considerable commerce in the produce of the country, coir, sandal-wood, cardamons, pepper, cassia, and cocoa-nuts; shark-fins and sandal-naga-nests are also sent to China. Malad (11° 42'), the only French settlement on this coast, has 2500 inhabitants, and is the resort of all those mountain-passes from the interior of India to the coast. It is rather well built, and principally, exports pepper. Farther south is the town of Calicut. [CALICUT.] We pass to the Southern Ghauts, a term not yet in use, but one which ought to be adopted to designate those mountain-ranges which support the table-land of the Decan on the south, and have only been discovered within the last twenty years. They cover by far the greatest part of the southern peninsula, and their altitude at some places is 75° to 79° E. long. The western portion of the Southern Ghauts is occupied by the Nilgherry Mountains, which are well known to Europeans resident in India; they affording them the assurance of high and healthy weather for the whole year, except from July to October, and for 11 degrees from the equator. These mountains are connected with the southern extremity of the Western Ghauts extending between 77° 26' and 77° 20' E. long. and between 11° 5' and 13° 5', so that their length from west to east is more than 60 miles, and from north to south, more than 200 miles. All this space is occupied by one mass of high land, unbroken by ravines or deep valleys. Its surface is not level, but a continual succession of ascents and descents, separated from one another by tracts of level ground. The lowest parts of these level tracts are estimated to have an elevation of from 5000 to 6000 feet above the sea. But they are overtopped are generally not high, but through the centre of this region there runs a more elevated ridge, containing various summits, the highest of which, nearly in the middle of the ridge, and called by the English Mount Dodaletta, is 8429 feet above the level of the sea. The surface of this region is a fertile soil overgrown with a green sward of grass and several kinds of alpine herbs where it is not cultivated. One of these European settlements is at Uskamand, 7800 feet above the sea, the foot of the Dodaletta Peak; the other is at Dimbutby, 5725 feet above the sea. The mean annual temperature at Uskamand is 56°, and consequently 28° less than at Madras; that of Dimbutby 64°. At the former place the thermometer sometimes rises to 69°, and has been observed to descend as low as 20°, but only once in 12 years. The changes in the temperature are very slow, and there is a greater difference between the highest and lowest degrees. The effect of both monsoons is slightly felt; nor are the rains occur all the year round, but more during the southwest than during the north-east monsoon. Frost occurs between the 1st of December and 1st of March, but it is moderate; the thickest ice does not exceed 4 inches in thickness. It is followed by rains, which are renewed by wheel, harley, mill, pea, and pulse, to which of late years European vegetables have been added. The fruit-trees of England succeed everywhere, and are frequently planted and fruits in all stages at the same time. Oranges grow only in the lower districts. No animals are kept, except cattle and buffaloes; sheep, goats, and dogs are found in a wild state. Very many large species are found abroad in the valleys and mountains, though the mountain-roads lead through the northern part of them, connecting the fortress of Sattagala with the small town of Caverpyrrom. We hear of no ascents of horses, or of any other animals, on the steep ridges. The mountains in this region rise to a considerable elevation; Kunbaterine Peak, which is a short distance north of the town of Sattimungalam, attains the height of 5545 feet above the sea. To the east of the Cavery River, which runs to the south, the Southern Ghauts extend eastwards, and their southern declivity approaches the towns of Salam and Atoor; they terminate near the last-mentioned place. It is only their southern border that is known to any extent. The banks of the river, which is extremely wide, enter the Paulmally Peak, which is 4925 feet high. North of Salem are the Sherrywary Mountains, whose highest summit, Mount Muttu (4935 feet) forms a table-land seven miles long and three wide, where Europeans whose health has been impaired seek the recovery of their strength. The Southern Ghauts are broken through by the river Cavery, which for about one-fourth of its course drains the table-land of the Decan, for nearly the same space winds between the high mountains of the Ghauts, and for the remainder runs through a level plain. It enters the mountains a little above the fortress of Sattagala, which is built on a rock, and is one of the finest seats of Sivaramdar [Cavery], and in this tract its course is extremely winding between high rocks, which approach so near its banks as not to leave space enough for a road: this part of the river has not been visited by any European. At Caverpyrrom there are no rocks, and the stream is free and clear, and with little windings, winds through the valley extending to the west of south. Where it receives
the Bhovany river it has already entered the plain, and is a large river in the rainy season. For about one-half of its course in the plains it runs in one channel, but below the town of Trichinopoly it divides, and encloses the island of Serampore, famous for its gum, and as a place of pilgrimage. Below this island the river again unites for a short distance, and then divides again. The northern arm, called Coleroon, runs in an east-north-east direction toward the Bay of Bombaim and Chilumbur; but its waters have been so exhausted by irrigating the adjacent fields, that it carries only a small quantity to the sea. The water of the southern arm, called the Chilumbur, is fed by a great many canals which traverse the sandy alluvial plain extending on the coast between Cape Calymere and Devicotta. The waters of these canals being conducted over the adjacent fields, contribute to the richness of the most fertile tracts in Hindostan, the staples of rice being only inferior to those of the district of Burdwan in Bengal. The principal of these canals terminate on the shore at Calymere, Negapatam, Nagore, Carrai, and Tranquebar. This extensive country is dotted with villages, but its towns have a worse pagoda, with architectural ornaments in a good style. The towns also are numerous, and each of them has a well-stocked bazaar. The Cavery river receives its principal supply from the south-east, and the tracts of Mamallapatam and the east, which during its continuance falls on the Western Ghauts. At Caverypoornam it begins to rise at the end of May, and attains its greatest height from 13th of July to 1st of August, and the rains of the north-east monsoon set in, its waters begin to decrease, and after the 11th of January they are so low as to be fordable.

The delta of the Cavery and the level country along its lower course are in the plain, in the delta of the Ganges and the Ganges itself, which may be considered as a prolongation of the plain to the Indian Ocean. That part of this plain which extends between the Gap and the delta, or between Trichinopoly, and Tanjore, contains many fertile tracts, some of which are cultivated; but the greatest portion is covered with forest, which however do not exhibit such a vigorous vegetation as those in the gap itself.

The countries extending along the Southern Ghauts and the lower course of the Cavery constitute a portion of the Carnatic, the principal division of the presidency of Madras. The most remarkable places in it are: Coimbatore [COIMBATORE], which is beginning to be a place of importance; Salem, which is celebrated as a place of manufactures and a good deal of commerce, but unhealthy. Trichinopoly is a fortress built on a rock. Tanjore is a place of great strength. [Tanjore] Negapatam, formerly famous for its two pagodas and as a place of manufactures and a good deal of commerce, but unhealthy. The Dutch settlement on the Cavery has been worked in some degree, and manufactures are found, especially to the north of the river Penn-air, and most frequently near Cuddapah and at Bangampally, in the neighbourhood of N одного.

The Eastern Ghauts, which separate the table-land of the Deccan from the low and level country extending along the Bay of Bengal, between 12° and 15° N, lat., occupy in width a much larger space than the other Ghauts. South of 13°10' N, lat., where their longitudinal direction is south-south-west and north-north-east, their average breadth is not less than fifty and this peculiar feature is still more distinctly marked in the Nella Malls Mountains than in the southern portion of the Eastern Ghauts. The longitudinal valleys which separate the single ridges appear to be raised more than those in the western Ghauts. It is stated that the most western range of the southern portion, which borders on the table-land about Bangalore, is about 300 miles above the plain, and may therefore attain an elevation of between 3500 and 4000 feet above the sea. In the Nella Malls Mountains the eastern range is said to be the most elevated; but its highest summits do not seem to exceed 9000 feet. The surface of the whole region is very stony, dry, and exceedingly broken, and presents few very spots fit for agricultural purposes. It is also nearly destitute of trees, with the exception of a few tracts covered with wild date-trees. In many places it is covered with stony rocks, with the coarsest sand stones; but in general it is almost entirely without vegetation.

Three rivers, originating on the table-land, pass through this mountain-region in transverse valleys, so narrow, that they are scarcely more than 200 miles in length, and yet are the Penn-air, which runs about 220 miles, enters the mountains between Oorderpe Droog and Gootty Droog; but at Gandicotta its valley becomes exceedingly narrow, and admits no road along its banks. It enters the lowlands, where the number of inhabitants is large, and is long, it brings down a comparatively small volume of water, and is of little use for irrigating the low-lands; whilst the Penn-air and Pal-air fertilize the whole country which they water.

The mountain-passes through this region are as difficult as those over the Western Ghauts. As the rivers which traverse it flow through very narrow valleys, the roads have been cut in the solid mass of the mountains, and little visited, and are nearly unknown, except the great military road which leads from Madras to the table-land. It runs over the plain to Arcot, on the Pal-air, and thence to Vellore, whence it either winds along the coast, or at a short distance runs into the Santhpur (1120 feet above the sea). Here it divides into two branches: the northern traverses Venachaterry (2180 feet) and Pednadurgam (1907 feet), and terminates at Colar, on the table-land; the southern branch leads from Santhpur to Kistnagur, and thence over the Penn-air to Raita, whence it passes to Oossoor and Bangalaur. The last-mentioned places are on the table-land. The Malla Nells Mountains are rich in metal, iron is very abundant, and copper and lead, which are worked in some places, are found, especially to the north of the river Penn-air, and most frequently near Cuddapah and at Bangapally, in the neighbourhood of Trichinopoly.

The Eastern Ghauts from the Bay of Bengal, and comprehends the central and northern Carnatic, with the Guntheer Cirear, has a low sandy beach, from which the surface rises gradually, but slowly, to the foot of the mountains, which rise to a height of 1500 feet, and the sea, is 490 feet above it. The surface of the whole is nearly level, but towards the mountains somewhat undulating. Near the coast the soil is a mixture of sea-sand and loam, with some remains of marine animals. In some parts it is covered with an efflorescence of common salt in dry weather. Towards the mountains, where the low hills commence, it consists chiefly of a mixture of loam and sand, with a considerable proportion of vegetable mould. This latter kind of soil is very fertile when irrigated, which is partly done by canals from the rivers, partly by numerous tanks; but the upper part of the hills is dry and sterile. Along the sea-coast the country is less fertile, but produces good crops of rice and sugar-cane. The chief trade is conducted by the river Goomalagamma; but the Guntheer Cirear, which comprehends the tract between the Goomalagamma and the river Khishna, constitutes a part of the country south of the lake of Puliset. This lake appears to owe its existence to the sea breaking through a low sandy beach, and overflowing the land within. It extends 33 or 34 miles from south to north, and is11 miles across its broadest part. It contains several islands. Its com marities with the sea at three points, but the outlets are extremely narrow and shallow.
The rainy season is later here than on the western coast of the Deccan. When the south-west monsoon (June to August) is in full force, only moderate showers refresh the air and soil. They become more abundant at the end of the month, and the intensity of the rain greater in October, and are heaviest in November, when they descend in torrents, sometimes for several days together. The north-east monsoon sets in regularly at the same time. In December, January, and February, the rains decrease, and, with the passing of the cool weather, they cease entirely. During the dry season (from January to June), a few showers only occur. The annual quantity of rain at Madras is about 46 inches. The climate of the Ceded Territories and Madras, then, is of the ordinary type of the east and south of Asia, with a monsoonal season in which the trade-winds from the east during the summer, and from the south-west during the winter, blow very strongly, sometimes to the extent of 77 miles an hour. The land is flat, and the natural water-supply is insufficient. Artificial lakes, and the larger tanks, are drained in four or five weeks during the dry season. Several attempts have been made to introduce irrigation, but they have not been very successful. In some districts the cultivation is carried on by small proprietors, but in others it is managed by professional farmers, who divide the lands into small fields and rent them out to the cultivators.
near the town of Wyragut, which remains on the west of it. This chain is very little known as to its elevation and width; but it seems to continue northward until it joins the table-land of Chintwahari, but is now only about 81 ft. long. It is the natural boundary of the table-land of the Deccan in this part, which table-land to the west of it is not more than 1000 feet above the sea. Another range of high land runs along the Bay of Bengal, between it and the Chilka, between the beginning ranges of the Rajahmundry on the Godavary, and terminating at the lake of Chilka near 26° N. lat. It rises from 600 to 1800 feet above the sea. The whole tract of country included by these two ranges is never less than 6000 square miles. It must be considered as unexplored ground, having never been visited by Europeans, partly on account of the difficulties which the steep mountains oppose to such an attempt, and partly because the whole tract is inhabited by a race of barbarians, who are not inclined to permit the visits of Europeans. These people are called Gonds or Gondas, and this extensive tract or country is called from them Gondwara or Gondwana. It is said only that the whole surface of Gondwara is covered with mountains and very thinly wooded, which latter circumstance distinguishes this tract from the Eastern Ghats. The British government appoints a small number of European officials to govern this country in nearly equal parts but the authority of both is only nominal. The hot tracts however along the sea-coast which the Gonds war on the east belong to the Rana in the province of Madras. It contains the Chotra of Balapur, Visakapatnam, Coimbatore, and Guntur. (Cutchka.)

The mountainous country of Godwara extends between 80° 30' and 9° 30' w. lat. South of latitude 20° 30' 2 to 41° 20' lat. but here it does not fill up the whole space between the Coromandel and the basin of the Godavary; for between this projection of the mountains and the ridge along the Bay Gonda lies a level country, with which we are not acquainted with, but which in length from south to north extends from the headborough of Koutkor (near 20° 10' N. lat.) to Rottenpoo (28° 29') about 150 miles. This plain of Rottenpoo is a fertile tract with fine rivers, towns and villages, the whole of it is inhabited by rice, grain in abundance, but rice only in such places as can be irrigated by artificial means. It forms the eastern portion of the territories of the raja of Bara, but is rarely visited by Europeans.

The Mahanuddy, whose upper branches drain this plain, receives its principal supply of water from the unknown mountain-region of Godwara, and partly also from the river of the Deccan. The plains in western Gondwara are by all accounts of this country it is very thinly populated, but the authority of both is only nominal. The hot tracts however along the sea-coast which the Gonds war on the east belong to the Rana in the province of Madras. It contains the Chotra of Balapur, Visakapatnam, Coimbatore, and Guntur. (Cutchka.)

The mountainous country of Godwara extends between 80° 30' and 9° 30' w. lat. South of latitude 20° 30' 2 to 41° 20' lat. but here it does not fill up the whole space between the Coromandel and the basin of the Godavary; for between this projection of the mountains and the ridge along the Bay Gonda lies a level country, with which we are not acquainted with, but which in length from south to north extends from the headborough of Koutkor (near 20° 10' N. lat.) to Rottenpoo (28° 29') about 150 miles. This plain of Rottenpoo is a fertile tract with fine rivers, towns and villages, the whole of it is inhabited by rice, grain in abundance, but rice only in such places as can be irrigated by artificial means. It forms the eastern portion of the territories of the raja of Bara, but is rarely visited by Europeans.

The Mahanuddy, whose upper branches drain this plain, receives its principal supply of water from the unknown mountain-region of Godwara, and partly also from the river of the Deccan. The plains in western Gondwara are by all accounts of this country it is very thinly populated, but the authority of both is only nominal. The hot tracts however along the sea-coast which the Gonds war on the east belong to the Rana in the province of Madras. It contains the Chotra of Balapur, Visakapatnam, Coimbatore, and Guntur. (Cutchka.)

The mountainous country of Godwara extends between 80° 30' and 9° 30' w. lat. South of latitude 20° 30' 2 to 41° 20' lat. but here it does not fill up the whole space between the Coromandel and the basin of the Godavary; for between this projection of the mountains and the ridge along the Bay Gonda lies a level country, with which we are not acquainted with, but which in length from south to north extends from the headborough of Koutkor (near 20° 10' N. lat.) to Rottenpoo (28° 29') about 150 miles. This plain of Rottenpoo is a fertile tract with fine rivers, towns and villages, the whole of it is inhabited by rice, grain in abundance, but rice only in such places as can be irrigated by artificial means. It forms the eastern portion of the territories of the raja of Bara, but is rarely visited by Europeans.
thirteen different kinds of trees useful as timber or for cabinet-work. A considerable portion of the population is employed in preparing these trees for the market, and in floating them down to Cuttack. These forests are inhabited by numerous wild animals, such as bears, lions, tigers, and wild buffaloes. Iron-ore is very abundant in this region, and diamonds are found in the tracts which separates the valley of the Mahanadi at Bhubanpur from the sources of the river Nerbudda. This country is the abode of the province of Quissa, and annexed to the presidency of Calcutta.

The table-land of the Deccan is separated from the mountain-tract of the northern belt by the courses of the two parallel rivers Tapti and Nerbudda. The Tapti rises in the mountain tract which joins the table-land of Ongunrutt-on the south-west, with two branches, the Tapti and the Purna; the former running west-south-west, and the second due west, till they unite after a course of about 140 miles, near 76° E. long. The high mountain-range which separates these two rivers, and rises to 3000 feet, is called the Mahadeo Pass; it terminates on the west at their junction, and encroaches partially to the east of them, is visited by the Whutdha, a distance of nearly 150 miles. Its average width may be 30 miles. Both declivities of this range are extremely steep, but partly covered with forests. After the junction of the Tapti and the Purna, the central part of the table-land is a wide valley between the Sauropors Mountains, on the north, and the Northern Ghats on the south, for about 200 miles, until it enters the Indian Ocean by a wide gateway below the town of Tapty and the Forts; the low ground level along the banks of the river, which is well cultivated in the upper parts, but almost entirely covered with bushes and jungle along its middle course. In its lower parts, the Tapti is a broad river, which is covered with a deep black mould of great fertility, but traversed in a very remarkable manner by channels 30 or 40 feet deep and, frequently several miles long. This place is of great importance as a site for British fortresses, and the site of the town of the Tapti is the camping of the Burhanpur situated on a fertile plain; it is of considerable size, though less extensive than formerly, and carries on an active commerce with the countries both to the north and south of it. Not far from the mouth of the river is the great emporium of Surat.

The Nerbudda rises on the table-land of Ongunrutt, but its sources have not been seen by Europeans, though the British have been hindered by numerous wild animals, among which are Elephants, which are visited by crowds of Hindu pilgrims. It is said to wind slowly over the mountain-plain in a westerly direction until it is precipitated from its steep western declivity not far from the town of Purna, and then descends into a valley filled between masses of rocks with a rapid course just below Bhubanpur, below which town it forms a confluence at Badghur. Further west the valley grows wider, the mountains to the south and west of the Nerbudda river being but a rapid course. Thus it arrives at Husungabah, or Nerbudda, where it is 900 yards wide and from five to six feet deep, so as to become navigable for small vessels. It continues to be navigable as far west as ten miles below Chhool-

dah, near the town of Burwanee (west of 75° E. long), a distance of between 130 and 140 miles, though there are two rapids in it, the first at Deori, between Hindoo and the island of Mandanati Unka, or Unkar Mandatta, on which there is a famous temple and place of pilgrimage; and the second at Sansadarbar, below the town of Mhetsir. About ten miles below Chhooldehy is the Hur Pahli (deer's leap), which Mandanati is 1250 yards broad, is narrowest to 200 yards, and bounded from rising 10 to 12 feet above its usual surface level across its bed. The water of the river rushes with great violence through three openings. Farther down the river is still more narrowed, and forms a small rapid, which runs in both sides to the water's edge; and thus the river becomes entirely unfit for navigation for a great distance. But about 10 miles above Talhagwarhah it enters the low lands of Gujerat, and is navigable from this place to its mouth for river-boats, a distance of about 50 miles, and for vessels of moderate size half that distance. Below the town of Bar-

ch it forms a wide gateway. The whole course of the river is about 600 which advance from the mountains on either of the rivers of the Deccan that empty themselves into the Indian Ocean, forms a delta at its mouth, as is the case with all the larger rivers which fall into the Bay of Bengal.

The valley of the Nerbudda extends mostly along the southern banks of the river, since the Vindhaya Mountains, which enclose it on the north, often advance to the banks of the river or very near them. The upper part of the valley begins from Mungo, in the province of Allahabad, and mainly filled up by low forests from the mountains for hundreds. When a level tract or a gentle declivity occurs, the surface is covered with a black mould of great fertility, while the high parts are little cultivated, and the forests which cover the adjacent mountains frequently descend to the bed of the river. South of the Hoshungabad, at the spring of the Tapti, the mountains take the form of a continuous chain, called the Sauropors Mountains. This chain at its commencement runs nearly south-west, but by degrees turns westward and continues nearly parallel to the Vindhaya Mountains, until it approaches that range, at about 76° E. long, but afterwards it resumes its western direction, these mountains are not very high, but form a mean elevation towards the coast not exceeding 3000 feet, and further westward they are somewhat lower. But both their declivities are steep, and the mountains are mostly inaccessible. The country between Allahabad, and the Vindhaya Mountains is a level plain, enclosed in several places; and at their western extremity, in the mountains of Raj Prades, are mines of coal, which have been noted for their produce from ancient times. The Nerbudda, which enters the Hoshungabad from the Hur Pahli, where the mountains approach to the banks of the river, is called the valley of Nerbudda, and is about 130 or 140 miles, not far from its lowest course, its communication being obstructed by the mountains, and a deep valley is formed, which almost follows the course of the river, and is separated from the coast by the mountains of Mhetsir, Hoshungabad, or Hoshungabah, to which the inhabitants have been removed by the government. This range is separated from the plains of Gujarat, already described, by the river Nerbudda, through which a road leads over the Vindhaya Mountains through Belhari to Pannah in Bundelcund; Hoshungabad, a large town with good buildings, and an important place for the communication between the plains the Ganges and the western provinces of the Decan, Multan, or Multisir, which, though not large, is an important place, because the most frequented pass leads from it northward over the Vindhaya Mountains to Gujerat; Mhetsir, a little further north, a large town with a broad market, a deep river, and a well stocked bazaar; and Burwanee, which is the most considerable town in Nerbudda, and contains many good buildings and a large palace.

The upper valley of the Tapti and Nerbudda are subject to the English, and annexed to the province of Allahabad, under the name of the Saidi Districts on the Nerbudda. The western districts on both rivers belong also to the English, with the exception of a tract in the middle, which is subject to the Gujerat. The British possessions in this part are annexed to the presidency of Bombay, forming a portion of the province of Khandiessah, or Candhes. The country between Allah-
bad and the presidency of Bombay is partly subject to Ma-
haraje Seindia, and partly to other Mahatta chiefs, espe-
cially to Hohar.

III. The mountain-Region of Northern Hindustan has nearly the form of a triangle, whose base is formed by the Vindhaya Mountains, skirting the vale of the river Ner-

budda on the north, whose apex is at Bharwara, at a great distance from Delhi, on the Jumna, to the southward. It contains a table-land of country, with the name of Mal-
va, which occupies its southern part, and is surrounded by mountain-ranges, and also a mountain-ranges, called Uparmal, which extends on the north of the table-

land. These two extensive provinces are to be considered as detached members of this mountain-range.

The Vindhaya Mountains begin on the west between 73° and 74° E. long, about 10 or 15 miles from the northern banks of the Nerbudda, with the high hill of Pounghar situated between the town of Dubbose and Champaran,
and extend eastward along the vale of the Nerbudda. The western portion, as far east as Chieudahr on the Nerbudda, has not the appearance of a continuous range, being frequently broken into isolated groups and presenting many steep and rocky cliffs. Its width, like that of the southern offsets approaching to the very banks of the river, and its northern declivity being intimately connected with the extensive mountain-tract which extends between 73° and 75° N. lat., it forms one of the most graceful parts of the tract along the river Mhye, and which unites the Vindhyha Mountains with the Aravalli range. East of Chieudahr (near 75° E. long.) the range approaches the river Nerbudda and connects the各式各样的eminences, which it occupies, with the eastern parts of the tract Malwa. The lower part of this region is occupied by a broad-backed range, called the Goonam Ghauts, or Rajamahal Hills, and sometimes, from a nation inhabiting it, the Pooharee Hills. They are large, dark, and backed with creeper, and form a vale of the Sone, near Rotasghur, and may therefore be considered as the most eastern offsets of the Vindhyha mountains. Between Bogipoor and Rajamahal these mountains continue for a considerable distance, so near the Dangs, that there is hardly space enough to make a good road along the river. Recently however the East India Company has caused an excellent road to be made between Rajamahal and Dolrong, which traverses the narrow of Sisulguri on the banks of the river. It may be compared with the military roads of the Romans. These Goonam Ghauts have excellent pastures and a fertile soil, but cultivation is much neglected; wheat and barley are raised in no great quantities. The hills are mostly covered with wood, and are very picturesque.

We pass to the table-land of Malwa. The Vindhyha mountains constitute its southern boundary. On the north it is enclosed by the Nerbudda and its spacious valley, called the Mokundra range, but Ritter prefers the name of Harraoutee range. On its eastern extremity it is connected with the Vindhyha mountains, near the sources of the river Dangs, and farther to the east with the greater part of the Malwa. This range extends north-west to Saugur, then west-north-west to Serong and Chuppra, and then westward to Rampoor on the Chumbul, and to Neemuch (75° E. long.), where it is connected with the Mokundra range. It is not until we come to the south of Oodipoor, and joining the Aravalli range near 24° N. lat., and between 73° and 74° E. long. This range, which probably does not rise more than 500 or 600 feet above its base, is not so extensive as the former range, and is intersected by a great number of rivers, which, after running through the rivers, which originate in the Vindhyha mountains, and in their northern course traverse the table-land of Malwa, and afterwards force their course through the Harraoutee ranges, where they form numerous rapids and cataracts in the narrow valleys.

The table-land of Malwa extends from Dohud or Dowud on the west (near 74° 20'E. long.) to Bhospi on the east (77° 20'E. long.), about 170 miles, and its average width between the branches of the river is about 50 miles. It is rarely, indeed, more than 60 or 80 miles wide; its area is frequently estimated at 13,600 square miles, or more than half the surface of Scotland. Malwa is a plain, gently inclined towards the north, with an elevation varying between 200 and 300 feet: its eastern and western borders are formed by the Vindhyha mountains, which are 2000 feet high; Oodipoor, 1640 feet; Barode, near the junction of the Chota Sind with the Chumbul, 1530 feet; and Rampoor, near the Harraoutee mountains, 1275 feet above the sea-level. These towns, which are built on the banks of the Chumbul river, indicate the declivity of the table-land northward. On the plain itself no range of any extent appears: a few hills only occur, which do not rise more than from 100 to 200 feet above their base. Their soil is a black, soft, and rich loam, producing rich crops of rice, Indian corn, peas, beans, &c. Large quantities of sugar-cane, tobacco, cotton, linseed, and sesamum are produced, and of the latter, or sesamum indicum (the oil-cotton, or citrificio) and safflower (Carthamus tinctorius), are also cultivated on a large scale. But the most important of its productions is opium, of which 350,000 pounds are annually raised, and more than 500,000 exported. The cultivation of this article increases rapidly. There are three seasons. The rain falls during the south-west monsoon, from June to September; its annual quantity amounts to ten inches. The thermometer rises occasionally as high as 98°, and at the utmost 96° in the day, and falls in the night to 72°. Towards the end of the rainy season it becomes colder, and then the mean temperature of the day varies between 72° and 79°. A hot season comprehends the months of December, January, and February, during which the thermometer sometimes, though rarely, descends to 26°. During the hot season, from March to June, the north-western winds prevail; they are dry and frequently boisterous.
The thermometer sometimes attains 98°, but the nights are always cool and refreshing. Though the cholera is considered endemic on the table-land of Malwa, it is in general allowed to be a healthy country.

Guicowar, some 15 miles from the Rann, is the most important of the alluvial towns of importance. Near the Vindhyas mountains is Bhupal, a large town built near an extensive tank; it is of great antiquity, and carries on some commerce, being situated on one of the great roads which go south down the greatest part of the peninsula. In the hills near the Vindhyas mountains, is the residence of the Mahatta prince Hollar. Bhar, once a very large place, has still a population of 36,000. Nearly in the centre of Malwa is Pendarah, a considerable place, situated on the great road which leads from the table-land to the plain of Gurroo and to Cutch; it is noted for its works in gold.

A line drawn from the last-mentioned town southward to Tauntra, and hence to Dhubar, marks the western boundary of the table-land of Malwa. West of this line is a mountain-tract, about 50 miles across from east to west, connecting the Vindhyas mountains with the Aravalli range. The land near this range is very elevated, and all the ridges are valuable for timber, which consists of much oak and many other timber-trees. This region, called Kauntel, extends westward to the meridian of Lunawar, a town which is situated on the W. point of the Meridian of Bombay.

West of this meridian lies the plain of Gujarat, with an average breadth of about 45 miles, extending southward to the very banks of the Tapti at Surat, and northward to the river Sabarmati, or Sabharati, which enters the most northern part of the Gulf of Cambay. It is one of the richest and most populous countries of Hindustan, having a good soil, and receiving the heavy rains brought on by the south-west monsoon. It is also well watered, though some of its rivers are occasionally dried up, and consist of a deep bed, sometimes 200 feet below the surface of the plain. Rice is nearly the only grain which is cultivated; but the numerous villages are surrounded by extensive plantations of cryns, which resemble the oranges of the East Indies, and supply the neighbourhood with most of its temples, and choultries. The number of large towns is considerable, Among its harbours those of Bareach (Baraonas) and Cambay (Cambay) have been noted as the oldest historical times. The latter, which was the seaport of Ahmedabad, has lost much of its importance, but still contains 30,000 inhabitants. In the interior is Baroda, the residence of the Guicowar, with 100,000 inhabitants (Bareonas), and on the bank of the Sabharati is Ahmedabad, with its extensive ruins, occupying a space of 30 miles in circuit; it still contains a population of more than 100,000 souls (Ahmedabad).

The coast of the Gulf of Cambay is divided into three parts: the first, from the peninsula of the same name, is very difficult of navigation, on account of the violence with which the high tides enter it, and of the circumstance that at low tide the northern portion is exposed. This part is the most unhealthy, as the exhalations of the warm “swampy tract” are very unwholesome, and many persons die from the effects of these vapours. The second part of the coast, extending from the mouth of the Mhio river, opposite Cambay, and the second tide carries them into Cambay creek. The violence with which the spring-tides enter the gulf and run up is compared to the gurra of the Bahr of Bengal; the mouth of the Mhio river is especially liable to this violent action, and the sediments of sand which are generally thrown up during it really seems to be still greater. This gulf extends in length about 72 miles, but its width varies between 32 and 8 miles. It is supposed that the depth of the gulf has progressively decreased for more than two centuries past.

At the most northern corner of the Gulf of Cambay, and on the western banks of the river Sabarmati, lies a very flat-tract, covering an extensive portion of the alluvial plain. This is a north-western direction until it meets that part of the Rann which forms the interior of the Gulf of Cutch. This tract is so low, that when the Rann is covered with water, it is likewise covered with the sea. In ancient times, it must have changed into an island. It is only used as pasture-ground, and may be considered as a continuation of the Rann, which is nothing but a salt-monas, which during the dry season becomes a great peninsula on the west coast, but is well formed when the south-western monsoon set in, it is entirely covered with water, and forms an impenetrable swamp. When the water has been evaporated by the heat of the dry season, the Rann is covered with a salt. This never advances to the north-east. It is separated from the eastern part of the Gulf of Cutch, as far west as Malilla in Gujerat, but the greatest portion of it extends to the north-east of the island of Cutch, which is separated from it by the sandy desert lying east of the lower course of the Indus.

The peninsula of Gujerat, which is separated by the Gulf of Cutch from the island of that name, and by the Gulf of Cambay from the plain of Gujerat, but connected with the latter by the low-lying tract extending from the most northern corner of the Gulf of Cambay to the Gulf of Cutch, comprehends, according to a rough calculation, an area equal to that of England, or about 50,000 square miles. The greatest width near the sea is covered with salt beds and hills, but a fertile plain extends along its northern shores from 15 to 20 miles inland, and the flat swampy tract along its eastern border continues along the Gulf of Cambay. The plains in this part of the interior are very imperfectly known. They seem to extend in two continuous ridges, of which the northern, called the Mandvi mountains, runs nearly north-east and south-west, beginning not far from the line of the southern corner, and terminating on the west near the harbour of Poor Bunder: the southern range, called the Joonsagar mountains, runs east and west at a distance of about 30 miles from the former, and is covered with a salt, but it is never advanced to the neighbourhood of the coast, and extends along it from Gopnath Point, at the entrance of the Bay of Cambay, to Putnum, and even further. This part of the coast is rocky and hilly, but all the remainder low, and in many places swampy, and especially so between Nuvve Bunder and Poor Bunder, where several lagoons occur. The mountains do not seem to attain a great elevation. Their declivities are steep. The northern range is mostly destitute of timber, but the southern is necessary for its inhabitants, and is covered with the most healthy vegetation. The whole of the peninsula is well watered, and the rivers, with the exception of those which fall into the Gulf of Cutch, preserve their water all the year round; the Bunder, which enters the sea near the southern corner, is of great service in time of famine, and even navigable for small river-boats during the greatest part of the year as far as Koyana. In the lower country which separates the two mountain-ranges several extensive tracts occur which are cultivated, but the best cultivated district is the northern plain, where the common grains of Hindustan are raised in abundance, together with cotton. Here also is the principal commercial town, Nowannuggur, which carries on a considerable commerce with Arabia and the Persian Gulf. It is a large place, and has good manufactories of cotton and many dye-houses. The most western district, called Oka Mundli, is covered with low hills, and separated from the main body of the peninsula by a low swampy tract, similar in its character to the Rann. The most mountainous districts are inhabited by some savage tribes which live by the produce of their herds. The climate of Gujerat is rather mild, and not unhealthy even for Europeans. The highest point to which the thermometer has been observed to rise is 102°; in January it sinks as low as 45°. In December and January eastern and north-east winds prevail, and are accompanied by heavy fogs, which however do not prevent the raising of the level. The hot winds from the west are general in May and June, after which follows the south-west monsoon with its rains, which are rather abundant. At the most southern point of Gujerat the Fouis are able to ascend the small island of Diu, where there is a good harbour and a fort erected for its protection. It was formerly a considerable place, but has now little or no commerce.
The Gulf of Cutch, which lies between the peninsula of Gujarat and the island of Cutch, grows more shallow as it proceeds east. Large vessels can sail up to Nowasangur, and even to Loctia; at which point it is a shallow sand-bank.

The island of Cutch is only an island during the rainy season of the south-western monsoon, when the Rann enclosing it on the northern side is covered with water. The strong winds force the water through the narrow channel or eastern mouth of the Indus into the low plain, but at the same time the rivers which fall into the Rann, as the eastern branch of the Indus, the Loony river, and the Munassar, which enter their mouths in the month of October, produce a tremendous fall of fresh water, with which the Rann is partly covered. These districts which are situated near the mouths of these rivers supply during the dry season much pasture-ground, and the remainder is all covered with a saline incrustation. During this season Cutch is separated from the continent of India by a desert. This island extends from east to west about 140 miles; its greatest width is about 60, but in some places not more than 12; its surface may cover about 10,000 square miles, or about the extent of Sicily.

Two ranges of low mountains traverse the island from one extremity to the other. The higher, called the Lunghi or Lunghi Mountains, is the southern range which does not exceed 8 or 10 miles, but it is a continuous chain, dry, without springs and destitute of wood, but broken by deep ravines in its declivities. Along the northern shores of the main body of the island, and the mouths of these rivers, which constitute the high coast of the Rann, but is frequently broken by declivities, and appears in single peaks or in groups. It is connected by some transverse ridges with the Lunghi Mountains, and the whole constitutes, with the southern plain, the cultivable portions of the island. The southern plain, which varies in width from 3 to 30 miles, is separated from the sea by a continuous series of sandhills, which project into the sea, and constitute the boundary of its range, running parallel to the coast, and it is about 60 miles long, but not more than 10 miles wide on an average. It is called the Binnene. Its surface is somewhat raised above the level of the Rann, but got sufficiently high to admit the cultivation of a grain. It is consequently only used as pasture-ground for numerous herds of buffaloes and cattle; and the produce of their dairies, the ghee, is one of the most important articles of export from Cutch. The three islands situated within the Rann, Puchum, or Gowra, the most western, Churnbul, the middle, and Charlum, lying in what is called the Little Rann, farther east, are of the same description. In the last-mentioned island is the town of Sauntulpoo, a place of some importance, which runs the river Churnbul and Anumage, passing through it. Though no active volcano is known to exist at present on this island, a great portion of its surface consists of particles of lava and other volcanic products, and extinct volcanoes are observed in some places. It is subject to earthquakes, and suffered much by one in the year 1819, in which many hundred persons lost their lives, and the mouth of the river Indus underwent some remarkable changes. The climate of this island, which is traversed by the tropic of Cancer, and is near the rainless region of the globe, is very dry and hot. The south-west monsoon brings rain from June to October, but as this island constitutes the most western boundary of its range, the rains are not copious, and it sometimes happens that they do not set at all. This seems to be the principal reason why the cultivation of the ground is in a very backward state, and the produce is not sufficient to supply the scanty population of 100,000 souls. The summers are hot, but the winters are neither very hot nor very cold. In the former season the thermometer rises to 106°, and in the latter it sinks to 33°. The prevailing winds during the month of April come from the west and northwest. Respecting the productions and considerable towns see Gujar."
within the mountain-range of the Aravalli chain, is full of ruins; but it has improved since it came into the possession of the English (1817), and now contains more than 25,000 inhabitants. In the northern districts is the large and well-built town of Jyopoor, the residence of the raj of Jyopoor.

As to the country south-east of the Chitore mountains, and between them and the Vindhya range, its western districts are known by the name of Harssourette, and in the eastern they are called Bundelcunt. It is a country of narrow valleys, joined by broad-ridged ranges, which, in their upper parts, extend in uneven plains. The only low and level plain of any extent occurs on the eastern side of the Chambul, between Kotah and Pally, where the country is honourable. The produce consists of rice, cotton, and oil; and the annual produc is considerale.

The valleys are narrow, and produce only jayvari and other more coarse grains, no irrigation being possible, on account of the bed of the rivers being so deep. Cotton plantations however are numerous and extensive.

The plains on the mountains, which rise from 1800 to 2000 feet above the sea-level, are still less productive, and mostly covered with bushes of pasturage growth. On the table-land of Punnah, between the Cane and Toma rivers, is the town of Punnah, or Punnah, a well-built place, perhaps 1800 feet above the sea, the neighbourhood of which contains the highest district of the province, which consists of Inns, on the banks of the river Can, the town of Bandah, which is well built, has some manufactories, and carries on a considerable commerce, especially in cotton, from the valley of the Kan.

The whole of the mountain-region borders on the plain of the Ganges. Another place, in a similar situation, is the fortress of Gwalier, which is built on a rock, having a tolerably level surface, of considerable extent, and a steep descent on all sides. At the foot of the fortress, on the left-hand side of the advance, the town of Patum, containing 30,000 inhabitants.

The right bank of the Chambul, in a very mountainous country, is the town of Kotah, the residence of the raj of Kotah, a well situated but unhealthy place, having the name of Bandel. The mountain-mass, by the division of Mahratta and Rajpoot, is Patum, a thriving commercial town, in which nearly the whole commerce between Malwa and the other parts of Northern Hindostan is now concentrated.

All the rivers which traverse the table-land of Malwa and the mountain-region of Umerpal fall into the Jumna or the Ganges, their course being north-east. The rivers which enter the western part of the table-land of Malwa with a slow current, break through the chain of the Harssourette Mountains in very narrow valleys, where they form a series of rapids and cascades. The largest is the Chambul, which, passing between the northern and southern branches of the Malwa branches, is in three branches, between which the towns of Dhar, Sagaore, and Indore are built; it receives a great portion of the drainage of the table-land before it leaves it, and enters the Harssourette range between Rampur and Shampoor. It then runs a narrow defile as far north as Kokhat, and as there is no level land along its banks sufficient for a road for beasts of burden, the great thoroughfare in this part of India traverses the Harssourette Mountains by the pass of Mokundra, which is some distance east of the Chambul, and which keeps up the communication between the thriving commercial towns of Shampoor in Malwa and Patum in Umerpal. In the plain below Kotah it is joined by other rivers, which enter the table-land from the east and west, and join it the waters of the eastern districts of Malwa, and likewise traverse the Harssourette Mountains in narrow gorges. The Chumbul begins to be navigable only a short distance above the breadth of the Jumna, which takes place below the great towns of Etawah and Calpeor, after a course of about 450 miles. The other rivers of Umerpal, the Sinde, Betmah, Cane, and Toms, which fall likewise into the Jumna, join the Chambul, and the Kadna, rising west of the Malwa, joins it to the east-north-east, in which general direction it continues until it joins the Ganges above Patum. Its course is in a narrow valley as far as Raisagur, below which it forms it enters the plain of the Ganges and becomes navigable.

The mountain-region of Northern Hindostan is for the most part in the possession of native princes. The British Government have however succeeded in the southern country of the Sone to the presidency of Calcutta, and the town of Allahabad to the British Government.

The mountain region is divided between the river, and the Ganges to Allahbud. Between the territories of Calcutta and Allahbud the possessions of the raj of Banasa are enclosed, which comprehends a tract of mountainous country, which has not on other side of any communication with the English, and which is called Allahabad, Allahbud or Allahbud.

A narrow valley lies between the mountain-range of Northern Hindostan and the banks of the Indian river; the name of Rajput is applied also to those countries. The Rajput princes of Coolipoor and Jyopoor, with the rajah of Shajah, have their principal residence between the table-land of the Aravalli range and the mountain-range of Hindostan.

The English territory in this part is annexed to the presidency of Bombay. The island of Cutch is subject to the king of that name.

IV. The Plain of the Ganges. The Ganges, or Ganges, rises with its two principal branches in the highest elevation of the Himalaya mountains, near 51° N. lat. and between 77° and 79° 40' long., and in time, which is 75° 40', and in 3000 feet; from that point, it descends imperceptibly to the west-south-west, in which course for a considerable distance runs south-west, until it joins another mountain-stream, the Deuli, which descends from the mountain-range of the Himalaya, which is 6500 feet above the sea, the Akkanandana flows in a west-south-west direction past Siramnagar to Deulpur. The river formed by the junction of the Bhaga and the Akkanandana, which is 6500 feet above the sea, its course within the region of the Himalaya Mountains is not long, but very winding, until it entirely leaves it below Hardwar, and enters the plain of the Ganges. The surface of the river at this point is hardly more than 1000 feet above the sea-level. The length of its course, including the Akkanadana as the longer branch, does not fall short of 150 miles. In the plain it continues its course for a considerable distance south-west, or nearly so, until it joins the Ganges, which is 6500 feet above the sea, its length is about 300 miles; its course is parallel to that of the Ganges, being first south-west, and afterwards nearly due south. It is navigable to that river until it joins it at Allahbad, at the Deulpur. Its course within the mountains does not perhaps
exceed 120 miles; but in the plain it runs nearly 150 miles more than the Ganges up to their junction. Though its waters during its course are increased by those of the mountain-region of Northern India, the Chumbul, Bindi, Bega, and Jumna, that point at the point of their confluence the Ganges is much larger, being a mile across, while the Jumna is only 1400 yards.

From Allahabad to below Bogipoor, situated at the foot of the Himalayas, it runs in the principal course eastward, and in this part of its course it receives a great number of large streams. The Goomtee, rising near the foot of the Himalaya range, runs through the plain and joins the Ganges with a winding course eastward, and in this part of its course it receives the name of Goomtee, which signifies the winding river. Above the town of Chitura the Ganges is joined by the Gogra, the largest of its affluents from this side: it rises far within the high ranges below the Himalaya range near the modern town of Taksakot, and passes Fyzabad and Oude. Its course is hardly less than 600 miles, which is equal to that of the Rhine. Opposite Patna, near Hajoopoor, the Ganges south of the former joins again about 40 miles lower source lies near the Mantass Pass, on the table-land of Tibet, and it is not much inferior in length to the Ganges.

Further down the waters of the Ganges are increased by those of the river which rises on the southern side of the higher Himalaya chain, passes near Kathmandu, the capital of Nepal, and entering the plain, changes its southern into a south-eastern course. Nearly opposite Bogipoor it joins the Gogra, which falls into the Ganges, whose further branches seem to originate on the table-land of Tibet, and which, like the Ghandaki Ganga and the Gogra, brings down the waters of a considerable area of the mountain-regions of Afghanistan. At Sirdar, 26 miles below Bogipoor and 10 miles above Rajamahal, the Ganges having passed the hills, which here approach its bed, turns southward, and here the great delta of the river may begin properly. Though it does not present its grandeur at this place, it is evident that its waters formerly did, and that one arm passed near the extensive ruins of Gour, which at present are five miles distant from the river. At present the Ganges flows south-east, and the Ganges forms thedelta, or the country of Bengal, of which part the western branch is called the Jollingbee river. It flows mostly in a southern direction, and joins the Ganges near Nuddea. The island which lies to the north of the course of the Ganges is called the Coarse island. Other arm branches off from the Ganges a few miles from Jollingbee. This arm, called the Mathabunga branch, runs likewise southward, with many large bends, and joins the Ganges at about the same distance from the Ganges as the Hooghly. After the junction of these three arms of the Ganges, the western branch of the Ganges is called the Hooghly, under which name it passes Patna and reaches the Bay of Bengal near the island of Sagar. The principal branch of the Ganges, continuing its course to the south-east, sends off another arm near Cutty, or Custea, which is called the Chundra river, and passes near Comorcula. The fifth great bifurcation takes place at no great distance lower down near Maddapoore, and here the smaller or western branch is called the Gurroo river. This two great branches, the Chundra and Gurroo, unite again near Cutty, and after they proceed southward, under the name of Booror, or Horinggir river, which, like the Hooghly, forms a wide sautury at its mouth. Whilst the Ganges loses a great deal of its waters by sending off so many large branches, besides several smaller ones, it receives new supplies from the Himalaya range and the Brahmapootra. The Mahabanda and the Teesta, which both run from 230 to 300 miles, rise on the southern declivity of the higher Himalaya in Nepal and Butan, and run southward. They combine by several branches with one another during the rainy season, but they join the Ganges at different points,—the Mahabanda near Nabography, and the Teesta below Jaffergunge. At the last named place the Mahabanda receives the waters of the Brahmapootra by the branch called the Jomy, which leaves its principal stream opposite the town of Steepoor, is very deep, and brings down a great vole of water. Where the Ganges is increased with the waters of the Jomy it divides again, and its eastern branch, called the Booree Ganga, passes Dacca at no great distance, and enters the wide bed of the Brahmapootra below Nurrin-gunga. The Booree Ganges receives three other navigable branches of the Brahmapootra, the Bungs, or Bunge, the Banar, and the Lukhya. The last is the most important, and joins the Booree Ganges near Nurrin-gunga; it is four miles wide below the mouth of the Ganges. The principal branch and the Booree Ganges and the Brahmapootra, but falls into the sea by a separate embouchure between the continent and the island of Deccan Shabapoor. The Ganges runs nearly 1500 miles.

All the affluents of the Ganges rising within the mountain-region of the Himalayas are navigable for smaller or larger river-boats to the very foot of the range for six months and longer. The Ganges itself and all its arms cause great loss among the vessels which enter the mouths of the Brahmapootra and the Booree Ganges. Even before the river divides its waters are not very deep. Far as upward as Allahabad it consists of a series of pools divided by sand banks. At Sirdar it is navigable for all vessels, and is rendered difficult and very dangerous. Above Allahabad numerous shallow places and rapid occur, which impede navigation during the dry season, but disappear after the rainy season. At present vessels can ascend to the town of Dacca on the Booree Ganges. In the Horinggir branch it is felt as far as Custey, where this river branches off from the principal body of the Ganges. The Ganges and its affluents may be divided into three parts:—the plain of Bengal, which comprehends the delta of the river and the country north of it as if as the lower range of the Himalaya mountains; the plain of Bahar, which is divided by the river Coosy and the Rajmahal hills, and extends as far west as the confluence of the Ganges with the Jumna; and the district of Obode, Oude, and Rohilkund. The first extends lengthwise from south to north, the second from east to west, and the third from south-east to north-west.

The plain of Bengal extends from the mouths of the Ganges to the Himalaya mountains, about 280 miles, and its width is from 160 to 250 miles. The Ganges, which before it reaches the Bay of Bengal, is divided into several branches and is divided by the river Coosy and the Rajmahal hills, and extends as far west as the confluence of the Ganges with the Jumna; and the district of Obode, Oude, and Rohilkund. The first extends lengthwise from south to north, the second from east to west, and the third from south-east to north-west.

The Tiperah or Triburipah mountains, which cover a great space between Chittagong and Silhet, seem to form
The country subject to inundation lies partly west of the Hooghly, and partly north of 25° N. lat. The district west of the Hooghly is of great fertility, especially Burdwan, which produces grain, sugar, cotton, silk, and indigo, in the greatest abundance and of excellent quality; it is the best cultivated, most populous, and most productive district in India. The country north of 25° N. lat. is fertile and well cultivated in its southern districts, as the lower tracts along the rivers are covered with water during the rainy season; but it is somewhat arid, and is cultivated by artificial means, and partly used for raising such kinds of grain as do not require irrigation. But farther north large tracts of waste land occur, which are covered with rank grass, reeds, and much water, and the population increases in number and extent as they approach the Tarai.

The Tarai (i.e. the swamp) divides the plain of the Ganges from the lower region of the Himalayas mountains, and extends from the banks of the Brahmapootra along the foot of the mountains to the place where the Ganges issues from them at Hardwâr. But it varies in width and also in its character, narrowing insensibly as it proceeds farther to the north-west. In Bengal it is from 20 to 30 miles broad, and towards its northern extremity only a few miles wide. Its soil is extremely soft, and as its slope is not sufficient to draw off the water of the numerous springs which issue from the mountains, it is converted into a deep swamp of great extent, covered with various kinds of vegetation and large forest-trees. [HIMALAY.] It is the haunt of elephants, rhinoceroses, wild buffaloes, tigers, monkeys, and other wild animals. But as the exhalations from them are injurious to crops, and the height of the ground, united to a great degree of heat, engender the most dangerous fever, it is very thinly inhabited, and by a very miserable class of people, among whom goître is common. These people chiefly maintain themselves by cutting down the forest-trees, and are sent to Calcutta, and sold in Bengal, where they are used for constructing boats and for building purposes. No part of this tract is cultivated, nor does any portion of it serve as pasture-ground. Farther south, the saultrees and forest-trees disappear, and the climbing plants disappear, and the ground between the trees is covered only with long coarse grass, which being destroyed by putting fire to it, hords of cattle pasture on the new grass which immediately springs up in the inundated districts with less labour. Its principal products are opium, indigo, rice, and cotton. [BAHAR.]

The country north of the Ganges is called Tihrt or Tribhuta. It is an inclined plain, near the Himalaya mountains, about 600 or 700 feet above the sea, and sloping towards the Ganges, where its mean elevation may be about 300 feet. Its surface is undulating, and the boundary of the Ganges do not differ much from Bahar Proper in soil and cultivation. But about 30 or 40 miles from the river large tracts are covered with forest-trees, especially saultrees, which increase in extent as the country descends in the heavy rains and is brought down by the numerous rivers from the Himalaya, forms extensive lakes, or dyils, which render this part of the Gangetic plain nearly uninhabitable. But the cultivation in a country distinguished by an extremely fertile soil. But with all these disadvantages its agriculture is on the increase, as no part of India is better adapted for the raising of indigo. The cultivation is on the increase. In no part of the great plain is saltpetre obtained.
in such abundance; indeed the ground seems to be generally impregnated by it. The large forests of sal furnish an article of export.

The portion of the Gangetic plain which extends west of the meridian of Allahabad, and comprehends the Doab, or country between the rivers Ganges and Jumna, together with Oude and Rohilkund, differs considerably from Bahar, and still more from Bengal, in its climate and productions. The length between, and the breadth of the rivers does not differ much from that of Bahar, being sandy and loamy, and having likewise water under it at no great distance from the surface; but it slopes more rapidly, descending from north-west to south-east from 1200 feet to 300 or 400 feet, and consequently the running water is sooner drained off and the soil is much drier. As the heat of the summer, though excessive, lasts only a short time, and the cold in winter is considerable, the vegetation differs greatly from that of the lower plain. The white-crops resemble those of Europe, consisting chiefly of wheat, barley, oats, and millet, together with peas, beans, vetches; also tobacco, flax, and hemp. The summer crops, which grow during the rainy season, are rice, jowar, cotton, indigo, &c. The palm-trees disappear; but the European fruit-trees grow together with bananas, custard-apples, and the fruits which have been transplanted from China. Almonds, peaches, pomegranates, and most of the fruits of England are cultivated with success. The number of evergreen trees is small; nearly all trees lose their leaves in December. Forests are rare in this plain, except towards the Himalaya mountains, and there the woodlands resemble the Tarkha, which however is of small width in this part of the plain.

The country which lies to the west of the Jumna, and extends as far as the banks of the Sutlej and Ghurta, consisting of the lowest link between the Ganges and the Indus. It is a level tract; no mountains or even high hills occur in its whole extent. The surface consists of a loose sand, and as the equatorial rains here begin to cease, and the river rises of the spates, the tract, though not extend so far south, is nearly without cultivation. Where this plain borders on the Himalaya range, it is in some measure watered and fertilized by the numerous small rivers which originate in the lower range of the lower monsoon, and flow to the west in the desert country between the last-mentioned river and the Sutlej they disappear entirely, or are only limited to a comparatively narrow tract along the Himalaya range.

The Gangetic plain is the most fertile, the best cultivated, and most thickly inhabited portion of Hindustan. It contains more than one-half of its whole population, and the number of inhabitants probably exceeds 60 millions. The number of inhabitants is larger in the lower portion of the plain than the upper. The lower portion of the plain is inhabited by the people of the article Bengal, and for a description of the largest see CALCUTTA, DACC, &c. Calcutta, on the banks of the Hooghly, is the town of the same name, and is a rapidly increasing place. In the middle plain of the Ganges, or Bahar, the large towns are also numerous; especially along the banks of the Ganges. Bogipore contains 30,000 inhabitants [Boilipoon] and Monghir, a fortress with an equal population, is noted for its manufactures of iron. Farther west, about the mouths of the river Son and Gundy, is a very populous district containing the great town of Patna, and near it the large towns of Bankiop, Hajee-pore, and the other towns. They contain about 75,000. Furruckabad, Buxar, and Gisipoor. Benares, farther west, is considered in some respect as the capital of this portion of India. [BA-NARES] Between Benares and Allahabad are Chunargru, a fortress with 15,000 inhabitants, and the great commercial town of Mirzapoor. At some distance from the Ganges on the south is the town of Gayah with 60,000 inhabitants and a famous temple of Vishnu, which is visited by a great number of pilgrims; and not far from it on the Son are Durnagur, with 18,000 inhabitants. The towns of the Teritop are not yet risen to importance, but are rapidly increasing with the extension of cultivation in this fertile district. The largest town is Mully, and it is reported the second town of the district has from the last ten years been the seat of the most powerful empires in India, and it contains several towns which successively have been the capitals of this country. All of these are situated either on the Ganges or the Jumna. The chief towns on the Ganges are Calcutta, the capitals of Cawnpoo, or Caumpoor, Canoope and Furrucka-
HIN 219 HIN

had. Campo-poor is a large town, containing six miles along the river, but it is thinly peopled, and the streets are intersected by large orchards and gardens. Canogo, which once covered a surface equal to that of London, is now of very little importance. Furruckhabad has still a population of 45,000, or about 12,000 people, and has a market town of Northern Hindustan. On the Jamna are the antient capitals of Calpea, Etawah, Agrha, Muttra, and Delhi. [Agra; Delhi.]

Calpea is a considerable place, and carries on an extensive trade in cotton. Etawah has also preserved a considerable number of its old antient structures, and is the residence of the Muttra, or Mathum (the Mithra of Arrian, Indica, c. 8), is still a large town, and a sacred city, to which great numbers of pilgrims annually resort, as well as to the neighbouring towns of Nampan and Kasipal. The last town, on the south part of Hindustan, one of the oldest seems to be Hustanpoor, near 29° N. lat. and 78° E. long., north-east of Merut, whose ruins covered a great extent of ground. In the Doab, or country between the Ganges and Jamna, are the towns of Merut and Scharanpoor, which in latter times have risen to some importance. In Oude are Lucknow and Fyzabad. In Rohulcund are Shahjanpoor with 50,000 inhabitants, Bareilly with 65,000 inhabitants, and Rampoon on the Kosiya river, which is said to have a population of 100,000 inhabitants. Hurdwar, which is situated where the Ganges issues from the mountain-region of the Himalaya, range, is a place of pilgrimage, and has a considerable trade. In its vicinity are the bustling places of Pandon Poon, and the lower towns of the Ganges to the Himalaya Mountains. Its area may be about 25,000 square miles, or half the extent of England. The British possessions are annexed to the presidency of Calcutta and to Allahabad, the river Ganges being the boundary between them on the south of the Ganges, and the Gonduck for a great part of its course on the north. The arid plain lying between the Jamna and the Sutlej is possessed by some chiefs of the Seiks, who are unfriendly to the British.

V. The Plain of the Indus.—The Indus, called in its southern course also Sinde, rises on the table-land of Tibet, but its sources have not been visited by Europeans. It is supposed that they are situated at no great distance from the sacred lakes Ravan Hrud and Mansa Sarower, to the north-north-west in 31° 20' N. lat. and near 80° 30' E. long., on the western declivity of one of the mountain-ranges which are above the 20,000 feet high. The mountain range, which is called the Gangdirci or Kailasa Mountains. Hence it runs north-west passing the town of Ghertpe to Leh in Ladakh, and it is called by the Chinese, in this part of its course, Sing-he-tai. After a course of perhaps not less than 250 miles, and coming from the Kudi-tso to the south and south-west, it is joined below Leh by the Shuyukh, which rises at a great distance north-east in the Karakorum Mountains, and probably exceeds the Sing-he-tai in the volume of water, if not in the length of its course. This affluent of the Indus has not been visited by Europeans, and indeed it is only that portion of the Sing-he-tai which lies between Ghertpe and Leh that has been seen by European travellers. Nothing is known of the Sampo, or Great River, as the Indus is called after its junction with the Shuyukh, until it issues from the Himalaya range a few miles east of Attaok. In this part of its course it gradually declines more to the west, and assumes a new character by the formation of the north-west mountain-range of the Himalaya, the Gosseque Mountains, which are separated from the elevated mountain-masses of the Hindu Coob. Above Attaok its course lies due west, and it is joined by the river of Goer, which comes from the west, and which receives from the west after it has left the mountains. Leaving the high mountains above Attaok, it continues its course in a south-western direction for about 70 miles more between lower ranges, until at 33° 7' N. lat. it enters the plain of Attock, which is divided into two great parts by the river. The north part lies almost entirely on the east side of the river, as the mountain-ranges which support the table-lands of Afghanistan and Beluchistan accompany the river in its course as far south as Paghman, or the confluence of the Panj and the Indus. South of this point lies the south-west, but only to a short distance. The Hala Mountains, which run along the eastern border of the table-land of Beluchistan, rise at a short distance from it, as some places within a few miles.

As soon as the Indus has left the mountains it divides into four arms, which run southward and at times unite, but separate again, so that the whole volume of its waters is seldom united in one bed. South of 29° N.lat., near the small town of Mittun Cote, it is joined on the east by the united mouth of the Jhelum, or Panjunkh, and changes its southern course to a south-western one; it is here 2000 yards wide. It continues its south-western course to Shidolkapoort and Bukkur, and then turning to the south-east, it reaches Hyderabad, above which town it divides into two arms and enters the Inland sea. A few miles below the left arm, the Fulial, passes the town of Hyderabad on the east, and flowing farther down in an east-south-eastern and southern direction, enters the Rann, out of which it flows by the wide estuary, called the mouth of the Indus. The plains of Sind and the Ganges. This branch of the river has only a great volume of water during the inundation; the greatest part of the year it is dry. Where it approaches the Rann, a place called Sindrow, with an extensive tract of land in its neighbourhood, was plunged into the water by the frightful earthquake of 1819, and at present is a large lake, whose waters are discharged into the Koorie, or eastern mouth of the Indus. The estuary of the Koorie has 12 feet of water as far as Basta, but further inland it is not so deep. The western and principal branch of the Indus divides again south of 29° N. lat. near Jarruck; the smaller or eastern branch, called the Pinwari, runs nearly parallel to the Fulial, and loses itself in the waters of the sea by the mouth called Sir. It is navigable however as far as Gunda for vessels of 35 tons burthen, and it is much navigated, though the merchandise must be transferred 200 miles below Calcutta. It has its source 250 miles from the sea, the principal branch of the Indus separates again into two branches, of which the smaller, called Buggaur, runs westward, and the larger, the Sata, continues to a south-western course towards the antient city of Kosila, which is mentioned in the course of its far, the remaining, and which is still navigable, though the latter is only accessible to small vessels on account of its wind and rapid current. Another of its embouchures, called the Humari, lies farther west, and admits vessels of 50 tons burthen, which may sail as far up as Vikurr, more than 20 miles from the sea. The Mulmouth of the Sata, which is to the south-east of the Gora branch, may be navigated by vessels of 25 tons burthen as far up as Shag-Bunder. Vikurr, as well as Shag-Bunder, exports great quantities of rice and other foodstuffs. Buggaur, divides again below the town of Darsji into two arms, called Pitee and Piteesean, both of which are navigable as far as their point of separation for small vessels. Buggaur has some water navigation, but does not exceed these two arms have less water than they had formerly.

The Indus receives only one great affluent in its extensive plain, but this affluent unites all the rivers which drain the Panjuckh, or the Five Rivers, the Pentapotamis of the Greeks. These five rivers, enumerated from east to west, are the Salut or Sutralu (the Zaradus of Ptolemy), the Beax or Beas (the Hyphasis of Arrian), the Ravee (the Hydromates of Arrian), the Chenwah (of the Attock), and the Hidrum or Behut (the Hydaspe). The Sutlej has the longest course. It originates on the table-land of Tibet, in some mountains north of the sacred lake of Ravan Hrud, and it is even supposed that this lake discharges its waters into the Indus. Above the capital of Attock the Sutlej flows in some measure parallel to the Sing-he-tai, or Indus, amounts to more than 150 miles. At Shipke, where it enters the territories of Bisair, it is still 10,484 feet above the sea. South of this point it is divided into two branches, turns to the south-west, it soon enters the Himalaya range, through which it runs in a narrow valley, with numerous bends, more than 100 miles. It enters the plain, near Roor, whence it flows west past Ludiana as far as Harures, where it is joined by the river of the Panj and the Beas, entirely on the eastern side of the river, as the mountain-ranges which support the table-lands of Afghanistan and Belochistan accompany the river in its course as far south as Paghman, or the confluence of the Panj and the Indus. South of this point lies the south-west, but only to a short distance. The Hala Mountains, which run along the eastern border of the table-land of Belochistan, rise at a short distance from it, as some places within a few miles.

2 F 2
Ravese does not appear to rise in the highest range of the Himalayas, but on one of its intermediate parallel chains, called the sacred mountain, which is well known, but it does not seem to be long. Above Kota or Kotha it enters the plain of the Panjab, where it flows in a south-west direction parallel to the Beas and Gurus, until it joins the great alluvial or the eastern end of the Panjabs, which was the Sanskrit name Chrandrabāgha (S. e. moon river) was not adopted by the followers of Alexander, because it sounded like Sandrakes (i.e. Alexander-estor), rises in the Panjab or in the farthest end of the Himalayas, the main source of the Beas and the mountain-pass of Paralaha, and runs for about 100 miles in a longitudinal valley of the mountain-region to the north-west; it afterwards turns gradually to the west-south-west, and inclining a few degrees more to the south, leaves the Himalaya mountains above Jommu, after a course of perhaps not much less than 200 miles. In the plain of the Panjab its course is west-south-west until it has joined the Ravese, when it declines to the south-south-west. The last of the rivers of the Panjab, the Jilhī, rises in the Tibet Panjab range of the Himalaya mountains, not far from the high peaks of Mount and Ser. Like the Chenab, it flows first in a north-west direction, through the range of the mountains of Samars, in a north-west direction, traverses the lake of Wooler, and issues from the valley by the narrow valley of the Renuke pass. Within the range it passes near Mount Panjab, which passes over 3000 feet, to the south. Soon afterwards it turns by a bold bend to the south, in which direction it reaches the plain, where it again takes a western course above Punice Duhar Khan. Its course within the plain of the Panjab of the Himalaya range is the remainder of its course, somewhat more than 100 miles, is mostly directed towards the south, until it joins the Chenab at Trinho, below Jug. After the five rivers have united, they flow south-west, and fall into the Indus at Muttun Cote. The natives call the united river Chenab, but in the other countries of India it is known by the name of Panjund. All the rivers of the Panjabs have no lakes or tracts, which might be called a watercourse between the mountains, and the Indus itself to Attoc, but above that place there is a whirlpool which cannot be passed by boats.

The northern portion of the plain of the Indus, the Panjab, or country of the five rivers, extends from the lower ranges of the Himalaya mountains to the confluent of the Chenab with the Indus, between 34° and 29° N. lat., and has the form of an isosceles triangle, whose sides are about 400 miles in length, and are not parallel, but lie along the Himalaya, and the equal sides, each about 600 miles, unite at the confluent of the Indus and Chenab. Its surface may be on an average about 1000 feet above the sea-level. The Lahor plain is inhabited, and has 900 feet higher than the Ganges at Delhi. This immense tract of country varies considerably in soil and surface. It contains very fertile and very sterile tracts. Perhaps not more than one-fourth of its surface is under cultivation. The country along the foot of the Himalaya range, and to a distance of about 100 miles from it, has an undulating surface; it is well supplied with water, and has the advantage of more abundant rains, and a plentiful irrigation. It is well cultivated, and contains a greater portion of cultivated land than the remainder. The Jilunder Doab, or country between the Sutlej and Beas, is very fertile, and is likewise the Barri Doab, between the Beas and Ravese as far as Amritsar. But it is range. In the Ravi and Chinita Doab, between the Ravese, Chenab, and Jhelum, the waste lands are more extensive. The remainder of the three last-mentioned doabs, or the country west of a line drawn between the Hurmpa at the confluence of the Sutlej and Beas, through Lahore, and hence to Punice Duhar Khan, has a much smaller portion of cultivated land. It is only found along the rivers to a distance of 5 or 15 miles. The Beas is the largest, and at the confluence of the surface of the rivers, so that it is either inundated when the rivers are swollen, or may easily be irrigated. The villages are commonly built at the place where the inundation ceases, or the farthest edge of the cultivated ground. Tracts of the country which are beyond the reach of irrigation and inundation are considerably more elevated, and their surface towards the Indus is generally covered with low sandhills; but between the Chenab and Ganges it is level, and the soil is a hard loam. These tracts are not cultivated, and serve only as pasture-ground and after the first season. The soil is extremely dry, and water can only be found at a depth of between 20 and 100 feet, and it is salt. The cultivated tracts along the rivers are of great fertility. Rice is the principal object of agriculture all over the Panjab, but wheat is also raised in considerable quantities. The cotton produces a greater yield of grain, as javary, gram, and several kinds of legumes, are imported. The sugar-cane is cultivated with great care, and much sugar is made. Where different kinds of fruits are grown, the melons are of the very good fruit south of Lahore. Other fruits are mangoe, guavas, and jamlu, and also those of Europe, as peaches, apricots, figs, pomegranates, quinces, oranges, lemons, almonds, peaches, grapes, etc. Those tracts on the sides of the Indus and Jilhī, and are also good and strong mules reared. Cattle are very numerous, though commonly of small size. Melons constitute the principal food of the lower classes.

We are very imperfectly acquainted with the climate of the Panjab, no series of meteorological observations having yet been made there. In Lahore the maximum of heat in July was 102°, and the minimum in January 24°. In Multan it seems to rise still higher; at other places even to 110°. The highest degree of heat is generally accompanied by violent north-western winds or tornados, which sometimes occur several days successively, but do not last more than an hour. The rain falls in the form of showers, to the north and west, but not in equal proportions: in July a greater quantity falls than in other months.

The country south of the Panjabs is occupied by the great sand-dunes which extend from the Aravalli range and the salt-morass of the Ronn. Its western border approaches the banks of the Indus, from which it is only divided by a fertile tract of land, from 10 to 15 miles in width. But as the Indus is almost always divided into several channels in this part of its course, of which some penetrate further into the country east of it, the cultivated tracts extend in some places to 20 miles and more from its principal channel. This country resembles in fertility the richest tracts of the southern Panjab, but its seasons seem to be more regular: several months pass without rain, and in others the rains are more abundant.

The Desert of Sind, or the Thurr, which on the north-east is connected with the sterile country which separates the plain of the Ganges from that of the Indus, does not present so dreary an aspect as the Sahara or the deserts of Hindostan. It is covered with sand-hills, generally extending from south-west to north-east. In some places these hills, called ties, are overgrown with coarse grass or low bushes, but they chiefly consist of loose sand and with a few scantly covered with it, and 900 feet higher than the Ganges at Delhi. This scanty vegetation lasts only for two months, and the remainder of the year their surface is bare, and exposed to great changes from the winds. Between these sand-dunes and the mountains of the north, which have a hard, loamy, or stony soil, and on these the vegetation lasts much longer. They are however generally of very small extent, and rarely contain a tract which can be cultivated; yet they are used as pasture-ground for camels and sheep, and for a small race of cattle, the only domestic animals which are kept here. These small oases, called dehirs, are not numerous in the neighbourhood of the Indus, but they increase in number and extent as we approach the mountains. In this part of the country the most extensive oasis of Jusselmur, and along the Aravalli mountains are the still larger oases of Bikannur, Nagore, Joutpoor, and Siroli, which contain a considerable extent of arable land. The principal agricultural products are bajery and javary. A little cotton is raised. No fruit-trees grow, but melons are abundant. Irrigation from wells is impossible; soon after the rains, the water is forced down by the weight of the water that is stored above, and only at a depth of 160 feet or even more. In some places it occurs only at the depth of 480 feet. A small quantity of rain falls during the south-west monsoon, but sometimes there is no rain of this kind in the summer season. In winter: at two o'clock the thermometer rises to 75°, but at sunrise it is as low as 30°, and the water of some lakes is covered with ice. In summer the heat is oppressive.

The desert of Sind may be considered as extending over the greater part of the delta of the Indus. All the eastern
part of the delta resembles the desert in sterility of soil, though many large oases possess fertile and grassy tracts; and to this extent the Indus does not carry down so much soil as that of the Ganges. Though the inundated country is covered with grass after the inundation ceases, it is very soon dried up, and it offers only pasture-ground for the numerous herds of cattle, and especially buffaloes, which, as well as their herdsmen, are continually moving from one place to another. Such is the condition of the whole of the Ganges basin, and it is the nature of the alluvial soil on the exception of a narrow tract along the banks of the river where the fields can be irrigated. A great part of the interior between the Fuladli and Pinyari branches is covered by the washing of the river, and the Suta branch and the Buggaur, where a considerable portion of the country is cultivated and produces rich crops; yet it does not extend over more than one-fourth of its surface. The cultivated lands do not reach the shores of the sea, being separated from them by a broad belt of country covered with bushes and entirely unproductive. The navigation along the delta is very dangerous. The bottom of the sea slopes very regularly from the shore, and at a distance of one mile and a half from it the sea is only from 12 to 15 feet deep. Farther from the shore are numerous sandbanks, against which the water agitated by heavy storms breaks with great violence. The spring-tides rise 9 or 10 feet, and in the mouth of the Indus the current ascends only 75 miles, and is not perceptible at Tatta. Besides rice, which is the principal object of cultivation, the other dry grains of Hindustan are raised. There are also considerable plantations of fruit-trees, from the Ganges to the Indus. The rice-seed, which is not adapted to the hot climate of the plains, is raised in the lowlands. The Alger rice, the common Indian rice, and the broken rice are raised in the lowlands.

The rice-seed, which is not adapted to the hot climate of the plains, is raised in the lowlands. The Alger rice, the common Indian rice, and the broken rice are raised in the lowlands.

The rice-seed, which is not adapted to the hot climate of the plains, is raised in the lowlands. The Alger rice, the common Indian rice, and the broken rice are raised in the lowlands.

The rice-seed, which is not adapted to the hot climate of the plains, is raised in the lowlands. The Alger rice, the common Indian rice, and the broken rice are raised in the lowlands.

The rice-seed, which is not adapted to the hot climate of the plains, is raised in the lowlands. The Alger rice, the common Indian rice, and the broken rice are raised in the lowlands.
the Ganges and Indus. They came to these countries with the conquerors, who at several epochs have established their empire here. They are mostly Afghans, and commonly called Pathans. Their number is estimated at about three millions, and their annual tribute amount to ten millions. But many, if not the greater part of them, are of Hindu origin, as the Mohammedans used to buy children from their parents in times of great dearth for the purpose of educating them in their own creed. In Sinde, and especially in the deserts of the country, there are numerous families which emigrated to that country from Beloochistan with the family of the Amirs. The Europeans in Hindostan are chiefly descendants of the conquerors or of the conquerors. They have been rather conquerors than merchants, established themselves permanently in the places where they settled. But they are only numerous along the western coast, where their whole population is said to be about a million. The number by which historians have exaggerated. Next to the Portuguese the British are the most numerous, but though they be at present in possession of nearly one half of the country, and dictate to more than three-fourths of it, their number is stated not to exceed 60,000.

For statistical details relating to Hindostan see East India Company. See also Bombay, Calcutta, &c.  

(Rennell's Memoir of a Map of Hindustan; Dr. Burnes's Journey through Imagore, Capara, and Malabar; Lossing's Visual Treasury of Travel and Tourism; Malcolm's European Memoir on Central India; Heber's Narrative of a Journey through India; Heyne's Tracts, Historical and Statistical, on India; Tod's Antiquities and Antiquities of Rajputana; Burnes's Description of Koh-i-Noor: Sirdar's Travels into Lahore; Burnes's Travels into Bokhara; W. Hamilton's Description of India; A. S. and A. B. Edwards: The Royal Asiatic Society: Transactions of the Royal Geographical Society: The Journal of Geographical Society: Ritter's Erdkunde von Asien: iv. 1 and 2, and v.)

Antient India known to the Western Nations.—Communications with the western nations of Asia appear to have been carried on from the earliest historic times. The spicery, which the company of Ishmaelites mentioned in Genesis (xxxvii. 17) were carrying into Egypt, and which at the present day must have been the produce of India, is also mentioned in the 30th chapter of Exodus, where an enumeration is made of various spices and perfumes, cinnamon and cassia are expressly mentioned, which must have come from India or the islands in the Indian Archipelago. It has been thought by many that the Egyptians must have used Indian spices in embalming their dead; and Diodorus Siculus says (i. 91) that cinnamon was employed by the Egyptians for that purpose. This trade appears to have been carried on by the Phoenicians, who were the greatest importers of produce India from the modern Sinde or the Malabar coast to Hadramaut in the south-western part of Arabia, or to Camerun on the Persian Gulf, from which places it was carried by caravans to Phoenicia, where it was purchased by Phoenicians merchants. A considerable quantity of Indian articles was also brought from the Persian Gulf up the Euphrates as far as Cireseum or Tarsus, and thence carried across the Syrian desert into Phœnicia. Europe was thus supplied with the produce India entirely by means of the Phœnicians; but we cannot assent to the opinion of Robertson (Historical Disquisition on India) that Phœnician ships sailed to India; for there is no reason for believing that the Phœnicians had any harbours at the head of the Red Sea, as Robertson supposes, but, on the contrary, the Idumeans remained independent till the time of David and Solomon; and in the 27th chapter of Ezechiel, which contains the prophecy concerning the trade that should follow the death of Solomon the trade with Phœnicia was probably neglected; and till the foundation of Alexandria the trade with India was carried on by the Arabs in the way already mentioned.

The produce of India was also imported by Greece through the Phœnician in very early times. Many of the Greek names of the Indian articles are evidently derived from the Sanskrit. Thus the Greek word for pepper or a pepper (wisphe, a pepper) comes from the Sanskrit pipali; the Greek word for emerald is emeraldos or morphedos (emeraldos or morphedos), from the Sanskrit morphikha. The bactræi sinadin (bactriana sinadin), "fine linen," or "muslin," mentioned by Herodotus, (ii. 86; v. 161), seems to be derived from Sintula, the Sanskrit name of the river Indus. The produce of cotton plant, called in Greek karpas-tos (karpas) or karpas-tos, comes from the Sanskrit kardus; this word we also find in Hebrew (Ezra, i. 6) karpas (קָרָפָס) ; and it was probably introduced into Greece together with the commodity by the Phœnicians. That this was the case with the word cinnamom, Herodotus (iii. 111) informs us. The word cinnamom (Greek, kinnammon or kinnammon; Hebrew, kinnamon, קִנַּמֵם) is not found in Sanskrit; the Sanskrit word for cinnamon is gudha boucha, "sweet bark." The word cinnamon appears to be derived from the Singhalese kahun nama, "sweet wood," of which the Sanskrit is probably a translation. We are not however surprised at finding the Sanskrit word for cinnamon, as the languages in southern India have no affinity with the Sanskrit. Cinnamon also appears to have been from early times an article of exportation from India; the Greek word for tin, kastoros (καστόρος), appears however even in Homer, is evidently the same as the Sanskrit kasthera.

It is usually considered that the Greeks obtained their tin, by means of the Phœnicians, from the Scilly Islands or Cornwall; but there is no direct proof of this; and it appears probable from what has been said above that the Greeks originally obtained their tin from India. The islands Catterides however, the position of which was unknown to Herodotus (iii. 115), are supposed to be the Scilly Islands of the English annals of Catterides. Their position is not very exactly defined by Strabo (iii. 175). Still there is little doubt that the "Catterides" to which the Phœnicians from Gades (Cadiz) went for tin, and the Romans afterwards traded for the same commodity, were on the south-western angle of Great Britain.

The western nations of Asia have to have had no connection with India, except in the way of commerce, till the time of Darius Hystaspes, b.c. 551. The tales which Diodorus relates regarding the commerce of the Phœnicians with the Persians and Semiremis, (ii. 60; ii. 103, ed. Rhodoman) cannot be estimated as historical facts. The same remark may perhaps apply to the alliances which, according to Xenophon in Cyropaedia, (v. 2, 1), Cyrus was made with the Persians and Indians. But in the reign of Darius Hystaspes, Herodotus informs us (iv. 44) that Scylax of Carysta was sent by the Persians to explore the course of the Indus; that he set out from the city Capistratus and the Persian country (Aegypt?), in the northern part of India; that he sailed down the Indus till he arrived at its mouth, and thence across the Indian sea to the Arabian Gulf, and that this voyage occupied 36 months. Darius also, it is said, sought the Indians, and formed them into a satrapy, the tribute of which amounted to 360 talents in gold. (Herodot. iii. 94.) The extent of the Persian dominions in India cannot be ascertained with much certainty. The Persians appear to have included under the name of Indians many tribes dwelling to the west of the Indus; it seems doubtful whether they ever had any dominion east of the Indus; and it is nearly certain that their authority did not extend beyond the Panjab.

The knowledge which the Greeks possessed respecting India, previous to the time of Alexander, was derived from the Persians. We do not find the name of Indian or Hindustan in ancient Greek works; but the name of Indus has been known under this name by the western nations of Asia from the earliest times. In the Zend and Pehlevi languages it is called Hinda, and in the Hebrew Alphabet (Hebrew, יִשְׂרָאֵל) which is evidently the same as the Hind of the Persian and Arabic geographers. The first mention of the Indians in a Greek author is in the "Supplices of Achæbyxus (i. 287); but no Greek writer gives
us any information concerning them till the time of Han-
dou. We may collect from the account of Herodotus a
description of three distinct tribes of Indians: one dwel-
ing in the north near the city Capatryrus and the Pactyian
territory, resembling the Bactrians in their customs and
manner of living. But the other two tribes are not well
live under Brthamical law; some of them dwelt in the
marshes formed by the Indus, and subsisted by fishing;
others, called Padië, with whom we may probably class the
Culitian, or Calitans, were wild barbarous tribes, such as
exist at present in the mountains of the Deccan. The
third class, who are described as subsisting on the spone-
taneous produce of the earth and never killing any living
thing, are more likely to have been genuine Hindus. (Her-
odotus, ii. 159.) From this it appears that the natural
productions of Hindustan, such as the cotton plant
and the 'bambou'; but his knowledge was very
limited.
Ceylon, who lived at the court of Artaxerxes Memon
for many years, has given us a fuller account than Herodo-
tus of the manners and customs of the Indians and of
the natural productions of the country. He had heard of the
war elephants, and describes the parrot, the monkey, the
cocchines, &c.

The expedition of Alexander into India (ALEXANDER,
vol. i., p. 306), n.c. 326, first gave the Greeks a correct
idea of the western parts of India. Alexander did not advance
farther than the Ganges, but he followed the course of
the Indus to the ocean, and afterwards sent Nearchus
to explore the coast of the Indian Ocean as far as the Peri-
gian Gulf. The Punjab was inhabited at the time of Alex-
ander by independent nations, who, as evidenced by the
remark of Ptolemy (vol. ii.), were engaged in war at
the time of the Ganges, whose king was prepared to resist Alexander with an immense
army. After the death of Alexander, Seleucus made war
against Sandracottus, king of the Prasi, and was the first
Greek who advanced towards the Ganges. Sandracot-
tus, or Sandracottus, or Sandrocottus (Epit., i. 32), is prob-
able the same as the Chandragupta of the Hindus. (See
Sir W. Jones in Anticic Researches, vol. i., p. 11; Wilson's
Theatre of the Hindus, vol. li., pp. 127-130, 2nd ed.; Schle-
gef's Indische Bibliothek, vol. i., p. 246.) Sandracottus is
represented as king of the Gangaride and Prasi, who are
probably the same people; Gangaride being the name
given to them by the Greeks, and signifying merely the
people of the neighbourhood of the Ganges, whereas
Prasi being the Hindu name, the same as the Pachie (i.e. 'eastern
country') of Sanskrit writers. Seleucus remained only a
short time in the country of the Prasi; but his expedition
with the means of giving the Greek merchant a glimpse
of the eastern parts of India they had hitherto possessed;
since Megasthenes and afterwards Dainchmus resided for
many years as ambassadors of the Syrian mon-
archs at Polibothra (Sanskrit, Patapitru), the capital
of the Prasis. From the work which Megasthenes wrote
on India later writers, even in the time of the Roman empire,
such as Strabo and Arrian, appear to have derived their
principal knowledge of the country. The Seleucids pro-
bably lost all influence at Polibothra after the death of
Seleucus Nicator, n.c. 261; though we have a brief notice
in Polibius (xi. p. 652, ed. Casaubon) of an expedition
which Antiochus the Great made into India, and of a
treaty which he concluded with the king of the Gangaride
(Sanskrit, Subhagaseha? i.e. 'the leader of a fortunate army'),
whereby the Indian king was bound to supply him with a
considerable part of the produce of India. The Greek kingdom
of Heat, which was founded by Tuscotus, or Diotonus, a
lieutenant of the Syrian monarchs, and which lasted about
120 years (n.c. 256-134), appears to have comprised a
considerable part of northern India.

After the foundation of Alexandria, the Indian trade was
almost entirely carried on by the merchants of that city;
but few ships appear to have sailed from Alexandria
to India till the discovery of the monsoons by Hippalus; and
the Romans supplied Alexandria, as they had formerly
done the Phenicians, with the produce of India. The
monsoons were not discovered by navigators about the
course of the middle of the first century of our era,
since they are not observed by Strabo, but in the time of Pliny
were well known. Pliny has given us (Nat. Hist., vi. 231) an
interesting account of the trade between India and Alexandria,
as it is existed in his own time. We know that the ships of
the Alexandria merchants set sail from Berenice,
a port of the Red Sea, and arrived in about 30 days at
Oe Elias, or Cane, in Arabia. Thence they sailed by the
northern coast of Arabia, and entered the Gulf of Alle-
sandria, or the Red Sea, and met with the wind Arabs or Auster (south
or south-west wind), and thus arrived at Berenice in less
than a twelvemonth from the time they set out. The same author
relates us that the Indian articles were carried from Beren-
ice to Kopitos, a distance of 235 Roman miles, on camels;
for there was no water, neither by the sea nor by the
wells. From Kopitos, which was united to the Nile by a
canal, the goods were conveyed down the river to Alex-
andria.

We have another account of the Indian trade written by
Arrian, who lived in all probability in the first century of the
Christian era, and certainly not later than the second.
Arrian had been to India himself, and describes, in a small
work on the Greek treatment entitled 'The army of
the Red Sea,' the coast from the Red Sea to the western parts of
India; and also gives a list of the most important exports
and imports. According to his account, the two principal
ports in India were the Ganges on the north-western, and
Barace or Nalbye on the south-western sea-coast. (Even
the Ganges (the modern Baraer in the river Neruddin), goods
were brought from Oene (Ouehin), Pilihan (Paltaneh),
and Tagara (Deogur). But Barace or Nalbye seems to,
the account of Pliny and Arrian, to have been the
principal emporium of the Indian trade. The Roman
ships appear to have seldom sailed beyond this point; and
the produce of the countries farther east was brought to
Barace by the Indians.
The knowledge which the Romans possessed of India
beyond Cape Comorin was exceedingly vague and defec-
tive. Strabo describes the Ganges as flowing into the sea
through one mouth; but he admits that the divisions
which had not previously been mentioned by any
Greek or Roman writer, we have no satisfactory account of
any part of India except the description of the western
cost by Arrian. Polenmy, who lived about 100 years
later than Pliny, gives us the names of many towns on the
Coromandel coast and the Bay of Bengal, and is the earliest
writer who attempts to describe the countries east of the
Ganges; but there is great difficulty in determining the
position of any of the places enumerated by him, in conse-
quince of the great error he made in the form of the peninsula,
which he has made to stretch in its length from west
to east instead of from north to south, a mistake the more
extraordinary in a man who has been so well acquainted with
whom we are acquainted had given the general shape of
the peninsula with tolerable accuracy. In addition to
which, Polenmy appears to have derived his information
from the Alexandrian (Pultaneh), and not from the
Malabar coast, and could not therefore have had any
knowledge of the eastern parts of India, and still less of
the countries beyond the Ganges. The Aurea Chersonesus of
Polenmy represents the peninsula of Malacca, on which
the port of Zalo was situated, probably on the coast of
Singapore. The Sinus Magnus is considered the same
as the Gulf of Siemens, and the Thina Metropolis is probably
Canton. (Asi vol. ii. p. 456.) The Romans never ex-
tended their trade so far as to make it a commercial
country except for the purposes of commerce. But the
increase of the trade between Alexandria and India seems to
have produced in the Indian princes a desire to obtain
some further information concerning the western nations.
We read of embassies to Augustus Caesar, sent by Pandion and Porus, and also of an embassy from the island of Ceylon to the Emperor Claudius. Böhlen, in his work on the Indians (i. 70), doubts whether these embassies were sent; but as they are both mentioned by contemporary writers, the former by Hanno and the latter by Pliny, we can hardly question the truth of their statements.

We may form some ideas of the magnitude of the Indian trade under the emperors by the account of Pliny (vi. 23), who says: To the land of the Huns and the land of the Phenicians, Pliny, can hardly question the truth of their statements.

We may form some ideas of the magnitude of the Indian trade under the emperors by the account of Pliny (vi. 23), who says: To the land of the Huns and the land of the Phenicians, Pliny, can hardly question the truth of their statements.

The invaluable tradition of the Hindus points to the northern part of Hindostan as the original abode of their race, and of the Brahmanical faith and laws. It appears probable, however, that the traditions of the Hindus and from the antient Sutras. The antiquity of the Sutras is far more ancient; and it is probable that the language, which is the language of the antient Hindus, is descended at some time after the period when the antient Sutras were composed, but before the Christian era, is probably the date of the Hindu and the Brahmanical faith and laws.

The antiquity of the Sutras is far more ancient; and it is probable that the language, which is the language of the antient Hindus, is descended at some time after the period when the antient Sutras were composed, but before the Christian era, is probably the date of the Hindu and the Brahmanical faith and laws.

The invaluable tradition of the Hindus points to the northern part of Hindostan as the original abode of their race, and of the Brahmanical faith and laws. It appears probable, however, that the traditions of the Hindus and from the antient Sutras. The antiquity of the Sutras is far more ancient; and it is probable that the language, which is the language of the antient Hindus, is descended at some time after the period when the antient Sutras were composed, but before the Christian era, is probably the date of the Hindu and the Brahmanical faith and laws.
small extent: its northern limit was originally at Pali, and later at Bheer, but it was bounded on the north by Pandya and Chola, and on the west by the kingdom of Keral, or Malabar, which extended along the western coast. This last kingdom was probably founded in later times, since, in the time of Aram the Malabar coast is said to have belonged to the Pandya kings. The Pallavahemulastpi are supposed to have settled principally in the southern parts of the Deccan: the native traditions represent the northern parts as inhabited by savage races till a much later time, and even the name of the Greek writers. The names of the places on the upper part of the eastern and western coasts are not Sanskrit. The modern Cocon is described both by Arrian and Pliny as the pirate coast; of the coast of Bengal it is said to have been inhabited by a savage race called Kirthahade, who appear to be identical with the Kiratas of Sanskrit writers, who are represented as a race of savage forestmen.

The accounts of the Greeks who accompanied Alexander, and more particularly of that of Megasthenes, give us, as we have already shown, some information respecting the northern part of Hindustan in the third and fourth centuries before the Christian era. But hardly any are known of the history of Hindustan from this period to the time of the Mohammedan conquest. There are only a few historical events which we can speak of with any degree of certainty. In the year 611 the King of Bihor, by the Tartars, n. c. 125, the Tartars (called by the Greeks Scythians, and by the Hindus Sakas) overran the greater part of the north-western provinces of Hindustan, which remained in the hands of the king of Khorasan, till the reign of Alpharib{n. c. 126}, or, after adding numerous provinces to his empire, drove the Tartars beyond the Indus. This sovereign, whose date is pretty well ascertained, since the years of the Samvat era are counted from his reign, is supposed to have had dominion over almost the whole of northern Hindustan from Cashmere to the Ganges. He gave great encouragement to learning and the arts, and his name is still cherished by the Hindustanis as that of one of their greatest heroes. He fell in a battle against Salivahana, raja of the Deccan. We also read of two other sovereigns of the same name, Vieramaditya II., a.d. 191, and Vieramaditya III., a.d. 441. The most interesting event in this period of Hindustan history is the persecution of the Buddhists and their final expulsion from Hindustan. It is difficult to conceive the reasons that induced the Hindu sovereigns, after so long a period of toleration, to aid the Brahman in this period, so that it may appear as if the Buddhists were tolered in all parts of Hindustan. But this portion of Hindu history has already been discussed in another part of this work. [Budhawa, vol. v., pp. 526-532].

During the reign of Kalki, n. c. 700, the island of Borneo was colonized by Brahmanand; and through the Brahmanahs and Buddhistns; for though the Brahmanahs were finally successful, yet at first they appear to have been overthrown by the Buddhistns. The latter were driven out of Hindustan, and to have been obliged to emigrate to foreign countries. (Crawford, in Anstic Res., vol. xii, p. 154.)

Sir Stamford Raffles, in his History of Java, ii, pp. 1-65, describes the splendid remains of Hindu art which are still to be seen in that island; and a recent traveller in Borneo remarks that in the very inmost recesses of the mountains, as well as over the face of the country, the remains of temples and pagodas are to be seen similar to those found in India. The architecture of India was in evidence even in the middle of the fifth century; and in the sixth century we learn from Cosmas that Christian churches were established in the most important cities on the Malabar coast, and that the priests were appointed by the archbishop of Seleucia, and were subject to his jurisdiction. When Vasco de Gama arrived at Cochin, on the Malabar coast, he was surprised to find a great number of Christians, who had married into the interior of Travancore and Malabar, and who had more than a hundred churches. But these Christians appear to have been the descendants of those Nestorians who emigrated to Hindustan in the fifth and sixth centuries, for there is no reason for believing that any Hindu were converted by their means to the Christian religion.

Second Period: History of the Mohammedan State —

The Mohammedans first occupied the country in the eleventh century; but the earliest invasion of the country by the Mohammedans, of which we can speak with any degree of certainty, was at the accession of the latter part of the tenth century by Sabuktaghin, a Tartar, who was supported by the army monarch of Ghizni. He passed the Indus at least twice, laid waste the province of Lahore, and returned to Ghizni laden with plunder. But he made no permanent conquests. He died a.d. 1237, and was succeeded by his son, the celebrated Sultan Mahmud, who is usually regarded as the first Mohammedan conqueror of Hindustan. The Mohammedan historians celebrate the twelve expeditions which he undertook against the Hindus, and extol the religious zeal which prompted him to destroy the idols and temples of the inhabitants. He died a.d. 1226, and was succeeded by his son Massud. Though Massud had subdued and conquered a part of Hindustan from the Indus to the Ganges, yet regular settlements of the Tartar tribes, denominated Seljukides, from the name of their leader, had been invited by Mahmud to settle in Khorasan. After his death they seized upon Bokhara, and Samarcand, the capital of the empire of Ghizni. The city was taken by a Moorish, called Haseel, in 1220. Lahore was taken by Mahmud, brother of Yeusuddin, in 1184, and Khosrou II., the last monarch of the house of Sabuktaghin, was put to death.

The Hindus however received no benefit from this change of dynasty. In 1191 Mohammed marched further east, and though he was at first defeated by the Hindu rajas, he finally conquered the greater part of the northern provinces. He appointed Kututt, a favourite slave, governor of the vast conquered territory, and swept on to conquer the conquests of Mohammed; and in 1193 took Delhi, and made it the seat of government, whence he has frequently been called the founder of the Mohammedan empire in Hindustan. His successes were continued by his brother Yeusuddin, the northern provinces of Hindustan formed part of the empire of Ghizni; but after the assassination of Mohammed, in 1206, Kututt became independent, and left his dominion to his son. Aram succeeded to the throne in 1210. Aram was obliged to surrender the power to Altunsh, the son-in-law of Kututt, a prince of great courage and vigour, who extended the Mohammedan conquests still further. He died 1235. During this reign Genghis Khan conquered the greater part of Asia, but did not penetrate into Hindustan. But the Moguls were soon tumped by the riches and fertility of the country, and the sons of Altunsh were engaged in constant wars in order to repel their invasions. Mahmud II., who ascended the throne in 1244, and his successor Balin (1266), were two able princes, who frequently defeated the Moguls. Kait-Kobad, grandson of Balin, was a weak prince, who was murdered in 1299. By his death the Gaurian dynasty ended, after having reigned for 117 years.

The Mogul dominion now passed into the hands of the Afghan. During the reign of Firor II., who succeeded Kait-Kobad, the Mohammedans first undertook the conquest of the Deccan. Daghir was taken by Ali, the nephew of Firor; but the entire occupation of the northern part of the Deccan was not effected until the time of Nadir Shah, who was succeeded by Ali, in 1292, who, though a cruel, was an able and powerful monarch. He defeated the Moguls, subdued the Rajputs, and, by means of his general Kafour, added the greater part of the Deccan to his dominions. He died in 1316, the prosperity of the Mohammedan empire.
In Hindustan rapidly declined. A succession of weak princes followed, during whose reigns many Hindu rajas in Bengal and the Deccan recovered their independence. The invasion of Afghans in 1526 overthrew the already tottering power of the monarchs of Delhi. Timur did not remain in Hindustan more than a few months; but after his departure the country became divided into a number of small independent states governed by Mohammedan chiefs. Shah Humayun, a grandson of Akbar, succeeded to the emperors of Delhi. Confusion prevailed in every department of the government, till at length, in the reign of Ibrahim II., Baber, a descendant of Timur, invaded Hindustan, and put an end to the Mogul dynasty. He extended his dominions as far as the Ganges; and though constantly engaged in military expeditions, he found time to cultivate the arts of peace, and devoted his attention to whatever appeared calculated to promote the prosperity of his empire. The troubles of Humania's reign, who succeeded Baber in 1539, prevented him from attending to the internal organization of the empire; and it was not till the accession of Akbar in 1556 that the Tartar (or Mogul) dominion in Hindustan was placed upon a firm basis. During his reign the Hindu princes had enjoyed greater prosperity than they had ever enjoyed since the invasion of the Mohammedans. Akbar was distinguished by a spirit of tolerance and a love of justice; and the memory of his virtues still survives among the Hindu as well as the Mohammedan race. His whole reign is described in the biographies of the Viceroys. Akbar was the first Mogul emperor who wrote an historiographical account of his reign, and who, according to the prevailing opinion, was himself the author of the work. His reign was troubled by foreign and intestine enemies. The Uzbek obtained possession of Cabul; the king of Persia took Candahar; the Rajputs again commenced their struggles against their conquerors; and the Afghans revolted in the north; and his son Shah Jehan rebelled against him. But notwithstanding these troubles, the country appears upon the whole to have enjoyed considerable prosperity; literature flourished, cities were built, and the Hindu religion experienced even greater toleration than in the reign of Akbar. During the reign of Jahangir, Sir Thomas Roe arrived at the court of Agra, and obtained from the emperor many advantageous grants to the East India Company. Jahangir was succeeded in 1627 by Shah Jahan, during whose reign a great part of the Deccan, which had not been subdued by Kafoor, was conquered by his son Aurungzebe. The ingratitude which Shah Jahan had shown to his father was destined to produce experience from his own sons. He was thrown into prison by Aurungzebe, in which he died at the age of 74, on the 21st January, 1666. He was succeeded by Aurungzebe, who, after having subdued Kafoor, became emperor of Hindustan. Aurungzebe was the last powerful sovereign that ruled over the Mogul empire of Hindustan. He took the cities of Hyderabad, Bijapur, and Golconda, and extended his dominions nearly to the limits of the Carnatic. During his reign the Mahattas first rose into power, and rapidly extended their conquests over the greater part of the Deccan. They were frequently defeated by the troops of Aurungzebe; but all the efforts of this powerful prince were unable to subdue the country of these mountaineers. Bajeevas, the founder of the Mahattara empire, died in 1692, and was succeeded by his son Sambajee, who was taken prisoner by Aurungzebe, and put to a cruel death in 1698. After the death of Aurungzebe in 1707, the Mogul dominion rapidly declined. He was succeeded by Shah Alum, who died, after a short reign, in 1712. New enemies arose on every side. The Marathas had taken possession of the south; the Rajputs, who had never been entirely subdued by the Mogul princes, again asserted their independence; and the Sikhs, who first rose into power in the reign of Shah Alum, ravaged the Punjab and the Bengal. This state of things now formed a powerful nation in India, and occupy a great portion of the western provinces of the ancient Mogul empire. Their origin and early progress belong to the religious history of the time, and it is not possible to give an account of it in this article. The Mogul power was still further weakened by intestine commotions. Each of the four sons of Shah Alum contend for the throne, which was obtained by a severe struggle by the eldest brother Moez-edin. He was de-throned at the end of a few months by his nephew Farrukh-shar (1713), who was succeeded in 1720 by Mohammed Shah, a grandson of Moez-edin. During his reign the Mogul lost all real dominion in Hindustan. The Deccan maintained a virtual independence of their authority under the vice-royalty of Nizam-ul-Mulk, the vizir of Mohammed; and a considerable portion of the northern provinces was wrested from them by the Pathan, Afghan, race, who established themselves in that part of the country, which was afterwards known by the name of Rohil-khand (Rohilkund). The sanguinary invasion of Nadir Shah in 1739, broke down the last vestiges of the Mogul empire among the southern and western provinces. The conquerors of those provinces seized upon the Afghans and the Sikhs, and the Rajputs extended their dominions as far as Ajmere. Ahmed Shah was dethroned in 1733 by Alagh Mir, a grandson of Moez-edin. Alagh Mir was assassinated after a reign of seven years; and the nominal sovereignty devolved upon Shah Alum II, who, after undergoing many vicissitudes, at last became the pensioner of the East India Company, which succeeded to the power of the Mogul empire.

Third Period: History of the European Conquests.

The Portuguese were the first nation of Europe that obtained any dominion in Hindustan. Vasco de Gama, of Portugal, landed in the Gulf of Khambat on the 20th of May, 1498. The Portuguese rapidly acquired extensive power in the country. By the possession of Malacca, which fell into their hands twenty-four years after the voyage of Gama, they commanded the trade of the Indian Archipelago; and by their numerous settlements along the Malabar coast, especially at Goa and Diu, they monopolized the commerce with Europe. In the beginning of the seventeenth century, the English and French began to make settlements along the coast; and the Portuguese lost their dominions almost as rapidly as they had acquired them.

The Dutch never acquired much political power in Hindustan, though at one time they carried on the greater part of the Indian trade. The French on the contrary obtained extensive possessions in the Deccan. Their principal settlement was at Pondicherry, of which they acquired possession in the latter part of the seventeenth century. The English and French began to make settlements along the coast; and the Portuguese lost their dominions almost as rapidly as they had acquired them.

The commencement and early progress of the political power of the British in Hindustan have already been described. [Bengal.] An account of the British government, revenues, &c. together with a list of the British possessions, is given under East India Company.

Languages.—The numerous languages spoken in Hindustan at the present time may be divided into two great classes: the one consisting of those languages which are derived from the Sanskrit, and which are spoken in the northern and central provinces; and the other comprehending those languages which are unconnected with the Sanskrit, and which are spoken in the southern parts of the peninsula.

Language.—The numerous languages spoken in Hindustan at the present time may be divided into two great classes: the one consisting of those languages which are derived from the Sanskrit, and which are spoken in the northern and central provinces; and the other comprehending those languages which are unconnected with the Sanskrit, and which are spoken in the southern parts of the peninsula.

Languages.—The numerous languages spoken in Hindustan at the present time may be divided into two great classes: the one consisting of those languages which are derived from the Sanskrit, and which are spoken in the northern and central provinces; and the other comprehending those languages which are unconnected with the Sanskrit, and which are spoken in the southern parts of the peninsula.

Languages.—The numerous languages spoken in Hindustan at the present time may be divided into two great classes: the one consisting of those languages which are derived from the Sanskrit, and which are spoken in the northern and central provinces; and the other comprehending those languages which are unconnected with the Sanskrit, and which are spoken in the southern parts of the peninsula.
The knowledge of Sanskrit is not alone sufficient for an accurate investigation of the history and structure of the modern languages spoken in the northern provinces, since these languages are immediately derived from the Prakrit, as the Prakrit was from the Sanskrit. An account of the Prakrit, and of the Pali, the sacred language of the Buddhists, in which also, as already derived from the Sanskrit, is given in another part of this work. [SANSKRIT LANGUAGE.]

The languages derived from the Sanskrit may be said in general terms to be spoken in the provinces which lie between the Himalaya and the Indus, and which have, as far as the Hindus are concerned, already been remarkd, is the proper country of the Hindu. But this definition is not sufficiently accurate; since the Sanskrit appears to have been also spoken to a considerable extent in the province of Ofterecida, which has been inhabited by the Getas or Goas to the western coast, where the northern languages from those which are unconnected with the Sanskrit.

The languages spoken in the countries bordering on the mountainous parts of Babool, and of the Himalaya, on the Cutch, which belong to the Prakrit, are all in no connexion with the Sanskrit, but belong to an entirely different family of languages. Those which are spoken in the countries watered by the Indus are closely related to the eastern and want languages, but differ from the same, which shall separate the languages of Sanskrit origin from those which are derived from the Zend, the antient language of Persia.

The following list contains an account of the modern languages derived from the Sanskrit. The arrangement is taken, with a slight alteration, from Lassen's 'Prakrit Grammar.'

I. Languages spoken in the eastern provinces.
   1. Bengali. [BENGALI LANGUAGE]

II. Languages spoken in the northern provinces.
   1. Panjabi. [Punjabi]

III. Languages spoken in the western provinces.
   1. Marathi. [Marathi]

10. The *Wuchi*, or *Mullam*, spoken in the provinces of the same name.
11. *Sindhi*, spoken in Sinds as far as the mouths of the Indus. A Grammar of this language has lately been published by W. H. Watten, which we have not yet seen; but the language is very nearly the same as the language of No. 10.
12. *Kutchi*, spoken in the peninsula of Kutch, or Cutch.
13. *Gurjara*, spoken in the province of Bikaner. This language is spoken along the coast as far as Bombay. (See Drummond's Illustrations of the Grammatical Parts of the Gujarattes, Marhata, and English Languages, 8vo., Bombay, 1808.)
14. *Kundur*, or *Kundhari*, spoken in the Dakhin. This language is spoken in the Dakhin, and therefore up the coast as far as Goa, where the Tuluva language begins.
15. *Bikanera*, or *Pokhana*; 16. *Marora*; 17. *Jugopura*. These four are the languages spoken by the Rajpoots. 19. *Harati*, called by the antient writers Srasvat, which was a dialect of the Prakrit. [SANSKRIT LANGUAGE.]
20. *Brijbhasha*, or *Brij-bhasha*, spoken in the Doab on the banks of the Yamuna (Jumna). This language is derived from the Sursasent, one of the Prakrit dialects. The Brij Bhasha contains a more than ordinary number of Sanskrit words, and appears to have been one of the great languages from which the modern languages of the Mahratta, and of the Gopis, are derived.
24. *Maharadra*, or *Mahatta*. The districts in which this language are spoken are mutually defined by Carey in the Prakrit Grammar, 'A line drawn across the country from the Indus to the Assinaboine, between 24° N. lat. to the west, and 120° W. long. to the east, will nearly express the southern limit of this language, and another at a small distance from Uyijain (Oujain) about 24° N. lat. will nearly mark its northern limits. From east to west, it includes the provinces of Bahar, Lucknow, and is reckoned to be spoken from the mountains which separate Bengal, Bihar, and Ofterecida, from the countries immediately west of them, to the western side of the peninsula and the province of Guzerat. The political importance which the Mahatta nation once possessed rendered the study of their language important to Europeans. The first Grammar was published at Rome of the Mahatta in 1776, under the title of Grammatica Mahattanae, by the famous George Candy, who was a deified valor, who is a native of Bengal.

The political importance which the Mahatta nation once possessed rendered the study of their language important to Europeans. The first Grammar was published at Rome of the Mahatta in 1776, under the title of Grammatica Mahattanae, by the famous George Candy, who was a deified valor, who is a native of Bengal.
the Brâja Bhâśâ and the Prakrit, which was spoken in the extensive empire in northern India, of which Könyûkûjûsû, or Cank, was the capital. After the conquest of Mahârâja this language was adopted as the means of communication between the Kömmãdænas and Hindus, in consequence of which a considerable number of Persian and Arabic words was introduced into the language. It was called by the Kömmãdænas 'Hindoostanee' and by the poets Rebkâh, 'scattered,' on account of the variety of languages interpersed in it. The Hindustân was very much cultivated under Akbâr and the following emperors, and numerous poems, by Kömmãdænas as well as Hindus, were composed at Delhi and Agra with the greatest purity, but since the downfall of the Mogul empire it has been principally cultivated at Lucknow. The Hindi is the same language as Hindustân, but differs from it chiefly in retaining Sanskrit words, and the Hindustani substitutes for them words of Persian and Arabic origin. The Hindi is the dialect which is chiefly cultivated by Hindu poets. The intercourse of Europeans with uneducated natives has tended to corrupt the Hindus- tani, and thus a barbarous dialect has been produced which is commonly called Moorish or Moors. Grammars of this dialect have been published by Lebèdèf, 'Grammar of the Mixed Indian Dialects, erroneously called Moorish or Moors,' 4to., Lond., 1801: and Hadley, 'Grammar of the Corrupt Dialect of the Jargon of Hindustan (commonly called Moors),' 8vo., Lond., 1809. The Kömmãdænas adopt Hindustâni, but differ from it chiefly in retaining Sanskrit words, and the Hindustani characters in writing Hindustân. 'The affinity of Hindi with the Sanscrit language is peculiarly striking; and no person acquainted with both can hesitate in afirming that Hindi is chiefly borrowed from the Sanscrit. Many of the etymologies of them are pure Sanscrit characters or poetic, or HINDOOSTANEE mistakes, and others retain to them to be purely Sanscrit, are received unaltered; many more undergo no change but that of making the final vowel silent; a still greater number exhibits no other difference than what arises from the uniform permutation of certain letters; others rest too, with comparatively few exceptions, may be easily traced to a Sanscrit origin.' (Colebrooke's Miscell. Essays, ii. p. 23.)

The Europeans who wish to commence the study of Hindus- tani the following works may be recommended:—
'Grammar of the Hindustani Language,' by Shakespeare, 4to., London, 1826: 'Rudimentos de la Langue Hindoustani,' by Garein de Tassa, 4to., Paris, 1829; 'Hindustanee Interpreter, containing the Rudiments of Hindooastan Grammar,' by W. C. Smyth, 8vo., London, 1824; 'Introduction to the Hindooastanee Language,' by W. Yates, 8vo., London, 1827; 'Hindoostani, or, Dialect of the Hindus, as well as some of the vanquished characters in writing Hindustani.' 'The affinity of Hindi with the Sanscrit language is peculiarly striking; and no person acquainted with both can hesitate in affirming that Hindi is chiefly borrowed from the Sanscrit. Many of the etymologies of them are pure Sanscrit characters or poetic, or Sanscrit mistakes, and others retain to them to be purely Sanscrit, are received unaltered; many more undergo no change but that of making the final vowel silent; a still greater number exhibits no other difference than what arises from the uniform permutation of certain letters; others rest too, with comparatively few exceptions, may be easily traced to a Sanscrit origin.' (Colebrooke's Miscell. Essays, ii. p. 23.)

The groundwork of all these languages is the same; and the remarks which Campbell makes respecting the Telugu applies equally to all the other dialects. 'It will be shown,' he says, 'that the denunciation of the noun by particles or words added to it is confined only to the first and second persons conjointly; the conjugation of the affirmative verb; the existence of a negative aorist, a negative imperative and other negative forms in the verb; the union of the dative and genitive in the gen- eral, and of the masculine and feminine in the plural of the pronouns and verbs; and the whole body of the syntax, are entirely unconnected with the Sanskrit.' (Introduction to Telugoo Grammar, p. 25.)

1. Tamil, which occupies the most conspicuous place among the languages of the Deccan, and which possesses a literature of considerable interest, is spoken 'by a population of more than 10 millions now existing in the southern portion of the peninsula of India, the three provinces of the Ang- hira, the districts of South Arer, Salem, Coimbatour, Combonoon, Tanjore, Thirchonpoul, Madura, Dindigul, and Timinnovl, as well as in many parts of the extensive kingdom of the Cooroes of Ceylon. It is 'at present in existence, and is either itself the parent of the Teelogyo, Malayalam, and Carnarese languages; or, what is more probable, has its origin, in common with these, in some antient tongue, which is now lost or only partially dis- served in its offspring. In its more primitive words, such as the names of natural objects, the verbs expressive of physical action or passion, the numerals, &c., it is quite un- connected with the Sanskrit; and which is therefore largely bor- rowed, when the Tamul, by intercourse with the more en- lightened peoples of the north, began to emerge from barbarity, has reference to the expression of moral senti- ments and passions. The letters, which are on the whole, and more especially in the nouns, pronouns, and verbal affixes, be found in the colloquial idiom. In this remarkable cir- cumstance, and also in the construction of its alphabet, the Tamil differs much from the other languages of the south, which are the result of the union of the vernacular tracts and poetical compositions than in the ordinary dialect of con- versation, and which adopt the arrangement of the Sanskrit alphabet with scarcely any variation. The higher dialect of the Tamil, on the contrary, is almost entirely free from Sanskrit words; and the letters, which are found in the Tamil alphabet which tradition affirms to have heretofore consisted of but sixteen letters, and which, so far from resembling the perfect alphabet of the Sanskrit, wants nearly half its characters, comprise either peculiar words.' (Babington, Preface to the Adventures of Goroor Paramur- tan, 4to., London, 1822, pp. 1, 2.)

It appears that the Tamul language was not cultivated.
before the emigration of the Brahmanical Hindus from the north. We find in the Greek writers the names of cities, mountains, rivers, temples, &c., are all pure Sanskrit, such as Coromor, or Coromarp, Madura, Kabel, or Carnam, &c.; and upon referring to the list of Tamil works in Wilson's Descriptive Catalogue of the Library of Col. MacKenzie, we find that the greater number of them are nothing but translations or imitations of Sanskrit works. But the Tamil language, by its greater simplicity and divisibility, has been more extensively cultivated, and the whole of its grammatical system is supposed to have been the work of two great Brahman grammarians, the Agastya of the Tamil, & the Asthigatvyan of the Tamil, who is said to have invented the Tamil language. His own works are lost; but fragments of his grammar are preserved in different writings; and his principal grammar now extant is ascribed to Pavanat. It is divided into five parts:—1. On Pronunciation and Orthography; 2. On words; the noun, verb, and other parts of speech; 3. On Syntax; 4. On Prose and Verification; 5. On Tropes and Figures of Speech.

The original part of Tamil literature consists chiefly of histories of the Chola, Pandya, and Chera kingdoms, of dramaties and moral and didactic poems, and of treatises on philology and medicine. A great number of the historical treatises has been published in Tamil, with an English translation and notes, by W. Taylor, under the title of Oriental Historical Manuscripts in the Tamil language, 2 vols. London, 1796. The wanted part of these poems is the Koral of Tiruvalluvan, or the Divine Valluvan, which was published by the Rev. Dr. John, in the Asiatic Researches, vol. vii., pp. 339-361. But the most celebrated work in the Tamil language is the Koral of Tiruvalluvan, or the Divine Valluvan, which was published by the Rev. Dr. John, in the Asiatic Researches, vol. i., pp. 233-234. Extracts from the Koral are given in Dr. John's Works. In his Specimens of Hindoo Literature, pp. 43-82, he has given extracts from the Koral, in which he has shown the connection of this work with the Koral of the Tamul language.

The Tamil language is divided into two dialects, namely Shem and Kodun, or High and Low Tamil. Almost all the classical works in Tamil are written in the Shem dialect; which has ceased to be intelligible to the generality of the people. Both these dialects have been cultivated by European writers, and a grammar of each was composed by the celebrated missionary Beschi. His Grammar of the Shum language was published in 1739, and that of the Kodun language was published in 1742. Both these grammars were written in the Shum dialect, and a valuable commentary. This work has not seen: but copious extracts from it are given by Wilson in the Descriptive Catalogue, vol. i., pp. 233-234. Extracts from the Koral are given in Dr. John's Works. In his Specimens of Hindoo Literature, pp. 43-82, he has given extracts from the Koral, in which he has shown the connection of this work with the Koral of the Tamul language.

The northern limit of that extensive region in which the Carnataks are spoken is the Sabaragamuwa, or the Talavur country, called by Wilson the Carnatic country, as it is the northern limit of that extensive region in which the Carnataks are spoken. The Carnatic language is divided into two dialects, ancient and modern: the modern cannot be said to have any separate existence, as it is a mixture of the common language of the Chola and the Tamul, both of which have been cultivated by European writers, and a grammar of each was composed by the celebrated missionary Beschi. His Grammar of the Shum language was published in 1739, and that of the Kodun language was published in 1742. Both these grammars were written in the Shum dialect, and a valuable commentary. This work has not seen: but copious extracts from it are given by Wilson in the Descriptive Catalogue, vol. i., pp. 233-234. Extracts from the Koral are given in Dr. John's Works. In his Specimens of Hindoo Literature, pp. 43-82, he has given extracts from the Koral, in which he has shown the connection of this work with the Koral of the Tamul language.

The northern limit of that extensive region in which the Carnataks are spoken is the Sabaragamuwa, or the Talavur country, called by Wilson the Carnatic country, as it is the northern limit of that extensive region in which the Carnataks are spoken. The Carnatic language is divided into two dialects, ancient and modern: the modern cannot be said to have any separate existence, as it is a mixture of the common language of the Chola and the Tamul, both of which have been cultivated by European writers, and a grammar of each was composed by the celebrated missionary Beschi. His Grammar of the Shum language was published in 1739, and that of the Kodun language was published in 1742. Both these grammars were written in the Shum dialect, and a valuable commentary. This work has not seen: but copious extracts from it are given by Wilson in the Descriptive Catalogue, vol. i., pp. 233-234. Extracts from the Koral are given in Dr. John's Works. In his Specimens of Hindoo Literature, pp. 43-82, he has given extracts from the Koral, in which he has shown the connection of this work with the Koral of the Tamul language.

The northern limit of that extensive region in which the Carnataks are spoken is the Sabaragamuwa, or the Talavur country, called by Wilson the Carnatic country, as it is the northern limit of that extensive region in which the Carnataks are spoken. The Carnatic language is divided into two dialects, ancient and modern: the modern cannot be said to have any separate existence, as it is a mixture of the common language of the Chola and the Tamul, both of which have been cultivated by European writers, and a grammar of each was composed by the celebrated missionary Beschi. His Grammar of the Shum language was published in 1739, and that of the Kodun language was published in 1742. Both these grammars were written in the Shum dialect, and a valuable commentary. This work has not seen: but copious extracts from it are given by Wilson in the Descriptive Catalogue, vol. i., pp. 233-234. Extracts from the Koral are given in Dr. John's Works. In his Specimens of Hindoo Literature, pp. 43-82, he has given extracts from the Koral, in which he has shown the connection of this work with the Koral of the Tamul language.
Malayalism is at present the language of the two last provinces. The Malayalam is, like the Kodian-Tamil, an immediate dialect of the Shen-Tamil; it differs from the parent language generally in the same manner as the Kodian in the pronunciation and idioms, but especially in retaining the terming forms of the Shen-Tamil, which in the former are obsolete. But its most material variation from its cognate dialects is, that though deriving from a language superficially abundantly in verbal forms, its verbs are of the personal class, and are generally being always indicated by the pronoun. It is this peculiarity which chiefly constitutes the Malayalam a distinct tongue, and distinguishes it in a peculiar manner from all other dialects; for it is not adopted by any tribe and is consequently not called even among the Tamuls for writing poetry, and the poetical language of both people is very nearly the same. (Journey from Madras through Mysore, &c., vol. ii., pp. 346-7.)

The Malayalam is the same as that of the Laccadives, containing a larger share of Sanskrit and of the Past or poetical dialect than the language prevailing to the eastward, is generally allowed to be the more perfect. The character of the Malayalam is thus called varnas, that is, 'colours.' The most ancient portion of the Vedas alludes to such a division; and in the laws of Manu, the Rayamaya, the Mahabharata, and all the other Sanskrit works of the greatest antiquity, it is always spoken of as the most cultivated. It contains some translations from the Sanskrit; but almost the only original work with which we are acquainted is entitled Kerala Upanis, and gives an account of the province of Kerala, taken from the Mahabharata and the Roads of Cherusm Perumal, who adopted the Mohammedan religion. An account of this work is given by Mr. Duncan in Asiatic Researches, vol. v., pp. 1-36. Buchanan remarks, 'Of the vernacular language of Mysore, especially the dialect spoken in the Madras country, I have been forced to have been Sankara Acharaya.' (Journey from Madras through Mysore, &c., vol. ii., p. 475.) A Grammar of this language was published by Drummond under the title of 'Grammar of the Malabar Language,' fol. Bombay, 1799.

CASTES. The division of the Hindus into classes or castes, with fixed occupations, existed from the earliest times: the word caste is derived from the Portuguese word casta, 'race,' or 'lineage;' and Sanskrit is the same at that is, 'colours.' The most ancient portion of the Vedas alludes to such a division; and in the laws of Manu, the Rayamaya, the Mahabharata, and all the other Sanskrit works of the greatest antiquity, it is always spoken of as the most cultivated. It contains some translations from the Sanskrit; but almost the only original work with which we are acquainted is entitled Kerala Upanis, and gives an account of the province of Kerala, taken from the Mahabharata and the Roads of Cherusm Perumal, who adopted the Mohammedan religion. An account of this work is given by Mr. Duncan in Asiatic Researches, vol. v., pp. 1-36. Buchanan remarks, 'Of the vernacular language of Mysore, especially the dialect spoken in the Madras country, I have been forced to have been Sankara Acharaya.' (Journey from Madras through Mysore, &c., vol. ii., p. 475.) A Grammar of this language was published by Drummond under the title of 'Grammar of the Malabar Language,' fol. Bombay, 1799.

CASTES. The division of the Hindus into classes or castes, with fixed occupations, existed from the earliest times: the word caste is derived from the Portuguese word casta, 'race,' or 'lineage;' and Sanskrit is the same as that is, 'colours.' The most ancient portion of the Vedas alludes to such a division; and in the laws of Manu, the Rayamaya, the Mahabharata, and all the other Sanskrit works of the greatest antiquity, it is always spoken of as the most cultivated. It contains some translations from the Sanskrit; but almost the only original work with which we are acquainted is entitled Kerala Upanis, and gives an account of the province of Kerala, taken from the Mahabharata and the Roads of Cherusm Perumal, who adopted the Mohammedan religion. An account of this work is given by Mr. Duncan in Asiatic Researches, vol. v., pp. 1-36. Buchanan remarks, 'Of the vernacular language of Mysore, especially the dialect spoken in the Madras country, I have been forced to have been Sankara Acharaya.' (Journey from Madras through Mysore, &c., vol. ii., p. 475.) A Grammar of this language was published by Drummond under the title of 'Grammar of the Malabar Language,' fol. Bombay, 1799.

CASTES. The division of the Hindus into classes or castes, with fixed occupations, existed from the earliest times: the word caste is derived from the Portuguese word casta, 'race,' or 'lineage;' and Sanskrit is the same as that is, 'colours.' The most ancient portion of the Vedas alludes to such a division; and in the laws of Manu, the Rayamaya, the Mahabharata, and all the other Sanskrit works of the greatest antiquity, it is always spoken of as the most cultivated. It contains some translations from the Sanskrit; but almost the only original work with which we are acquainted is entitled Kerala Upanis, and gives an account of the province of Kerala, taken from the Mahabharata and the Roads of Cherusm Perumal, who adopted the Mohammedan religion. An account of this work is given by Mr. Duncan in Asiatic Researches, vol. v., pp. 1-36. Buchanan remarks, 'Of the vernacular language of Mysore, especially the dialect spoken in the Madras country, I have been forced to have been Sankara Acharaya.' (Journey from Madras through Mysore, &c., vol. ii., p. 475.) A Grammar of this language was published by Drummond under the title of 'Grammar of the Malabar Language,' fol. Bombay, 1799.

CASTES. The division of the Hindus into classes or castes, with fixed occupations, existed from the earliest times: the word caste is derived from the Portuguese word casta, 'race,' or 'lineage;' and Sanskrit is the same as that is, 'colours.' The most ancient portion of the Vedas alludes to such a division; and in the laws of Manu, the Rayamaya, the Mahabharata, and all the other Sanskrit works of the greatest antiquity, it is always spoken of as the most cultivated. It contains some translations from the Sanskrit; but almost the only original work with which we are acquainted is entitled Kerala Upanis, and gives an account of the province of Kerala, taken from the Mahabharata and the Roads of Cherusm Perumal, who adopted the Mohammedan religion. An account of this work is given by Mr. Duncan in Asiatic Researches, vol. v., pp. 1-36. Buchanan remarks, 'Of the vernacular language of Mysore, especially the dialect spoken in the Madras country, I have been forced to have been Sankara Acharaya.' (Journey from Madras through Mysore, &c., vol. ii., p. 475.) A Grammar of this language was published by Drummond under the title of 'Grammar of the Malabar Language,' fol. Bombay, 1799.

CASTES. The division of the Hindus into classes or castes, with fixed occupations, existed from the earliest times: the word caste is derived from the Portuguese word casta, 'race,' or 'lineage;' and Sanskrit is the same as that is, 'colours.' The most ancient portion of the Vedas alludes to such a division; and in the laws of Manu, the Rayamaya, the Mahabharata, and all the other Sanskrit works of the greatest antiquity, it is always spoken of as the most cultivated. It contains some translations from the Sanskrit; but almost the only original work with which we are acquainted is entitled Kerala Upanis, and gives an account of the province of Kerala, taken from the Mahabharata and the Roads of Cherusm Perumal, who adopted the Mohammedan religion. An account of this work is given by Mr. Duncan in Asiatic Researches, vol. v., pp. 1-36. Buchanan remarks, 'Of the vernacular language of Mysore, especially the dialect spoken in the Madras country, I have been forced to have been Sankara Acharaya.' (Journey from Madras through Mysore, &c., vol. ii., p. 475.) A Grammar of this language was published by Drummond under the title of 'Grammar of the Malabar Language,' fol. Bombay, 1799.
them to the honour of eating in their houses. The northern Brahmans are however at least as proud as those from the south, and allege several reasons for holding them in contempt; among which the most urgent is, that the women of the southern Brahman class are not allowed to appear in public at Jatimala. (Journey from Madras through Mysore, &c., vol. i., p. 306.) In the Deccan the Brahmans are also divided into Vaiādikas, who subset by charity, and dedicate their lives to study and devotion; Lokikas, who follow worldly pursuits, and imitate the priests of diocesan bishops in a Christian church. They possess authority over a certain district, in which they have jurisdiction in everything relating to religion and caste. They travel in great state, and receive large contributions from their disciples.

The raja of Tenjore is said by Buchanan (Journey from Madras, &c., vol. i., p. 22) 'to give his house 250 pagodas a-day (915. 18s. 6d.) when that personage honours him with a visit.'

The Kshatriya, or military class, is said by the Brahmans to be extinct; but the Rajputs and the Naics in the Deccan in all probability belong to this class, though the Brahmans assert that there are only two Sudras, or inferior classes, in India; while the Naics inform us that they are, on the contrary, of a higher order. The Naics, who in the language of Karnataka are called Chitrakaru, but who are better known by the Mohammedan appellation of Jinigar, or Jiigar, pretend to be of the Kshatriya class, but they have been deprived of the authority of that name. They allege that their ancestors, on account of some injury done to the Brahmans, were compelled to follow their present mechanical occupations. The decay of the Kshatriya class may also be attributed to the suppression of the monastic order, and their freedom from foreign invasion, and the consequent want of employment for a military class. But according to an ancient tradition the Kshatriya caste was descended from Brahman, the sixth incarnation of Visnou, and their land bestowed upon the Brahmas. The laws of Manu appear to refer to the same tradition in a passage where a list of Kshatriyas is given, who, 'by the omission of holy rites and by seeing no Brahmas, have gradually sunk among men to the lowest of the four classes.'

The duty of the Sudra is servile attendance upon the higher classes, and especially the Brahmas, but he may also follow mechanical or capacious, as joiner and masonry, and practical arts, as painting and writing; and although a man of a lower tribe is in general restricted from the arts of a higher class, the Sudra is expressly permitted to become a trader under certain conditions. (On Indian Classes: Miscell. Essays, vol. ii., p. 187.) The statements of Robertson, Mill, and many other writers, respecting the strict hereditary nature of all trades and occupations, are not substantiated by the laws of Manu. The liberty which is given to the Brahmas, except by the laws of Manu, has already been remarked; and a similar latitude is allowed to the Kshatriya and Vaisyas classes. Mr. Colebrooke, whose opinion from his extensive acquaintance with Hindu literature, and from his long residence in India, is entitled to the greatest respect, remarks, that almost every occupation, though regularly it be the profession of a particular class, is open to most other tribes; and that the limitations of the Brahmas, as regards the peculiar profession, that of the Brahmas, which consists in teaching the Vedas, and assisting at religious ceremonies.' (Miscell. Essays, ii. 187.) Even as early as the compilation of the laws of Manu, Sudras had risen to royal power (iv. 61); and in the present day a real Kshatriya prince is not to be found; all the greater princes of India, excepting the Peshwa, a Brahmin, are base-born. (Richard's India, vol. vii., p. 188.) Rich Sudras of every order employ Brahmas as cooks; even the Vaiāgī mendicants procure Brahmas to prepare the food at their feasts. (Vies, &c., of the Hindoos, vol. i., p. 95. See The Hindoos, in the Literary World, 1836-8.)

There is the opinion of some Europeans who have acquired an accurate knowledge of the manners and customs of the natives, that Europeans in general give too much credit to the assertions of the natives concerning the rules of their caste, which are commonly alleged as an excuse for declining any duty that is disagreeable. (Buchanan's Journey from Madras, &c., i. p. 294.)

A great portion of the population of India does not belong to any of the four pure castes. The individuals who form what is usually termed the impure or mixed classes, called in Sanskrit Varna-Sankara, i.e. mixture or confusion of castes, are either the original inhabitants of the country who have never professed the Hindu faith, or persons who originally belonged to one of the four pure castes, and have either lost caste themselves, or are descended from those by intermarriage with persons of different classes. The faults which occur in the loss of caste, and for which no pardon can be given, are—1. Sexual intercourse within the prohibited degree of consanguinity; 2. Sexual intercourse with any prohibited class; 3. Eating forbidden food, or drinking intoxicating liquors; 4. Stealing; 5. Slaughering any animal of the cow kind, or of the human species; but a Brahman is permitted to kill his enemy in battle; 6. Eating in company with persons of another caste, or of food dressed by their impure hands; 7. Eating on board a ship food that has been dressed there; 8. Omitting to perform the ceremonies due to deceased parents. (Buchanan's Journey from Madras, &c., vol. i., p. 306.)

There has arisen from the intermarriage of persons of different classes. It is not true, as has been frequently stated, that every individual is obliged to marry in his own caste; even India, that is, the Brahman, is not prohibited to select his wife from any of the four castes; a Kshatriya from the Vaisyas and Sudras castes in addition to his own; a Vaisyas from his own and the Sudras castes; but the Sudras are not permitted to marry a woman of any other caste but their own. But though these marriages are legal, their offspring cannot be admitted into the caste of either of their parents.

As early as the compilation of the laws of Manu the number of mixed classes had become considerable. (See the tenth chapter, which is principally devoted to an enumeration of the mixed classes, with the respective occupations of each.) The most important of the mixed classes may be divided into two sets:

1. The classes which have sprung from the marriage of a man of an upper caste with a woman of an inferior caste.
   a. Mūrdhābhiksita, by a Brahman from a woman of the Kshatriya class. His duty is the teaching of military exercises.
   b. Aṃkatha, or Vādyga, by a Brahman from a woman of the Vaisyas class. His profession is the science of medicine.
   c. Nishīda, or Pārakṣaps, by a Brahman from a woman of the Sudras class. His occupation is catching fish.
   d. Mūdhyāga, by a Brahman from a woman of the Vaisyas class. His profession is music, astronomy, and attendance on cattle.
   e. Ugra, by a Kshatriya from a woman of the Sudras class. His duty, according to Manu, is to kill or confine such animals as live in holes; but according to the 'Jātimāla' he is an enemic or bard.
   f. Čaraṇa, by a Vaisyas from a woman of the Sudras class. He is an attendant on princes, or secretary.

2. The classes which have sprung from the marriage of a man of an upper caste with a woman of an inferior caste. The offspring of these marriages, which are illegal, are considered inferior in rank to the classes enumerated under the first division.
   a. Āpla, by a Kshatriya from a woman of the Brahman class. His occupation is managing horses and driving cars.
   b. Vādyga, by a Vaisyas from a woman of the Brahman class. His occupation is waiting on women.
   c. Cāhāda, by a Sudra from a woman of the Brahman class. He is regarded as the most impure of all the mixed classes. His business is the offspring of common criminals, and to officiate in other abject employments for the public service.
   d. Māgadhā, by a Vaisyas from a woman of the Brahman class. His profession, according to Manu, is travelling with merchants, but according to the 'Jātimāla' he is an enemic or bard.
the Most Ayogava, Indra, entitled 7. Asiatic

The Vedas, which are supposed to have been composed by inspired seers (rishis) and attributed to the sage Vyasa. Only a small portion of these have been kept in the

these classes are formalized among the Hindu deities, and the principal religious and philosophical sects into which the Hindus are at present divided.

The word 'Veda' is hotly debated among scholars, and the chief part of the community (or castes) belonging to one Veda is entitled its Sakti.

The mythology of the Vedas personifies the
divine beings, or deities, which include the

The original worship of the Hindus appears to have been

The Vedas undoubtedly teach the belief of one supreme

Mr. Colebrooke remarks that 'the deities invoked appear, on a cursory inspection of the Vedas, to be as various as the authors of the prayers addressed to them; but according to the most antient annotations on the Indian Scrip-
tures, the names of deities, which are

The lower castes are also divided into left and right hand

The lower classes are divided into

The religion and philosophy. — A knowledge of the religion of a people is always useful in assisting us in forming an estimate of their civilization. With regard to the Hindus, such a knowledge is indispensable, since every circumstance in the history of his birth to that of his death, is closely connected with religious observances; and the most insignificant as well as the most important acts cannot be performed without the observance of some religious rites or without a reference to some sacred doctrines. It is erroneous to suppose, as often has been done, that the Hindus have always professed the same faith. The sects into which the Hindus are divided in the present day are of modern origin; and the system of theology taught by these sects differs very much from the ancient religion of the people. It is proposed in the following remarks to give a brief account of the ancient religion of the Hindus (which is still the faith of the Brahmans and of the educated part of the community); and afterwards to mention the principal religious and philosophical sects into which the Hindus are at present divided.

The Vedas, which are divided into four main sections

The Vedas, which are divided into four main sections

The Vedas, which are divided into four main sections

Each Veda, Mr. Colebrooke remarks, 'consists of two

The mantras or prayers, which form the principal portion of the Vedas, are divided into the

The mantras or prayers, which form the principal portion of the Vedas, are divided into the

The mantras or prayers, which form the principal portion of the Vedas, are divided into the

The mantras or prayers, which form the principal portion of the Vedas, are divided into the

The mantras or prayers, which form the principal portion of the Vedas, are divided into the
list of Lokapalas, of whom a list is given in a note to Wilson's translation of the Vi<ref>Para<ref>ro<ref>ati</ref>s</ref>. (Hindu Theatre, vol. i., 219.) Those who wish for further information respecting the Hindu deities, may consult with advantage Moor's "Hindu Pantheon," Lond., 1810; Coleman's "Mythology of the Hindus," Lond., 1832; and Rhode, "Uber Religiöse Bildung, Mythologie und Philosophie der Hindus," Leip., 1827.

The worship of these gods, as well as of numerous others, which was once very popular in Hinduism, has almost entirely disappeared, in consequence of the exclusive worship which is paid to Vishnu, as Shiva, and by a few sects of the religious sects of the Hindus of the present day. The exclusive worship of these deities does not appear to have arisen much earlier than the tenth century of the Christian era. Each sect maintains that the god which agrees with the sentiments and wishes of its members is the deity. The exclusive worshippers of Vishnu, Siva, &c., must not be confounded with the orthodox worshippers of these deities. Few Brahmins of learning will acknowledge themselves to belong to any of the popular divisions of the Hindu faith; they acknowledge the Vedas, Puranas, and Tantras, as the only orthodox ritual, and regard all practices not derived from these sources as irregular and profane. Some of these sects appear to have arisen in great measure in opposition to the Brahmanical order; their teachers are frequently chosen from the lower castes, and the distinction of caste is in a great measure lost in the similarity of sects and rites. (See the Preface, in An Asiatic Researches, vol. xvi.) The following is a list of the principal sects:

1. **Vaishnavas**, who worship Vishnu, or rather Rama, Krishna, and the heroes connected with him, and his associates or companions of that deity. This sect has numerous followers in Bengal and Oryasa, and is distinguished generally by an abstinence from animal food, and by a worship which is less cruel than that of the Saivas. But it must be recollected that the Vaishnavas have a high respect for Vishnu, but it is not so often agreed in maintaining that Vishnu is Brahmas, that is, the deity. A long and interesting account of these sects is given by Wilson in the sixteenth volume of the 'Journals,' and that of the Saivas, in the same volume. The sect is the **Kahtr Pantis**, founded by Kahar in the beginning of the fifteenth century. No one, with the exception of Nanak Shah, has produced a greater change in the popular belief than Kahar. He assumed the whole system of idolatrous worship, and ridiculed the learning of the Pundits and the doctrines of the Sastras. Though the immediate effect of his doctrines was considerable, their influence is still great, and the principal of the Hindu popular sects are little more than ramifications of the Kahtr Pantis, and Nanak Shah appears to have been principally indebted to him for the doctrines he promulgated among the Sikhs. This sect is included among the Vaishnavas, and in respect to Vishnu than to any other deity; but it is not a part of their faith to worship any Hindu deity, or to observe any of the rites or ceremonies of the Hindu religion.

2. **Saatars**, who worship Siva, are more numerous than any other sect. Siva is usually represented by the Lingam, which the Saivars worship, some figuratively, others literally. The sectarian mark by which the Saivars are distinguished consists in three horizontal lines on the forehead with ashes, obtained, if possible, from the hearth on which a consecrated fire is perpetually kept; and thus differs from the sectarian mark of the Vaishnavas, which consists in perpendicular lines of ashes according to the sect to which the individual belongs.

3. **Saktas**, The Hindu mythology has personified the abstract and active powers of the divinity, and has ascribed several of the attributes of the deity to the active power of God, which is female, and is considered the consort of the abstract attribute. The Saktis, who may perhaps be regarded as only a subdivision of the Vaishnavas, worship the Sakti of Siva, which is usually represented by the female organ, as the counterpart of the phallic personification of Siva.

4. **Saurs**, the worshippers of Burya, the sun.

5. **Gomapagyas**, the worshippers of Ganessa, the god of wisdom, affection, and beneficence, in the 18th century of this most numerous of all religious sects are divided into two classes, which, for want of a better name, may be called clerical and lay. The priests may also be divided into two classes, the monastic and secular clergy, of which the majority belong to the monastic order, since the preference is usually given by the lay part of the community to teachers who lead an ascetic life. These sects usually spend the greater part of their life in travelling from one holy place to another, subsisting by alms or merchandise; and when they are no longer able to pursue this wandering mode of life, they generally retire to some monasteries or monasteries, which are scattered over the whole country. These sects, Mr. Wilson remarks, 'vary in structure and extent, but they generally comprehend a set of books, or Writings, called Vastus, or the books of the present pupils; a temple, sacred to the deity whom they worship, or the Sardars, a shrine of the founder of the sect, or of some eminent teacher; and a Dharma Sala, one or more sheds or buildings for the accommodation of the mendicants or travellers who are constantly visiting the math. Ingress and egress are free to all.' (An Asiatic Researches, vol. xvi., p. 39.)

The sects which have already been enumerated profess to follow the authority of the Vedas in all matters which relate to religion and philosophy, though their opinions are in many points quite at variance with the doctrines of these books. But there are other sects which entirely disapprove the authority of the Vedas, and which are therefore regarded as forming no part of the Hindu church. The most important of these sects are the Buddhists [Buddha], the Jains, and the Sikhs. The Buddhists have long since been expelled from their native land, and have since the existence of large architectural remains clearly referable to this sect, from the account of the Brahmans themselves, and from other circumstances, that the Buddhists were once a very numerous sect.

The sect of the Sikhs was founded by Nanak Shah, who was born A.D. 1469, at a small village called Talwandi, in the district of Bhati, in the province of Lahore. He attempted to reconcile the religion of the Mohammedans and Hindus, by recalling them to the consciences of which they both believed, namely, the unity of God. 'I am sent,' he said, 'to the Mohammedans to reconcile your jarring faiths; and I implore you to read the Hindu scriptures, as well as your Koran, and to enter into the doctrine taught: for God has said no man shall he saved except he has performed good works. The Almighty will not ask what tribe or persuasion he belongs; he will ask only what he has done.' (Malcolm's Sketch of the Sikhs, in As. Res., vol. xi., p. 275.) Nanak gained many proselytes, and his doctrines continued to spread in peace for two centuries. But in the beginning of the seventeenth century their number, at the establishment of the Mohammedan government; and from that time the Sikhs may be considered as an armed people. A series of bloody contentions ensued; in which the Sikhs were at first entirely crushed; but on the naked, god-given, and holy doctrine of the religion of the followers of Nanak, by the complete abolition of the system of castes, wisely judging that the only means by which he could ever hope to oppose the Mohammedan government with success was by addressing himself to the profession of arms. His plan succeeded to a greater extent than might have been expected; immense numbers of the lower castes joined his ranks; and on the downfall of the Mogul government the Sikhs obtained possession of the greater part of the northern and north-western provinces of Hindustan. Malcolm describes the present faith of the Sikhs as 'a creed of pure detem, grounded on the most sublime general truths; blended with the belief of the virtues and duties of the fables of Mohammedanism.' The Sikhs reject the authority of the Vedas, Puranas, and all other religious books of the Hindus; eat all kinds of flesh, except that of cows; willingly submit to the discipline of the Sikhs, and the greater profession of arms the religious duty of every individual. An interesting account of this sect is given in Malcolm's Sketch of the Sikhs. (An Asiatic Researches, vol. xi., pp. 197-292.)

A belief in the transmigration of souls forms an important tenet in the Hindu faith. It is the great object of Hindu worship to obtain a deliverance from future existence, which is supposed to be inflicted by the evil nature of man, with that primitive spirit which pervades all nature, and which receives the souls of men, when they have been purified, into its essence. The prevailing notion of the means by which an individual may accomplish this
object is, by subjecting the body to sufferings and privations, and withdrawing from all intercourse with mankind. It is expressly commanded in the laws of Manu (vi. 2, 3), that a Brahman, when his children have attained maturity, should retire from the world and take refuge in a forest. He is required to spend his time in studying the Vedas and in performing penances for the purpose of uniting his soul with the divine spirit. (Manu, vi. 59.) Many of these hermits, indeed, have been distinguished as the highest and holiest of mankind. The Greeks gave to them the name of Gymnosophists, from the Greek for naked persons, and they were styled 'the sectaries' of the divine spirit, possessing a sort of sacred science with great success; and they have always been considered by the orthodox Hindus as the wisest and holiest of mankind. The Vedas gave to them the name of Sannyasins, and they are considered as the most perfect state of existence which a Brahman can attain, in which state he 'is not to wish for death, he is not to wish for life; but he is to expect his appointed time, as a hired servant expects his wages.' (Manu, vi. 45.) He must entirely detach his affections from all worldly desires; for should he cherish in his heart the slightest wish for any earthly object, the fruits of his previous penance and all his holiness would be lost. This doctrine is enshrined in the Vedanta, a philosophical poem, forming an episode of the Mahabharata, which has been translated into English by Wilkins (Lond. 1677, and into Latin by Schlegel, who has also edited the Sanskrit text). But it is understood in the present day with a wider significance, to designate all the wandering mendicants of the different Hindu sects. These mendicants are also frequently called Vairagya, that is, naked philosophers, and they are divided into two classes: the one, called Sannyasins, or hermits, and the other, called Vaiseshika, or Gymnosophists; and Yogis, that is, persons who perform worldly acts and ceremonies without regard to their results, and who keep their minds fixed upon Brahma or God alone. (Wilson, p. x.)

The Hindus have various philosophical systems which they consider to be orthodox, that is, in accordance with the theology and metaphysics of the Vedas; and others which are deemed heretical, as incompatible with the doctrines of the Vedas. The philosophical design of all these schools is to 'teach the means by which eternal beatitude may be attained after death, if not before it.' The most orthodox of these schools are the two Mimamsas, of which the former, Pura Mimansa, said to have been founded by Jaimini, teaches the art of reasoning with the express view of interpreting the practical part of the Vedas, that is, the ritual of religion and devotion, including also moral and legal precepts; the latter, Sana Mimansa. The latter, Uttara Mimansa, commonly called Vedanta, said to have been found by Vyasa, treats of the spiritual worship of the Supreme Being, or soul of the universe, and is regarded as containing an scripture of a refined psychology, which goes to a denial of a material world. 'The two together,' Mr. Colebrooke remarks, 'comprise the whole system of interpretation of the precepts and doctrine of the Vedas, both practical and theological. They are parts of one whole. The latter Mimansa is supplementary to the former, and is expressly affirmed to be so; but differing on many important points, though agreeing on others, they are essentially distinct in a religious as in a philosophical view.' There are three other schools of philosophy, the SaMkhya, Nyaya, and Vaiseshika, which, though not strictly orthodox, are respected by very rigid adherents of the Vedas.

The SaMkhya system of philosophy, which derives its name from a word signifying reason or deliberation, because precision of reckoning is observed in the enumeration of its principles, maintains that true knowledge can alone secure perfect deliverance; and that true knowledge or experience 'consists in rightly discriminating the principles, perceptible and imperceptible, of the material world, from the sensitive and cognitive principle, which is the immortal soul.' The SaMkhya system is divided into three schools: of which the first, founded by Patanjali, recognises the existence of a supreme God, and is therefore denominated 'theistic' (Sarvaera Sankhya); the second, founded by Capena, acknowledges no superior providence, and is therefore called 'atheistic' (Nirvana Sankhya); the third, founded by Caposa, is being superior man, but like him subject to change and transmigration; the third school, which has not many followers, may be called 'mythological' (Purana Sankhya), because the cosmogony contained in several of the Puranas agrees with this system.

The Nyaya and Vaisesikas, said to be founded respectively by Gotama and Candalo, may be taken generally as parts of one system. The first is chiefly occupied with the metaphysics of logic, whence it derives its name of Nyaya, that is, reasoning; the second, with physics, that is, with physical or intellectual objects, whence it derives its name of Vaiseshika, 'particular.' These schools contain with other schools of philosophy in promising beatitude or (nirvana) final excellence, and (moksha) deliverance from sin, as the Vedas require. But, in the main part of their doctrines, they are founded upon the principles which they teach, that is, of truth, meaning the conviction of the soul's eternal existence separable from the body. An interesting account of the philosophical tenets of these sects is given by Mr. Colebrooke in his essay 'On the Philosophy of the Hindus,' in the Transactions of the Royal Asiatic Society, vol. ii., pp. 19-43; vol. ii., pp. 323-325, and in his Miscellaneous Essays, vol. ii., pp. 223-325; to which we are indebted for the greater part of the preceding remarks. See also Kennedy on the Vedanta System, in the 3rd volume of the Transactions of the Royal Asiatic Society.

Laws.—Works on law form an important branch of Sanskrit literature. Of these the most celebrated is the code generally known under the title of the Institutes of Manu, to which the commentaries of the Pandits are considered the antient Hindu laws. Those who are desirous of further information on this subject may consult Halhed's 'Code of Gentoo Laws,' London, 4to, 1776; Svo., 1777, which has been compared with the Pandits under the administration of Samskrit by a set of the most experienced lawyers selected from every part of Bengal. They picked out sentences by sentence from various originals in the Samskrit language, neither adding to nor diminishing anything of the Hindu text. The articles thus collected were next literally translated into Persian, under the inspection of one of their own officials, and from that translation were rendered into English, with an equal degree of exactness. (Asiatic Researches in Bengal, however, p. 179.)

Several other works on Hindu law have been published at Calcutta, of which the most important are—Dady Bhaga, a Treatise on Inheritance, 1814; new edition 1829; Dady-Crama-Sangara, an original Treatise, of the Hindu Law of Inheritance, with an English Translation by P. M. Wynch, 1818; Dady-Tatwa, a Treatise on the Law of Inheritance, by Ruchhundana Bhattacharyya, 1823; Two Treatises on Inheritance, under the title of Dady Bhaga, and the Mitakshara, translated by H. T. Colebrooke, 1816. An interesting account of the composition of an Indian court of justice, conformably with the antient Hindu institutions on the principles of the Roman law, as contained in the Hindu Courts of Justice, in the Transactions of the Royal Asiatic Society, vol. ii., pp. 166-196: and a curious instance of a trial of a criminal cause in a Hindu court occurs in the Sanskrit play of Mishchon, or the Toy-cart, translated in Wilson's 'Theatre of the Hindu,' vol. ii., pp. 143-159.

Arithmetic, Algebra, Astronomy, and Geometry.—The reader is referred to the articles Arithmetic, Algebra, Astronomy, Geometry, Tables of Sines, Tangents, and Viga Ganita, in this work.

Medicine.—Professor Wilson remarks (Oriental Mag., Calc., Feb., 1828), 'that there is reason to conclude, from the imperfect opportunities of investigation we possess, that in medicine, as in astronomy and metaphysics, the Hindus once kept pace with the most enlightened nations of the world; and that, although that knowledge 'consists in rightly discriminating the principles, perceptible and imperceptible, of the material world, from the sensitive and cognitive principle, which is the immortal soul.' The SaMkhya system is divided into three schools; of which the first, founded by Patanjali, recognises the existence of a supreme God, and is therefore denominated 'theistic' (Sarvaera Sankhya); the second, founded by Capena, acknowledges no superior providence, and is therefore called 'atheistic' (Nirvana Sankhya); the third, founded by Caposa, is being superior man, but like him subject to change and transmigration; the third school, which has not many followers, may be called 'mythological' (Purana Sankhya), because the cosmogony contained in several of the Puranas agrees with this system.

The Nyaya and Vaisesikas, said to be founded respectively by Gotama and Candalo, may be taken generally as parts of one system. The first is chiefly occupied with the metaphysics of logic, whence it derives its name of Nyaya, that is, reasoning; the second, with physics, that is, with physical or intellectual objects, whence it derives its name of Vaiseshika, 'particular.' These schools contain with other schools of philosophy in promising beatitude or (nirvana) final excellence, and (moksha) deliverance from sin, as the Vedas require. But, in the main part of their doctrines, they are founded upon the principles which they teach, that is, of truth, meaning the conviction of the soul's eternal existence separable from the body. An interesting account of the philosophical tenets of these sects is given by Mr. Colebrooke in his essay 'On the Philosophy of the Hindus,' in the Transactions of the Royal Asiatic Society, vol. i., pp. 19-43; vol. ii., pp. 323-325, to which we are indebted for the greater part of the preceding remarks. See also Kennedy on the Vedanta System, in the 3rd volume of the Transactions of the Royal Asiatic Society.

Laws.—Works on law form an important branch of Sanskrit literature. Of these the most celebrated is the code generally known under the title of the Institutes of Manu, to which the commentaries of the Pandits are considered the antient Hindu laws. Those who are desirous of further information on this subject may consult Halhed's 'Code of Gentoo Laws,' London, 4to, 1776; Svo., 1777, which has been compared with the Pandits under the administration of Samskrit by a set of the most experienced lawyers selected from every part of Bengal. They picked out sentences by sentence from various originals in the Samskrit language, neither adding to nor diminishing anything of the Hindu text. The articles thus collected were next literally translated into Persian, under the inspection of one of their own officials, and from that translation were rendered into English, with an equal degree of exactness.
divided Ayur Professor promote altogether nor gold and considers art of admissions, is the science of medicine: the two preceding divisions constitute the surgery of modern schools. 2. Bhutardana is the restoration of the faculties from a disorganized state, induced by demoniacal possession. 3. Kauamara Bhiriga, on the diseases of women and children, etc. 4. Agha2 is the administration of antidotes. 7. Rasayanaa 'is chemistry, or more correctly alchemy; as the chief end of the chemical combinations it describes, and which are mostly metallurgic, is to change common iron into gold, that is, to render health permanent and life perpetual.' 8. Bajikarana, professes to promote the increase of the human race.

The most celebrated parts of the Ayur Veda are the treatises of Charaka and Susruta. Part of the work of Susruta has been published at Calcutta, 1835. Professor Royse, in an essay 'On the Antiquity of Hindoo Medicine,' and a writer in No. 15 of the 'Journal of Education,' p. 176, informs us that a variety of medical treatises were translated from the Sanskrit into Persian and Arabic, and give many reasons for believing that the Arabs derived their principal knowledge of surgery and medicine from the Hindus. In the 16th century, the works of Charaka and Susruta were translated into Arabic; Wilson remarks, 'that the disappearance of surgery from among the Hindus is evidently of comparatively modern occurrence, as operative and instrumental-practice forms so principal a part of those writings which are undeniably most antient, and which, being regarded as the composition of inspired writers, are held of the highest authority.' The Hindus must at a former period have possessed a considerable knowledge of the useful, etc. Many difficult operations, such as that of lithotomy and the extraction of the fetus ex utero are mentioned in Sanskrit works. The reader will find in the essay of Professor Royse above referred to much valuable information on the subject of Hindoo medicine.

Arts, &c.—It is evident from the most antient Sanskrit works, as well as from the testimony of the Greeks who visited the country, that the useful arts and manufactures had attained a considerable degree of perfection among the Hindus in very early times. The Ramayana contains numerous proofs of the progress they had made in working metals. The art of smelting iron-ore and of manufacturing steel is undeniably of great antiquity (Ctes., Indic., c. 44); and their skill in the manufacture of gold and silver ornaments is evident from the descriptions of the Ramayana. The Hindus, however, in the 12th century, had not yet reached such perfection in that art as to possess a gold coinage in the time of Ariyan, who mentions, in his 'Periplus,' gold coins under the name of Kalis, and probably at a much earlier period. Major Tod gives it as his opinion, that the Hindus still have to learn from the Greeks. Among the associations of the Asiatic Society, vol. i., pp. 340, 341, of several gold coins which he considers of great antiquity. The Hindus must also have been acquainted with the art of working diamond mines at a remote period, since Ariyan informs us, in his 'Period,' that the Kusasses, the inhabitants, in the East Indies, were brought from the interior to the port of Nelcunda. Ear-rings of ivory are mentioned by Ariyan (Indic., c. 19); and the pearl fish was known to the companions of Alexander (Ariyan, Indic., c. 9).

The degree of perfection to which the Hindus carried the art of weaving in antient as well as modern times is well known. Their country has always been distinguished for the number and excellence of the substances which it contains, for dyeing colours: and the beauty and brilliancy, as well as durability, of their colours were as celebrated among the Greeks and Romans as among ourselves (Ctes., Strabo, xv., pp. 1018-1024; Pliny, Nat. Hist., xxxv., c. 6.) Silk also, as already remarked, was probably manufactured in India in very early times.

The art of obtaining intoxicating liquors by distillation is mentioned in the Ramayana and the laws of Manu. In the laws of Manu (xi. 95) three kinds are specified; that extracted from dregs of sugar, that extracted from bruised rice, and that from the leaves of the Madhuca.

In painting the Hindus appear never to have attained much proficiency; their artists draw with great accuracy, but they have no knowledge of perspective. With regard to music, many of their instruments are numerous; but their compositions are simple, and the music is not so lasting; the Hindus were, in a few cases, very skillful in imitating the sounds of the sea, mountains, and various other sounds, which possess,' according to Sir W. Ouseley, 'the plaintive simplicity of the Scotch and Irish, and others a wild originality pleasing beyond description. Countercoutelps seem not to have entered at any time into the system of Hindoo music.' (Orional Collections, vol. iii., p. 298.) An account of Hindu music is given by Sir William Jones in his essay 'On the Musical Notes of the Hindus' (At. Res., iii. pp. 159-177).

With respect to the present state of the arts among the Hindus, Bishop Heber remarks (Journal, vol. iii., pp. 521-2), 'Nor is it true that the Hindoos are totally destitute of the general run of European nations. Where they fall short of us (which is chiefly in agricultural instruments and the mechanics of common life), they are not, so far as I have understood, inferior to any of the nations of Europe, and in any great degree by the people of those countries. Their goldsmiths and weavers produce as beautiful fabrics as our own; and it is so far from true that they are obstinately wedded to their old patterns, that they show an anxiety to imitate our modes, and do imitate them, with spirit and industry. The ships built by native artists at Bombay are notoriously as good as any which sail from London or Liverpool. The carriages and gigs which they supply at Calcutta are as handsome, though often not as durable, as the English. In the little town of Monghyr, three hundred miles from Calcutta, I had pistols, double-barrelled guns, and different pieces of cabinet-work brought down to my boat for sale, which in outward form nobody could desire to be of Hindoo origin; and at Delhi, in the shop of a native wealthy jeweller, I found broaches, ear-rings, snuff-boxes, etc., of the latest models, and ornamented with French devices and emblems.' (Journal, vol. iii., pp. 159-177.)

Most of the subjects treated of in this article are discussed with considerable learning by Bohlen in his 'Das Alte Indien,' Königs. 2 vols. 8vo, 1830; and in a more popular manner in the 'Hindoo' published under the supervision of the Council of the Diffusion of Useful Knowledge, 2 vols. 12mo. 1834-35.

Hindoo Architecture.—Much yet remains to be done before we possess precise information in regard to a style of architecture which has not yet been studied by professional men, they being indebted for what they know of it solely to the accounts of travellers and antiquaries, which, again, either consist of merely verbal descriptions, or if accompanied with drawings, are not illustrated by delineations of the kind indispensable for obtaining exact and accurate ideas of the structures themselves. Till we shall possess a more complete knowledge of this, purely measuring plans, elevations, and sections, not only general but particular, so as clearly to express every circumstance of detail, our knowledge must be very imperfect; and even with such aid very much would be wanting, were it not for the assistance afforded by the rate drawings or models could, in regard to dimensions, effect no more than words themselves, it being utterly impossible for them to convey the impression caused by actual magnitude and colossal bulk, which, as much as their form, characterizes the edifices both of Egypt and India.

After the difficulties which we have just stated attending the subject, it cannot be supposed that we were pretend to do more than offer the subject which must be a fruitful field for every person who desires to enlarge our knowledge of Hindoo and Egyptian architecture; since the obvious affinity exist-
ing between them will afford means of direct comparison, while such comparison will greatly facilitate explanation. In the article on Egyptian Architecture we referred rather to points of difference and contrast between that style and the Grecian, than to anything of positive similitude, they being separated from each other by an exceedingly wide interval as to all that regards feeling and taste. The Egyptian and Hindu styles, on the contrary, seem absolutely to come in contact with each other, agreeing most in those points wherein they most differ from Grecian and from modern taste. If there existed no other resemblance between the architecture of the two regions, there would be a decidedly strong one in their hypogae, or subterraneous cavern-structures hewn out of solid rock, works therefore more properly of excavation than of construction, and to which, no doubt, ought to be ascribed the chief peculiarities of the styles originating in them, namely, extraordinary massiveness of bulk and proportions coupled with no less singular capriciousness of form. Where the forms are produced by cutting away instead of putting together and building up, they may be shaped quite arbitrarily, moulded according to fancy alone, because they still belong to one naturally coherent mass; whereas the same forms worked out of separate pieces of material, not only would they frequently be at variance with security and stability, but would occasion an enormous waste both of material and labour; the difference between the process of excavation and that of construction being, that in the former the solids are only left after the operation of taking away, while in the latter they are produced by what is built up. This, in our opinion, goes far towards accounting for the various capricious, not to say unmeaning shapes we meet with in many of the columns of the cavern-temples of India; and these, again, account for the similar taste which was afterwards manifested in works of construction, a taste so remote from our own that the two can hardly be said to have any sym- pathies in common.

Of these subterraneous or grotto edifices, whose antiquity at the most moderate computation extends to several centuries before the Christian era, and is by some carried back to periods lost in the obscurity of fable, the most remarkable are those on the Island of Elephants near Bombay (Elephantas), at Kennerich, in that of Salsette; those at Ellora near Dowlatabad; at Perwadam on the Kistna; those near the pass of Ajant, and those at Carh, about 30 miles north-west of Poonah. Many of those excavations are of prodigious extent, being composed of a series of apartments and recesses cut out of the rock, amounting in some instances to an almost incredible number, it being said that in the mountains of the Soubab of Cashmere there are no fewer than twelve thousand. Merely as monuments of human labour and perseverance the works of this class would be truly astonishing, but it is their stupendousness combined with magnificence, barbaric and frequently monstrous, that impart to them a character almost supernaturally sublime and awful. As if to imitate nature in her most minute as well as her grandest productions, while colossal statues and sculptures display themselves within these cavern temples and on their walls, elaborate embellishments of detail are frequently given to the columns, which appear composed of fragments capriciously put together, it being impossible to determine where their pedestals terminate and their shafts commence, or how much of these latter belong to the capitals. In fact, what is sometimes described as pedestal supporting the column, might with as much propriety be termed its lower portion, although square or polygonal, while the rest of the shaft is circular. In this respect the Hindu style, at least this earliest class of it, differs materially from that of the Egyptians, where the shafts of the columns have no pedestals, and scarcely any thing amounting to a distinct base, and where, however much the column itself may be ornamented, the capital is plainly distinguishable from the rest. The forms themselves are so singular as to baffle all attempt at verbal explanation or even comparison, and so varied, that to illustrate them by drawings would be laborious. As far however as a solitary example can be of assistance for such purpose, some idea respecting them may be obtained from those in the temple at Elephants; which, if the square part is to be considered as a distinct pedestal, are remark-
taken of natural cavities in the rock, which were extended and hewn into more regular shape, or whether such works were entirely artificial and the result of human labour. Probably the latter was the case in some instances, the former in others.

If it be difficult to form any sort of classification, either architectural or chronological, there is one obvious distinction observable in these excavated temples, namely, that in some of them the ceiling is quite flat, as at Elephanta; in others, hollowed out so as to resemble more or less a regular vault. Of the latter class we have, in the temple of Kanhera, Keniyari, or Canara, in Sutlej, which is exactly on the same plan as that at Carli, and the principal object or idol is alike in both, and consists, as Moor describes it, 'of a vast hemisphere of stone resting on a round pedestal, the whole being supported by a sort of canopy or umbrella of peculiar construction.' The ground-plan of an arch temple of Buddha at Ellora is exactly similar, but there is here a figure of Buddha himself in front of the cylindrical pedestal and hemisphere just mentioned. 'In neither of these three arched caves,' says Moor, 'will I think, be found sculptures referring to the gods of the Brahmins: and these three are the only caves I have ever seen or heard of constructed with an arched roof. And I presume to hazard an opinion that they are of modern origin relatively with other excavations at Ellora and at Elephanta, containing entirely artificial and the result of human labour. Neither were they, as the case of the Buda-hills, worshipped by the Brahmins.' If the examples just referred to are similar, as being the only instances of vaulted roofs in excavated temples, it is not at all less singular that such a form should have been adopted, it being in itself the most obvious, and that furnished by natural rock-caverns and grottos. Afterwards this form of roof appears to have been elaborated with great industry and skill, for that of the temple of Mahadeva at Nasik exhibits a perfect model of the most ancient style of dome in the East, and probably anterior to any thing of the kind in Roman architecture. The stones are placed so as gradually to project one beyond the other, the apex being closed by a circular key-stone. The principle therefore is that of a horizontal instead of a radiating pressure, and the edges of all these projections being rounded off, the spectator sees, on looking up, a vault composed of gradually diminishing circles or annular courses of masonry.

In this respect then even the earlier Hindu style presents a marked difference from that of the Egyptians, whose edifices are all covered with flat horizontal ceilings. On the other hand, the affinity between the architectural taste of the two people is strongly marked by the prevalent use we observe, in the edifices of both, of colossal statues placed against piers or walls, sometimes quite attached to or sculptured on them; and which may therefore be considered as much as to constitute part of the general embellishment, as to be specific objects of worship. In both too we find frequent use of Caryatic figures, or such as serve as columns; and either entire figures or the upper parts of them, both human and animal, enter abundance into the composition of Hindu columns and capitals. A strong similarity of system also observable in the general disposition of the sacred buildings of the Hindus and Egyptians, is that the former, like the latter, have generally an open or unroofed court before them (sometimes formed by clearing away the rock itself), leading to a vestibule, nave, and sanctuary, progressively diminishing in size. Neither is it uncommon joined with, in the excavated temples, a series of chambers or small chapels along their sides, increasing their otherwise strong similarity of plan to those of Egypt. The profusion of inscriptions and symbolic sculptures on the walls affords also another characteristic point of resemblance.

On proceeding to consider another class of Hindu works, namely, those of construction, that is, edifices erected above ground, we can hardly avoid being struck by the prevalence of pyramidal masses and forms, as exhibited in pagodas or towers. Whether the Egyptian pyramid originated in the purpose of constructing an artificial rock containing sacred chambers and sepulchres similar to those excavated in natural ones, is merely a hypothesis; neither can we pretend to say that structures of similar outline, among the Hindus, are evidently derived from and imitations of existing masses and pinnacles of rock. Resemblances of this kind afford no positive evidence of intention, being in themselves too indefinite, and depending chiefly on the fancy of the spectator. Still we may be permitted to observe, there is nothing very extravagant in the notion that the forms alluded to were derived from such natural prototypes. In the infancy of art it is probable that stones were rudely piled up one above the other, converging to an apex, as being of all forms the most stable; or else a monolithic fragment of rock was reared up to serve as a monumental record and object of superstitious veneration; and in these we may be allowed to recognise the first advances towards the pyramid and obelisk. At the same time it must be admitted that the Egyptian structures of this kind bear a much closer resemblance to such prototypes than do those of the Hindus. The gopuras or pagoda towers erected over the gateway leading to temples are indeed pyramidal in their general form, but infinitely more, as we shall meet with in Egyptian architecture; being divided into a succession of stories, sometimes to the number of twelve or even more, with doors or rather windows in each, adorned with balconies and pillars. Neither do they terminate in a point or mere platform, but have generally a great deal of ornament bestowed on their summit, which sometimes assumes, not inelegantl, the form of a crown, as that of Deo at Bahar; and there are also instances (of course comparatively modern ones) of their being surmounted by a bulbous dome. Besides this they differ from the pyramid in being of far loftier proportions. As is remarked in the article on Egyptian architecture, in the pyramids the height measures less than the side of their base; but in these Hindu structures it greatly exceeds the width at the lowest part, being often much, or even many times, above the former termination, if not exactly a dome, we have an example in the great pagoda at Tanjore, which is considered one of the finest specimens of the kind in India, and from the annexed representation of which their general character may be understood.

Pagoda at Tanjore.

Among the more considerable ones are those at Chalum baram, Deoghar, Talerat, and Congeram. Those at Deoghar are grouped together; a mode that seems to have been
practised on other occasions, for at Benares there is a group of several pagodas, four of which are now standing quite in the river, two upright, and two in a slanting position; and at Bindrabund on the river Jumna there exists another group of about thirty structures, whose bases, which are ornamented with sunk panels, are neither graduated nor flat, but curving in such a manner that their section is not unlike that of a sugar-loaf: the angles between these faces are filled with projecting ribs, which are inserted in them. These however are not divided into stories like the usual pagodas, in some of which such divisions are very strongly marked, each story being consider- ably less than the former structure on which it stands, so that there is no small resemblance to those of the Chinese. And here it may be remarked that Hindu architecture seems to have some resemblance to that of the people just referred to, as well as to that of the Egyptians.

Besides the two varieties above described, there is another class of Hindu monuments which calls for some remark, namely, the temples erected by the Jainas, or chief sect of the Buddhists. Some of these were erected long prior to the Christian era, and are distinguished alike by chasteness and beauty of design, by rich and exquisite finishing; in short, according to one traveller, they evince the perfection of art, and in symmetry, beauty of proportion, and unity of style, they rival the productions of the classic Europe. That at Ajmeer, which is said by Tod to be, with the exception of the cave-temples, probably one of the oldest now existing in India, is remarkable for the ele- gance of its composition and its production of the Romanesque architecture. The temple is surrounded by a super screen of Saracenic architecture, assigned by Tod to the first dynasty of the Ghorian Sultans. The entrance arch is of that very ornate characteristic of the Saracenic style, and is pronounced by Tod to be the finest Hindu temple. The columns of the entrance are of the analogy observable between the details of the columns in this temple and the orna- ments of Gothic buildings.

We should also refer to the great temple at Barsi, as a structure of most complete and exquisite workmanship. Although placed within an area about 250 yards square, the body of the temple, or sanctuary (mandra), over which rises a pyramid skr, or roof, is only 21 feet square, but the addition of a multitude of polygonal and square por- ticoes composed of four superb columns makes the whole 44 feet by 21. The ceilings are elaborately worked, and that of the portico consists of a single block. Facing this temple are magnificent edifices, on the Nautal Square, or Nuptal Hall, a square of about 40 feet with a double range of pillars on each side forming open colonnades. Its skr is the frustum of a pyramid, each stone of which is elegantly carved, and gradually decreasing in size to the bulla or ball. In some of the older Hindu edifices (not excavations, but constructions) there is a decided Egyptian physiognomy; and the ruins of Bheeme Chaori in the Mokinda are considered by Tod to exhibit the link between the two styles, which, though they have very much in com- mon, have also little that is peculiar to each. Not only do they assimilate in employing the pyramidal form, but the web of its own advantages in the distribution of masses or parts, and the classical styles of ancient Europe, but the religious edifices of both people have very marked and important features in common, with which Greek architecture offers us nothing at all similar to a section of the Egyptians, though something analogous in purpose. It is true, when we compare them together we see as much struck by the specific differences as by the generic resemblance between the pro- gress of the Egyptian and the Greek art. The entrance to the Hindu temple. For besides being divided into stories, the latter are otherwise far more varied and complex, and display a lavish profusion of detail and subdivision of parts far exceeding those we have been used to in the Egyptian, though perhaps simplified, and certainly not to be found in those of the same class as the one here referred to.

In fact, however highly enriched many Egyptian buildings may be, the mode of decoration employed in them is not of a kind to interrupt the simplicity of the outline, it being almost entirely superfluous, that is, merely enriching surfaces, as though they were brought another grade of decoration to the other globes, or pious, which the Hindus seem frequently to have affected the extreme both of massiveness and lightness in the same design, attac- ing very slender and merely ornamental pillars to enor- mous piers, which are the real supports. Of this we have ample proof, for on one occasion, at least, we have observed that the pillars which support the archway in the choultry at Madura; at which latter place there is also another remarkable monument of Hindu architec- ture, namely, the great temple, with its four gigantic porticoes, which are surmounted by lofty pyramids, or rather, in ten stories, whose faces have projecting breaks; conse- quently they deviate still more from the simple pyramid form. The Kheema Khumb, pillar, or rather tower, of vic- tory at Patna, is a sort of stately temple, consisting of a long in plan, and the breadth of each side 35 feet at the base, and 178 immediately below the cupola. Each story has doors or balconies adorned with pillars, so as to resemble small porticos. Here we must close this imperfect sketch of the subject, without touching upon that later style introduced into Hind- ustan after the Mohammadan conquest at the close of the 16th century. But we cannot forbear mentioning two of those remarkable monuments to which this latter beam, and some of its features to our own pointed architecture. Hedges refers us to the mosque at Chunar Gung on the Ganges, as a proof of the perfect similarity of the architecture of India brought into the western world, which is doubtless partly brought into Europe by the Moors of Spain. 'All the minster ornaments,' he says, 'are the same, the lozenge square filled with roses, the ornaments in the spandrels of the arches, the little pavilions and their supports, and every feature of the front of a person would almost be led to think that artists had ar- rival from the same school, at the same time, to erect simi- lar buildings in India and in Europe. Unfortunately his stone plates do not exhibit a single example of what he called Gothic, than do the Moorish edifices of Spain. But in both we recognise one characteristic peculiar to the latest style of our English Gothic, namely, the arch being enclosed within a large square-headed panel. There are however many features in Mohammedan architecture which stamp it distinctly from the Moorish style in the west of Eu- rope. Among these are its numerous bulbous domes, which are frequently applied even to minarets; and the projecting balconies, surmounted by appendages of various sorts of very projecting balconies, supported on massive canti- levers or consoles. One of the most splendid and perfect examples of this later style is the celebrated Taj Mahal of Agra. An example of a smaller character is the Béng-ha-chow, or the tomb of the wife, in the 17th century. 'It stands,' says Bishop Heber, 'in a square area of about 40 English acres, enclosed by an embattled wall with octagonal towers at the angles, sur- mounted by open pavilions, and four very noble galleries of red granite, the principal one of which is inlaid with white marble and has four high marble minarets. The space within is planted with trees and divided into green alleys leading to the principal building, which is a sort of solid pyramid surrounded entirely with colonnades, galleries, and domes, diminishing gradually, till it ends in a square platform of white marble, surrounded by a most elaborate lattice-work of the same material, in the centre of which is a small altar, or a white marble, crowned at the top by a super- imposing delicacy and beauty.' From the description Forbes gives us of a Dewal, or temple, not long erected when he saw it, consisting of two edifices, the farthermost of which was the pyramid, and was surrounded very gradually diminising to the summit, with appropriate orna- ments, it would appear that the Hindus of the present day are no mean architects.

The results of Hindu architecture of the Hindus,' Lond., 1834, by Rám Ras, is curious as giving the technical rules, derived from anterous treatises, but they are so dry in them- selves, and so mingled with nonsensical superstitions prac- tically of little value to the student, either historically or artistically. HINNITES. M. Daembrace gave this name to a few fossil species of conchifera monommatis, which occur in
supracrustacean strata; one (H. Duboissoni, of Sowerby) is found in the English crag.

HIZOUAN. [ANZOUAN.]

HIPPA. HIPPAA TRIBE, Hippidae of Latreille, Hippians of M. Milne Edwards, the latter of whom thus describes those crustaceans belonging to his family of Pterygura.

The tribe is composed of a small number of anomalous crustaceans which appear to be especially framed for burrowing in the sand, and which present extraordinary forms. The carapace is longer than it is wide, and very convex transversely, presenting always on each side a great lamellar prolongation, which more or less covers the base of the feet; it is truncated posteriorly, and appears to be continuous with the anterior portion of the abdomen, which is very wide and lamellar laterally. One of the pair of antennae is always very long. The external jaw-feet do not present a conformation like that which is observable in the greater part of the crustaceans treated of in the prior part of M. Edward's system; they have neither flagrum (fouet) nor palps, and their three last joints are very well developed. The sternum is linear, and the feet are imperfectly extensible; those of the first pair are monodactylous, or subcheliform, and those of the two or three succeeding pairs are terminated by a lamellar joint proper for burrowing. The posterior feet are filiform, semimembranous, recurved forwards, and hidden between the lateral parts of the carapace and the base of the preceding feet. The penultimate ring of the abdomen is always furnished with a pair of false feet, terminated by two more or less oval curled blades or laminae; but these appendages have a forward curvature, and are not applied against the seventh segment so as to form with it a fan-shaped calceal-fin, as in the Macrura. The calceus are on the first joint of the third pair of feet. The branchiae are disposed on a single line and inserted by a peduncle which rises near the lower third of their internal surface.

This tribe is divided into three genera, which M. Milne Edwards distributes as follows:—

External antennae large, short, and subcheliform.

Anterior feet sub-dactylous.

Genera.—

Remipes. (Latreille.)

Carapace nearly regularly oval, convex, and less than once and a quarter as long as it is wide. Front rather large and truncated. Orbis semicircular, and their external angle much more projecting than the frons. The ophthalmic ring is covered above by the front, but is not surrounded by the carapace; the ocular peduncles are composed of two movable portions, one basiocular, which is stout and short, the other terminal, cylindrical, slender, carrying at its extremity a very small imperfectly retractile cornua; the eyes, in fact, can scarcely be turned backwards, as in the greater part of the Decapods, but advance and recede a little by the motion of the basiocular portion of their peduncle. The internal antennae are inserted below the base of the ocular peduncles, and are very large; their basiocular portion is composed of three joints nearly of the same size, and their terminal joint consists of two long filaments which are multi-articulate, stout, and directed forwards. The external antennae are inserted within the internal, nearly on the same line, and under the lateral anterior edge of the carapace: they are short but very large; their first joint is much wider than it is long; the second and the third are nearly of the same dimensions, and the succeeding joints diminish rapidly in volume. The ocular frame is not closed anteriorly. The external jaw-feet are short and wide; their first joint is nearly globular, and carries neither palps nor flagrum; the second joint, which is so large in the Drachyura, is rudimentary here; and it is the third, which, become very large and nearly cylindrical, contains solely the species of operculum formed ordinarily by the second and third joints united; the three last joints form a sort of large claw, which applies itself against the anterior border of the third joint. The jaw-feet of the second pair are equally destitute of the flagrum, but have a filiform palp; it is the same with the anterior jaw-feet; their palp is lamellar, dilated anteriorly and disposed nearly as in the Oxystomes. The jaws of the second pair present nothing remarkable; those of the first pair are very small. The mandible, which is strongly dentilute, is furnished with a palp composed of two small lamellar joints, separated from the body of the mandible by a large membranous furrow. The tertiurn is linear. The anterior feet are long; their second and third joints are enlarged; but the three last are cylindrical; and the last, which is nearly as long as the preceding one, is slightly flattened, pointed,
and incapable of being bent back upon it. The two following pairs are large, and terminated by a large hastiform lamina; the fourth pair are held by a small nearly conical joint. The fifth pair are slender, long, and membranous, and are bent back upon the lateral prolongation of the carapace. The last thoracic ring, which supports these appendages, is composed, movable, and not covered by the carapace, so that it might be easily taken for the first abdominal segment. The abdomen is very large, and presents on each side a lamellar oval prolongation which rides upon the carapace; its anterior border is notched for the lodgement of the second abdominal ring, which is oval; the third and fourth segments diminish progressively in volume; the fifth and sixth are equally small, but are soldered together; and the seventh has the form of a great triangular lamina, the length of which exceeds that of all the rest of the abdomen. The three first rings in the female are furnished with simple oviferous filaments; the fourth and fifth rings are without appendages, while the sixth ring carries a very large pair of false natatory feet, terminated by two raised oval plates which are ordinarily bent forwards.

(M. Edwards.)

Example, Remipes testudinaris. Length of carapace about 13 lines.

Locality, the coast of New Holland.

Remipes testudinaris.

When Fabricius established the genus it was much more extensive in its limits, and at present it only contains those Hippians whose external antennae are terminated by a long and stout multi-articulate filament. Body oval, or rather ellipsoid, being rather less wide forward than backward. Carapace truncated posteriorly, very convex transversely, and presenting towards the middle a transversal curved furrow which indicates the posterior tenuity of the stomatral region; its lateral anterior border is concave, but its lateral posterior border is very convex. The rostrum is small and triangular, and on each side of its base is a notch which exposes the insertion of the ocular peduncles and the internal antennae, and which is bounded externally by a projecting tooth which advances above the internal edge of the great antenna. The ophthalmic ring, which is covered in its mesial part by the rostrum, is of a horse-shoe shape, and its two extremities are exposed; the ocular peduncles, inserted at its extremity, are composed of three pieces, and of these the two basalar, which are very short, are bent under the carapace in the form of V, and the last, which is slender, cylindrical, and very long, advances between the internal and external antennae, and terminates by a small pyriform enlargement which carries the cornea. The internal antennae are of moderate size, and their basilar joint, which is cylindrical and a little curved downwards, is hardly larger than the succeeding one, which is furnished on the external side with a strong tooth directed forwards; the third joint is short, and gives insertion to two multi-articulate stemlets (tigelles). The external antennae are very large, but easily escape observation, for they are ordinarily bent backwards and hidden almost entirely between the mouth and the external jaw-feet. The first joint of their peduncle is small and but little apparent; the second is large and armed anteriorly with two spiniform teeth, the external of which is much the strongest; the two succeed-
certain that he drew his catalogue of stars, and nearly all the observations on which his theory is founded, from Hipparchus, the article just alluded to would necessarily contain all that is to be said on the subject. We shall therefore here present ourselves, without entering into the whole which Hipparchus is said to have written, and the resumption of his labours given by Delambre.

The titles of the writings attributed to Hipparchus, on whom Ptolemy has fixed his eyes, are:—
1. \( \text{περὶ τῶν ἀνάπλων ἀναγραφῆς} \) (the love of truth), have been collected by Fabricius, and are to be found in Weidler, as follows:—
   1. \( \text{περὶ τῶν ἀνάπλων ἀναγραφῆς} \)
   2. \( \text{Περὶ μεγάλης καὶ ἄνω κατηγορίας} \)
   3. \( \text{De \ xi. Signis \ Ascensionis} \)
   4. \( \text{Περὶ τῆς} \)
   5. \( \text{Περὶ μεγάλης καὶ ἄνω κατηγορίας τῶν} \)
   6. \( \text{Περὶ Ἱερότικους καὶ ἄνω κατηγορίας} \)
   7. \( \text{Περὶ τῆς} \)
   8. \( \text{Περὶ τῶν ἰσαμετακώς τῶν} \)
   9. \( \text{Περὶ τῶν ἰσαμετακώς τῶν} \)
   10. \( \text{Περὶ τῶν ἰσαμετακώς τῶν} \)

The following summary is from the preface to Delambre's History of Ancient Astronomy, in which work will be found the most complete account of the labours of Hipparchus. The facts of this historian seems to be, to add to Hipparchus some of the fame which has been generally considered due to Ptolemy, for which he gives forcible reasons.

The following is the summary:—
1. Let no one be surprised at the errors of half a degree which we attribute to Hipparchus, seemingly with reproach. It must be remembered that his strobe was nothing but a spheroidal mirror, of no great diameter, and with very small subdivisions of a degree; as well as that he had no telescope, vernier, nor micrometer. What should we do even now if deprived of these helps, and if we knew neither the refraction nor the true altitude of the pole, on which point, even at Alexandria, and with arums of every sort, an error of a quarter of a degree was committed? At this day we dispute about a fraction of a second: they could not then answer for any fraction of a degree, and might be wrong by a whole diameter of the sun or moon. Let us rather think of the essential services which Hipparchus rendered to astronomy, of which science be the true founder. He was the first who gave and demonstrated methods of solving all triangles, whether plane or spherical. He constructed a table of chords, of which he made nearly the same use as we now do of our tables of sines. He made many more and much better observations than his predecessors. He established the theory of the sun in such a manner that Ptolemy, 263 years afterwards, found nothing to change. It is true that he mistook the inequality of the sun's motion: but it can be shown that his mistake arose from an error of half a day in the time of the solstice. He himself avows that he may have been wrong by a quarter of a day; and we may always safely suppose that, without impeachement of an author's integrity, his self-flow may halve the error which he is really liable to commit. He determined the first inequality of the moon (the equation of the centre), and Ptolemy found nothing to change in his result: he gave the mean motion of the moon, and that of the apogee and nodes, in which the corrections made by Ptolemy were slight, and of more than doubtful goodness. He had a sight of the second inequality (the equation); it was he who made all the observations necessary for a discovery of which the honour was reserved for Ptolemy; a discovery which he had not perhaps time to finish, but for which he had prepared every thing.

1. The bias above alluded to proved out here a little too much.
HIPPOCRATES, a genus of the natural family of Hippeastrum, so named after Hippocrates, and which might therefore be expected to contain many useful or medicinal plants. It is not so. The species consist of moderate sized trees, which are found in the hot parts of the world, as in the tropical parts of America, in Sierra Leone, the warmer parts of India, and the island of Timor. The genus is characterized by having the calyx 5-leafed, but very small. Petals 5, usually hooded at the apex. Stamens 5, usually united at the base, and being free at the apex. Carpels 3, samaroid, bivalve, valves keeled and compressed. Seeds winged from the funiculus being widely expanded. The fruit of some of the plants of the family is eatable, but that of most of the species is starchy and are mentioned as being of any use; those of H. commosum, being oily and sweet.

HIPPOCRATES was born at Cos, B.C. 460. His family followed the pursuit of medicine for near three hundred years, and produced seven physicians, who attained considerable celebrity, and who are supposed to have written the numerous treatises which are commonly attributed to Hippocrates alone. Before their time the knowledge of medicine was either derived from the priests, or employed their skill in maintaining their influence over the people, and carefully concealed the little knowledge they possessed, or was merely followed as a subordinate pursuit. The science is supposed to have been introduced to the Athenians by Thasos, and that the science of medicine is indebted for a separate existence, and the great progress which it made in their hands after this separation sufficiently proves the worth of the treatises.

The most celebrated of the family was the subject of the present notice, Hippocrates, the son of Heracleides and Phanarete, who is supposed to have been the author of this important revolution in medicine. It could have been extremely interesting to give some details of his personal history, but unfortunately we possess but few authentic materials for this purpose, except some fragments contained in his life by Soranus. His medical studies were pursued under the immediate dependence of his father and of Hercoleides, and he is said to have had for his masters in philosophy, Gorgias of Leontini, the celebrated sophist, and Democritus of Abdera, whose cures he afterwards effected. We are told that he spent some time at the court of Perdiccas, king of Macedon, and visited Thrace and Scythia; and it is probable that these statements are true, as mention is made in his writings of several towns in Thrace (Suidas, 'Iro-

Douris). Soranus states that he delivered 'other treatises from the ravages of a dreadful plague which was raging in the city; but this can hardly be the one which occurred in the second year of the Peloponnesian war, of which such a calamity was seen by Thucydides. For though Thucydides suffered from the disease himself, and was witness of its ravages, he makes no mention of the name of Hippocrates, but on the contrary declares that medical skill was of no avail against it. But we find that many of the works usually attributed to Hippocrates were in reality the productions of various members of his family. This circumstance alone would render it impossible to determine accurately the amount and value of his contributions to the science of medicine. But this difficulty has been still further increased by the manner in which his writings were mutilated, and fresh passages interpolated by later editors. This confusion is supposed to have been initiated at the time when the Ptolemies were forming their celebrated library at Alexandria, for the high value which was set upon ancient writings by these monarchs induced men to endeavor to possess copies of ancient authors, which had previously been passed off for the genuine works of those to whom they were attributed. It appears that in the time of Galen they were able in some degree to distinguish the genuine writings of Hippocrates from those falsely attributed to him. All the writings assigned to Hippocrates by the Byzantine historians are in the new dialect, but he does not adhere so closely to its forms as Herodotus.

The principles of Hippocrates were those of rational empiricism. He did not attempt to form his theories from a priori reasoning, but he observed the phenomena of nature and deduced from them such conclusions as these phenomena would justify. That he adhered to this principle in all cases, however, is not to be supposed. He thought that the body is composed of four primary elements—fire, water, earth, and air; that these elements, variously combined, produce the four cardinal humours, and these again the different organs of the body. These doctrines are principally developed in the treatise 'On the Nature of Man;' and Galen asserts that he was the author of this treatise, which was afterwards adopted and more generally promulgated by the genius of Plato. His knowledge of anatomy seems to have been very limited. The superstitions which was paid to the remains of the dead among the Greeks preceding Hippocrates were rigidly kept down by the subject by dissection of the human body. He gives such descriptions of the bones as show that he had indeed studied the subject, but not acquired any very accurate knowledge. The medicine of Hippocrates is fresh (species), and though such explanation is given of them in the treatise 'On Art,' this is probably spurious. The term phæle (phæle) is applied indiscriminately to the veins and arteries, while arteria (arterios) is confined exclusively to the trachea. His description of the veins is connected to the course of some of the larger ones, without expressing any opinion as to their origin. He does not seem to have supposed that they originate either in the heart or liver. These views were afterwards adopted and more generally promulgated, under the term nerves (vetera) he confounds all the white tissues of the body, the nerves, properly so called, the tendons, and ligaments.

According to Hippocrates the function of medicine is to aid nature in fighting disease. In his pathology he confines himself principally to the investiga-
tion of the remote causes of diseases, without entering into many speculations on their nature. However he ex-

plains the cause of the passage of the very fever, which did not previously contain it. In this case we still require to be informed how the blood passes into these parts. He paid great attention to the effects of changes in the external conditions of life, namely, air, warmth, moisture, and cold, and related, upon the progress of the disease. He has also committed that particular attention should be paid to the constitution of the seasons.

Among the doctrines of Hippocrates, that of critical days, upon which he supposed the recession of the menses matter when concocted to take place, is the most remarkable. In his 'Præmonitions' he says, fevers come to their crises on the same days, both those which turn out fatal and those which turn out well. These days are the fourth, the seventh, the eleventh, fourteenth, seventeenth, and twentieth. The next stage is of thirty-four days, the next of forty, and the next of sixty. It appears very probable how this theory was born out by actual ob-
servation, but it is possible that it may have been more nearly true under the treatment of Hippocrates, which was not usually very active, than under the more energetic treatment of modern physicians. Of the indications to be obtained from the pulsation of the patient, then aware, and the word ephygmos (ephygmos) is usually employed by him to denote some violent pulsation only. It is how-
er upon the accuracy with which he observed the leading features of disease. And his vivid description of the fame of Hippocrates is principally and justly founded. Nowhere is the peculiar power of the Greeks in expressing their conceptions more strikingly shown. We have ex-
ttracted one or two of the most marked descriptions from his 'Prognostics.' 'If the appearance of the patient be different from usual, there is danger. If the nose be sharp, the eyes hollow, the temples collapsed, the ears cold and contracted, the patient is a stranger, when he is a stranger. If he is hard, dry, and stretched, and the colour of the face pale or black or livid or leaden, unless these appearances are pro-
duced by watching or diarrhoea, or under the influence of malaria, or the consumption of any fever, which goes under the title of Faeis Hippocrates. Again how well does he recommend us to observe the position of the patient in bed? 'If he lies upon his side with the neck and arms and legs slightly bent, and the whole body in a flexed position, since this is the best post-bed, but if he lies on his back, with the legs and arms extended; and still more if he keeps sinking towards the bottom of the bed, or tosses his arms and head into unusual positions, our observation is that this is the surest sign of an acute disease the hands are waved before the face, as if seeking something in the air, or brushing and picking notes from the walls or bed-clothes, the prognosis must be unfavourable.' In the remainder of this treatise he goes through the different evacuations from the bladder and
HIP 243

the bowels, by vomiting and by expectoration, describing their characters and appearances, and the conclusions that may be drawn from them. He has observed that the children in the appearance of ulcers before death, that they become pale and dry or livid and dry; and of pus, he says that it is best when white and uniform and smooth, and with a little bad odour as possible. The various symptoms are thus attached to which he has been led by experience. His directions for the examination of a patient supposed to be labouring under empyema present an example of sound and cautious investigation. "If there is empyema on one side of the chest, we must not wait for the symptoms to develop, for the disease may be present in two sides, and if one side be hotter than the other; while he is lying on the sound side, we must ask if he feels any weight hanging from above. For if this be the case, the empyema is too large for him to sit upright."

We may recognise the presence of empyema by these general signs:—if the fever does not remit, but is moderate during the day and increased at night, and considerable purpurae occur, and there is great inclination to cough and but little expectoration; while the eyes become hollow, the cheeks are flushed, the finger-nails curved, and the fingers hot, especially the tips, and the feet swell, and pustules are formed over the body.—Cough is usually one of the symptoms; chronic empyema, and may be only relieved by repeatedly siphoning the pus. We must not forget that Hippocrates asserts that auscultation may be employed to distinguish between the presence of pus and serious fluid in the cavity of the pleura. No attention seemed to be paid to the symptoms of empyema, which is extremely rare, but which he had observed in the time of Laencrenas's great discovery, by whom the passage is noticed and referred to. The statement of Hippocrates is in itself incorrect, but the fact of his having accu-
taneously treated the disease, is of the greatest interest.

Hippocrates appears also to have introduced, some valuable improvements in the treatment of disease. During health he recommends that the diet should not be too exact, lest any unavoidable changes should届时 indicated. When he was speaking of the diet, he says it should not be taken during the summer, but in the winter he allows a more liberal use of it. In his treatise 'On Diet' he claims to have been the first to recognise the importance of diet in the treatment of disease, which had been neglected by all previous physicians. He makes use of the statement to support his observation, and in this statement he is in some measure borne out by the authority of Plato (De Rep. iii. 14), who praises the antient physicians for having neglected it; whereas the modern ones, by this system, convert life into a tedious death. However he attributes the introduction of the new system to Herodius. In fevers and acute diseases he confined his patients to a liquid diet, but not so strictly as some other physicians; and he was careful to ascertain the patient's meals by the character of his urine. In his general treatment he employed purgatives, some of which were of the most violent character, as the black and white hellebore and eunatum, which generally produce excessive vomiting at the same time. He made use of his treatment, for he would not allow purgatives to be employed unless the humours were duly concocated. To relieve the head in certain diseases he was accustomed to make use of aternatorums. In acute affections, when the disease was violent, he employed bleeding, and recommended that blood should be taken from as near the affected part as possible. This was the origin of the doctrine which recommended bleeding in aeurysm from the arm on the side affected. He also made use of cupping-glasses, with and without scarification. Certain diuretic and sudorific medicines also entered into his pharmaconidia, and he was not ignorant of the virtues of many other drugs.

In the time of Hippocrates the distinction between medicine and surgery had not been made, as we find among the works usually attributed to him, and contained in the list of Eramus's treatise on ulcers. He wrote on all the parts of the head. In the latter he was in the habit of employing the trephine, and gives directions for its use. However, in the oath of Hippocrates the pupil is made to swear that he will not attempt the operation of ligation, but give it up to the surgeon. In his treatise 'On Injuries of the Head' he remarks that convulsions usually take place on the side of the body opposite to the injury.

We find that consultations were not unknown in the time of Hippocrates, but of a very different kind. Pneumaticians say that a physician ought not to be ashamed to call in the assistance of another, if he finds himself at a loss in the treatment of his patient. The oath which he adminis-
tered to his pupils shows the high sense he had of the duties and responsibilities of a physician. The pupil is made to swear that he will not allow 'himself to be observed in the chirurgery of his master, or his father, and his descendants as brethren; that he will use his art to the benefit of his patients, and never to their injury or death, even if requested; that he will never attempt to cut upon the body, except he be chaste, and never divulge any professional secrets. Simplicius says in his commentary in the treatise 'On the Physician,' but it is doubtful whether this is a genuine production of Hippocrates. As we have remarked above, Hippocrates wrote in the tone of a dialect, though he has been generally supposed to have been actually written in the dialect, which was but imperfectly comprehended by the Dorians. His style is remarkably concise, so as to render his meaning at times somewhat obscure, and it would appear that he occasionally makes his statements too briefly to be comprehended, with exceptions. The high estimation in which his works have been held is proved as well by the general reputation of his name, as more especially by the numerous commentaries on them which have been published in all ages. It will be sufficient to mention the names of Auspiades of Rufus Ephesianus, of Celsus, and of Galen, who have all commented upon his writings. Galen declares that we ought to reverence them as the voice of the Deity, and that if he has ever written too much or somewhat obscurely, he has never written anything which is not to the purpose. His knowledge of anatomy and physiology, and of the processes which go on in the body during health and disease, is in some measure due to the fact that the ancient physicians had observed the symptoms of disease and in the fidelity of his descriptions he has rarely, if ever, been surpassed. It is upon these grounds that he has justly obtained the title of 'the Father of Medicine,' and many others continue to command the respect of his medical descendants.

Hippocrates is said to have died at a very advanced age at Lirissa in Thessaly. The essays of which he is the reputed author are said to be 150, and 200 commentaries on them do not allow more than 15 or 20 to be genuine. The most esteemed of them are the essays on Air, Water, and Locality; the first and third books of that on Epide-
mies, the Aphorisms, the Essay on Prognostics, that on the Sounds of the Sea, and that on the Sick in Acute Dis-
cases. The best editions of his works are those of Fossius, Frankl., fol. 1595, which was reprinted several times; of Linden, 2 vols. 8vo., Amsterdam, 1665; and of Mack, 2 vols. fol., Vienna, 1743—1749. There are also several other editions, some of which have been sufficiently commented upon. From a list which Fossius gives of all the works published upon them previous to 1595, it appears that 157 authors had written upon the topics contained in these volumes. Many of these, and upon the rest of his essays would be sufficient by themselves to form an extensive library. Many of the treatises have been edited separately. There is a complete German translation of the Aphorisms by J. P. C. Grimm, Altenburg, 1781—1792, 4 vols. 8vo.

(Sprengel, Histoire de la Medecine, tom. 1.)

HIPPOLYTE, the name of a genus of crustaceans be-
longing to tribe of Palaeonemidae. [PALAEOMINAE.]

HIPPOMANE MANCANINA, the manchineel-tree, is a plant which has as bad an American reputation as that of the upas-tree in the Indian Archipelago. It is a tree of very considerable size, and of a handsome aspect, belonging to the natural order Euphorbiaceae; and among the most poisonous of all known vegetable productions. The leaves are alternate, ovate, acute, serrated, and shining, with a roundish depressed gland between the blade and the petiole. The young leaves are small, white, pellucid, and on slender axillary spikes, the lowermost only being female, all the others male. The male flowers grow in clusters, and have each a small calyx of two sepals, containing a single rudimentary pistil. They have a calyx of three sepals, a round ovary crowned by six or seven re-
flexed stigmas, and containing as many cells. When the fruit is ripe it is a fleshy yellowish-green round body, very like a European crab-apple. The tree is common in the West Indies, throughout the tropical regions, and is extremely noxious. In some places it forms thick woods, as upon Sandy Island, near Tortola, to the exclusion of all other vegetation, for not a blade of grass will grow beneath its branches. It produces a white, milky juice of the most venomous description; dropped on the skin it produces a sensation of severe burning, followed by a blister; and the fruit, when bitten, causes dangerous inflammation.
of the mouth. This is denied by some of the West Indian settlers, but is undoubtedly true, according to the elder Jacquin, and to the more recent testimony of Mr. Schomburgk, who suffered severely from having tried the experiment of eating the fruit. Jacquin however asserts that to sleep beneath the shade of the manchineel-tree is not dangerous, as is commonly reported. But Mr. Schomburgk says that if rain passes through the branches and drops upon the skin of a person below them, it produces severe inflammation, and that the dew which falls at night causes the same effects, as he saw in certain cases which came beneath his own observation; but he adds that it acts differently upon different persons, he himself not suffering any inconvenience from rubbing the juice on the skin. But while the dangerous qualities of this tree are thus undoubted, it is very uncertain whether the poisonous quality, which, it is believed in the West Indies, the land-crabs acquire from the manchineel-tree is really owing to that cause. Jacquin denies it, and Mr. Schomburgk could obtain no proof that it is so; all that is certain is, that land-crabs are frequently found under the shade of manchineel woods, and that those animals are often poisonous. The wood of this tree is represented to be of fine quality, handsome, and well suited for cabinet-makers’ purposes.

Hippomone, a genus of Dorsibranchiate Ammonoids, considered by MM. Audouin and Milne Edwards to approach the genus Amphimone. Hippomone is deprived of a caruncle and has only a single packet of bristles to each foot and a single cirrus.

Hippopoda, a genus established by MM. Quoy and Gaimard for a marine floating mollusk which M. De Blainville considers identical with Protonodes of Lesueur’s MSS., and places under his (M. De B’s) Physegrada.

Hippopo’diüm, a genus of Conchifera Dimyaria proposed by Mr. J. Sowerby in the ‘Mineral Conchology of Great Britain.’ It includes only one British species, Hippo’podium, which is found in the seas.

Hippopotamus, the Roman name for the River-horse (ὢρυχος ρηχαμος of the Greeks), and retained by modern zoologists as the generic appellation of the animals of that Fychydermatous form.

Dental Formula:—Incisors 4↓1-1↓1↓1 Canines 1↓1↓1↓1 Molars 7-7↓6↓4 = 38.

Cuvier remarks that there is no animal that requires to be more studied at different ages than the Hippopotamus, in order to acquire a perfect knowledge of the molar teeth, which change their form, their number, and their position; and in his Oeuvres Fléssies he goes into minute details of those changes.

In the upper-jaw the first incisor is conical, straight, and a little worn on its internal side; the second is equally conical, but curved inwards. The canine-tooth is short, and cut, as were, obliquely, in consequence of its abrasion against its opposite. The four molars which succeed the canine are strictly false molars. The first is very small, is shed as the animal advances in age, and is not reproduced it is separated by an interval from the rest of the molar teeth. These, nearly of the same size, are also shed during the youth of the animal, are replaced by others, and the first teeth are more complicated than the second. When these, the true and permanent molars, are worn by use, they exhibit the form of a trefoil on their crowns. The three last resemble each other generally: they are composed of four large tuberces approximated in pairs, and conical before the points are worn by attrition consequent on mastication. After the first effects of abrasion, they each present, by the contour of the enamel, the figure of a trefoil, or, in other words, three-lobes disposed more or less regularly in the form of a triangle; but as the abrasion proceeds and the tooth is farther worn down, they exhibit the form of a cross with a disk in the middle.

In the lower-jaw the first incisor is long, subcylindrical, terminated in a point, and a little worn on its external side. The second is of the same form as the first, but much smaller. The canines are enormous tusks sharpened into a somewhat chisel-like edge, the polished and abraded internal surface of which presents a shape inclined to elliptical. The molars form a continuous series; the first and the second are false molars, the first being the smallest, and dropping as the animal advances in age, never to be replaced. The four succeeding teeth exhibit the same general forms as those of the upper-jaw. The first, which is smaller than

HIPPO'NOE, (P. Cuvier.)

Teeth of Hippopotamus.
the others, has an anterior isolated tubercle: the succeeding teeth are nearly of the same size, and have also an isolated tubercle, but it is posterior. (Hippopotamus of S. Africa.)

Cuvier makes the first section of his second family of Pachydermatous Mammifers (Ordinary Pachyderms) consist of those which have four, three, or two toes; and these he separates into two great genera, the Hippopotami and the Hogs [Suidae]. The Hippopotamides are further characterized generally as having on all their feet four toes, which are nearly equal and terminated by small hoofs (sabots), an immensely massive body destitute of hair, very short legs, a belly trailing against the ground, an enormous head, terminated by a large tumid muzzle which encloses their great anterior teeth, a short tail, and small eyes and ears. Their stomach is divided into many compartments. They live in rivers, on roots and other vegetable substances, and are ferocious and stupid. The genus is placed by Linnaeus among his Bellua, between Equus and Sus. Mr. Gray brings it under the Elephantidea, his third family of his fifth order, Ungulata, as a genus of his subfamily, Hip- popotamina, and inquires whether the form be not allied to the Halicorides. (Annals of Philosophy, 1825.)

**Organization.**

_Skeleton._—The skeleton of the Hippopotamides approaches that of the ox and of the hog; but it presents differences which distinguish it from that of any other animal. The skull, whilst in the connexion of the bones and the arrangement of the sutures, it bears great similitude to that of the Suidae, has its own peculiarities, which render its form extraordinary.

The number of vertebrae are 7 cervical, 15 dorsal, 4 lumbar, 7 sacral, and 14 coecygal = 47. The atlas and the axis, besides the ordinary articular facets, have each two others also towards their dorsal aspect; but taken as a whole, the cervical vertebrae approach nearest to those of the hog. There is nothing very remarkable about the rest of the vertebrae, except that their bodies are rather flat. There are 7 true and 9 false ribs of a side = 36, nearly as much arched as those of the Rhinoceros, but distinguishable from them, as well as from those of the Elephant, in as much as they are much wider and flatter at the part nearest to the vertebrae than at the opposite end. The anterior part of the sternum is compressed into a ploughshare-like shape and very much prolonged into an obtuse point below the first rib. The rest is depressed, and the number of pieces is seven. The scapula may be easily distinguished from those of the Rhinoceros and Elephant, being larger than that of the first and less than that of the second, and also differing in form. In its general aspect this bone reminds the observer a little of the scapula of the Hog, but approaches nearer to that of the Ox in the more essential characters of the spine and articulating surface. The humerus bears a singular resemblance to that of the Ox; while there is some similitude to that of the Hog, which is however less in proportion towards the bottom. The radius and ulna are anehylosed at an early age, leaving on the outside only a rather deep furrow which occupies only three-fourths of the length of the radius, and on the inside a simple aperture towards the upper fourth part. These bones of the fore-arm resemble those of the Ox very much, but those of the latter are more elongated, and the articulating facets of the lower head of the bone are, in the last-named animal, less oblique. There are in the carpus points of resemblance to the Hog; but its characters distinguish it both from that quadruped and the Ox. In the metacarpus, all comparison with that of the Hog ceases. The pelvis is.
easily distinguishable from those of the Elephant and Rhinoceros, from the smaller width of the ilia in the Hippopotamus and other differences. The Ox perhaps approaches it more closely in these parts; but, besides other discrepancies, the lower part of the pelvis and especially the oval holes are much more elongated in the Hippopotamus. The sacrum is very large, but the bones of the pubis project but very little. The femur, which possesses a ligamentum teres, is the largest of the lower extremity, and its head is projected throughout, regularly cylindrical anteriorly. The great trochanter, which is compressed laterally, does not exceed the height of the head of the bone; the small trochanter is moderate; there is no third, as in the Rhinoceros, the Tapir, and some other animals, which is so common over the head of the bone of the great ruminants; though the upper head of the bone is much more detached and more spherical, and the lower head is much wider, especially behind. These differences will assist in distinguishing it from the femur of the Ox: that of the Giraffe, which, being of the same size, might more readily be mistaken for it, may be known by its more approximated upper head, its relatively larger condyles, and the more elevated and projecting internal edge of the lower articulating surface. The femur of the Hog more resembles that of the Hippopotamus in the upper part, but much less below; and its dimensions prevent the possibility of confusion. The head is comparatively large; and in this respect it is beyond that of any other quadruped, especially at the extremities. It approaches nearest to that of the Ox, but the latter is more elongated, and differs in other respects. The tibia of the Hog is also more elongated in comparison, and affects a long line. The fibula is very slender. It is throughout very distant from the tibia, except at the two extremities. The malleolar bone is anchylosed to the lower extremity. The tarsus is framed principally on the plan of that of the Ox.

Digestive Organs.—From the structure of the teeth we are led to the inference that the quantity of vegetable substance submitted to the action of the digestive organs of the Hippopotamus must be very great. The animal takes its nourishment from the mass. The principle on which the jaws and teeth are constructed seems to be a principle for rudely tearing and dividing, but not comminuting or masticating the food, by which means the staple food of the animal. The jaws are so constructed that the process executed by them is more a bruising than a grinding process. The food therefore transmitted to the stomach has undergone but little altering internal edge of it from the mass employed in extracting from the course and ill-prepared load the greatest amount of nutritious matter. The stomach of a full-grown Hippopotamus is said to be capable of containing five or six bushels, and the large intestine is of a size commensurate with that to a length of it is stated to be eight inches in diameter. The Hippopotamus mentioned by Mr. Burchell ('Travels in South Africa') was considered to be only half grown, but three bushels of grass in the form of chaffy vegetables were taken from it, and its stomach and intestines.

Reproduction, Food, Habits.—The time of gestation is stated to be nine months; but this does not seem to be accurately ascertained. The birth takes place on the land; and on the slightest alarm both parent and young take to the water. Thunberg, during his visit to Caffraria (1773) was assured by an eye-witness that he, having watched, when on a hunting party, one of these animals which had gone up from a neighbouring river to calve, lay still with his company till the calf was produced, when one of the party fired and shot the mother dead. The Hottentots immediately took their hides and bones, to take their flesh alive, but its instinct saved it, for it made for the river, and escaped. The food of the Hippopotamus consists of water-plants and those which grow on the banks of the rivers in which it is found. The time of feeding is principally in the night, and those enormous animals, when in the neighborhood of cultivated lands, do incalculable damage, not only from the quantity what they actually consume, but the still greater quantity that they spoil and lay waste by their continual digging with great force beneath the surface of the water for some time, there must be some muscular arrangement for closing the nostril, such as we see in the Seals. Hassiauquet, on the authority of a 'certain black man who was a native of the Cape,' says: "1. In the hide of a full-grown Hippopotamus is a large for a camel. 2. That the River-horse is an inveterate enemy to the Crocodile, and kills it whenever he meets it. 3. That the River-horse never appears below the cattle in Egypt, wherefore the inhabitants of Upper Egypt only can give any account of it. The Egyptians, he adds, very seldom bring the hide of it to Cairo; and, he continues, it is impossible to bring thither the living animal. 4. The River-horse does much damage to the Egyptians, in those places he frequents. He goes on shore, and in a short space of time makes some descent into the river with great ease, while the least verity as he passes; for he is voracious and requires much to fill his great belly. They have a curious manner of freeing themselves, in some measure, from this destructive animal: they remark the places where they frequent, and the point at which they have made an opening in the earth; when the beast comes on shore, hungry and voracious, he falls to eating what is nearest him, and filling his belly with the peas, they occasion an insupportable thirst; he then returns immediately into the river, and continues upon the large draughts of water, which suddenly causes his death; for the peas soon begin to swell with the water, and not long after the Egyptians find him dead on the shore, blown up, as if killed by the strongest poison. 5. The often the River-horse goes on shore, the better hopes have the Egyptians of a sufficient swelling or increase of the Nile. 6. The Egyptians say, they can almost distinguish the food of the River-horse from other animals by the quantity of excretion that (regarding the peas, for instance) may be considered as bordering upon the marvellous, but there are others which there seems to be no good reason for doubting. If the alligator is to be distinguished from the Crocodile can hardly be considered to be well founded.

In Professor Smith's Journal (Tuckey's Narrative of an Expedition to explore the River Zaire, usually called the Congo, in South Africa) we find it stated that they landed on one of the sandy coasts behind a long projecting point. It is called Sandi-Sundi.

An immense number of Hippopotami were seen here. In the evening a number of alligators were also seen. This large animal is of a blackish colour. Tuckey gives us the following description of it: 'The Hippopotamus and Alligator appear to be numerous.' The usual mode of capturing the animal is by a fall or the natives at least, but the Zerenghi, in the year 1600, frequented the neighbourhood of the Nile, near Darnietta. He stationed men upon the Nile, who, having seen two of these animals go out of the water, would dart in immediately, and destroy them by thrusting through which they passed, and covered it with thin planks, earth, and herbage. In the evening, when returning to the river, they both fell into the ditch. Zerenghi immediately hastened to the place with his janizaries, and they killed both the beasts by pouring water upon them to make them sink. They are by far the largest alligators. They almost instantly expired, he adds, after uttering a cry which had more resemblance to the bellowing of a buffalo than to the neighing of a horse. Captain Tuckey has preserved a copy of a fragment of skin with these words heark, hark, heel-heel: 'the two first being uttered slowly, in a hoarse but sharp and tremulous sound, resembling the grunting of other animals; while the third, or compounding sound, is not unlike the neighing of a horse. It is true, it is impossible to express these inarticulate sounds in writing to any great degree of perfection; but perhaps one may make nearer that it was found in Lower Egypt in the year 1600, appears by Zerenghi's account above given. His expedition travelled in the year 1738-259. See also 268.
approaches to it than one can to the guttural psalmodic sounds of the Hottentot language. Le Vaillant has an account of the habits of a hippopotamus under water at Great River. 'This river,' says he, 'contained many hippopotami; on all sides I could hear them bellow and blow (mugir et souffler). Anxious to observe them I mounted on the top of a elevated rock which advanced into the river, and I saw one walking at the bottom of the water (marcher et se promener au fond de l'eau). But I remarked that its colour, which when it is dry is greyish, and which when the river is high and muddy appears brown, seemed then to be of a deep blue. I killed it at the moment when it came to the surface to breathe. It was a very old female and my people in their surprise, and to express its terror at the sight of the greatest of the four rivers.' (Beyond Voyages.) Mr. Barrow, in his journey into the interior of Southern Africa, when he reached the mouth of the Great Fish River, saw towards the evening a vast number of Hippopotami (Bea-Cows of the Dutch) with their heads above the surface. Several paths must by these animals led from various parts of the river to a spring of fresh water about a mile distant. To this spring they went in the night to drink; the water of the river for some distance from the mouth being salt. According to Damper and others, the Hippopotamus, when wounded or irritated, is violently ferocious, and has been known to sink a boat by its bite.

History.—For a long time it was considered that there was but one species of Hippopotamus, by making the former and the latter sex too large a single species. The affirmation now seems to be that there are at least two. Before we enter into this part of the subject it may be expected that we should give a slight sketch of the history of the Hippopotamus, at least of that time of the world when it was first known.

If the Hippopotamus be the Behemoth of Job (ch. xli.), we must refer to the well known verses 10 to 19, both inclusive, as the earliest description of the animal. But the identity is by no means satisfactorily ascertained. The vulgar uses the word Behemoth, and the Zürich version translates the word by 'Elephas.' In the edition of the Bible, 'imprinted at London by Robert Barker, printer to the King's most excellent Majesty' (1615), Behemoth is the name given to a sort of fabulous beast thought to be the elephant, or some other which is unknown.' Bochart, Ludolph, Schenckeler, and many others, hold that the Hippopotamus is the animal meant; while not a few, the learned have written in support of the elephant. Curtier and others think that though we may believe with Bochart that the Hippopotamus is intended, the description in the book of Job is too vague to characterize it. Good comes to the conclusion that some external characters are ascribed to the animal by the term; and some have lately even gone so far as to contend that Behemoth and the Iguanodon of geologists are identical.

Herodotus (ii. 71) gives a most incorrect description of what must be regarded, from the context and other evidence, as the Hippopotamus. This description is borrowed almost entirely by Aristote, who has not however given to the animal a horse's tail, which Herodotus bestowed upon it, adding, correctly enough, that its size was that of the largest oxen.

Aristotle (Hist. Anim. book ii. chap. vii.) thus describes the Hippopotamus:—'The Hippopotamus of Egypt has a mane like a horse; a bristly visage or muzzle; an asstragelus like the animals with cloven feet; projecting teeth which do not show themselves much; the tail of a dog; the voice of a horse; and in size is like the umbilicus of a horse. The forefeet of it when the animal is out of water are made of it.' Now, though there is enough in this curious description to lead to the conclusion that Aristote meant no other than the Hippopotamus, there is also quite sufficient to show that he trusted to the wild accounts of others. We trace however the descriptions of Herodotus and Aristotle in many of the figures of the animal which were published after the time of the ancients. But though the fact that notwithstanding the highly erroneous descriptions of ancient authors, some of whom must, one should think, have had an opportunity of seeing the animal, the portraits of it by ancient artists, &c., &c., are, almost without exception, far from bad representations of the animal, we must return to the ancient authors.

Diodorus (book vii.) comes much nearer to the truth in his description, at least as to the size of the Hippopotamus; for he says that it is a five cubits in length, and in bulk approaches to the size of an elephant, and avers that the teeth are not badly characterized by the same author; but he also leaves to the animal the cloven hoof and the horse's tail.

Pliny says of it (book viii. c. 25), after treating of the Crocodile and Sirens, 'Major altitudo in eodem Nilo sit; et veluti hippopotamus deinde percorruit ad adventum insulae duabus, ad prope summa altitudinem, et alios, ut ad opus nostrum dicam, in altitudo maxima, ut de auditum, et habes, ut in omnibus est, ut femina, ut mascula, ut horum, ad inismus, rostro resino, cauda et dentibus aporum, aludum, sed minus noxius.' In short he seems to have followed with very little exception the account given by Aristotle, without adding anything else to that of Dioscorides and others. The animals are made of its skin, which are impenetrable unless they are softened by moisture, and he speaks of its feeding on the crops 'depascatur segetes,' and its caution in avoiding snares.

In his ninth book and twelfth chapter, on the covering of aquatic animals ('Pélagos Aquilum'), the varieties of which he enumerates, he says, 'Alia corio et pilis teguntur, ut vituli et hippopotami,' thus making it fairly clear that the seals, which we take to be by 'vitulis,' and yet, with all this monstrous error, be himself (book viii. c. 26) speaks of M. Scaurus as being the first who had shown the hippopotamus, together with five crocodiles, at Rome, during his episcopate; finishing the account however that the beast may be seen by all without the least harm, in the art of healing, in consequence of his habit of letting blood by pressing the vein of his leg against some very sharp stake when his obesity requires such relief. We know moreover that the river Nile in Augustus' reign, the animals on occasion of his triumph over Cleopatra. (Dio.)

Not to weary the reader with the descriptions of the animals, we shall only refer further to that of Achilles Tatius (book iv. c. 2), which, notwithstanding some errors, perhaps, is correct. It is to this notice that, under the later emperors, a considerable number of hippopotami were introduced into the Roman shows. Thus Antoninus exhibited some, with crocodiles, tigers, and leopards; and other animals, which, as he says, he killed and killed some of them with his own hand. Heliogabalus and the third Gordian also exhibited hippopotami. These demands seem to have produced their effect; for according to Marcellus Ammianus (book xxii. c. 1), others, the race of hippopotami had disappeared from Egypt since the time of the emperor Julian. Favourable circumstances however must have operated to restore it, as we collect from the account of Zerenghi above alluded to and others. That the animal was a sacred one in the district of Paphres is said by Herodotus (book ii. c. 57), "Retepo; 'Those which are found in the district of Paphres are sacred, but in other parts of Egypt they are not considered in the same light.'" Sonnin (Travels in Upper Egypt, book ii. c. 33) relates the same narrative, and also one from Pausanias (book iv. c. 33), goes on to state that these animals laid waste whole countries by ravages as fearful as their size was enormous, and that they were held in especial dread by the water by the crocodile. From the terror which they inspired, they were, he asserts, generally looked upon as the symbol of Typhon, that giant who had spread death and destruction among the deities which were worshipped in that quarter; and he adds, of course the emblem of mischief and of cruelty, and the particular worship of them at Paphres must have been practised solely with the view of appeasing or averting their rage.

We have mentioned that with few exceptions, if not with one only, the representations of the antient artists have been found faithful to nature when compared with the description of antient naturalists and authors. The exception is the figure copied by Hamilton from one of the frescos of Beni-Hassan, in which the feet are represented as crowned, and the lower tusks are so enormous as to render it impossible that they should be covered by the skin, and the upper tusks are so long that they cannot even be seen when the beast is at rest. The skin is so thick that when dried the shafts of darts are made of it.\*
the amusing book on Egyptian Antiquities observes, the
designer sometimes placed on one animal a part taken from
another, and that mentioned by Belzoni was a calf with
the head of a hippopotamus. Though the details of the
tooth and fact are not correct in the figures on the plinth of
the statue, which is of a later date, and which was made by
Professor Vailan (Travels in Upper and Lower Egypt, vol. iii.),
and quoted Matthison, who speaks very slightly of
Belon; but a perusal of that accurate observer's account
will convince us that he was by no means an erroneous
living hippopotamus; he even alludes to the differences
between the figures of that animal on antient works of art
and the specimen which he had before his eyes, and rectifies
the account of the figure on the plinth of the Nile, which has five
toes instead of four. Of the teeth indeed he only remarks that they approach to those of
a horse. Genner does little but quote Belon, and without
detailing the description of the organist, which is given above alluded to, which were good, or the compilation of
Alrovandus, who did not use the figure of Zerenghi, but
another sent to him from Padua (Cuvier thinks, by Prosper Alpinus), or the good description and more accurate
representation given by Fabius Columba, we come to Ludolph,
who in his History of Ethiopia gives an entire figure on
a large scale. This is the best which had been hitherto pub-
lished; but the teeth are exaggerated, and a great deal too
much exposed, and the ears are rather long. Below this is a
figure of 'the sea-horse, putting up his head above the
water; hence called the river-horse by the Greeks.' The
head and neck alone are visible; but the exaggeration
and execution of this are more charming, and the
lengthening the neck, head, and ears, has given a much
more horse-like character to the figure. Thenovet, in his
Voyage to the Levant, very fairly describes an individual
killed not long since near Cairo, and sent to Cambrai.
The date of the last of these authors is 1689, but in 1735
the work of Prosper Alpinus was published, and obscured
the subject again by giving a representation of two stuffed
skins, the one of a large female animal, and the other of
her fustus, which he had seen in the house of the Pacha of
Cairo. These were the skins of two Hippopotami, but the
skulls had been withdrawn, and the absence of the project-
ting teeth led Prosper to the conclusion that he had at last
found in this, which he took for a distinct species, the
animal represented by the antient artists, forgetting, or
more probably not knowing, that the Hippopotami of the
present day keep their mouths closed no tooth is visible.

We need not detain the reader with a reference to the
figures and descriptions given by other zoologists, but shall
come at once to Linnaeus, and this will bring us to the
question of the geographical distribution of the genus,
and of the number of species.

Linnaeus, in his last edition of his Systema Natura, gives
only one species, Hippopotamus amphibius, and places its
habitat in the Indus, Strabo (690, 707, Cassius) seems to
prefer the testimony of Aristotle in contradiction of the
fact, and Pausanias (iv. 34) agrees with Strabo.
Cuvier, who has collected almost all the learning on this
subject, well observes that no traveller of credit has
reported that it has been found on the continent of India.
He remarks that Buffon gave no credence to the testimony
of Michael Boyo, who states China to be one of the locali-
ties. he observes that it is nearly without authority that
Linnaeus supposes the animal to occur at the mouths of the
rivers of Egypt, or at the mouth of the Nile, and that it
would be well authorized in denying that it is to be found on
the continent of India.

Marsden includes the Hippopotamus amphibius among the
tails of the 'Indus,' 'Sumatra,' Java; and Cuvier ("Oe-
imens Fossiles") enters into an interesting discussion, well
worthy of the perusal of the reader, to shew that Marsden is
mistaken; and, in addition to his arguments, he brings
forward the fact that MM. Diard and Duruy (who tra-
velled over a considerable part of Java and Sumatra in dif-
ferent directions, could not find a Hippopotamus, though
they succeeded in obtaining two species of Rhinoceroses and
a Tapir. Upon the whole evidence at present known, it
seems to be established that the geographical distribu-
tion of this pachydermatous form is confined to the great rivers
and lakes of Africa.

Species.—It remains to consider how many species of
Hippopotamus at present exist.

M. Desmoulins (Journal de Physiologie, &c., par F. Ma-
gendie, tome v.) gives osteological reasons, drawn prin-
cipally from the differences in the skull, for distinguishing
at least two species. He thinks that the differences between
the skull and those of the moderns, seemingly to be so
marked, that it must be allowed that he appears to be borne out in his
position that the distinctions between the two species, one of
which he designates as the Hippopotamus of the Cape (Hippopotamus Capensis), and the other as the hippopo-
tamus of Senegal (Hippopotamus Senegalensis), are as strong
as those on which Cuvier founded his specific separation of the
fossil Hippopotamus from that of the Cape. M. Des-
oulins in his fourth edition of his works, was of opinion
that the Hippopotamus of the Nile differs specifically from
the other two. The external differences do not appear to be
considerable, if any. M. Desmoulins indeed remarks, that
forty Hippopotami seen by M. Calap, in the river Nile,
two or three were blass-black, all the others reddish,
and M. Desmoulins even hints that there may be two spe-
cies in that river. The latter adds, that of the two Hippopo-
tami of the Cape possessed by the Paris Museum, one is
black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numerical
disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
We have examined several skulls of Hippopotami, and some
of them differ very much from the skulls of the Nile, among
the former, a black, the other reddish; but he considers that the numer-
ical disproportion observed between the individuals of the
two colours in the Nile can hardly admit of a sexual solution.
look at the enormous ripping, chisel-like canines of the lower jaw, and the lower incisors formed for gnawing, we cannot but think that such an animal must be an active agent in clearing rivers from the greater water-plants which might in time, if left undisturbed, go far to convert the running stream into a sluggish swamp. With regard to minor details, the flesh of this *Water Ock* is much esteemed as an article of food. In the first catalogue of the African Museum we read that it is much in request both among the natives and the colonists, and that the epicures of Cape Town do not disdain to use their influence with the country farmers to obtain a preference in the matter of *Sea Cow's Stew*, as the fat which lies immediately under the skin is called when salted and dried. Nor are the whips which are made of the skin of the Hippopotami of the Nile thought lightly of in the neighbouring countries. They are said to be made by cutting the fresh skin into triangular strips some five or six feet in length: one extremity of the strip is pointed, and it gradually widens till the breadth at the opposite extremity is equal to the intended circumference of the bulk of the whip. The strip is then rolled up so as to form a sort of conical pipe, is firmly tied to keep it in place, and dried in the sun. When all is finished a light and elastic whip is produced. But there is no part of the Hippopotamus in more request than the great canine teeth, the ivory of which is so highly valued by dentists for making artificial teeth. No other ivory keeps its colour equally well; and these canine teeth are imported in great numbers to this country (where more are sent in the first instance than anywhere else perhaps) for this purpose, and sell at a very high price. From the closeness of the ivory, the weight of the tooth, a portion only of which is available for the artificial purpose above mentioned, is heavy in proportion to its bulk, and the article fetches, or did fetch, upon an average, about thirty shillings, more or less, per pound. One of the specific distinctions pointed out by M. Desmoulins is the comparative abrasion of the canines in the supposed two species; and we would call the attention of the curious who deal in these teeth to this circumstance and the papers above quoted.

---

**Fossil Hippopotami.**

The remains of fossil Hippopotami occur abundantly in the tertiary series. They are most common in the Pliocene period of Lyell, and are frequently met with in the superfi-
cial beds of gravel, clay, and sand, termed by some diluvial, in the osiferous caverns, osseous breccia, &c. They are also found in some of the beds of the Miocene period. The following species are named: Hippopotamus major (Nesti and Cuv.); Hippopotamus minutus (Cuv.); Hippopotamus medius (Cuv.) and Hippopotamus dubius (Cuv.).

A comparatively small species was detected by Mr. Cliff among the fossil remains found on the left bank of the Irawadi, and presented to the Geological Society by Mr. Crawford. Remains of Hippopotamus were also abundantly present in the large collection of bones obtained by Captain Cautley among the ruins of fallen cliffs, and partly in situ in the sandstone of the Sewalk mountains, at the southern foot of the Hima-
layas, between the Sutlej and the Ganges. (Geol. Proc.)

---

**HIPPOTHŒE (Lamouroux).** A small celluliferous coralline attached to marine plants in the Mediterranean. It is capillary and branched, the branches articulated; the articulations are single fusiform cells, with a round, polypi-
erous opening near the summit. (Tableau Méthodique.)

**HIPPURIC ACID.** When the urine of horses and cows is mixed with muriatic acid in excess, a precipitate is obtained, which, when purified by boiling with cream of lime, a little chloride, and with animal charcoal, is rendered nearly inodorous. The solution is again to be mixed with hot muriatic acid, from which hippuric acid separates in prismatic crystals on cooling, which are perfectly white.

Hippuric acid is analogous in its characters to benzoic acid, and was at first supposed to be that acid modified by the presence of animal matter; but it is stated by Liebig that it is distinguishable from benzoic acid by the nature of its salts, which are less soluble in water, and also in contain-
ing azote, which benzoic acid does not.

It is composed of

| Nine equivalents of hydrogen | 9 |
| Twenty | carbon | 120 |
| Six | oxygen | 14 |
| One | azote | 14 |

Equivalent 191

It is stated that this acid, when scented by subliming with a little benzoic acid, is substituted as an article of commerce for benzoic acid.

---

**HIPPOPUS. (TRIGACINODE.)**

**HIPPA Therium**, the name of an extinct quadruped allied to the horse, found and described by Professor Koen, from the strata of sand at Epplesheim, near Altsey, about twenty leagues south of Mayence, referred to the second or Miocene period of the tertiary formation.
Hippurites (in Zoology), a name given by Knorr and Schreber to a fossil coral (Cystophyllum ceratites, Goldfuss) of the Eifel transition limestone. Guettard also used this title for a lamelliferous coral.

By Lamarck, Dendrean, and other writers, this name is given to a somewhat problematical group of fossils found in limestones of the ooitie age which flank the Alps in the Unterberg, near Salzburg at Regensburg, &c., in the chalk of Perigord, &c., &c.

The group of hippuritides with belemnites and orthocerates, among the cephalopods, (Conchyliazi, Nouv. Dict. des Sciences Nat.) Latrelle takes nearly the same view as Lamarck. (Familles Naturelles du Regne Animal.)

Recent descriptions and remarks of Rang, and ampleness of Sowerby (which is certainly a lamelliferous coral), introduces the genus among the orthoceratous rudista, according to the views of De Blainville.

The synonymy of the name has been studied by M. Ch. Des Moulins and M. Deshayes, and the location of hippurites in that group may, on their competent authority, be definitively adopted. Considered as a bivalve shell, whose valves are excessively unequal, one may be described as cylindrical, conical, or curved; the other as flat, or tumid externally, and opercularly.

The lamina of the valve is sometimes separated, as in some stony and sublittoral species, as is the case of the external valves of the shell of the appearance of longitudes of agglomeration immersed in the shell. These are arguments, and very insufficient ones, for comparing hippurites with cephalopoda.

The shell is divided into a rigid or rather formed, side figure, in a longitudinal direction, which have been compared to the cellular structure of the shells of Balanus. These shells are sometimes attached side by side, as two portions of a coral. The internal cavity is far from corresponding to the external figure of the shell, and the cast in this cavity has been called Birostrites.

The abundance of these fossils in certain calcareous bases of the chalk or top of the oolitic formation in the Fyrestones, near Salzburg, the Bavarian, &c., is extraordinary, so that particular strata receive from the circumstance the name of Hippurite Limestone.

Hippocage, a genus of plants of the family of Malpighiaceae, better known under the latter name (Voy. ii., t. 135), which is common in the forests of many parts of India; the other, H. obtusifolia, is found in China, but commonly cultivated as an ornamental plant in India. Both are remarkable for their large size as climbers, ascending to the tops of the loftiest trees, and hanging down in elegant festoons of white flowers.

Hippodamus. [LeMmmg.]

Hippol is similar to butyrine, which exists in goat's fat and in mutton suet, combined with olein; its name is derived from hircus, and it is obtained from the fat of the goat by a process similar to that by which butyrine is procured, from which it appears to differ by yielding hircic acid, by treatment with the caustic alkali.

Hire, L.A. [Lahire.]

Hirtius, Aurelius, born of a patrician Roman family, applied early to the study of rhetoric, and became intimate with Cicero, who speaks highly of his oratorical talents.

There is a letter of Hirtius to Cicero in Ep. ad Att., xx. 4. Hirtius served with distinction under Caesar in the Gallic War. He is generally supposed to be the author of the eighth book of the Commentaries, Life of Cicero, c. 56, as well as of the books of Caesar's Alexandrian and African campaigns, which are avowedly written by the same person as the eighth book of the Commentaries. With regard to the De Bella Hispania, it appears to have been written by a different and an inferior hand, and it has been attributed by some to C. Oppius, another friend of Caesar. (Vossius, De Historiae Latinis.) Hirtius remained attached to his master after the death of Cicero, and was named consul with C. Vibius Pansa. The two consuls had an engagement with Antony, whom they deposed near Mutina (Modena), and were killed in the battle.

Hirundineae. [Lamk.]

Hirundinella, a name given by M. Bory to a genus of Microcormor.
plained when we consider the abundance of fertile land which is still unoccupied, the limited wants of the people, and the facility with which the bare means of existence are obtained.

Port au Prince, the capital and the seat of government, is situated between the large plain of Cul de Sac and a more narrow one extending along the southern coast of the island of Gonaves to Leogane and farther, both of which are very fertile, but badly cultured. The streets of the town are straight and sufficiently wide and commodious, but the houses are low and mean, with the exception of a few built by the French, which outlived the revolution and the fires. Its commerce with the United States and with Jamaica is considerable. The population is estimated at about 30,000.

On the same day that Gonaive and Port au Prince were seized, two small but thriving places. On the northern coast is Cap Haitien, formerly Cap François, with about 12,000 inhabitants; it carries on some trade with the United States.

S. Domingo, on the southern coast, is the oldest European establishment in America, having been built by Columbus in 1504; the town of Isabella, which was erected on the northern coast in 1493, was abandoned. The population of S. Domingo is about 15,000 souls; and it formerly carried on a considerable trade with the Spanish colonies on the mainland and with Cuba, especially in jerked beef; but its trade is now very limited.

Hispaniola was discovered by Columbus in his first voyage, at which time he named it Haiti. The Spaniards formed settlements, first at Isabella and then at S. Domingo. For nearly half a century these settlements received much attention, and rose to great prosperity, until different parts of the island were depopulated and the aborigines were exterminated.

Perceiving that they would be driven away by the Spaniards, they voluntarily submitted to France, and Lewis XIV. sent them a favorable treaty in 1713. France then was obliged to give up the western districts, or nearly one-third of the island to France. The French, who considered their portion of Hispaniola as the most valuable of all their foreign settlements, began to cultivate it with great care.

In 1791 the sugar culture, and the balance of the French portion only was valued at more than eight millions of pounds sterling.

In 1794 the negro slaves were declared free by the National Convention, a declaration which was followed by a general insurrection of the negroes. The insurgents compelled all the white inhabitants to emigrate who had not been massacred.

One of their chiefs, Toussaint L'Ouverture, established in 1801. a kind of republic, but was obliged to submit to the arms of Napoleon in 1802. After he had been treachery taken prisoner and sent to France, the negroes rallied under Dessalines, and expelled the French in 1803. Dessalines gave the island the name of Haiti. In 1804 he followed the example of Bonaparte and called himself emperor: in 1806 he was murdered. After his death the French portion of Hispaniola was divided into two states; the northern coast was formed into a negro republic under Christophe, who in 1811 also took the title of emperor: the plains about the Bay of Gonaves became a mulatto republic under Petion. The island was then divided into four districts, and the French claimed the whole under his authority. In the meantime the Spanish part of Hispaniola had been ceded to Spain by the treaty of Paris in 1805. On the Spanish part of the island the negroes had also rebelled and were defeated in 1808.

The following year however it declared its independence of the Spanish government, and remained in an unsettled state until 1822, when it was subjected to the authority of Boyer. In 1823 the island was conquered by the French, who were considered as a despotism, the chief being chosen by the army, but some republican forms have been added.

The government is anxious to promote education, and to encourage the settlement of whites; but they do not enjoy the same privileges as the coloured people.

The French
Another example of history in a limited sense, and one which brings us to the very summit of the life of an individual. That branch of the historical art which treats of the life of an individual has long since obtained the specific name of biography. The reason why this species of composition has always given so much pleasure, to the persons, or to the nations, to whom it is presented, is the same as that which makes a ghost to his minute investigations into the phenomena which present themselves on the surface of this globe. He labors, if not with the hope of finally attaining a complete view of various stages of human life and of the actual state of things, yet with the reasonable certainty of learning something, and of being rewarded by a more exact and comprehensive view of the whole present condition of the world. Such is the interest which few individuals can create for themselves in branches of investigation which to mankind in general are distasteful or repulsive. But everything which concerns a human being excites the universal sympathies of mankind, and when we hear of those who have greatly desired or suffered, of those who by their talents and virtues have been the benefactors of mankind, or by their virtues have inflicted misery on thousands of their own and succeeding generations, we know all the principal events of the life of an individual is so far like the history of a nation, that it involves a progress from a beginning to a certain definite point; and though the life of an individual cannot be viewed detached from that of the society, yet it is a distinct as that of an individual death, but its condition at any one stage, like that of an individual, is to be deduced only from a full comprehension of all the preceding circumstances of its existence.

We may then conclude that the history of any nation is a statement in chronological order of the various actions and events by which the society which constitutes that nation has attained and is in its actual state; meaning by its actual state a certain term of time such as its aggregate means of happiness. But though such a statement as we have just mentioned of actions and events, when they are judiciously arranged, will of itself indicate the general character which it has, or which is likely to affect the condition of society, the purpose of the historian is distinguished from the labour of the annalist by the philosophical character which he gives to his work. It is true of a history, that as the artist in life, so the man more particularly with reference to one kind of actions and events, and by another man more particularly with reference to another kind; but as the subject of history is the progressive development of society, the historian who best seizes on those things which at each stage characterize this progress, will approach nearest to giving his work a real philosophical character. The religion, the positive morality, the legislation, the education, and the domestic habits of a people, are matters which more intimately affect the happiness of a nation, than their skill in the mechanical or other arts. Progress and improvement in the latter, though highly useful and valuable, are not such special qualities in which the parts of a society may be more especially distinguished, or in which the whole may be more particularly distinguished.

The present part of this work, then, is designed to present the past, be more particularly directs his attention to the consideration of those civil and religious institutions, and to those popular notions of right and wrong, of virtue and vice, which lie at the foundation of the present state of society, and which has existed or does exist, however disguised or obscured by the structure which has reared upon them. To trace to their origin, and to view in their simplest forms, these elements of the subject, is to seize with precision their characteristics and their differences, to follow them in the progress of their development and modification, both
as influencing and being influenced by the new elements which from time to time enter into the composition of society, and so to show at each stage of its progress, not only the condition of society, but the causes which determine such condition—such may be called a philosophic exhibition of history, or, in other words, a determination of the general principles by which any given society, and the consequences which flow from them.

As this determination of general principles and of their effects forms the scientific part of the subject of history, so the mode of treating and exhibiting of such subject is the artistic part of the business, unless we lay down for the treatment of history as a branch of art. It may be simply said that while the main object is to instruct, it is also an object to please, independent of the pleasure given by the mere contemplation of history in any case, in a mere number of events which mark the progress of society, a few are often sufficient for the purpose of the historian, and that in the selection of the most appropriate he will show his judgment and skill; that while he clearly points out those principles which have had most influence on the condition of society, he will not overload his work with reflections which the matter will suggest to the reader; and he will often not do more than put him in the way of following out a train of thought. His art will often teach him to conceal his purpose of instruction, when his work will not be prejudiced by his apparent forgetfulness of the dignity of his subject.

To enumerate among the historian's qualifications those of industry, integrity, and sound knowledge, or to detail all the qualifications for executing his task in the best possible manner would be superfluous; if we think instead of this, briefly consider the value of his labours when complete, and the advantage which his readers will derive from a careful perusal of his work and an examination of the original sources.

It is a common remark that all history is uncertain, and if the remark were true to the full extent, there would be little use in attempting to show the value of that which cannot be known with certainty. But though many events, or the occurrence of such circumstances as are uncertain, the most valuable part of history rests upon monuments which have no uncertainty in their character. The positive institutions of every civilized country, its laws and its literature, are facts recorded, which are rich in instruction, independent of their being evidence of an infinite number of other facts of which they are conclusive proof. The study of these monuments, whether prosecuting under the guidance of a historian who has used them in the construction of his work, or followed out by individuals according to their own judgment and mainly with reference to some special branch of inquiry, is one of the noblest subjects to which the energies of human understanding and, unlike the philosophic exhibition of what now is, by reference to what has led to it: it: show what principles lie at the roots of our social system, what they once were, how they have been modified, and what they now are. Knowing what each thing now is, and how it came to be what it is, we are better enabled to form a conjecture of what it will be, and how we may best fashion it to our purposes. Thus, we learn in what circumstances change may be made with advantage; and knowing, from the experience which history teaches, that changes in our social relations become necessary in the course of time, and can neither be resisted with safety nor safely left to be directed by the blind impulses of number, we are more likely to produce social changes which have the least chance of injury. But such a study, to be prosecuted with success, must be the occupation of a whole life: and if the active man of business into whose hands legislation and administration are committed, cannot live in peace, and with the least chance of injury. But such a study, to be prosecuted with success, must be the occupation of a whole life: and if the active man of business into whose hands legislation and administration are committed, cannot live in peace, and with the least chance of injury. But such a study, to be prosecuted with success, must be the occupation of a whole life: and if the active man of business into whose hands legislation and administration are committed, cannot live in peace, and with the least chance of injury. But such a study, to be prosecuted with success, must be the occupation of a whole life: and if the active man of business into whose hands legislation and administration are committed, cannot live in peace, and with the least chance of injury. But such a study, to be prosecuted with success, must be the occupation of a whole life: and if the active man of business into whose hands legislation and administration are committed, cannot live in peace, and with the least chance of injury. But such a study, to be prosecuted with success, must be the occupation of a whole life: and if the active man of business into whose hands legislation and administration are committed, cannot live in peace, and with the least chance of injury. But such a study, to be prosecuted with success, must be the occupation of a whole life: and if the active man of business into whose hands legislation and administration are committed, cannot live in peace, and with the least chance of injury.
next resistance of accumulated ages, embodied in the habits, opinions, and institutions of the actual generation. The anticipation of universal change and complete reformation of social habits and opinions is indulged in for a few short years, sometimes mingled with contempt of those who persisted in the old ways; and this, instead of throwing away all doubts as to the future. An instructive lesson is all that remains of these brilliant expectations. The effect of those writings was not duly estimated, and of opposing to opinions and habits hardened by the growth of centuries, even the soundest conclusions of our philosophy, when unaided by the experience of history.

HOD, BENJAMIN, born 1676, died 1761; an English clergyman, successively bishop of Bangor, Hereford, Salisbury, and Winchester.

His character, and his relation to the times in which he lived, he is to be regarded, 1st, as a principal writer among the divines of the English church who are called Rational, that is, who have renounced the whole of what constitutes proper Calvinism, and have advanced more or less near to the opinions which are comprehended under the term Unitarian: not that it would be just to them to rank them among Socinians, or in the modern syllogistic nomenclature called only Unitarians; they abandoned opinions which are supposed to be the most opposite to those of Unitarians, such as Election and the other distinctive doctrines of Calvinism. His 'Plain Account of the Sects of Jansenists,' and his 'Memoirs on the Terms of Acceptance,' show how rational was the view which he took of Christianity, its requirements, and its ordinances. They are still much read, and greatly valued by Rational divines both in and out of the Establishment.

2. He is to be regarded as the great advocate of what is called Low Church principles, a species of Whiggism in ecclesiastics, in opposition to the high pretensions sometimes advanced by the church or particular churches. It was in this character that he was the dowager bishop of St. Asaph. He was a celebrated Bangorian controversy, one of the most remarkable in the history of the Protestant church of England. In the reigns of the first and second Georges, divines of the school to which Hoadley belonged found favour at court. It was otherwise in the reign of George III. The succession of Hoadley's prefaces with the dates follows. In early life he was a city clergyman, having the rectory of St. Peter Poor with the rectoryship of St. Mildred in the Poultry. In 1710, when the Tory influence was becoming predominant in the councils of Queen Anne, and he was suffering from that and from the popular High Church dissolution of the time, a private patron, Mrs. Howland, of Streatham, who was connected with the noble house of Russell, presented him with the rectory of Streatham. The queen died in 1714, and the accession of king George I. brought with it a great change in the politics of the court; on the accession of George II. the tide of that of Bangor, was presented to him. In 1721 he was translated to Hereford, and from thence in 1723 to Salisbury. In 1734 he was made bishop of Winchester.

A last accusation of Hoadley made by his contemporaries of an extraordinary attempt at imposition upon him in his old age, in an affair of money, by a foreigner to whom he had shown great favour, detected and exposed by him with a plainness that can hardly be believed, in the age into which he was cast, may be read in the 'Biographia Britannica.'

Dr. Benjamin Hoadley, a physician, author of a once popular play, entitled 'The Suspicious Husband,' was his son.

HOBBS, THOMAS, was born at Malmesbury, in Wiltshire, on the 5th of April, 1688, and was the son of a Protestant clergyman of that town. At the age of fifteen he was sent to Magdalen Hall, Oxford, and after he had gone through the usual university course, he became in 1698 private tutor in the family of Lord Hardwicke, soon afterwards created earl of Devonshire. In 1616 he went abroad with his pupil Lord Cavendish, and made the tour of France and Italy. After his return he came to mix much, chiefly through the patronage of his patron the earl of Devonshire, with the men most distinguished at that time for learning, as well as with others conspicuous by their high station. He enjoyed the familiar friendship of Bacon, who is said to have been assisted by Hobbes in the translation and annotation of his works, and he was an intimate associate also of Lord Herbert of Cherbury, and of Ben Jonson. Ben Jonson revised for Hobbes his first work, the translation of Thucydides.

This translation, which had been begun, as Hobbes himself tells us, 'with an honest view of preventing, if possible, those disturbances in which he was apprehensive his country was to be involved, by showing, in the history of the Peloponnesian war, the real consequences of intestine troubles,' was published in 1628. His patron the earl of Devonshire had died two years before; and the son, Hobbes's pupil, died in the year in which this translation was published. Hobbes, seeing his patron's heir was a boy and that he was likely to affect his mind, he globally seized an opportunity of going abroad with the son of Sir Gervase Clifton, with whom he remained some time in France. He returned in 1631, at the instance of the Earl of Devonshire, who, having caused Mr. Scholten, a man of learning and education of the young earl, was then only thirteen.

In 1634 he went with his new pupil first to Paris, where he enjoyed the friendship and frequent society of father Mersennus, and applied himself most to the study of natural philosophy, and afterwards to Italy, where he became known to Galileo. He returned to England in 1637. Shortly afterwards he applied himself to the composition of his 'Elementa Philosophica de Cive,' a few copies of which were printed in Latin and were translated and published in Holland, in 1642; the whole of the work was published in Holland in 1647, under the superintendence of M. Sorbi, to which were prefixed two laudatory letters addressed to the editor, the one by Gassendi, and the other by Mersennus.

Shortly after the meeting of the Long Parliament, which took place in the end of the year 1646, Hobbes had withdrawn himself to Paris. He became acquainted here with the Descazes, with whom he afterwards held a correspondence on mathematical subjects; and also acquired the friendship of Gassendi.

In 1647 Hobbes was appointed mathematical tutor to the Prince of Wales, and was elected professor of mathematics at Oxford. He threw off the esteem and affection of the prince, that thought, after the publication of the 'Leviathan,' Charles, yielded to the opinions of divines, forbade him his presence, he yet always spoke of it in terms of the greatest kindness, kept his friendship, and never took the measure of the prince when he had been restored to the throne, unsolicited presented him with a pension.

Hobbes's two small treatises, entitled 'Human Nature' and 'De Corporis Politico,' were published in London in 1650, and in the following year the 'Leviathan.' He caused a copy of this last work to be fairly written out on vellum and presented to Charles II.; but the king, having been informed by some English divines that it contained principles subversive both of religion and civil government, thought it right to withdraw his favour from Hobbes, and, as has been already said, forbade him his presence.

After the death of the 'Leviathan,' Hobbes returned to England. In 1654 he published his 'Letter upon Liberty and Necessity,' which led to a long controversy with bishop Bramhall [Bramhall]; and it was about this time too that Hobbes conceived the design of writing a treatise in eighty, may be read in the 'Biographia Britannica.'

Dr. Benjamin Hoadley, a physician, author of a once popular play, entitled 'The Suspicious Husband,' was his son.

[Continued on page 255]
HOB 255

as is usually the case, the notoriety attending the obloquy under which Hobbes laboured had its sweets as well as its
bitteres. In 1656 he received a visit from the Grand Duke of a
Medici, then prince and afterwards duke of Tuscany, who
honoured him with many presents, and asked in return
for his picture and a complete collection of his writings, the
former of which he purchased at his turisteries, and the
latter in his library at Florence. He received many similar
visits from foreigners of distinction, all of whom were curious to see one whose name and opinions were
known throughout Europe.

In 1672 Hobbes wrote his own life in Latin verse, being
then in his eighty-fifth year; and in 1675 he published his
translation in the Iliad and Odyssey. He had previously,
published the books of the Odyssey; and the reception which they had met with had encouraged him to undertake the whole. But however fa-
vourable might have been the reception at the time, the
popularity of this translation has certainly long since ceased;
and it must be allowed that the fame of the philosopher is
anything but heightened by his efforts as a poet. Hobbes
had now retired to the earl of Devonshire's seat in Dor-
byshire; but notwithstanding his advanced age, he still con-
tinued to keep his mind and mouth open, and to take the
Student of the Common Law of England.' In 1679 he
sent his 'Bebemoth, or a History of the Civil Wars from
1640 to 1660' to a bookseller, with a letter in which he re-
guested permission 'to publish it under the自治or with
this reservation, should not the library publish it. It appeared however almost immediately after
Hobbes's death, which took place on the 4th of December,
1679, when he was in his ninety-second year. The imme-
diate cause of his death was a fall from a ladder.

The quality which chiefly strikes us, in contemplating the
personal character of Hobbes, is its independence. Placed
during the greater part of his life in circumstances which
would have made any other man, despite himself, a courtier
—the inmate of a noble house and tutor to a king—amid
the temptations of society he steadily pursued philosophy,
and at the risk of losing great friends, and indeed with
the actual sacrifice of royal favour, constantly put forth and
challenged of which he was the greatest and most ob-
turous. His independence in smaller things may have been
gathered from the following account of his daily mode of life
in the earl of Devonshire's house, which is given by Dr.
Kennedy: 'Five o'clock, I breakfast, walk in the garden the first out of bed and climbed any hill within his reach; or, if the weather
was not dry, he fatigued himself within doors by some ex-
ercise or other, to be in a sweat. After this he took a
comfortable breakfast; and then went round the lodgings to
wait upon the earl, the countess, and the children, and any
considerable strangers, paying some short addresses to all
of them. He kept these rounds till about twelve o'clock,
when he had a little dinner provided for him, water poured
always by himself without ceremony. Soon after dinner
he retired to his study, and had his candle with ten or
twelve pipes of tobacco laid by him; then shutting his door,
he fell to smoking, thinking, and writing for several hours.'
We have already spoken of the prince of his own profession,
more particularly in his latter years, and that he did not
easily brook contradiction. And there can be no doubt that
his independence was often displayed in that excess which in
his youth he had been so strongly attached to the obstinate
defenders of Aristotle, for instance, 'that though physics were a new
science, yet civil philosophy was still newer, since it could not
be styled older than his book 'De Cive.' Such indeed was one of his own performances, which he never always
him 'the apostle of tyranny.' And because, carrying out
his views as to the supremacy of government, he has re-
quired submission to the mode of faith which the monarch
establishes, and, writing not on moral but on political
science, has chosen, and especially in the treatment of ar-
beits, for instance, 'that though physics were a new
science, yet civil philosophy was still newer, since it could not
be styled older than his book 'De Cive.' Such indeed was

There is no doubt that in Hobbes's views, as we have stated them, there is some error. His hypothesis of a covenant as the origin of government, for instance, is a fiction which has now long been exploded in this country. But this is an error solely speculative, and of little importance; for all the valuable conclusions which Hobbes seeks to derive from his fiction he may get at, without its aid, by much more cogent and solid reasoning. We have elsewhere shown, which have been so sedulously brought against Hobbes, from the first appearance of his works to the present time, that they have no other foundation than ignorance and prejudice.

The following vigorous reference to Hobbes's acts, although his whole life is long laboured, are from a work which, both as regards thought and style, is one of the most masterly that modern times have seen. "The authors of the antipathy with which he is commonly regarded, as the author of that Government, or set of government ideas, which was the base of all the ancient Catholic church, the High Church clergy of the Church of England, and the Presbyterian clergy of the true blue complexion. In matters ecclesiastical (a phrase of uncertain meaning, and therefore of measureless compass), independence of secular authority was more or less affected by churchmen of each of those factions. In other words, they held that their own church was co-ordinate with the secular government; or that the secular government is a mere subordinate, but rather partook in the supreme powers with one or more of the clerical order. Hobbes's unfailing loyalty to the present temporal sovereign was alarmed and offended by this anarchical pretension; and he set his face against it with a weighty reasoning and an unaffected energy of expression which the aspiring and vindictive priests did bitterly feel and resent; accordingly they assailed him with the poisoned weapons which are ministered by malignity, and which are for the most part (agreedly) used with flat atheism; whilst some of them affected to style him an apostate of tyranny or misrule, and to rank him with the pervasive writers (Machiaveli, for example) who really have                                applied to murder by reason. And this is the way the doctrine of a tyrant is regarded with pious or republican horror by all the extremely few who have ventured to examine his writings." (Austin's Province of Judgement determined., p. 293, note.)

The number of works to which Hobbes's writings gave rise is very great. "The Philosopher of Malmesbury," says Dr. Warton, "was the terror of the last age, as Tindall and Colman were in that of the first. The press never met with more opposition, and every young churchman-militant would try his arms in thundering on Hobbes's steel cap." (Divine Legation, vol. ii., p. 9, pref.) His principal antagonists were, Clarendon, and Dr. Burnet; but the latter, after the publication of Hobbes's "De Jure Naturae," was more at a loss than ever to stop at hostilities. In the quarrel which was then beginning to manifest itself between the Parliament and the Legis-

In his treatise on 'Eternal and Immortal Morality,' and Bishop Cumberland, in his treatise on the 'Laws of Nature,' Bishop Burnham published a book called "The Catching of the Leviathan," to which Hobbes replied. We may also mention Archbishop Tenison's "Credo of Mr. Hobbes examined," and Dr. Eckard's "Dialogues on Hobbes." And, in addition to direct and personal attacks on Hobbes, there are numerous references to his views for the purpose of censure in Harrington's "Oceana," and in Henry More's writings. But although Hobbes's writings excited so much controversy, and have, to the antipathy of politicians, so much influence, the name is clear, from the very few editions which have been published of his works, and from the circumstance that those few are old, that they have not for a long time been in print. His influence and the duration of the hostility with which his name is regarded.

HOBBIMA, MINDERHOUT, one of the most eminent of the Flemish landscape painters, was born at Antwerp, and christened Johannes, about the year 1638. The prevalent notion not, we believe, conjectured by whom he was instructed, but his works evince the most assiduous and successful study of nature. His subjects are in general simple country scenes, to the flatness of the landscape, and tree, the borders of a forest, a winding path leading to a village, or some ruin, building, or piece of water, often carrying the eye to an almost evanescent distance; such are the materials to which, by accurate perspective, cleanliness, and fullness of colour, and the most careful execution, with a free and light pen, he gives an unrivalled charm. His works are very fine productions; art in England, Sir R. Peale's collection, and the Grovesnor Gallery. The largest and, in the opinion of Dr. Waagen, the finest of his works is in the possession of Lord Hatheron, who has refused 3000L for it. HOCHE, Emmanuel, a French general, was born at Strasburg, in a very humble parentage, enlisted in the French Guards at the age of sixteen. When the Revolution broke out he warmly espoused its cause, obtained a lieutenant's commission in a regiment of dragoons, and distinguished himself in all its encounters and campaigns. He was a member of the Jacobin club of Paris, and in 1791 commanded a division of the National Guards. He was first a prisoner of war at Brandenburgh, and then was expelled the Austrian army under Wurmser, and drove it out of Alsace. Upon incurring the displeasure of St. Just, the terror commissioner of the Convention, he was arrested and thrown into prison at Paris; but his life was saved by the timely overthrow of Robespierre in July, 1794. The Convention restored him to his rank, and sent him against the insurgents of La Vendee, where he showed such firmness mingled with considerable address and a disposition to conciliate, instead of driving the royalists to despair. He defeated the emigrants who had landed at Quiberon in July, 1795, and having obliged them to surrender, he set upon them, and most of them only being punished, the rest were spared; but the Convention ordered a general massacre. Hoche, upon this, gave up the command of that district to General Lemoine, and withdrew within the walls of the city of La Vendee. His operations in Vendee Proper, where he succeeded in putting down the insurrection, and seizing Charette and the other leaders, who were put to death. By a decree of the Directory, July 1796, he was declared to have well deserved of his country.

Hoche now conceived the bold idea of effecting a landing in Ireland, and a fleet having been equipped at Brest with great secrecy, he embarked his troops in December, 1796, was prevented from landing by a storm from the east on the 30th, but he was obliged to return to France without effecting any thing. [Bantrey Bay.] Upon the Directory giving him the command of the army of Sambre et Meuse, he crossed the Rhine near Neuwied, in presence of an Austrian army, defeated the Austrians in several battles, and advanced as far as Wetzlar, where he heard of the death of Bonaparte, and hastened to the aid of his master. He thereupon put a stop to hostilities. In the quarrel which was then beginning to manifest itself between the Directory and the Legislative Council, Hoche took the part of the Executive, as he considered the opinion that France stood in need of a strong government in order to be restored in power, and he began to direct some of his forces towards Paris in order to support the Directory in the measures which it contemplated. For this he was denounced by the Councils, and Bourgoing meantime having offered the support of his own army of Italy, the Directory declined Hoche's services, and made use of Augereau to effect the coup d'etat of Fructidor. [Augereau.] Hoche seems to have had in his career, minor and major crises, at which he returned to his head-quarters at Wetzlar, where he was seized by a sudden illness, of which he died on the 15th of September, 1797. The symptoms of the disease give rise to sus-

Hochstädt [Bleheim.]

HOCO, a name employed by Buffon, Latham, and others, to designate some of the Curassow birds. (Cracids, vol. viii.)

HOCHSTADT.
HODESDON. [HERTFORDSHIRE.]

HODESDON. [ARABIA.]

HODGE, W. HUMPHREY, D.D., an eminent divine, was born on the 1st of January, 1659, at Oldecombe, in Somersetshire. He was educated at the University of Oxford, took his degree of M. A. in 1662, and was elected in 1684 a fellow of Wadham College. In the same year, he published 'A Dissertation in the Ark of the Covenant, Arte LXX. Interpretibus,' which was well received by most of his learned contemporaries. Vossius however published a reply to it in an appendix to his edition of Pompionius Mela. But the arguments and reasoning of Vossius among his contemporaries were those which he published respecting the bishops who had been deprived of their hierophicies during the reign of William and Mary, for refusing to take the oath of allegiance to the Protestant succession. The first work which he published on this subject was a translation of a Greek treatise, supposed to have been written by Nearchus in the latter half of the fourteenth century, in which the writer maintains that 'although a bishop was unjustly deprived, neither be nor the church ever made a separation, if the successor was not a heretic.' The original Greek work, as well as the English translation, were both published in 1691. Amongst the numerous works published in reply to Hody, the most celebrated was written by Dodwell, and was entitled 'A Vindication of the Deprived Bishops' (Lond., 1693). In 1694, Hody published another work, 'The Case of Seen Vacant by an Uncanonical Deprivation,' (4to, Lond., 1693), in which he supports the opinions of Nearchus, and replies to the arguments of his opponents. These exertions of Hody in favour of the non-jurors, and the non-jurors of the same party was not unrewarded. He was appointed domestic chaplain to Tillotson, archbishop of Canterbury, which office he also held under his successor. He was presented with a living in London, and in 1700 he succeeded Mr. Collier, of the Greek, at Oxford in 1698, and archdeacon of Oxford in 1704. He died on the 29th of January, 1706. He founded ten scholarships at Wadham College, in order to promote the study of the Greek and Hebrew languages.

Of the other works of Hody, the most important are:--

1. 'De Bibliorum Textibus Originalibus, versionibus Graecis et Latinis Vulgatibus,' libri iv., Oxford, 1704, 4to, which is by Bishop Marsh to be the 'classical work on the Septuagint.' The first book contains the dissertation against the history of Aristeus, which has been mentioned above. The second gives an account of the real translators of the Septuagint, and of the time when the translation was made. The third book gives a history of the Hebrew text, and of the Latin Vulgate; and the fourth, of the other ancient Greek versions.

2. 'The Resurrection of the (Same) Body Asserred,' 8vo, Lond., 1693. 3. Animanvqenmexon on the Prophets, Collected and Published, 8vo, Lond., 1696. Sir W. Perkins and Sir J. Friend had been executed in 1695 for treason against the government; but previous to their execution he had absolved of their crime by some preposterous act. This was condemned by the ecclesiastical authorities, but was justified by Collier in two pamphlets which he published on the subject.

4. 'De Graecis Illustrissimis linguis Graecis litterarumque humaniorum instauratoribus,' Lond., 1742. This work was published several years after the author's death, by Dr. Jebb, who has prefixed to it an account of Hody's life and writings, to which we are indebted for the greater part of the present sketch.

HOE, HORSE-HOEING. The hoe is an instrument used in gardens and in the fields for loosening the earth, and destroying the weeds between plants. It has various forms. The most common hoe consists of a blade or flat piece of iron, which is inserted at a right angle with the handle at a very obtuse angle, and is used by pushing it forward and cutting off the weeds an inch or less under the surface of the ground. Hoes are made of different sizes and shapes according to the work which is to be done in which the hoe is to be used.

A horse draws the instrument, which is held and guided like a plough. When the space to be hoed is considerable, the iron of the instrument is shaped differently. The hoe is narrower in the blade, and the instrument resembles a wheel-barrow more nearly than a plough.

From these simple instruments a variety of others have been invented of a more complicated nature, but the object of them all is the same, viz. to stir the ground between the rows, and destroy the weeds as fast as they appear.

The horse-hoe is now chiefly used in the cultivation of peas, beans, potatoes, cabbages, turnips, and carrots. It has been found that the required distance for the horse-hoe to act properly is too wide for rows of corn, and that the narrow hand-hoe is a more effective instrument in keeping these crops clean.

The effect of hoeing is remarkable in very dry weather. Although the stirring of the soil would seem to extract what little moisture there might be in it, and the weeds wither on its surface, it soon appears that, on the contrary, moisture is increased or produced, and the weeds which drooped before appear refreshed and invigorated. This is probably effected by a chemical action of the air on the vegetable portion of the soil and on the roots of the plants, which have the power of combining the gaseous principles in various ways, pro-

P. C. No. 756.

257

H O E

VOl. XLI.—Z.
ducing that combination of oxygen and hydrogen which forms water, while the power of vegetation in the plant itself can combine hydrogen and carbon dioxide and various other substances. Whether the mode in which it acts, experience has proved that the more the earth is stirred around plants the better they thrive. Where a very great perfection has been attained in drainage it is necessary to have the perfectly equi-
distant and straight, an instrument may be used which shall have ten or a dozen rows at once, without danger of cutting up the growing plants. Such an instrument has been invented, which is said to be perfectly safe, and probably be very generally used. It is called the inverted horse-
hoe, because the hoes are so placed as to present the back part of the hoes, which are rounded, towards the growing plants, so that they touch the surface, and they would not cut them down. The points of the hoes are all in the middle of the intervals, one pointing to the right and another to the left. When the intervals are very wide, as is the case in growing potatoes, turnips, or cabbages grow in rows, one plant to a plot, with one horse, going up and down the interval answers the double purpose of a hoe and plough. It stirs the ground to a greater depth, and can be guided nearer to the growing plants than the common horse-hoe.

But this system cannot be performed too soon after the plant has shot out its roots, because the ground may then be stirred very near the young plant without danger, and the roots will spread readily in the newly-stirred soil.

In stiff soils it is very often difficult to use the horse-hoe, owing to the hardness of the surface, which rises in lumps, the very reverse of what is intended; but a little attention to the condition of the soil will obviate generally all difficulty. If the soil is bound at the surface, it is a proof that the preceding tillage has not been so perfect as it ought; that the ground has not been stirred to a sufficient depth before winter, nor had sufficient dry, or that it wants under-draining. There are few soils which may not be made mellow and crumbling some time or other in spring; and if the proper time be chosen for the first hoeing, the surface will scarcely ever become so compact as to rise in large clods. In the case of very a tenacious soil the small-spoked roller, described [Branx] in vol. iv., p. 82, may be had recourse to, and after using it a few times in dry weather, the surface will be left in a fit state for the common horse-hoe. The mould usually taken by the horse-hoe husbandry has been taken from the common cultivation of the maize or Indian corn in Lombardy. The rows there are about 27 to 30 inches distant: as soon as the plants show a practical subject to it, the earth is taken from the plants and laid in a ridge in the centre of the interval; here it is exposed to the sun and rains, which, besides killing the weeds, makes it much finer. In this state it is thrown back on the plants and laid against the stems, which strike fresh roots into this mellow ground. But this will not be equally proper with all plants and in all soils. Both potatoes and cabbages are much improved by heaping up the loose soil over them; but this is not the case with many other plants. The best, for example, while it is growing and swelling, is not benefited by having earth thrown round it, for this would induce the root to send out fibres sideways, whereas they should strike downwards in search of moisture. Turn-
\[\text{...}\]

HOF, a district in Upper Franconia, in the kingdom of Bavaria, has a population of about 19,000 inhabitants. The chief town, of the same name, called also Stadt-
Hof, is a place of great antiquity, and was early admitted as a free city of the empire. It has 6000 inhabi-
tants, who carry on extensive manufactures of woolen, cotton, muslin, leather, paper, &c. The breweries are celebrated. There are three churches, a gymnasium, with a large library, a hospital, and a university. There are quarries of fine marble and iron-works in the neighbourhood. Of 697 houses, 262, with the fine church of St. Michael and the town-hall, were burnt down in 1823. The town is well approached from the north, and the regularity of the new buildings has greatly im-
proved its appearance. It is joined to Ratisbon by a bridge over the Saale.

HOPF, FRIEDRICH, was born at Halle in Saxony, in 1660, of a family which had been engaged for two centuries in the practice of medicine. After having graduated and received his diploma at Jena, he established himself as a physician in Minden. In 1684 he travelled through Holland and England, and on his return was appointed physician to Frederick William, elector of Brandenburg, and to the garrison at Minden. In 1688 he removed to Halberstadt, and having gained considerable celebrity both by his successful practice and his writings, he was invited by Frederick III., elector of Saxony, after-
\[\text{...}\]
in the result of the change which he affected in the doctrines supposed to explain the essential nature of disease. The moral pathology, which ascribed all diseases primarily to a morbid condition of the fluids, which by their action on the solids produced secondary changes in them, had prevailed in all the schools, and had been almost ineffectually opposed by Glisson and Bagiari; and the only subject of dispute had been whether the primary disorder of the fluids consisted in an alteration of their physical or their chemical properties. But Hoffmann showed that the action of disease was more than physical; it was an alteration of the fluids as well as of the fluids. He believed that all their disorders were attributable to an alteration from the healthy degree of action, or, as he called it, tone, which constitutes the natural state of the moving fibres, and that consequently the same result was another modification of the same theory of Hoffmann. In this country some of his terms alone are preserved to express similar and rather indefinite ideas. In the applications of his theory to the details of physiology and pathology, he introduced a new character to the chemical elements, and the chemical doctrines of his predecessors; in his practice he was extremely simple, and, by comparison with modern physicians, temperate and inefficient. In accordance with him, his pupil and admirer, the young Leclerc, was another exponent of the same system. Hoffmann himself, either as tonics or as anti-parasitics, the former class including all stimulants, and the latter all depressing agents; but he also admitted alternators and evacuants. His knowledge of therapeutics was considerable, and the system he owed to him the discovery and first introduction of the Seidlitz waters and the purgative salt obtained from them. The best edition of his complete works is that published at Genoa in 1748, in 6 vols. folio; and his best treatises are the 'Medicinae Rationalis Systematicae,' which occupies the first 3 volumes, and the 'Consiliorii Medic.' (Life prefixed to his works; Broussais' Examen des Doctrines Medico-chirurgicales,' 2 vols. folio.)

HOFFMANN, CHRISTIAN GOTTFRIED, born in 1692 at Lauben, in Upper Lusatia, studied at Leipzig, where he took his degree. In 1718 he was made professor of law in that university, and afterwards appointed to the chair of mathematics, in which capacity he was also appointed counsellor to the king of Prussia, and member of the Academy of Sciences of Berlin. His principal works are: 1. 'Historia Juris Romano-Justiniani,' 2. 'Specimen Conjecturarum de Origine et Nature Legum Germanicarum.' 3. 'Introductio in Jurisprudentiam Canonico-Pontificiam.' 4. 'Nucleus Legum Imperii et Novissimae Germaniae Pacificationum.' 5. 'Praetextes de Origine, Progresso, et Nature Jurisprudentiæ Criminalis Germanicæ.' 6. 'Novum Volumen Scriptorum Rerum Germanicarum, in præmissà Lusatiam et vicinas Regiones spectantium.' 7. 'Novum Scriptorum Rerum Monumentorum, per Moriæ legam, in Insulae Rheni Insulae.' 2, 8. 'Scriæs Rerum per Germaniam et in Comité á Transactiones Passaviani ad annum 1720 gestarum.' He also published in German 'Ausfuhrliche Beschreibung des Russischen Reiches,' and 'Gegenwärtige Zustand der Finanzen von Frankreich.' Hoffmann's eulogy is contained in the 'Nova Acta Eruditorum' for May, 1736. He died in 1738, with the reputation of one of the first jurists of his time.

The class to which his education was in the first instance turned was that of the peasantry, whose education was a subject of great concern to him. He found them nearly as ignorant as the oxen that they drove, and able to avail themselves of but few of the advantages which nature offered them for improving their condition. The idea struck him that an estate might be so managed as to constitute not only a source of profit to the proprietor, but a means of rescuing the peasant from a state of brutish ignorance, and making him more comfortable in his circumstances, more industrious, more contented, and more upright than the boy of the city instead of an incumbrance. The theory which he devised he also executed; young, full of energy, by birth a patrician, and possessed of a fair proportion of wealth, thirty-six years old, he commenced a life of industry, and few can command—nor has his zeal flagged. From that time to the present he has been occupied in improving and perfecting his first design, which a long experience has proved to have been justly conceived with reference to the wants, the powers, and character of man.

The chief characterizations of the peasant school are—

1. The combination of industry with instruction. As in after-life bodily exertion must occupy the largest proportion of a peasant's time, it is made to occupy the larger proportion of the day in the education in this school. Intellectual instruction occupies only a comparatively short period, and the peasant is left to digest his task. The industrial employments are worked with the assistance and strength of the children, and are superintended in such a manner as to secure the habit of performing each skillfully. Indeed the arrangements of the institution are of a manner which enables the peasant to dispose of his time either at home, in the garden, the care of horses and cattle, &c., each in its turn engages the attention of all the children, thus giving them independence by rendering them capable of supplying their wants, and learning at the same time to take care of them; or among the shrubs, or the like, the peasants taught to work and not purchase, while it enables them to occupy with advantage many a long winter's evening, or day, when employment for wages is not to be had, which would otherwise be spent in listlessness, if not in riot.

2. The reference of the intellectual instruction to the industrial employment.

Beyond the usual routine of reading, writing, and arithmetic, the children also obtain such an acquaintance with all those practical duties by which a peasant can as well as by any other be turned to profit; mechanics, chemistry, so far as it relates to agriculture, natural history, botany, geology, mensuration, geography, &c., form a part of the instruction. The first school of the young peasants begins with the study of the Seidlitz waters and the purgative salt obtained from them. The best edition of his complete works is that published at Genoa in 1748, in 6 vols. folio; and his best treatises are the 'Medicinae Rationalis Systematicae,' which occupies the first 3 volumes, and the 'Consiliorii Medic.' (Life prefixed to his works; Broussais' Examen des Doctrines Medico-chirurgicales,' 2 vols. folio.)
part of education is carried much farther than in the peasant school. Great attention is paid to agriculture, both in theory and practice, while the pupils are expected to labour in all the departments of the institution in the same manner, although not for so long a portion of the day, as the peasants. The children in this school pay a small annual sum for their education, as the quantity of labour which they perform is not sufficient to repay the cost of their education.

Besides the pupils which we have mentioned there is also another for the higher classes of society. At the time when the writer of this article visited Hôwfyl, there were about 100 children in it, thirty of whom were English. The number of English children is very small, although as in the other schools, bodily labour forms a part of the occupation of the day; but while in the peasant school labour is the chief part, here it is only a relaxation.

For the purpose of attending to the various departments of education there are no less than thirty professors, who live in a house apart: several of them are individuals of considerable eminence. In addition to these schools the founder, at his own expense, receives and gives instructions, for a certain period of the year, to all the schoolmasters of the peasant schools of the canton of Berne.

The estate around the institution is so managed as to furnish the necessary food and clothing for the pupils. All the most approved agricultural implements invented in England, Scotlant, Belgium, and other countries, are manufactured at the institution for sale to the agriculturists of Switzerland. Considerable attention has been paid to the breeding of horses and cattle.

It is with regret that we have to state that M. de Fel- lenberg has met with much opposition from his own constituted by a number of his plans.

HOG. [Zoology.] [Stirpes.] HOG. The hog is one of the domestic animals which is most widely dispersed through the world, and yields to no other in its usefulness. It lives and thrives on every kind of food, vegetables, grass, or flesh. As regards the ox, it is said that the hog will eat hay; and its stomach can digest what few other animals could swallow with impunity. The sow bears two litters in the year, having from eight to twelve, and even sometimes as many as fifteen, in a single time. All animal converts a given quantity of corn or other nutritious food so soon into fat, or can be made fat on so great a variety of food.

The food of the hog in a wild state is grass, roots, acorns, beechee and fruit. He is active and ferocious; and the hour-hunt, from the danger which attends it, is well adapted to excite those who are of a warlike disposition.

Varieties of the domestic hog. The brindled hog mostly resembles the wild species; but although the flesh is savoury, he does not fatten so soon, nor is he so profitable as the more indolent and softer skinned hog. The great quality of a hog is his power of digestion; the more rapidly he fattens, and the earlier he can be made to increase in flesh without increasing in bone, the better is the hog. Some of the small hogs which are brought from France are remounted for this quality, as well as for their prolific nature; and when, by judicious crossing, the size is increased, they are a very profitable breed. The Chinese pig is short in the head, with ears pricked up and pointing backwards, very white in the cheek, high in the chest, and short in the body of this breed is heavy in pig, her belly generally drawn on the ground. The young pigs of the Chinese breed, especially the white variety, are excellent for roasters, at three weeks or a month old, whereas small and fat, with little bone, and their skin is very delicate. They also make excellent porkers at about three months old, when kept for some time after weaning on the refuse of the dairy. They may be fatted at any time and as soon as they are weaned, but when kept they are fit to be killed for bacon; and although they do not come to a great size, they will pay very well for their food if killed at a twelvemonth old.

The Essex breed is most black and white. The pure breed however is said to be quite black, and is nearly allied to the smooth Neapolitan breed, which has scarcely any hair, that we cannot help supposing a consanguinity between them. When crossed with the Neapolitan they produce a breed which fattens at a very early age, and to an astonishing degree. A breed of this cross, carefully selected by Lord Harborough, has gained the first prizes for fat pigs at the Smithfield annual Christmas shows for several years past. They were fed extra straw and bran, but they were not permitted to run outside. They were so completely covered with fat, that their feet were scarcely to be seen; and if they could stand, which is doubtful, it is certain that they could not walk.

The Middlesex is a large breed, with any hair, very plump, with pricked ears. No breed can excel it in the aptitude to fatten. The sows often become so fat on very scanty food that they will not breed: they are extremely tender; and if they happen to have litters in winter, it is difficult to save the young pigs from dying in cold weather. A cross of the Neapolitan with some of our hardier breeds greatly improves their usefulness, without injuring their aptitude to fatten: the best cross is with the Berkshire, which is a very well proportioned to the flesh, than in a smaller.

From the prolific nature of the hog it is not difficult to select the best individuals to breed from. In every litter there are some individuals which are worth careful selection, but by careful selection of these any breed may be soon much improved without crossing; but experience teaches that when the sows and boars are too nearly related the fertility greatly diminishes; and it is of very great advantage to have from the same stock the sows at last produce only two or three diminutive pigs at a litter. Hence the experience of frequent crossing. To restore fecundity no breed is so effectual as the Chinese breed. A breed compounded of the Berkshire, Chinese, and Neapolitan breeds, by judicious crossing, produces many varieties which can be desired: numerous litters, early fattening, and fine hogs for bacon at twelve or sixteen months old, are the result of care and selection.

The black hogs are preferred on the whole. They are much less subject to diseases of the skin than the white, and the sun affects them less in summer. For sucking-pigs or porkers, many prefer the white, merely for the appearance; for the black skin is in general the finest.

There are some very large breeds, which have been recommended under the idea that in a large hog the bone and flesh are in proportion to the flesh, than in a smaller. But these large hogs do not come so soon to maturity. They cannot be profitably put up to fatten till eighteen or twenty months old, or more; and although some of them may make hogs of thirty or forty score when killed, they are so long and thin, and require so much time and care, that they are very doubtful whether they pay for it as well as the smaller. For delicate bacon the hogs killed at a twelvemonth old, and weighing ten or twelve score, are much preferred; and it is a fact which we are inclined to think that there are most profitably raised. When hams are the principal object the hogs should be killed before they are so fat as they might be; and the carcass is then cut up and pickled instead of being converted into dry bacon. To keep hogs profitably, a regular system should be pursued both in the breeding and feeding. Proper hogstyes should be constructed, with chambers in which the pigs of different ages and the breeding sows may be kept separate; and where they may be boiled or steamed in an apparatus conveniently placed, and the greatest cleanliness and regularity should be maintained. It is a great mistake to suppose that the hog loves dirt and filth. If kept clean and well fed it will wallow in the mud is not from a love of dirt, but from a heat and shelter in the skin in warm weather, which is relieved by rolling in the cool mud. If hogs have plenty of clean straw, and are well fed, and have nothing makes them thrive so quick, or pleses them more, than being washed and curried regularly. If the hogs are not closely confined they will always lay their dung at a distance from the place where they sleep or feed, and in all well conducted farms there should be a separate apartment, in which the hogs can deposit their dung.

When a sow is near the time of farrowing, which is four months after she has taken the boar, she should be put in to a sty by herself, with a moderate quantity of straw, for, if there be too great an abundance she is apt to lie down or...
The young pigs when they bury themselves in the loose straw, or are upon very hard boards, are apt to lie on them, especially when any of them are near a wall. To prevent this it is very useful to have a ledge of wood six inches wide and six inches from the ground all round the sty, so that she cannot lie down close to the wall and with the body accidentally behind her, she can take refuge behind the ledge, and thus escape being lain upon. When no precautions are taken, one-fourth of a litter is often lost in the first day or two after they are born. The into the body of estuarine young pigs as soon as they drop; good feeding will prevent this in some measure, but attention at the moment of farrowing is the safest and surest preventive. When one of the young pigs have sucked much of the danger is past.

The sow with many pigs should be well fed; bran and barley-meal with milk or whey is the best food; grains, where they are at hand, are excellent; and it is useful to let the sow go out to graze in a meadow or clover-field for an hour or two every day, shutting up the pigs during that time till they are a fortnight or three weeks old, when they may then accompany the sow. A sow will live many years and bring numerous litters, and the older she is the better nurse she is in general. When a sow has ten or twelve pigs at a litter, and two litters in the year, one in spring and another in autumn, she is said to be well raised, but ought to be kept as young as she will breed. But otherwise it is very profitable to let a young sow have a litter at ten months old, and spay her immediately; she will then fatten most readily as soon as the pigs are weaned, and the bacon will, in the course of a year, be hung and sold. When a sow does not bring a sufficient number of pigs, or is not a good nurse, or has ever eaten any of her pigs, she should be spayed and fattened immediately. The young pigs in their pre-natal life of store pigs are castrated; the sweetest fat does not bring a sufficient number of pigs, or is not a good nurse; or has ever eaten any of her pigs, she should be spayed and fattened immediately.

The sow is usually put up at a twelfth month old and fatted in three or four months. At first they have their food raw or boiled, mixed with bran, or bean-meal, or they have dry beans and water. After they are half fat they should only have pea-seed or barley-meal or water, unless in a dairy, when she has the skimmed milk or whey. Hogs fattened on potatoes only do not make so good bacon as those which are fattened on corn. This is the reason why the home-bred bacon sells so much dearer than the Irish. When a piece of raw bacon is put into the pot and the boiling begins while fat is being put in, it is a sure sign that the hog has been very well fed; if it shrinks, it may be concluded that he has been fattened chiefly on potatoes. The labourers in the country, who live chiefly on bacon, know this well, and always purchase the best fed bacon, even at a much higher price, finding it most economical. Potatoes are an excellent food for store pigs, and may be given boiled and mixed with meal in the early part of the fattening process; but beans and peas make the finest flesh and the best bacon. Before a hog is killed he is usually fed for some time on barley-meal and water alone, given as thick as porridge, and very little, if any, water is given to him. This last rule is often carried to too great an extent. Much water will make the food pass through too rapidly, and it will not be digested, but the hog should never suffer from thirst, or he will not thrive. Before a hog is killed he should be kept without food for twelve hours at least. He may however have water. He should be killed without giving him more pain or causing more struggling as is necessary, by a resolute stab with the knife in the lower part of the neck, where the knife may sever the large and small blood veins. The head should be bleached to flow freely till it is all out of the body. The hog, if intended for salt pork, must then be scalded with water not quite boiling, and well scraped to take off the hair; but with the common style of salt pork it is best to singe the hair by burning straw over the body, and then scratching the skin. Care must be taken not to allow the skin to be burnt so as to crack. The hog is then hung up, and the entrails taken out. The inside of the body is washed out with cold water, a rat or sponge dipped in water, that no blood may remain, and the next day the hog is cut up. The head and feet are cut off; the chine is taken out, and the upper part of the ribs, with the backbone, are cut out, leaving as much flesh as possible adhering to the fat outside. The small ends of the ribs remain attached to the bacon. The curing of bacon has been described. [Hampshire—Agriculture]

A Hog-Style. Much of the profit of breeding and fattening hogs depends on the economy of labour in preparing their food. Any place is often thought good enough to lodge a pig in, and a style is a word synonymous with a filthy place. But in every well arranged farm-yard there should be a convenient place for keeping hogs and feeding them, which may be erected at a small expense, and which will soon repay the outlay. There should be a piece to boil and mix the food in, with or more large copper vessels and a steaming apparatus. The food should be mixed in square brick tanks sunk in the ground and cemented, that there may be no filtrations. If there is only one tank, there should be a partition in it. From the boiling-house there should be an immediate communication with the feeding-styles, under cover, if possible. Each style should open into a small yard behind, which should communicate by a door with the principal farm-yard, where the harn is situated in which the corn is thrashed, and be enclosed with a low wall or peling. There should be separate styles for breeding-sows, for porkers, and for fattening hogs. Not more than three or four of the latter should be in one style. The food should be given in troughs, in a separate compartment from that in which the hogs lie down, and no litter should be allowed there. The floor, which should be of brick or stone, should be freely tilted, as the troughs should be cleaned out before every meal; any of the food left from the last meal should be taken out and given to the store-pigs. A very convenient contrivance for keeping the troughs clean is to have a flipp or door, made with hinges, which can be opened and closed so that it can swing and alternately be fastened by a bolt to the inside or outside edge of the trough. When the hogs have fed sufficiently the door is swung back and the trough is easily cleaned out. It remains so till feeling time, when the food is poured in, without any impediment from the greedy hogs, who cannot get at it till the door is swung back.

A simple contrivance saves a great deal of trouble, and is easily adapted to any common style. It is a great advantage to be able to inspect the styles without going into them, and this is effected by placing them under a common roof, which may consist of the leanest part of the hogs-house or any part of the wall of the building, with a passage between them. The preceding figure will best explain this, and shows its superiority over common styles.
In the parish church on the 28th November. His father, Richard Hogarth (or Hogart, as the name seems originally to have been written and pronounced) died in 1721, leaving two daughters and one son, William. Of William Hogarth's education nothing has been recorded; but we may conclude that it was slight from the frequency of his errors in grammar and orthography. 'My father's pen,' writes Hogarth himself, 'like that of many other authors, did not endure. I had more for my amusement than for my shifting for myself. As I had naturally a good eye and a fondness for drawing, shows of all sorts gave me uncommon pleasure, and mimolody, common to all children, was remarkable in me. An easy entry into a neighboring print shop drew my attention to that art, and I ran away at every possible opportunity employed in making drawings. My exercises when at school were more remarkable for the ornaments which adorned them than for the exercise itself. In the foundry or copy-shop, where I was set to work to make the world know would soon surpass me, but for the latter I was particularly distinguished.'

It was at his own wish that he was apprenticed to Ellis Gardiner in Granboune-street; but he soon found this business too limited, and its scope insufficient for his fancy. 'The painting of St. Paul's Cathedral and Greenwich Hospital,' he writes, 'at this time going on, ran into my head, and determined me to complete engraved copies of buildings which should be followed by me no longer than necessity obliged me to it. Engraving on copper was at twenty years of age my utmost ambition.' In 1718 Hogarth ceased to be an apprentice, and being twenty years old; and, according to Walpole, he attended Sir James Thornhill's academy in St. Martin's-lane, where 'he studied drawing from the life, in which he never attained great excellence.' He was also instructed by engravers, copper-plate engravers, shop-bills, and similar works, until the year 1724, when he published his first original engraving, now called the 'Small Masquerade Ticket, or Burlington Gate.' Illustrious personages and the great men of the day have since been the subjects of his pens; and, by a kind of poetic license, which, with the help of some small excursions of scenes of town life and folly, replenished his purse, and gained him a moderate reputation. He now paid his addresses to Jane, daughter of Sir John Thornhill, to whom he was united in 1730, without the consent of her parents. Her father resented the marriage as a degradation to his daughter, and was not reconciled to her until two years after it had taken place. The facility which Hogarth had gained in the use of the brush now induced him to attempt portrait-painting; but although he was not unsuccessful in the treatment of many of his subjects, the style did not satisfy his mind: though this was not altogether for ingenuity and invention, to compensate for the drudgery. He accordingly abandoned portrait-painting, and entered upon that original style on which his fame rests. 'The reason,' he says, 'which induced me to this design was, that I thought both writers and painters had, in the historical style, totally overlooked that intermedium species of subjects which may be placed between the sublime and grotesque.'

Before he had done anything of much consequence in this walk he entertained some hopes of succeeding in the higher branch of historical painting. 'He was not,' says Sir Joshua Reynolds (Discourses, vol. i., p. 153), 'blessed with the knowledge of his own deficiency, or of the bounds which were set to the extent of his own powers.' After he had invented a new species of dramatic painting, in which probably he will never be equalled, and had stored his mind with infinite materials to explain and illustrate the domestic and familiar scenes of comic life, which were generally and ought always to have been the subject of his pencil, he was imprudently, or rather presumptuously, attempted the more difficult; but this style, which his previous habits had by no means prepared him for, he was indeed so entirely unacquainted with the principles of this style that he was not even aware that any artificial preparation was at all in the province of man. After this failure as a historical painter, he resumed his former manner, engraving, as had been his custom, the pictures which he had painted. The eager demand for these in the age of printsellers, and the price at which he sold them; and the piracy so diminished the profits of the author that he applied to parliament for redress; in consequence of his application a bill was passed in 1735, granting a copy-right of a print for fourteen years after its publication. The reputation of Hogarth was now established, and he continued to paint with undiminished ability. At the age of forty-eight he was in easy circumstances, and rich enough to keep a carriage. The sale of his prints was his principal source of income: the price of his pictures kept pace neither with his fame nor with his expectations. We find that in 1745 he sold by auction nineteen pictures, including two engravings, for a sum most unequal to their merits. Some conditions which he had very whimsically annexed to the sale appear to have diminished his profits. In 1753 he published his 'Analysis of Beauty' and attempted to prove the foundation of beauty and grace consists in flowing and fine line; he writes numerous examples; and though his conclusion is unsound, his arguments are both amusing and ingenious. They were attacked and ridiculed by a host of his enemies and even his contemporaries."

For an account of Hogarth's contests with Wilkes, the celebrated politician, we must refer to his biographers. After his sixty-sixth year his health began to decline, and he died on the 30th October, 1764. He was buried in the churchyard at Chiswick, where his wife was also interred in 1759, in her 80th year. They had no children.

Hogarth is the first English painter who can be said to have had ideas. He is also one of the few English painters who can be considered an original genius. His style of painting may be characterized as the 'satirical;' the satire being sometimes humorous and comic, and sometimes grave and satiric. His portraits are chosen from common life, among all classes of society, in his own country and in his own time. His comico-satirical vein may be seen in the Enraged Musician, the Rakes Progress, and other plates of the same vein is exemplified in the Harlot's Progress, the Rake's Progress, Gin Lane, &c. His tragic vein is seen in the History of little Drummer boy, History of Fashion for forty-eight years, &c. The series of Marriage à la Mode contains pictures in both these veins. In the latter style his works are closely analogous to those of Watteau; and like Sevres, Of which all the life and drivel is put together in those parts of human nature from which most men turn with disgust: as for example, in the Four Stages of Cruelty, and Gin Lane. He also resembles Juvenal, in unmercifully describing the vices and weaknesses of mankind, and displaying them with the most revolting minuteness. The exaggeration of salient peculiarities, and the accumulation of characteristic incidents, which are common in the works of Hogarth, establish him in the rank of caricaturists. At the same time, he never departs so widely from nature as to mar the effect of his composition. To such an extent is he a caricaturist, that he is the fashioner of his fashion. Hogarth holds a high rank in the world of satire, and is considered, with Gibbon and others, one of the most eminent satirists of Europe. With reference to the quality, it has been remarked of his works, 'that there are such a number of minute circumstances, so many collateral points rather hinted at than expressed, that they can only, even after a study of hours, be taken for the mind in succession, that is to say, in mode analogous rather to that in which language works, than to the manner in which painting ought to produce its effect.' The same tendency is more strongly marked in the means by which he frequently had recourse to, to express a witty thought by some allusion written on a scrap of paper, or something of the sort, and which literally make the spectator a reader, and the artist something besides a painter.' (Review of Passavant's Tour, in Cochran's Foreign Quarterly, vol. i., p. 5.) Although caricature, as its name imports, originated among the Italians, Hogarth must be considered the greatest master of this style. As first introduced and perfected by him, this style seems to have suited the genius of the English nation. Gillray, although he never painted, and though he never attempted a line of the sort equal to Hogarth, nevertheless produced political caricatures of excellence, which, with respect to his style, are superior to anything else of the sort with which we are acquainted. The modern caricatures published under the initials of H. B., though less vigorous and in imagination scantier, and though, as is said, are mostly intended to very high praise in this department of art. Concerning the merits of Hogarth's technical execution, there has been some difference of opinion. As to the excellence of his drawing and composition there can, we presume, be no question; but the mind of the public is attached to his original pictures. On this subject generally, we quote the opinion of Dr. Waagen respecting the series of Marriage &
la Mode, whose high authority we consider altogether decisive. 'What surprises me,' he says, 'is the eminent merit of these works as paintings, since Hogarth's own countryman Horace Walpole says he had but little merit as a painter. All the most delicate shades of his humour are here marked in his heads with consummate skill and freedom, and every other part executed with the same decision, and for the most part with care. Though the colouring on the whole is weak, and the picture, being painted in dead colours, had less the look of water-colour than of oil paintings, yet the colouring of the flesh is often powerful, and the other colours are disposed with so much refined feeling for harmonious effect, that in this respect these pictures stand in a far higher rank than many that are, in the opinion of the most sagacious critics, worked up with its glaring inharmonious colours.' (Waagen's Arts and Artists in England, German edit., vol. i., p. 230.) Hogarth appears to have avoided high colouring, lest the attention he had received was from being two or three winters at school before he had completed his eighth year; but there is reason to believe that in this particular also his account of himself is to be regarded as somewhat poetical. He first began, he tells us, to be Dr. Trusler, who was assisted by Mrs. Hogarth: an improved edition of his work, which has been published by Mr. Major, contains a complete list of Hogarth's works. The best criticisms in Germany on Hogarth's works are those of Dr. Sickel and Mr. C. H. and his 'Artists of the 18th Cent.' His life is that of a man who lived to be a great artist, that of a man who lived to be a great artist, and who, having married, returned to the country, to live on a farm given to him by the duke of Bucchech, which soon however, under his management, came to yield little profit to the occupier, who was born into the long history of his varlet but constantly struggling life, marked as it was by much more than the usual share of fluctuation and casualty, and by many curious passages arising out of his transactions with the dealers and the collectors with some of his distinguished literary contemporaries. He has prefixed a full memoir of his own life to an edition of his 'Mountain Bard,' published in 1821; and many fragments of autobiography are to be found scattered up and down in his other works. To the various, and by no means inconsiderable, which it is proper to remark, are very far from being perfectly consistent with each other; and some of the statements have been denounced by other parties implicated in them as a complete mixture of fiction. Of Hoggh's poetical works, by far the most remarkable is his 'Queen's Wake,' first published at Edinburgh in 1813. It is undoubtedly a very extraordinary performance to have proceeded from a man of his kind of a kind that do not require the peculiarity of the circumstances in which it was produced to excite admiration. The wild imagination of some parts, the gentle beauty of others, and the spirited expression of the poet, which the reader, unaccustomed to the public taste, and it went through many editions, both in this country and in America, in a few years. The author never attained the life, or even the polish, of this early work in anything he subsequently attempted. 'Queen's Wake,' 'Winter Evening Tales,' 'The Three Perils of Man,' 'The Three Perils of Woman,' 'The Confessions of a Justified Sinner,' 'The Ar- trive Tales,' 'The Domestic Manners and Private Life of Sir Walter Scott,' and a volume of 'Lays of Burnes.' His deeds took place at his farm of Altavre, on the 31st of November, 1835. Wordsworth's noble lines suggested by hearing of this event, but in which the mention of the 'Shepherd of Altavre' is omitted, have been given to our language one of the finest examples it possesses of the Doric simplicity and grandeur in poetry.

HOGSHED, an ancient measure of liquid, which, not being mentioned in George IV., cannot now be considered as having any legal existence.

The hoghead of wine was 2 wine barrels, or 63 old wine gallons; the London hoghead of ale [Barrel] was 1 1/2 ale barrels, or 48 ale gallons; the London hoghead of beer was 1 1/2 beer barrels, or 54 beer gallons; and the ale and beer hogs heads for the rest of England was 1 1/2 barrels, or 51 gallons. All Excise measurements being now made in gallons, the London hogshead remains in only as a memory.

HOGUE, LA. otherwise written HAGUE, or HOGGLE, a cape forming the north-western extremity of the peninsula of Cotentin, in France, now the department of Manche, in 47° 46' N. lat. and 1° 49' W. long. A great battle was fought near the Cape in A.D. 1610, between the English and Dutch fleets, under Marshal de Tourville, and the combined English and Dutch fleets, under Admiral Russell. The allies possessed a decided superiority of number, consisting of thirty-eight vessels of the English fleet, and fifteen French. The contest was however maintained throughout the day, but ended in the entire defeat of the French, fifteen of whose ships were destroyed.

Hohenlieder, ein Dorf in der-Provinz [Bonaparte].

Hohelohre, [L. H.]

Hohenstaufen. [Germ. History. Literature.]

Hohenzollern, a sovereign principality in Germany, so called from the name of the original seat of which was the ancient castle of Zollern, or Hohenzollern. The oldest known ancestor of the family.
was Tassilo, count of Zollern, who died in 800. His descendent in the eighth generation was Rudolph I., who lived in 1165, and had two sons, Frederick IV. and Conrad. The latter became in 1200 the first burggrave of Nürnberg. His descendant, Frederick VI., obtained the franchise of Nürnberg by purchase in 1415, and received from the Emperor Sigismund the dignity of elector by the title of Frederick I. He was the founder of the present reigning family of Prussia. Constance, his eldest daughter, was the fourth wife of the house of the princes of Hohenzollern, which was divided towards the close of the sixteenth century into the two still existing branches of Hohenzollern-Sigmaringen and Hohenzollern-Sigmaringen. The latter was surrounded by the kingdoms of Württemberg and part of the grand-duchy of Baden. The Danube, with its tributary streams, flows through the southern part of the country, and the Neckar, with its tributaries, through the northern part. The highest mountains are a Kornhöhl (2732 feet high), the Zellerhorn, the Heiligenberg, and the Zollberg. HÖHENZOLLERN-SIGMARINGEN lies in the Suhanian Alps, which cover all the north part of the country: the soil is stony (2392 feet), on the west is the castle of Hohenzol- lern, the original seat of the family, which has lately been repaired. The area is 140 square miles. The total population is 22,000. The country is on the whole fertile, though its soil is not always of the most productive character. The forests are extensively cut, for the home consumption, besides potatoes in great abundance, and flax, which, with timber, are the principal products of the country. Hunting one of the favorite pastimes, and swine is considerably kept. There is but little game, there being no preserves and no game-laws. There are quarries of stone for building, and lime, but no metals. There are no manufactories properly so called; some woollens are made at Hchingen, and the villagers used formerly to spin a great quantity of cotton-thread; but this occupation has greatly declined. The exports consist of timber, corn, geltian, which plant is cultivated very extensively in some trades for some cotton-thread, and a few other articles. There are no subdivisions of this little principality, which contains one town, Hechingen, 8 market-villages, 20 villages, and several hamlets. Hechingen, the capital, situated on an eminence, has the castle of Hechingen, furnishes 145 men, and Ho- henzollern-Sigmaringen 356 men, and which form part of the reserve. In the full council (or plenum) each of the principalities has one vote. In the close council they are joined. In the patrimonial, or in the suits, Lippe-Detmold, and Waldeck, holding the sixthteenth place, with one collective vote. The succession is regulated by family compacts of the years 1575 and 1821, in the latter of which the king of Prussia joined as head of the family. It is hereditary in the male line; so that if the male line in one of the principalities becomes extinct the other succeeds: if the male line in both becomes extinct, Prussia succeeds. The King of Prussia is not till Bruchsal in 1547, obtained the franchise of 500. In 1732, 1776, and in 1702, the whole of the principalities in all three houses that the succession can come to the females and their descendants. (Johler, Geschichte Land- und Ortskunde der Fürstenhöher Hohenzollern.)

HOLBACH, PAUL THURY, BARON D', born in 1723 at Heidesheim, in the Palatinate, of a wealthy family, spent the greater part of his life in Paris, where he became acquainted with Madame Geoffrin, and Madame d'Epinay, and the principalities of Hohenzollern-Sigmaringen, especially of those who contributed to the first Ency- clopédie. [Diderot.] Holbach was himself a great ad- mirer and disciple of Diderot. The baron was fond of conviviality, and he gave good dinners: for early forty years he assembled round his table every Sunday a circle of literati, including at one time Diderot, Rousseau, Mar- montel, Gallian, Grimm, Damilava, Morelet, Helvetius, and others. This coterie had at first assembled at Madame Geoffrin's, and afterwards at Madame d'Epinay's. They held their way of thinking, they transferred their meetings to the house of the Baron d'Holbach, who was a free-thinker of the freest kind, and with whom they had no reason for disquiet- ing them. The literary character of this society is given in the memoirs of the Abbé Morelet, of Madame d'Epinay, in Grimm's 'Correspondance,' and, lastly, in a curious though not very impartial work of Ma- demme de la Tour, the Baron d'Holbach's sister, which con- daus lesquels se trouvent assemblee, sous leurs noms, une partie des Gens de la Cour et des Litterateurs les plus remarquables du 18 Siecle.' D'Holbach was well acquainted both with the physical sciences, and especially with those of electricity, and also with French bur- lary, and he translated into French several useful German works on those subjects. He also contributed many arti- cles to the 'Encyclopédie.' He wrote, either wholly or in part, several volumes, which were published in Holland under fictitious names, and of which those which made most noise at the time are: 1. 'Le Sys- tème de la Nature,' a system of pure materialism, and which Voltaire characterized as absurd as to physics, illo- nially written, and abominably execrated by Frederick II. undertook to refute it; but the best refutation of it is that of Berger, in the 'Essaim du Matérialism.' 2. 'Morale Universelle,' ou Devoirs de l'Homme fondés sur la Nature,' a volume of sermons, in which Voltaire, in a very brief and clear style, written after the preceding, the precepts are generally good, and the tone is calm, rational, and tolerant; for a proof of which see, among other passages, section iv., chapters 3 and 4 of the preceding work. This is entitled 'Devoirs des Guerriers.' 3. 'Le Christianisme dévoillé,' attributed by some to Damilava; and other works against revealed religion, which are now mostly forgotten.

D'Holbach died at Paris in 1789. He seems to have been a man of moderate talents, rather croudedul, of a ge- nerous disposition, and a pleasing host and table companion. He was as much praised by his friends as he was by his enemies; among others by Rousseau, who chose to quarrel with him, as he quarreled with every body else. HOBELICH. [LINCOLNSHIRE.] HOBBEIN, JOHN, or HANS, is considered by the Germans to be the best painter next to Albert Dürer, whom he however excelled in the manner. He was equally well in oil, water-colours, and distemper, on a large scale and in miniature, and was besides well skilled in architecture. It is rather remarkable that neither the date of his birth nor of his death is heretofore certain. Some accounts say that he was born in 1498, others in 1495; the place of his birth has usually been supposed to have been either Augsburg or Basel; but recent researches are said to have proved that he was born in Strassburg, by the residence of the counts of Leiningen-Westphurg. He was instructed in the art of painting by his father, whom he soon excelled. Accompanying his father to Basel, he became a member of the guild of painters in that city in order to superintend the printing of his works. Hollein painted several portraits of Erasmus, who gave him a letter of recommendation to Sir Thomas More, and he went to
England in 1596. Sir Thomas took him into his house, and after having employed him for three years, invited King Henry VIII. to see the pictures which Holbein had painted for him. The king was so delighted with them, that he commanded some hundred Livres to be given him for his amusement, for which he compensated him with royal munificence. The favour of the king and his own extraordinary merit concurred to bring him into vogue; as his masterly conceptions, his exquisite draughtsmanship, and rapid execution, he was so fully engaged in painting portraits of the nobility and eminent public characters, that he had no leisure in England for historical painting. Of himself he said, when he left Basel, that he was no more engaged in painting than before he left Basel, and many of his pictures are still to be seen in that city. It appears however that he adorned the walls of a saloon in the palace of Whitehall with two great allegorical statues of the two rages of life, riches and poverty. He likewise executed large pictures of various public transactions, such as Henry VIII. giving a charter to the barber-surgeons, and Edward VI. giving the foundation of Bridewell Hospital. Holbein was equally remarkable for the freedom and spirit of his pencil, the lightness of his touch, clearness and brilliancy of tone, and exquisite finishing. Though from his long residence in England his original pictures have become very numerous, there is no doubt that, as they represented well-known characters, many copies, of various degrees of merit, were made even during his life. This fact is too little considered in England, where portraits wholly of his own invention are esteemed by his followers. Of his sons who forget that in refined feeling for nature, accurate delineation of the parts, and vigour of style, his best portraits have an honourable place beside those of the greatest masters of our school.

HOLBERG, BARON LUDVIG, or LEWIS, who may be regarded as the father, or, as he has been styled by some, the Colossus of modern Danish literature, was born at Bergen in Norway, in 1684. So far from being the inheritor of his father's title or patrimony, he was of obscure family, his father having been originally a common soldier, though afterwards promoted to the rank of colonel. His death however, which happened in his forty-third year, left his widow and three children in a state of very straitened circumstances, so that, as soon as the son had completed his studies at Copenhagen, he had no other resource than to become a private tutor. It was not long before to acquire the foundation of Bridewell Hospital, Holbein had raised himself to affluence by his writings, and having no family, for he was never married, he bequeathed the bulk of his property (amounting to 78,000 dollars) to the Academy of Sciences in Copenhagen, for the purpose of preventing the Danish nobility from studying at foreign universities. In conferring on him the rank of nobility (1745), Frederick V. chiefly honoured himself, for he could not have obtained a more illustrious ornament of his court, than the most illustrious ornament of his reign and the public benefactor of his country. Frederick only created a baron; Holberg had created a national literature.

HOLcroft, THOMAS, born December 10, 1745 (old style). His father kept a shoemaker's shop in Leicester Fields, and occasionally dealt in horses. The first six years of his life were spent at his birth-place, but some change in his father's circumstances brought him into Berkshire, and at last to a vagrant life. When very young he became a stable-boy in racing-stables at Newmarket, and continued in the service of training-grooms till his seventeenth year, after which time he was sent to a school, and in a few years to schoolmaster till twenty, when he married. About this time he had proceeded far enough in self-education to dare to commit his performances to the columns of the 'Whitehall Evening Post,' but this whim soon gave way to others, and in a short time he found himself an author. In 1782, having been some time on the London stage, he turned author, producing first a novel, then a comedy, and afterwards some poems, which were followed in their turn by a series of plays, and by translations of various French works, of which those most remembered at present are—"Tales of the Castle," and 'The Marriage of Figaro.' In 1793 he lost his son, and in 1796 his third wife. Four years afterwards he died, reducing his husband to great poverty for Constitutional Information. From this time his life presents no tangible points: he seems to have spent the greater part of his time in writing and cultivating the arts. He lived much in Germany and occasionally in Paris, and of this residence his 'Travels into France' was the fruit, a book which has probably been deposited below, as his plays were deposited above, the real merit. He died March 23, 1809.

Holcroft's chief merit lay in translation. As a translator he will probably be remembered; as an author, probably he will not. His style was as various as his subjects; he has written for the most part as well as most men, but he has never been a man. It possesses much occasional vivacity, mingled with mistakes of a character which we should not expect to see if we did not remember how innumerable are the points in which educated men attain an unmeaning superiority over
the half-educated. The peculiarities of provincial utterance rarely disappear; how much more rarely the peculiarities, and especially the deficiencies, of an uncultivated childhood. They can not be made against such feelings, but it will never utterly overcome, except by avoiding them.

Holcroft's life has been published, partly from diaries of his own. It is a performance of the form which private friendship has a large share in determining. Lengthy speeches and needless talk fill three volumes, where one would have amply sufficed.

HOLDENNESS. [Yorkshire.]

HOLINSHED, RAPHAEL, the author, was born probably during the first half of the 16th century, but when is uncertain. Anthony Wood says that he was educated at one of the universities, and was a minister of God's word, but it appears most probably that he was educated in Oxford, and later became a rector in Warwickshire. It is possible however that the sentence in which he refers to 'his master' may be interpreted on the supposition of his having been private chaplain, which would reconcile his death to which he is said to have been a minister, and which was made fifteen months before, and proved two years after that time.

Holinshed is an important authority in English history, and of the value to which it is said to have been attributed it is not unlikely that the northern portion will still be called the kingdom of the Netherlands, and we therefore have given the general description of the kingdom under that head.

The province of Holstein is situated between 53° 30' N. lat. and 43° 4' and 2° 60', and is bounded on the north and west by the German Ocean, on the east by the Zuyderee and the provinces of Utrecht and Gelder, on the south by the North Sea. The province is divided into four districts, each of which is further divided into several larger districts. The whole country is a flat, in many parts below the level of the sea, against which it is protected by stupendous dikes, which are raised along the coast and on the banks of the rivers. The dikes of Holstein are in many places, 60 ft. high, and are made of sand, and have a breadth of 50 ft.

The country is traversed by canals in all directions. The soil, like that of the other provinces of the kingdom, is well adapted to agriculture, but the dike system is not so extensive as in some of the other provinces. The produce of Holstein is said to be excellent quality. Hemp is produced chiefly in South Holstein, but though of a good kind, too little care is bestowed on it. Potatoes are extensively cultivated, and are for the most part consumed by the peasantry, and large quantities of onions and canary seed, are raised for exportation. The garden produce is abundant and excellent. Flowers are cultivated chiefly in the tract from Almkaar to the Hauge, but more especially in the district called by Holsteiners 'the garden'. The climate is very mild, and the exportation of these two articles is one of the chief sources of the wealth of the farmers. Wood, both for building and fuel, is very scarce: the greater part of the land gained from the sea never grew any timber; and the same, where large tracts have been for about fifty years ago, they have been long since stripped. For fuel the inhabitants use turf, which is due to the annual value of a million and a half shilling. Of minerals, properly so called, there are none. Mercury, and the various metals, which are extremely fine, are made from the shalles gathered on the coast about Catwyk, Nordwyk, and Wasseram. The rivers and seas abound in fish; but the fisheries of Holstein, though not so extensive as in other districts, are still productive of much profit. The Dutch are industrious, and are not yet deriv'd from their former prosperous condition. The manufactures, formerly so flourishing, have been much depressed by heavy taxes, the dearness of provisions, and the rivalry of the London and other markets. The Dutch linen is celebrated for its fineness and durability. Next in importance and excellence is paper: though Dutch paper is now banished from almost every market, each country manufacturing has its peculiar kind, and no paper on the Continent equal to the Dutch kinds.

The woolen manufactures are flourishing; and the finest cloths, those of Leyden for instance, fetch very high prices.

The distilleries of gin, especially at Schiedam, are very extensive. The solid foundation of the wealth and greatness of Holstein has been its commerce. On this subject we might state, as applicable to this province, all that relates to the commerce of the other provinces; which, to avoid repetition, is deferred to the article NETHERLANDS. Here it need only be observed that the effects of the French revolution, the annexation of the country to France, and the loss of its colonies brought its commerce to a state of decay, from which it is now beginning to recover. The province of Holstein is divided into two governments, North and South Holstein.

1. North Holstein contains 920 square miles, with a population, on the 1st of January 1838, of 27,393 inhabitants. It is divided into the four districts of Amsterdam, Haarlem, Hoorn, and Alkmaar. The Helder is a village at a very considerable distance from the coast, called the Middel, which separates the two districts called the Texel, celebrated for its large and secure harbour, and its commodious roadstead on the east coast. Great naval battles between the English and the Dutch were fought of the Texel, in 1664, 1673, and 1799. The Helder has
about 2560 inhabitants, who are chiefly pilots. The harbour, called the Nieuwe Diep (in which ships of 600 tons burden can lie close to the quays in perfect safety, even in the greatest storm), is defended by two strong forts, which have bomb-proof casemates for 10,000 men. The Nieuwe Diep communicates with Amsterdam by means of the North or Holder Canal, one of the greatest works of our time; it is about 60 miles in length, 24 feet deep, and 120 feet wide, capable therefore of bearing the largest merchantmen. It has also, according to some, a depth of 70 fathoms at some places. It cost nearly eight millions sterling. The great dike of the Holder, nearly two leagues in length, is 40 feet broad at the summit, on which there is a very good road, and deserves to be reckoned among the wonders of the world. At certain distances enormous buttresses, broad and high in proportion to the rest of the dike, and constructed with still greater solidity, project several hundred yards into the sea. The artificial coast is entirely composed of enormous blocks of granite from Norway. Edam (3500 inh.) is celebrated for its two cheese fairs, at which about seven millions of pounds are annually weighed. In the neighbourhood is the famous Berenem Polder, about 5000 acres, formerly covered with water, but now gained for cultivation by dikes and canals, and occupied by an industrious and wealthy population of nearly 3000 souls, who have numerous herds of cattle and flocks of sheep (1500 inh.), though it has declined from its former importance, and has still an extensive share in the herring fishery. The other remarkable towns are described at their respective places.

Holland, Philemon, was born at Chelmsford in 1551, and educated there at Trinity College, Cambridge, of which he became a Fellow. Afterwards he was elected master of the Coventry free-school, whom he undertook to stock with laborious editions of the classics which have given him a respectable name in literature. He is, to the best of our knowledge, the first English translator of Livy, Suetonius, and Plutarch's Morals, and the only English translator of Pliny's 'Natural History,' and Aemilius Marcellinus. He also translated Xenophon's 'Cyropedia,' and Camden's 'Britannia.' In addition to all this he found time to publish a Latin translation of the Bible, with notes and critical comments, and reached the age of 85, after a most laborious life, with unclouded faculties, having gone on translating till he was 80 years old.

Hollar, William, was born at Prague, in Bohemia, in 1607. He was first intended for the profession of the law; but partly from disinclination to that pursuit, and partly from the ruin of his family after the taking of Prague in 1619, his views in life changed, and he took to drawing and engraving. He had some instructions from Matthew Marcin, an engraver who had worked under Vandyke and Rubens, and who is thought to have taught Hollar that peculiar manner which marks the working on his plates. He was but eighteen when the first specimens of his art appeared. These were a print of the Ecce Homo, and another of the Virgin, both small plates, with a Virgin and a Christ after Albert Durer, with Greek verses at the bottom, and a Latin verse, the first given in print in Prague in 1637. During his stay in different towns of Germany he copied the pictures of several great artists, and took perspective views and draughts of cities, towns, and country seats. He improved his skill in etching and line etching, and the minute beauty were exceeded by no artist of his time. His views along the Rhine, the Danube, and the Neckar gained him his greatest reputation. In 1636, Howard earl of Arundel invited Hollar, when proceeding on his embassy to Ferdinand II., to remain in his service for his own profit. He afterwards made a drawing of Prague which gave satisfaction to his patron. After finishing his negotiations in Germany, Lord Arundel brought Hollar to England, where he was not confined to his lordship's service, but allowed to take employment from others. His prospect of Greenwich, which he finished in two years dated in 1637, was one of his first works in England. In 1639 he etched several portraits of the royal family for the work which was published descriptive of the entry into this kingdom of Mary de Medici, the queen mother of France, and which was called 'A Monasticon Mundi.' This work seems to have been introduced to the royal family, to give the prince of Wales a taste for the art of design. In this year appeared his beautiful set of figures entitled 'Omnatus Muliherit Anglorum,' for the safeguard of women, from the nobility to the countrywoman, as they are in these times.' In 1641 were published his prints of King Charles and his queen. At the breaking out of the civil war Lord Arundel took the kingdom to attend the queen, and Hollar was left to shift for himself. From some unknown cause he soon became obnoxious to the ruling powers, probably from his general acquaintance with the friends of his patron, who were mostly royalists, with some of whom he was made prisoner at the surrender of Basing House, in Hampshire, in 1643. Hollar however having some time after obtained his liberty, went over to the Continent to work on a History of Antwerp, where he remained for several years, copying from that portion of his patron's collection which had been carried there, and in working for print-sellers and publishers. Several of the works which he undertook for the Earl of Cumberland, and in his 'Survey of Warwickshire,' sufficiently prove his industry. It would be endless to enumerate all the subjects he engraved. A map of Donegal, in Ireland, is one of the rarest. In 1649 he went to Africa, in quality of his majesty's designer, to take the various prospects there of the garrison, town, fortifications, and surrounding country: these he subsequently engraved. In 1652 he undertook the engraving of the History of St. Bavo, and in his 'Survey of Nottinghamshar,' some of which remain unfinished. When Hollar was in his seventieth year he had the misfortune to have an execution at his house in Gardner's Lane, Westminster: he died only two days after laying his head by the same stroke that might not be repaid to any other prisoner than his grave. Whether this was granted to him or not is uncertain, but he died March 28th, 1677, and, as appears from the parish register of St. Margaret's Church, buried in the New Chapel-yard, near the place of his death. No record of his death was erected to his memory. Grose, from information he received from Oldys, has recorded that Hollar used to work for the booksellers at fourpence an hour, always having an hour-glass placed before him; and that he was so scrupulously exact, that even whilst talking, through with the persons for whom he was working, and upon their own business, he constantly laid down the glass to prevent the sand from running. His works, according to Vertue's catalogue of them, amount to nearly 2400 prints. In drawing the human figure Hollar was defective; and he failed in a few plates which he attempted to execute with the graver only. Hollar, with his peculiar style, had a very high character with some account of his Life, 4to, Lond., 1759; Strutt's 'Dict. of Engravers;' Chalmers's Biography, 18th ed., vol. viii, pp. 72-78.
Linnæus, in his last edition of the *Systema Naturae* (the 12th), gives the following definition of his genus *Holothuria,* which he places under his *Ferrum Molleum,* between *Tethys* and *Terellia.* *Body* is ribose; vent (anus) terminal. *Tentacles* numerous at the outer extremity (tentaclia plura in altera extremitate). *Mouth* situated among the tentacles. He records 9 species. Gmelin, in his edition of Linnæus's work, adds 4 species, but he does not know: however, he adds some observations, etc.

The following is Lamarck's definition of *Holothuria.* *Body* free, cylindrical, thick, soft, very contractile; with a coruscous skin, which is most frequently papillate. *Mouth* terminal, pierced with tentacles. *Intestines* are preceded by *Actinia* and followed immediately by *Saccopulscus.* The place therefore assigned by Lamarck to *Holothuria* is among the radiated animals, in the third section of which, the *Phylaeides,* he has arranged the tribe.

Cuvier gave the *Holothuriae* a position among the pedicillated *Echinoderma,* making them follow the *Echinidae.* *Priapulus* is placed by him in the next order, the footless *Echinoderma.* He gives a good outline of the anatomy, referring the work of Tiedemann to a later edition.

M. de Blainville's *Echinoderma* is the first class of his *Actinoozoa,* and the first order of that class consists of the *Holothuridae,* which are followed (*'Actinologie,'* 1834) by the second order. *M. de Blainville* thus defines the *Holothuridea*:

*Body* more or less elongated, sometimes subvermiform, soft or flexible on all sides, provided with tentaculiform segments, very extended or completely contractile, and pierced by a great orifice at each extremity. *Mouth* anterior, at the bottom of a sort of funnel or prehensile cavity, sustained in its circumference by a circle of flat tentacles, and provided in the interior with cirri or circular appendages, more or less ramified. *Vent* terminating in a sort of scoea opening externally by a large terminal orifice. *General Organ* terminating externally by a small median cleft, at a little distance from the anterior extremity, and nearly marginal.

*M. de Blainville* observes that Bianchi appears to have been the first who came to the conclusion that this form ought to be approximated to the *Echinidae,* and in fact names one species *Echinus cornuta,* an opinion which was adopted by Blumenbach and most of the modern zoologists, when they made the *Holothuridea* a division of their *Echinoderma* with the *Echinidae* and * Asteridea,* some however, following the ideas of Stimpson, consider that they should be placed near the *Actinidae.*

**Organization.**

The author last quoted remarks that the organization of these animals is not completely understood, the labour of Bohtatsch, Müller, Vahl, Forskahi, Monro, Tiedemann, and Delle Chiesa. In addition to these names we would call the attention of the reader to the drawing and description of *Holothurium tenuissima,* Linn., left by John Hunter. The drawing is beautifully engraved, and, with the description, will be found in the 1st vol. of the Descriptive and Illustrated Catalogue of the *Physiological Series of Comparative Anatomy* contained in the Museum of the Royal College of Surgeons in London, vol. iii. The following parts are distinctly made out, viz.: 1. The mouth, in which a bursa is introduced. 2. *Appendiculae coxae,* which surround the mouth, or orifice, into which they enter, and which Mr. Hunter supposes to be salivary glands and ducts. 3. A large one, lower down, just at the beginning of the intestinal canal. 4. The whole tract of the intestinal canal, *Bostra,* which is of considerable length. 5. The dilated part of the gut, *Pylorus* or ventralis, in which Mr. Hunter answers the same purpose as the dilated part of the gut at the anus in a bird. 6. The anus. The use of the parts to which we next have to advert, though the parts of the body are more or less confused, seems to have been more the subject of conjecture with Mr. Hunter. 7. Two branching bodies almost like a tree, which consist of a duct with its branches, and which open into the dilated part of the rectum. To these Mr. Hunter suspects to be the kidneys, from their opening similar to the kidneys in birds, turtles, &c. There are small oblong bodies near the opening of the principal trunk into the rectum. 8. A vast number of hollow round tubes, all un-
the distinction of the species, from the following, among other causes:

1. The general form is extremely variable. When the animal is in a state of tranquility in the enjoyment of all its faculties at the bottom of the water, it is, in the greatest number of cases at least, very much elongated, often cylindrical, and almost vermiciform; on the contrary, when in a state of excitement, it becomes a globular, or somewhat round, mass, more convex in the middle than at the extremities. When it is irritated, whether in or out of the water, the contractile action becomes stronger, and the animal can no longer be recognised. But it is especially when it has been plunged in spirit that the form differs totally from that which the living animal exhibits.

2. The size, the form, and distribution of the more or less mamillated tubercles which are numerously spread over the skin appear, to M. de Blainville, to offer too great a number of variations to permit of their being employed in distinguishing specific character.

3. The tentaculiform suckers, which have their exit through the pores or holes in the skin, and by means of which these animals attach themselves to submersine bodies, are, in a certain number of species, spread nearly equally over the whole superficies of the body; but in others they are accumulated on the lower surface, without order, in a determinate order, or are disposed in double series upon five longitudinal lines, as in Holothuria pentacta.

4. The more or less terminal position of the two orifices may, M. de Blainville thinks, be taken into consideration advantageously.

5. Some zoologists, and among others M. Lesueur, says M. de Blainville, attach a great importance to the number of the tentacular appendages of the mouth, and to their form and mode of division; but, M. de Blainville fears, erroneously, for he has been positively assured that the most common species of the Mediterranean, H. tubulosa, which is found in hundreds at Toulon, varies much, both as to the number and terminal divisions of these organs.

6. It seems to M. de Blainville that a better character may be drawn from the form of the circle of the solid pieces of the mouth, which is constant, as he believes, in each species; it is however difficult to employ this test.

7. To judge from a considerable number of Holothuria tubulosa seen by M. de Blainville, colour in these animals is very variable, in intensity at least, passing from a nearly deep brownish red to a light, almost earthy tint, to which the colouring matter appears frequently to be attached by various phenomena. The animal itself is of a quite different hue. When it is irritated, whether in or out of the water, it becomes a bright red, and seems to be thrown into the state of excitement.

8. With regard to dimensions, besides the difficulty of measuring the animals when captured, it appears that they vary considerably in size, doubtless from age.

M. de Blainville, finally, after a careful examination of the different species described by authors, joined his own observations upon seven or eight species in a living state, distributes these animals into the following five sections, which he considers to be sufficiently natural, and some of which may be established as genera:

A. Species whose rather short body, more convex and harder above than below, is provided with tentaculiform suckers, only on that side, and with fairly developed buccal appendages; the two apertures more or less superior. (Cuviera. Pérón; Pecaus. Oken.)


B. Species whose coriaceous and rather elongated body is subprismatic; the belly sufficiently distinct from the back, and alone provided with tentaculiform suckers, scattered throughout its whole extent; the buccal appendages in general but little ramified; the mouth sub-inferior. (Holothuria. Lam.)

Example, Holothuria tubulosa.

C. Species whose body, in general elongated, but little coriaceous, or even fusiform, is totally covered with reticulate papillae, and whose buccal appendages are very large. (Thyone. Oken; Multeria, Fleming.)

Example, Holothuria papillosa.

D. Very soft species, but little or not at all coriaceous, very long and vermiciform, cylindrical or subpentagonal, pro-

vided with cirriform papillae, which are very small, scattered, and with the buccal appendages usually regularly pinnated.

Example, Holothuria vittata.

E. Species sufficiently coriaceous, smooth, in general shorter or moderately elongated, regularly pentagonal, with tentaculiform suckers in ten rows, two at each ambulacral and (Cucumaria; Sea-Cucumber). Example, Holothuria cucumis.

Such was M. de Blainville's arrangement in 1834, and from the figures a general idea of some of the forms of this large family may be collected; but the number of new and fine species discovered by Lesueur, Quoy and Gaimard, Lesson and Garnot, De Chamisso and Eisenhardt, Rückpöl, Kocheltz, and Mertens, could not fail of throwing new lights upon these curious animated forms; and the systems of M. Jeger and M. Brandt made their appearance. Upon these M. de Blainville remarks (1836), that M. Brandt having had the great advantage of possessing both the beautiful
zoological and anatomical drawings made by M. Mertens or his draughtsman, taken from the living and well-developed animals, as well as the descriptions left in manuscript by the former, it may be conceived that the system of M. Brandt, strengthened by that of M. Jager, rests upon differences of great value, but it is in M. de Blainville's opinion sometimes a little too anatomical, which may be injurious to its adoption. The three characters, which he considers as the key-features for the system of M. de Blainville and Brandt, are the following:—

1. The absence or the presence of tentacular or suckers, which M. Brandt, as well as M. Jager, calls feet, in common with many zoologists.

2. The resemblance or dissemblance of those organs.

3. The existence or absence of the posterior and internal aquatic, branchial apparatus, which they name lungs, with good reason, because the ambient fluid penetrates therein.

4. The disposition of the tentacular suckers at the surface of the body, all round it or on certain parts only, in regular series, of variable number, or irregularly scattered.

5. The freedom or the adhesion of the respiratory aquatic tree, divided by M. Jager into the intestinal lung and the locomotive lung.

6. The last and most important character is drawn from the form of the tentacles which surround the buccal aperture, which leads M. Jager to his subgenera and tribes, and M. Brandt to his genera and subgenera. M. Jager forms, says M. Brandt, in fact three only, which he considers as subgenera, Fistularia, Cucumaria, Tethysmannia (Fistularia), and Holothuria, which he separates into six tribes, Mulleria, Bohatechia, Cuertera, Prolus, Holothuria, and Trepang, this last from which he conceives, as M. Brandt, as M. Jager himself considered it.

M. Brandt's divisions resolve themselves into seven groups:—

1. Pentatuneces, answering to M. de Blainville's division R (Cucumaria), and subdivided according to the free or fixed state of the aquatic tree.

2. Sporadopodes, confounded by M. de Blainville with the Holothurie properly so called, from which he says they do not differ greatly, excepting that the tentacular suckers with which the body is covered are similar both above and below. This division contains only two genera, established upon the distinction of having the tentacula sheath'd or not.

3. Hypopodes, comprising M. de Blainville's division A, separated into two genera, Cuertera and Prolus, containing each two species.

4. Acanthopodes, which were regarded by M. de Blainville as belonging to the genus Fistularia of Lamarck, to the number of four or more, the half of which are doubtful, and containing only, for M. Brandt, the genus Okeniana.

5. Schizopodes, which are diversiform species more or less elongated, in which the tentacular suckers are disposed in three or five longitudinal rows: these form but two genera, each containing one species, which are well defined by M. Brandt.

6. Heteropodes, corresponding to M. de Blainville's divisions B and C, that is to say, to his Holothurie properly so called, and to his Mulleria, of which M. Brandt forms seven genera.

All these are Holothurie pedate, but the 7. consists of the Non pedate, forming a great part of M. de Blainville's division D, that is to say, the genus Fistularia of Lamarck, separated into three principal genera and some species provided with suckers, distinguished by the form of their body, and the third has been named Synapta by Escholtz.

Though M. de Blainville does not think that this disposition of the Holothurie is very natural, nor in a serial order, he takes advantage of it to complete his method according to his principles of zootomy, and in his ' Nouvelles Additions et Corrections ' (1836) to his 'Animologie' published in 1833, he methodized out with some interesting observations relating to the affinities and analogies of the various groups. We must refer the reader for details to the work itself, and must limit ourselves to the mere notice of his statement of the characters which he subdivides retaining many of the generic names of Jager and Brandt.

A. The Vermiform Holothurie (Fistularia), which have the body elongated, soft, vermiform, and the tentacular suckers very small or even null. Three divisions.
trepang. In the Gulf of Carpentaria we did not observe any other than the koro or grey slug.

Captain Phillip Parker King, who quotes a part of the above passage ("Survey of the Intertropical Coasts of Australia"), found a fleet of Malay prows in the bay at Capo-Di-Canap (1818): it had just returned from an unsuccessful voyage on the south coast of Timor in search of trepang. Dr. D. MacC. in the principal races of the fleet, gave Captain King the following information about the places of the first Homalium, which the races had frequently visited in the command of a fleet that annually frequents its shores. The coast is called by them "Maregu," and has been known to them for many years. A fleet of the Maregu consists of about ten vessels, of which the number is perhaps very much exaggerated) annually leaves Macassar for this fishery; it sails in January, during the western monsoon, and coasts from island to island, until it reaches the north-east end of Timor, when it returns to the coast of New Holland; the body of the fleet then steers eastward, leaving here and there a division of fifteen or sixteen prows, under the command of an inferior rajah, from the command of a fleet that annually frequents its shores.

His proa is the only vessel which is provided with a compass; it also has one or two swivels, or small guns, and is, perhaps, armed with muskets. Their provisions are the Greenland pilot-fish, and their water, which during the western monsoon is easily replenished on all parts of the coast, is carried in joints of bamboo. After having fished along the coast to the eastward, the whole fleet removes the day after the last of May each detached fleet leaves the coast, without waiting to collect in one body. On their return they steer north-west, which brings them to some parts of the coast 80 miles from their steers to Macassar, where the Chinese traders meet them and purchase their cargoes. At this time (1818) the value of the trepang was from forty to fifty dollars a picol; so that if each vessel returns with 100 picols in the year, each one of them will be worth 5000 dollars. Besides trepang, they trade in sharks' fins and bird's nests (SWALLOW), the latter being worth about 3000 dollars a picol. To this Captain King adds a note stating that in 1822 the value of the trepang was much less, the price having fallen to twenty-five dollars a picol.

In Crawford's "Indian Archipelago" it is stated that the slug, or trepang, is sometimes as much as two feet in length, and from seven to eight inches in circumference, and implicitly obeyed. His proa is the only vessel which is provided with a compass; it also has one or two swivels, or small guns, and is, perhaps, armed with muskets. Their provisions are the Greenland pilot-fish, and their water, which during the western monsoon is easily replenished on all parts of the coast, is carried in joints of bamboo. After having fished along the coast to the eastward, the whole fleet removes the day after the last of May each detached fleet leaves the coast, without waiting to collect in one body. On their return they steer north-west, which brings them to some parts of the coast 80 miles from their steers to Macassar, where the Chinese traders meet them and purchase their cargoes. At this time (1818) the value of the trepang was from forty to fifty dollars a picol; so that if each vessel returns with 100 picols in the year, each one of them will be worth 5000 dollars. Besides trepang, they trade in sharks' fins and bird's nests (SWALLOW), the latter being worth about 3000 dollars a picol. To this Captain King adds a note stating that in 1822 the value of the trepang was much less, the price having fallen to twenty-five dollars a picol.

In Crawford's "Indian Archipelago" it is stated that the slug, or trepang, is sometimes as much as two feet in length, and from seven to eight inches in circumference, and implicitly obeyed. His proa is the only vessel which is provided with a compass; it also has one or two swivels, or small guns, and is, perhaps, armed with muskets. Their provisions are the Greenland pilot-fish, and their water, which during the western monsoon is easily replenished on all parts of the coast, is carried in joints of bamboo. After having fished along the coast to the eastward, the whole fleet removes the day after the last of May each detached fleet leaves the coast, without waiting to collect in one body. On their return they steer north-west, which brings them to some parts of the coast 80 miles from their steers to Macassar, where the Chinese traders meet them and purchase their cargoes. At this time (1818) the value of the trepang was from forty to fifty dollars a picol; so that if each vessel returns with 100 picols in the year, each one of them will be worth 5000 dollars. Besides trepang, they trade in sharks' fins and bird's nests (SWALLOW), the latter being worth about 3000 dollars a picol. To this Captain King adds a note stating that in 1822 the value of the trepang was much less, the price having fallen to twenty-five dollars a picol.
The government of Denmark had a seat in the diet as duke of Holstein; but on the dissolution of the empire and the formation of the Rhenish Confederation in 1806, he secured all his German possessions to be parts of the former Rhenish Confederation; however, as the German Confederation in 1815 he became a member of it, and Holstein was re-annexed to Germany. (E. Kuss, Herzogtum Schleswig und Holstein; J. F. A. Dörter, Topographie des Herzogtums Schleswig.)

HOLTENSIUS, the Latinized name of L. HOLTSTE, born at Hamburg in 1595, became one of the first scholars of his time. After travelling through Italy, England, and other countries, he came to Paris, where he made acquaintance with the brothers Dupuy, Peiresc, and other learned men. At Paris he embraced the Roman Catholic religion, in consequence, he said, of his deeply studying the works of the Fathers, and of his seeking for the principle of unity in the Church. Peiresc introduced Holtenius to the pope's nuncio, Cardinal Barberini, the nephew of Urban VIII, whom he accompanied to Rome in 1597. From that time he lived in the鲍庭顿 Hungary, in different towns and cities, and was made dean of St. Peter's, and lastly librarian of the Vatican. He was sent on several missions to Germany, among others, to Innsbruck, to receive the abjuration of Queen Christina of Sweden. Many of his Latin instrumental in effecting other conversions to Catholicism. Holtenius died at Rome in February, 1661, leaving his patron, Cardinal Barberini, his universal legatee. He had collected a vast quantity of scarce books, and the works of his hand were of service in an unfinished state. With much application and a great desire of knowledge, he wanted perseverance, and was apt to suddenly desert one branch of study for another. Among his published works are the following:—1. Porphyri liber in Isid. Pap. Spectacul. Rome, 1630, with Latin version, 4to. 2. Notae in Sallustium Philosophum de Dis et Mundo. 4to. 3. Observationes ad Apolloni Rhodi Argonautica. 5. Arrianus de Venatione, with a Latin version. 6. Adnotationes ad Tacianum, by Secundus. 7. Liber Conlogium Apollonii, by Curtius. 8. Theologiae Humanae. 9. Life written by N. Wilkins, Hamburg, 1723.

HOLT, SIR JOHN, lord-chief-justice of the King's Bench, was the eldest son of Sir Thomas Holt, Knt, a barrister, and a gentleman of property in Oxfordshire. Sir John Holt was born at Thame in Oxfordshire, on the 30th of December, 1642, and after spending some years at the free-school of Abingdon was in his sixteenth year sent as a gentleman-commoner to Oriel College, Oxford. His college life appears to have been unusually wild and licentious; but like his predecessor in the King's Bench (Sir Mathew Haire), he discarded his irregular habits, and became his librarian, and was made a professor of moral philosophy in the University of Oxford. In 1662, before he was ten years old, he had been entered upon the books of the Society of Gray's Inn, and on the 27th February, 1663, he was called to the bar, and rose rapidly into notice as a first-rate lawyer and successful advocate. He was about thirty when he was employed in some of the most difficult cases which the troubled times in which he lived produced, and was generally counsel on behalf of the accused. His opposition to the measures of the court brought upon him the displeasure of James I., and he was imprisoned in Newgate, and the recordership of London. Shortly after the accession of William III. (April, 1689) Sir John Holt was made lord-chief-justice of the King's Bench, in which situation he continued until he resigned his seat, although, the chancellorship was offered to him on the removal of Lord Somers in 1700. Sir John Holt in the discharge of the duties of his office evinced great resolution in opposing the extravagances of James II., and procured the removal of the House of Commons from the old parliament. His demeanour towards prisoners presented a noble contrast to the intransigence, brutality, and vulgar brutality which had disgraced the original proceedings of former reigns, and he set an example of mildness and temper which has continued to distinguish and adorn the judicial bench of England.

It was the fortune of Sir John Holt to be placed more than once in a position to bring into a striking point of view the personal rapidity of his character, one instance of which, from the interest attached to it from the recent claims of privilege by the House of Commons, may be here mentioned. It arose in the famous case of the Aylesbury burgesses, in which Sir John Holt was the returning officer who had refused to record their votes. The House of Commons resolved that the plaintiffs were guilty of a breach of privilege, and committed them to the Commissary. The case was tried at Westminster. Sir John Holt in his charge to the jury, said, 'The chief justice was of opinion they were entitled to their discharge. Upon this the House of Commons issued warrants for the apprehension of the counsel who had argued for the burgesses, and sent the sergeant-at-arms to Sir John Holt to summon him to appear at the bar of the house. The chief justice bade him begone, upon which the house sent a second message by their speaker, attended by as many members as supported the measure. After the speaker had delivered his message, Sir John Holt is reported to have said, 'Go back to your chair, Mr. Speaker, within this five minutes, or you may depend upon it I will send you to the Commissary.' He was not, however, a man of such a principle as to be impeded, it is probable that his anger at the interference of the House of Commons would be shown by very strong language.

Sir John Holt died in March, 1709-10, leaving behind him a reputation for learning, honour, and integrity, which he never was surpassed even among the many eminent individuals who have adorned his profession. There is no complete biographical account of Sir John Holt. The volume which bears the title 'The Life of the Right Hon. Sir John Holt, Knt.' (London, 1764) is merely a collection of notices from the press, and the works of Sir John Holt always preserved official notices of his life. The above account has been taken chiefly from a memoir published in the 'Law Magazine.' The 'Tatler' (No. 14) contains an outline of his character.

HOLYHEAD, or CERR MIIR, a seaport and market-town situated upon a small island of the same name at the western extremity of the island of Anglesey, 267 miles north-west by west from London. The Romans are supposed to have been the first people who lived on the island, and several remains of their habitation have been found in the vicinity at different times; there are also distinct traces of Druidical remains. The two principal streets are broad and well built, and several of the residences are embellished with strikingly beautiful architecture. The port is formed by a pier 900 feet in length, constructed chiefly of hewn limestone, and at the pier-head there is, during ordinary tides, a depth of 14 feet at low-water. The other extremity of the pier is connected with the town by a suspension bridge of cast-iron, and the rail-road is thence continued across the island of Anglesey to the Menai Bridge. The church is a very antient structure, embellished, with the inside of the porch and part of the transept rudely carved. (Pennant's Tour.) The living is a paid curacy in the diocese of Bangor, with an average net income of 167l., in the gift of Jesus College, Oxford. Holyhead is the station of the post-office packets, which sail daily between this place and Dublin.

The inhabitants are principally employed in the coaling trade, ship building, &c.; the population in 1821 was 4598. (Parliamentary Papers, &c.)

HOLY ISLAND, or DURHAM, is one of the Tyne Islands, and is situated off the coast of Northumberland.

HOLYWELL, a manufacturing town in the hundred of Rhuddlan and county of Flint, situated upon an eminence near the southern shore of the estuary of the Dee, 206 miles north-west by west from London, and is a town of considerable importance. It was formerly an inconsiderable village, but is now become, from its mineral riches and the manufactures carried on in the neighbourhood, a rapidly improving and flourishing place. It contains cotton-spinning and rope-makers, brass-works, wire-mills, &c., there is a cotton-twist manufactory, which is carried on upon a large scale, and in the vicinity are the coal-plits and great lead mines of Flintshire, which afford constant employment to about 600
of the inhabitants of Holywell. The machinery belonging to the establishments above mentioned is occasionally worked by steam power, but it is more frequently driven by the force of a stream which issues from the remarkable Holywell of St. Wenafred, and which is justly considered by the inhabitants as the origin of their present prosperity. According to Pennant this spring throws up twenty-one tons of water in a minute, and has never been known to freeze, even in the severest winter. The waters were formerly in high repute for the cure of diseases, and were moreover resorted to by large numbers of pilgrims. Even as late as the time of Pennant the Lancashire pilgrims were to be seen in deep devotion up to their chins for hours, sending up prayers, and making a prescribed number of evolutions, and this excess of piety was carried so far as in several instances to cost the devotees their life. Near this town are the remains of the abbeys of Bangor and near the spring are the remains of the old British fortification of Dinas Bassoc, 'the fort in the bottom.'

The manufactured copper and brass is all shipped on the Dee, just below the factory, to the warehouses of the company at Liverpool, whereas large quantities are reshipped to London, America, and India. Holywell is a contributory parliamentary borough to Flint. The living is a vicarage in the diocese of St. Asaph, with an average net income of £1,000, in the possession in 1837 of Mr. Coke, of Holywell, in the borough. (History of the Parishes of Whiteford and Holywell, 4to. 1796, &c.)

HOLZMINDEN. [Brunswick.]

HOMAGE an incident of tenure which is now abolished by 12 Car. II, c. 34. [Feudal System.] The word, according to Sir Edward Coke, is derived from homan, because the tenant did his service to the Lord, he said 'I become your man,' &c.

HOMAGE, according to the old English law writers, was of three kinds: by diligence, by reason of tenure, and assurance; the distinction between which is not necessary to state here; the whole subject, which is now merely matter of curiosity, is explained in 'Coke upon Litt,' p. 64, and following pages.

The copyholders, or tenants who attend to do their duty in a court baron, are called the homage.

HOMALIA or Homalium is a small natural order of shrubby exogenous plants with polypetalous flowers, a row of glands in front of the segments of the calyx, many perigynous stamens, and a 2-4-styled ovary, with many parietal placenta as styles. The species chiefly inhabit tropical countries; they have small starry flowers, and are of no known utility. Brown considers them nearly related to Passifloraceae.

Of the inhabitants of Holywell. The machinery belonging to the establishments above mentioned is occasionally worked by steam power, but it is more frequently driven by the force of a stream which issues from the remarkable Holywell of St. Wenafred, and which is justly considered by the inhabitants as the origin of their present prosperity. According to Pennant this spring throws up twenty-one tons of water in a minute, and has never been known to freeze, even in the severest winter. The waters were formerly in high repute for the cure of diseases, and were moreover resorted to by large numbers of pilgrims. Even as late as the time of Pennant the Lancashire pilgrims were to be seen in deep devotion up to their chins for hours, sending up prayers, and making a prescribed number of evolutions, and this excess of piety was carried so far as in several instances to cost the devotees their life. Near this town are the remains of the abbeys of Bangor and near the spring are the remains of the old British fortification of Dinas Bassoc, 'the fort in the bottom.'

The manufactured copper and brass is all shipped on the Dee, just below the factory, to the warehouses of the company at Liverpool, whereas large quantities are reshipped to London, America, and India. Holywell is a contributory parliamentary borough to Flint. The living is a vicarage in the diocese of St. Asaph, with an average net income of £1,000, in the possession in 1837 of Mr. Coke, of Holywell, in the borough. (History of the Parishes of Whiteford and Holywell, 4to. 1796, &c.)

HOLZMINDEN. [Brunswick.]

HOMAGE an incident of tenure which is now abolished by 12 Car. II, c. 34. [Feudal System.] The word, according to Sir Edward Coke, is derived from homan, because the tenant did his service to the Lord, he said 'I become your man,' &c.

HOMAGE, according to the old English law writers, was of three kinds: by diligence, by reason of tenure, and assurance; the distinction between which is not necessary to state here; the whole subject, which is now merely matter of curiosity, is explained in 'Coke upon Litt,' p. 64, and following pages.

The copyholders, or tenants who attend to do their duty in a court baron, are called the homage.

HOMALIA or Homalium is a small natural order of shrubby exogenous plants with polypetalous flowers, a row of glands in front of the segments of the calyx, many perigynous stamens, and a 2-4-styled ovary, with many parietal placenta as styles. The species chiefly inhabit tropical countries; they have small starry flowers, and are of no known utility. Brown considers them nearly related to Passifloraceae.
But the separation thus further carried out by M. Milne Edwards does not depend on external distinctions only; for there are great differences in the conformation of the internal organs of generation and digestion, as compared with that of those essential parts of the animal economy in the other Astacians. Thus M. Milne Edwards remarks, that in the Crawfishes the duodenal portion of the intestine presents on its internal surface a great number of small vili, and is not clearly separated from the rectum, which is smooth internally; while in Homarus the duodenum is smooth within, the rectum is pleated internally, and there exists between these two parts of the digestive tube a kind of circular valvule; the posterior caecal appendage of the 'intestine, which is seen at the extremity of the duodenum of the true Lobsters, is wanting in the Crawfishes. The liver is composed in the Crawfishes of small sac-like tubes, which are comparatively much more elongated, and its anterior lobes are less developed; the testicle is very small, and is composed of three lobes, whereas spring the very long and tortuous deferent vessels, whilst in the true Lobsters these secreting organs are very much elongated, extending from the head into the abdomen, presenting no mesial lobe, but a simple commissure, and only giving rise to very short deferent canals.

The Astaci, which are all fluvial, consist of the species: _A. fluviatilis_ (the natural history of which will be found in the article Astacus, vol. ii.). _Homarus, affinis, Australasianus_, _Chileensis_, and _Blandings_. These, which are all marine, consist of the species: _H. vulgaris_, the Common Lobster (the natural history of which will also be found under Astacus, Americanus, with its immense claws, and _Capensis_, according to M. Edwards, who considers _H. homarus_ to be a species of the genus with _Capensis_. The species _A. crotelaeceus_, _A. fulgens_, _A. fulvis_, are unknown to M. Edwards, and considered doubtful by Latreille.

Nephrops. (Leach.)

Body more elongated than that of the Crawfishes; _rostrum_ slender and rather long, armed with lateral teeth like that of Homarus. _Eyes_ large and reformed. Lamellar appendage of the external antenna wide, and long enough to extend beyond the peduncle situated below. _Fest, first pair long and prismatic; succeeding pairs with a compressed membranous. Nothing remarkable either in the abdomen or in the buccal appendages. _Brachtheli_ disposed as in Homarus. _Example: Nephrops Norvegicus_, Norway Lobster of author. Length six or seven inches.

Fossil Astacians.

M. Milne Edwards refers the impression of the small Macrurus crustacean from the beds in the neighbourhood of Pappenheim to the genus _Astacus_ provisionally. He quotes the figures of Knorr (pl. v., fig. 8–5), and Desmarest (Crustacea Fossilis, pl. ii., fig. 3), and dedicates the species to the first of the naturalists, under the name of _Astacus knorri_. He considers that the fossil figured by M. Desmarest (pl. ii., fig. 3), under the name of _Palinurus Regi- legypos_, has more relation to _Nephrops_ than any other genus of crustaceans, but that it probably ought to constitute a particular genus. _Astacus Leachi_ of Mau- tell (Geology of Sussex) belongs, in the opinion of M. Milne Edwards, to the family of Astacians; but he remarks that it differs considerably from the species which compose the three genera constituting that family. Of the genus _Coelob_ established by Mr. Broderip, and described and figured by him from the _Geol. Trans._ 2nd series, vol. v., p. 171, pl. 12, M. Milne Edwards says that he considers it to be intermediate between the Astacians and Scolopauxs.

HOMBURG, HESSE. [Hesse-Homburg.]

HOME, HENRY (Lord Kames), was born at Kames, in the county of Burwic, 1756. He was originally bound to a writer of the common law, but by diligent study he qualified himself for the higher practice of an advocate. His first work, entitled 'Remarkable Decisions in the Court of Sessions,' which appeared in 1728, excited considerable attention. The second of his works, 'A Memoir of Mr. Home,' was published by the publication of his 'Essays on several Subjects in Law.' In 1741 he published, in 2 vols. fol., 'Decisions of the Court of Sessions,' which were arranged under heads in two forms of a dictionary, and in 1751 appeared his 'Essays on several Subjects concerning British Antiquities.' In his 'Essays on the Principles of Morality and Natural Religion,' while he worked out extensively the principle of a moral sense as taught by Lord Shaftesbury, he opposed all exclusive theories of human nature which divorce all the actions of men from some single principle, and endeavoured to establish several general principles. Some of the propositions advanced by him concerning natural religion gave offence to a few, who thought that they could advance the interests of Christianity by depreciating the reason, on which however all revealed religion ultimately rests. In 1732 Mr. Home was appointed a judge of the court of session, and took his seat on the bench by the title of Lord Kames. At the same time he was nominated a trustee for the encouragement of manufactures, fisheries, and arts, and also commissioner for the management of the royal estates. But the activity of his mind was far from being exhausted by his numerous official duties, and he found leisure to compose two important works, in which he attempted to apply to the sources of jurisprudence the principles of philosophy. The titles of these works are, 'Historical Law Tracts' and 'The Principles of Equity.' In 1761 he published an 'Introduction to the Art of Thinking,' for the use of youth, which, as an elementary work, is still highly esteemed. The year following there appeared 'Elements of Criticism,' 3 vols. 8vo., which exhibit a rare union of philosophical acuteness with a fine taste and warm feeling for the beautiful. In 1763 he was appointed one of the lords commissaries of justice; but his literary labours were still uninterrupted by the growing weight of duty and years, and in 1774 he published 'Sketches of the History of Man,' 2 vols. 4to., an ingenious and amusing work: but the fanciful ideas and the doubtful authority of the facts upon which it rests materially detract from the value of the many important views of society which it lays open. In 1776 appeared 'The Gentleman Farmer, or an Attempt to improve Agriculture by subjecting it to the test of Reason and Principles.' This treatise is even now referred to by writers on agriculture, and was not without its influence in effecting the present improved state of Scotch farming. His last work was devoted to the benefit of the young. 'Loose Hints on Education' were published in the 85th year of his age, and in the following year he died, on the 27th December, 1789.

Lord Kames's reputation as an author rests at present
HOM

275

HOM

principally upon his 'Elements of Criticism.' This work con-

A)

Hesiud,

fined, but not without a kind of poetic licence by which they are appre-

Hesiud,

H tl K

275

Hesiud,

end

be re-organized.

sufficient thing is

it.

they are calculated to awaken correspondent emotions. The fine

forms, he observes, are a subject as well of reasoning as of
taste. In his use of the term 'taste' however he is incon-

sistent with himself: occasionally he understands it by the

taste of the more refined faculties of the mind, and at other

times by the more inadequate perception of a congruity in objects

man's triple nature, whether they present themselves under the form

of the good, of the beautiful, or of the true. It is in this sense

of beauty that Homer, we are led to suppose, was

nearly allied to the moral sense. But he more frequently uses

it in the larger and more general sense, in which it

comprises not merely this simple feeling, but the culiva-

tion also of an intellectual perception of the causes and

ground of this congruity itself in the objects of taste. This

is particularly noticeable in his remarks upon beauty. This

term he confines originally to objects of sight; it is only

figuratively that it can be applied to the objects of other

senses. Visible beauty is of two kinds: intrinsic, which

is perceived immediately; and relative, which is only medi-

ately perceived by an act of reflection and the discovery

of some cause hidden within the object. Again, the

oftentimes the judgment may overbear the taste, and an

object totally devoid of intrinsic beauty may appear beautiful

upon its perception of a utility; for instance, a want of

form and symmetry in a tree will not prevent its appearing

beautiful.

His theory of the sublime is more correct. The strong

emotion produced by the impression of a great or grand

object which we cannot apprehend without an effort is the

source of the impression. In an Attic minstrel, for instance,

we may feel an emotion similar to that which a great

work would produce on its author, and thereby

is excited by the minstrel's passion. But he

rightly observes that psychologically they agree in

exciting an agreeable emotion diversely modified by its re-

spective objects or causes.

The chapters on Wit, Language of the Passions, Lan-
geage,

et, contain many excellent remarks and happy illustrations.

In those on Epic and Dramatic Poetry, Lord Kames

insists that the unities of time and place do not rest upon

any general principle, although absolutely necessary to the

Greek epic, and that these rules are applicable only to

the particular parts of the chorus. (Life of Lord Kames, by Lord Woodhouselee.)

HOME, or HUME, JOHN, was born in Scotland about

the year 1725, and is supposed to have been a relation of

Dr. Johnson. Though he was not then in the public eye, he

and subsequently nominated to the parish of Athelstan-

ford, where he produced his tragedy of 'Douglas,' which

was acted at Edinburgh with the most unbounded ap-

plause. Perhaps there never was a composition more per-

fectly harmless and free from offense; but the circumstance

of its being a drama was enough to draw down the anger

of the rigid clerics of the kirk, who were shocked to find such

a work proceed from the pen of a minister. Not only did

they expel* him from the ministry, but even denounced

those of his friends who might visit him, or go to see

the performance of his piece. Home retired to England, where

he received the reward of his success. He obtained a

pension. Four other tragedies, 'Agas,' 'Aquitaine,' 'The

Fatal Discovery,' and 'Alonso,' followed 'Douglas,' but

they did not equal it, and have been long since forgotten.

Home died in London.

The play of 'Douglas' has always kept its place on the

stage, and from its pure style, elegant language, and inte-

resting plot, will ever continue a favourite. Never was

fanaticism more unlucky than in having such an insufficient

work as this for a model. It is as well

reading the drama would never dream of the possibility

of its exciting anything like persecution, and while Home's

work goes down to posterity as a classical and moral pro-

duction, it frequently, if not always, was regarded by

every rational person with indignation and contempt, unless

indeed a liberal allowance be made for the bigotry of the age.

HOMER (in Greek, Ὑμήρος), the supposed author of

the earliest of all heroic poems, and of some hymns

in praise of different gods. Opinions the most various

have been held respecting his life, his age, his

station, and the circumstances of his life; so that it seems

almost hopeless to come to any satisfactory conclusion on

subjects which history has given us such scanty materials

to determine. The authority of the Iliad must have

been accurately acquainted, at least, with the geography of

Greece and the northern part of the Archipelago. Leake

notices several instances where epistles are applied with an

exactness which seems to indicate personal knowledge of the

people mentioned. These considerations might perhaps

we may infer that Homer was a wandering minstrel.

The existence of such wandering minstrels seems to be shown

by the Hymn to Apollo, quoted by Thucydides, as the

notion that such persons, whether living together or

apart, formed a sort of brotherhood, which might serve to

prove the existence of bands attached to particular courts.

And indeed, without this information, the analogy of our

own heroic age would render it highly probable that there

should have been an order of wandering minstrels; while in a

country like Greece, inhabited by kindred though often

hostile tribes, it would be impossible for a wandering mu-

sician to receive the same tales at every court and before

every audience. Either he must have had contradictory

accounts to retail according to the tribe among which he

exercised his powers, if he exercised them on international

feuds at all, or, which is much more probable considering

the reverence with which national legends were held, he must

have confined himself to particular courts. He could be

contemplated as uniting against a common foe, or

have resigned all claim to be considered an heroic bard.

Of these two plans, the author of the Iliad adopted the

former. The minstrel who tells these stories

must, as we find that the Attic hero Theseus is

reported to have stolen her when young. What

then could be more natural than for a minstrel,

particularly an Attic minstrel, who travelled from

place to place, to make use of the poetical

legends, as the writer of the Iliad, and

with others which gave some account of an expedition

undertaken by the Greeks against Asia, produce the

narrative which we find in the Iliad. We do not insist

on this method of compounding the poems; all we wish to do

is to illustrate the way in which they might have arisen, and to

give what we think a rational exhibition of the causes, or some few of the more

important of the causes, which led to the establishment of

a national heroic epic in opposition to a cycle of poems refer-

ring to the exploits of particular tribes. Whatever be the

origin of the Iliad, it is peculiarly remarkable in standing

as it does a witness of the unity of the Hellenic races. We

have seen these races which we regard as possibly, as

rivals, as strange, as enemies; if we turn to

to their poetry, we find them united. The common Chris-

Christianity of Europe is not a more strongly marked bond of

community, and the political community must, in the Epic period particularly (wherein it is

most strongly marked), be referred to that genus—whether

in the author, or in the race for whom he composed, matters

at all, which has given birth to the Iliad, and

to the Odissey, and the Homeric Hymns. Of these poems, the Iliad

stands first, as the oldest and at the same time the completest specimen of a

national heroic epic.

Its subject, as is known to all, is the revenge which

Achilles took on Agamemnon for depriving him of his

mistress Briseis, during the siege of Troy; and the consequent

decline of the Greeks, and the conquest of Asia by the

Trojans. The poem is composed of various rhapsodies or books, which detail the history of

the besieging force during the period of Achilles' anger, and end with the death of Hector (who is slain by Achilles in retaliation for

Hector's having killed Patroclus, the Trojan warrior. If any one reflects on the form which the first

imaginative compositions of any people in an early stage of

progress must take, and when he has ascertained, what it

probably will ascertain, that these compositions, if they

are of a sacred nature, will bear reference to external and active

* Some accounts say that he burned his expedition, and avoided it by retiring

2 N 2

Digitized by Google
life, goes on to apply his conclusions to the Greek nation in particular, and furthermore to the heroic age of the Greeks, he will doubtless find little difficulty in agreeing with a remark which has already been made regarding heroic poetry, namely, that as a simple form of art it does not imply the development of a plot, but rather the extraction of a certain portion from the poetical annals of a nation, because just where the poet may seem to suggest, but not necessarily needing with a regular disengagement of a plot regularly worked up and studiously combined from the beginning of the poem. To apply this to the Odyssey, it is evident that to wander vain, not to be out of place, to aim at proving, as some have done, that the Iliad is a poem constructed on regular principles of art. It is a poem of natural growth; the earliest and yet the noblest attempt made by the epic spirit in the most imaginative state of the art. Its application, however, is what we believe to possess the exact poem which thus forms the beginning of all literature properly so called, or not, is scarcely doubtfull. The lapse of so many ages can hardly have failed to have altered the original passages, and removed others; but whether to any great extent seems almost impossible to decide. Particular scholars may impugn particular passages, and themselves entertain no doubt of their own correctness, but it behoves them to remember that the same practice in style which would be necessary to enable a scholar to decide correctly on a passage of doubtful authority would, unless that scholar's ingenuity were under perfect control, be very likely to suggest difficulties, and questions too tempting for his judgment to resist. But the same spirit of criticism which suggested these doubts has also suggested others, as it would seem, on better foundation. We mean those relating to the authorship of the Iliad, of which we have any record, and, as Thrall has well remarked, perhaps the first work to which was applied the newly invented art of writing. This last supposition, if adopted, would lead us to infer that the reason why those adventures which Ulysses encountered on his way home from Troy, and in its present state consists of twenty-four books, which division is said to be owing to the grammarians in the time of the Poimondes Nitzsch (Anmerkungen v. d. Od., v. 262.) divides the Odyssey into four parts, ending with the 4th, the 92nd line of the 13th, the 19th, and the 24th books respectively, and containing the story of the absent, the returning, the vengeance-seeking, and the successful conclusion of the grand plot, as many others have done, to point out all the interpolations. Our limits do not permit us to say more on this subject than to notice that there is little doubt that much has been interpolated in the account of the Lotos-eaters, and that Aristophanes and Aristarchus the grammarians considered the latter part of the 23rd and all the 24th book spurious. It will be more to our purpose to consider the one or the other. The Iliad and Odyssey are or are not to be referred to the same author, and this we shall both with the view of pointing out some important features in the discussion, than as hoping to arrive at any very definite result. A sect arose very early among the critics called the 'Iliad is not the Iliad' ('ειμι εις τον Ιλιαν,' τον Ιλιαν), who denied to Homer the authorship of the Odyssey. The grounds of this opinion were mostly critical, such as the different use of different words in the two poems; or historic, such as disagreement, in points relating to Helen, Neleus' sons, Aphrodite's husband, &c; but we possess but little of the fruits of their researches, although enough, according to Grunert (Rheinisches Mu-'nster, Bd. V, S. 26) we think they could have belonged to early childhood of criticism. In our day, or at least in that of our fathers, the question has been revived, with a power of suggesting doubts, as much greater as that of satisfying them. Has the Iliad been, in the sense of belonging to the use of different words in the two poems, both in antient and in modern times, it must be observed that in the Iliad itself, compared with itself, there is, if anything, a more remarkable variety in the use of words than in the two poems. We do not remember to have seen the observation, but we think that any one who reads the Iliad, noting down any words which strike him, will find that no sooner has he got acquainted with a set of words than they disappear, and that this rising and setting of words continues all through the poem. If then the use of different words argu different authors, there will be some difficulty in escaping the conclusion that the Iliad is a poem composed by separate authors. The different use of words however is a strong argument, but a stronger than all is to be found in the different state in which the Odyssey displays itself above the class, a tendency which we observe that the Odyssey displayed in the Iliad, and which above the class, a tendency which we observe that the Odyssey displayed in the Iliad, and which
a logical proof, especially one which only goes on probabilities. Each man who engages in the controversy will have decided for him as much by his own natural character and bent as by argument; and here we may leave it, with this one remark, that the most which can be proved, even by the rules of taste, is that the great design and chief filling-up is by one author: individual lines or even whole hymns are used, and these are used, but are mingled up together; and furthermore to his having mixed up two separate hymns, one to the Delian and one to the Pythian Apollo, of which the latter was itself composed of two, one to the Pythian and one to the Thessalian Apollo. The Hymn to Hermes is very corrupt, consisting of a larger and a smaller hymn, and interpolations. The Hymn to Aphrodite and that to Demeter are also much altered; the latter, according to Hermann, having many additions of at least two editions. These are the principal of the Homeric hymns; the fragmentary one to Dionysus seems also to have been one of the larger and more important ones. There are two texts of the Hymn to the Sun, first, the introduction, and second, as well as seventeen epigrams, or rather epigrams. These, with the 'Battle of the Frogs and Mice,' make up the sum of the Homeric poems, genuine and spurious.

The 'Hymn of Homer' by Pindar. Hebrodus and Thucydides quote to refer him; and when we get to Plato he is constantly either hinted at or transcribed. There is a good deal of information on this topic and in Hayne's work already quoted; but we may quote Thirlwall's authority for the remark that 'an argument which confines itself to the writings of Wolf and Hayne can now add but little to our means of forming a judgment on the question, and must keep some of its most important evidence, of course, in the text.' The more information is to be found, by those who will take the trouble to look for it, scattered up and down in the pages of German periodicals. Buttmann's Lexicon and Thiersch's Grammar supply critical instruction in abundance. Greven's 'Symbolik und Mythologie,' Hermann and Creuzer's 'Letters on Homer and Hesiod,' Voss, Nitzsch, and K. O. Mueller, may be also studied with advantage, as well as Mr. Thirlwall's 'History of the Language of the Literature of Greece,' in the 'Library of Useful Knowledge.'

The principal modern editions of Homer are, those by Clarke and Payne Knight, in this country (the latter having the so-called Iggammas inserted in whose proper places their absence, Hayne, Hermann, and Nitzsch (which is as yet incomplete), for the Iliad, Hymns, and Odyssey respectively. Of translations we have Hobbes, Chapman, Pope, and Cowper; but of these Pope's, the best known, is rather an imitation, not at all in the style of the original, than a translation. Perhaps, on the whole, Chapman's is the best. The German translation by Voss is perfectly wonderful as regards accuracy. It is in hexameters, and preserves every security for the nearly every word.

HOMICIDE, in the English law, signifies the killing of one man by another. Homicide is of three kinds: justifiable, excusable, and felonious. Justifiable homicide is when the killing of the person in whose life there is an immediate necessity, no where of shame of blame can be attached to the party killing, as soldiers in action, persons defending their own lives, &c. Excusable homicide is of two kinds, by misfortune or argument, and here we may leave it, when a man doing a lawful act, and using proper precautions, unfortunately kills another; the second, where a person in defending himself from an assault of a less serious nature than that which was intended, kills the offender; and this it is often difficult to distinguish from manslaughter, in the legal sense of the word. Felonious homicide is the offence of murder; for the legal definition of murder is 'a killing in the first degree, without the necessity of premeditated intent, to the murder or killing done with malice, as murder done with malice a turpitude and estimating the resemblance between a disease and the state produced by the medicine, they regard only the external symptoms, and do not consider on what essential internal.
condition of the body these depend. But even the resemblance between the apparent symptoms of the disease and those produced by the substance said to be its homoeopathic remedy is, in most cases, very slight. This ground-work of the doctrine is therefore extremely weak.

Hahnemann's explanation of the efficacy of the homoeopathic method is ingenious. Two different diseases, he says, cannot destroy each other, so they affect different parts to be systematized; they will either turn them into their progeny, or else the same parts of the body, and the two, meeting there, will destroy each other.

A great peculiarity of the homoeopathic treatment is the minuteness of the doses in which the medicines are administered. A substance with which other physicians prescribe several grains is given by the homoeopathist in the quantity of a decillionth of a grain, or even less. An ordinary form in which the dose is administered is that of a comfit of sugar of the size of a poppy seed impregnated with a very weak solution of the medicine; but if the patient is very sensitive, it will be sufficient to let him smell once to a phial containing a comfit of sugar, thus impregnated, of the size of a mustard seed. Such doses appear at first sight to be so small, but Hahnemann reminds us that, since homoeopathic medicines produce the same symptoms as the original disease, they must act on the same parts, and hence have far greater power than substances acting on other organs. Moreover he has discovered that his medicines acquire at each division or dilution a new degree of power by the rubbing or skimming which they undergo. 'So that latterly,' he says, 'I have been forced by experience to reduce the number of shakes to two, while I formerly prescribed ten to each dilution.' It is worthy of remark that Hahnemann was a disciple of Mesmer, a believer in animal magnetism, and speaks of the wonderful effects which have been produced by homoeopathic doses of Mesmerism, that is to say, by one movement of the hands of the magnetizer along the surface of the body of the patient, from the crown of the head to the soles of the feet.

It is a fact that current operations performed by the Hahnemanni method, but it appears most reasonable to regard these merely as new proofs of how much may be done by the strict regulation of diet, by the powers of nature, and by the wonderful influence of the imagination upon the body. When patients are firmly convinced that they shall be cured, the cessation of nervous pains, particularly those of a hysterical nature, may with more justice be ascribed to the influence of the mind than to the power of infinitesimal doses of medicines.

HOMOGENEOUS and HETEROGENEOUS, terms applied in mathematical language to expressions which have or have not the same number of factors of a given sort. Thus, with respect to $x$ and $y$, $kx^a + ky^b$ is homogenoous, but $ax^a + by^b$ is heterogeneous.

HOMOLA, HOMOLA TRIBE. The Homolids, according to the system of M. Milne Edwards, are the second tribe of the Aderdoraitae family of the Armoresum crustacea, and their place is between the Dromiids and the Raminids.

Character of the Tribe.—Carapace spiny, and armed with a rostrum. Internal pair of antennæ without a pinc and incapable of being bent back upon the front. Jaw-feet pediform. Feet of the second, third, and fourth pairs, very long; fifth pair very short, and of no service in progression. Sternal insertion of claws. Carapace presenting the anterior feet composed of two fingers in the ordinary form. Tarsi of the three following feet styliform. Posterior feet more or less completely proleneiform.

M. Milne Edwards thus divides the tribe into three genera:—

Subcheliform and exposed; cara-
pace quadrilateral. 

HOMOLIDS having the posterior feet Cheliform, and hidden under the lateral parts of the cara-
pace. 

Carapace triangular; rostrum very much elongated. 

Lithodes. 

Lithodes (Jatteville.) M. Milne Edwards remarks that up to the present time the Lithodes have been arranged among the Oxyrhychi, on account of the form of the rostrum, but he asserts that

Homola. (Leach.) Carapace longer than wide, nearly quadrilateral; the stomal region occupying the whole breadth of it anteriorly, and the branchial regions, though not prolonged above the base of the feet, very large; lateral parts of the cara-
pace vertical. Front narrow, and advancing so as to form a small rostrum; on each side of its base a large concave tooth directed forwards. Orbis extremely incomplete, even within, where the posterior ocular peduncles is naked; they are scarcely limited without, and are continued with a large oblique and very superficial pit, against which the eyes are applied. Ocular peduncles cylindrical and divided into two pairs, one internal, slender, and elongated; the other stout, short, and terminated by the eye. Internal antennæ not lodged in pits; their basilar joint nearly globular and advancing below the insertion of the ocular peduncles, the two succeeding joints very long, the third, as in the Brachyura, supporting two very small multiarticulate filaments. External antennæ inserted nearly on the same line as the internal; at their base a large auditory tube; which is sometimes extremely pro-
jecting; their first joint cylindrical, rather stout, and moderately long; the second slender and very long; the third very short; the terminal filament very long. Buccal frame quadrilateral. External jaw-feet nearly pediform, their three last joints being large and nearly as long as the two preceding, which are hardly flattened. Sternal plastron much resembling that of the Dromiids, and not containing the genital parts. Feet very long; 1st pair terminated by a nearly cylindrical hand, 5th pair raised upon the heel and subcheliform. Abdomen very wide in the male as well as the female, and composed of 7 distinct joints; in the female the first ring carries a pair of very short appendages; those of the four succeeding segments are of the same form as in the Brachyura; the penultimate ring has no vestige of any appendage. The vulva, instead of occupying a place in the sternal plastron, as in the Brachyura, are hollowed in the basilar joint of the third pair of feet.

The disposition of the branchiae is equally remarkable; there are fourteen on each side; the first is laid across (ten travers) under the base of the succeeding ones, and fixed to the base of the second jaw-foot. But the others are all directed obliquely up, and are fixed to the circumference of the vault of the sides. One is inserted at the ring which carries the jaw-feet of the second pair, two above the base of the external jaw-foot, three on each of the two succeeding rings, and two to the penultimate ring.

Locality, Seas of Europe. Example, Homola spinifrons—Body covered with yellow hairs; length about 15 lines. Locality, the Mediterranean Sea.

Homo sapiens. a, left external jaw-foot.
it is not their place, and that they evidently belong to the _Anomura_. They bear, he says, the general analogy to the _Asterura_, and especially to _Homola_; but they establish the passage between those crustaceans and _Birega_.

_Carapace_.—The carapace is not very long, nor rather heart-shaped, its upper surface distinctly limited by a thick and spine border. _Rossum_ is horizontal and very long; its base covers the insertion of the eyes and the anterior border of the carapace is very long. Its divided. _its_ term is the anterior border of the carapace; the second carries a conic tooth externally, the last joint of the peduncle is long and slender, and finally the multiscissile is rather long. The _buccal frame_ is not distinct as the anterior, where its borders are divided. The _external jaw-facet_ are pediform, and their second joint is which is stout and short, carries internally a strongly toothed prolongation. The _thorax_ presents a disposition different from that of the crustaceans which precede this genus in the system, but which is general in the succeeding family (_Ptygurus_); its last joint is not solidated to the preceding, but free, and even moveable. The _sternum_ is furnished with new joints which precede, but becomes very wide afterwards, and presents complete transverse sutures between the three segments; in the interior of the thorax there is no posterior sells tibetica nor well that is not distinct, nor well formed. The bands of the three pairs are moderate and cylindrical; the three succeeding pairs are long and equally cylindrical; finally, those of the fifth pair are extremely small and bent back in the interior of the branchial cavities; they are cylindrical and terminated by a small claw with flattened and extremely short fingers. The _abdomen_ is large, triangular, and bent back against the plasmon; its basilar part is completely solidified below, but in the terminal half it is only furnished with some rami on flat plates, which appear to represent the six last rings. In the female, oviferous filaments seem to exist only on one side of the abdomen.

As in the other Anomurans the crustaceans the _culvae_ are not situated on the sternum, but occupy the basilar joint of the third pair of feet. The _branchiae_ are disposed as in the rest of the tribe.

_Example._ _Lithodes Arctica._—Length of carapace about five inches; colour reddish-yellow.

Locality. North sea.

---

HOM. (Milne Edwards.)

M. Milne Edwards remarks that the small crustacean on which he has founded this genus has been confounded up to the present time with the _Porcellana_ to which it in fact, bears a resemblance in its general form, but from which it differs in many important particulars, such as the conformation of the tail, the antennae, &c. He gives the following generic character:

_Carapace_ depressed, narrowly anterior and truncated posteriorly, it does not reach beyond the middle of the base of the third pair of feet; the upper surface of the body is occupied by the base of the abdomen. _Front_ is truncated and armed with a small mesial tooth; there are no orbital pits, and the _ocellar peduncles_ have the form of two large globular joints which touch each other on their internal edge and carry the first joint at its external angle. The _internal antennae_ are moderate; their three first joints are cylindrical, and terminate by two small filaments. The _external antennae_ are inserted on the outside of the eyes and nearly on the same line; they are large and terminated by a stout multiscissile stem furnished with long hairs at its lower border. The _external jaw-facet_ are pediform; their third joint has no noticeable dilatation, and the three succeeding joints are very large. The last thoracic ring is not solidated to the preceding. The first pair of feet are very large, very wide, and extremely depressed; the carpus is as large as the arm and nearly quadrilateral; the claw is stout, short, and nearly horizontal. The three succeeding pairs are short, stout, and terminated by a nearly conical joint; the fifth pair are very slender and bent back above the others in the branchial cavity. The abdomen is very wide but limbiform, bent back below the sternum, as in the _Porcellana_, and presents no vestiges of appendages belonging to the penultimate ring.

M. Milne Edwards says that he knows nothing of the structure of the oviferous female of these crustaceans, of which species is known, viz._Lomites hirta_ (Porcellana hirta of Lamarck). The body above is covered by very short and close-set hairs, and the hands are nearly as large as the carapace.

_Homolous._ A term applied in England to those crustaceans which, being of the same kind, occupy different places in a proportion, one being an extreme, and the other a mean. Thus, if A : B :: C : D; then A and B being of the same kind, and also C and D, but the first pair of a different kind from the second, A and B are homologous, and so are C and D. But if all four be of the same kind, A and B are homologous terms, and also A and C; B and C are homologous, and also B and D.

_Homolonotus._ A name of a group of trilobites, as they are generally called (_Palaeodesmicus_ Dalman), in which the tripartite character of the species is almost lost; for which reason Mr. Miller called it Monolobite. _Homolonotus_ Knightii occurs in the Upper Silurian rocks of England, and a similar species at the Cape of Good Hope. (Koen, the _Sectes_; Mr. Murchison.)

_Homoptera._ One of the sections into which the class Inssects is divided. According to Leach, Stephens, and some other authors, the section Homoptera is regarded as a smaller, but in which the appendages are long and slender, the first joint of the two great sections into which the order Hemiptera is divided. The insects of this group are thus characterized by Latreille:—rostrum arising from the lowest part of the head near the chest; the elytra, almost always tectiform, are of the same consistence throughout, semi-membranous, and sometimes resembling the wings; the three segments of the thorax are blended, and the first is often shorter than the following.

In the typical Homoptera the head is large, broader than long; the eyes are large, and there are oval, or simple eyes, between them; the antennae are minute, composed of but few joints, and terminated by a seta; the rostrum is a slender, jointed process, which, like that of _Homoptera_, lies close to the chest; the legs are of moderate size; the hinder tibiae are usually spined; the body is convex above and flatly beneath; the wings are semi-membranous, the anterior pair often and sometimes transparent, always of a uniform texture throughout. The larva are active, and resemble the perfect insect, excepting that they possess no wings; the pupa are also active, but possess rudimentary wings.

These insects feed upon vegetable juices. The females are furnished with an ovipositor, composed of three denticulated blade-like processes, which are lodged in a groove in the abdomen. By means of this ovipositor they pierce holes in vegetables, in which they deposit their eggs. Many Homopterous insects possess the power of leaping by means of their posterior pair of legs.
The section or order Homoptera may be divided into the following families, most of which are analogous to Linnæan genera, or nearly so.

Family 1. Cicadidae (Leach) comprises those species in which the antennæ are six-jointed; where there are three ocelli on the upper surface of the head, and where the tarsi are three-jointed.

In these insects the wings are usually transparent, and have dark nervures; the males are furnished with an appendage, situated at the base of the abdomen on each side, by means of which they create a monotonous musical sound. They are usually of large size (some measuring as much as seven inches in width when the wings are expanded), and for the most part inhabit hot countries. But one species is found in England, the Cicada hematorhoides of authors, an insect about two inches in width, with transparent wings having black nervures, and their basal portion red; the anterior margin of the fore wing is also red; the body is black, but with the margin of each segment red; the legs are red, varied with black. This, which is the largest Homopterous insect found in England, is not uncommonly met with in the New Forest, in Hampshire.

Family 2. Fulgoridae (Stephens). Antennæ three-jointed, inserted beneath the eyes; ocelli two in number; tarsi three-jointed.

The males of this family have most generally the fore part of the head produced, and varying in form according to the species. They do not possess the power of creating a sound, nor do those of the following families.

The species, but one genus (Fulgora), is wholly south of the Regne Animal. The Fulgora lateraria (Linn.) will serve as an illustration of the second. This curious insect is an inhabitant of Brazil. It is about five inches wide, and two or half inches long, of a yellowish colour, mottled with black, and having a large ocellated spot on each of the under wings.

Family 3. Cercopidae (Leach). The antennæ three-jointed; tarsus three-jointed; ocelli two in number; antennæ situated between the eyes. [CICADELLA.]

Family 4. Peyridae (Stephens). Antennæ with ten or eleven joints, of which the last is terminated by two setae; legs formed for leaping; tarsi two-jointed; both sexes winged.

Family 5. Thripidae (Stephens). Antennæ eight-jointed; rostrum minute; tarsi terminated by a vesicular joint, and without claws.

Family 6. Aphidide (Leach). Tarsi two-jointed; antennæ with five joints; rostrum, in both sexes, with three distinct joints; females generally aperous. [ARALLA.]

HONDEKOR, the name of a celebrated family of Dutch painters, of whom the founder, Egidius or Gille Hondeker, born at Utrecht in 1635, was the son of a merchant, the wealthiest landowner in Brazil, who was obliged by the persecutions of the Inquisition to withdraw from his own country. He painted landscapes in the manner of Savery and Vinckenboorns, in which he introduced many kinds, highly finished. His son, Gysbrecht, born 1613 at Utrecht, was a skilful painter of domestic poultry, but was far surpassed by his son Michael, born at Utrecht in 1636. Till the age of seventeen Michael was carefully instructed by his father, on whose death in 1653 he studied for a time under John Baptist Weenix, his uncle. His representations of cocks, hens, ducks, peacocks, &c., excel in truth, life, elegance of design, and delicacy of execution, the works of all other painters of such subjects. His genuine pictures are held in highest estimation, and fetch great prices. Hondeker died in 1693, aged 60.

HONDURAS. [CENTRAL AMERICA.]

HONEY is a fluid or semi-fluid substance, the materials of which are collected by different kinds of bees, in Europe chiefly by the species Apis mellifica, which is neuter or working bees, from the nectariferous glands in the cup or chalice of flowers. It cannot be said to be a purely vegetable production, for after being collected by the producers of the insect it is transmitted to that disposition of the osmophagus termed the crop, sucking-stomach, or honey-bag, where it is elaborated, and again dosed, to be deposited in the cell of the honey-comb. It undergoes less change in the bees are very young, remaining nearly white, and is then denominated curvum honey. At all times it retains qualities derived from the kind of plant whence it has been procured, as is manifest not only by the peculiar odour of the honey, but by the effects which follow the use of honey. The honey from certain plants are evidently regarded by the bee tribe Rhaodates, such as the Aralea, rhododendron, kalmia, &c., which yield a honey frequently poisonous, while that from the genus Erica (termed heather-honey), and most parts of the heather, is wholly without effect. The honey of the plants of Hymettus, see Chandler's 'Travels,' chap. xxvii., and Hobhouse's 'Letters from Irania,' letter xxvi.,

The honey of the common bee is at first generally white, inclining to yellow, but by age it becomes of a deeper colour and greater consistence, and of a more acid taste. The honey of Surinam and Cayenne, collected by the aps, is almost black. The spiga unicolor is red. The spiga unicolor produces a greenish honey collected from the Minosia heterophylla and Weinmannia glabra, of the most exquisite flavour. Honey is of different degrees of consistence: that of Mahon, of Hymettus, and of the Bermudas is liquid; that of England is more or less disposed to become nearly solid.

Honey is sweet, faintly aromatic, granular, soluble in water, and capable of undergoing the vinous fermentation, and so yielding an intoxicating drink, such as mead, athem, or mead. Honey consists of an uncrystallizable portion, and a portion which crystallizes in very white grains. The former is soluble in alcohol, the latter not, and is regarded as the honey of Melitite, or manuka, from the action of nitric acid, can be converted into oxalic acid, like the sugar of the sugar-cane. When old it probably contains some free acid. Honey is sometimes adulterated with flour, sugar, and other impurities which it may be freed by diffusing it through cold water. Honey is certainly nutritive, but it cannot be employed to any great extent, since, if taken in considerable quantity it excites the action of the bowels, and is gently laxative. Its effects in this respect will be greater in proportion to its age and acidity, and less or scarcely appreciable if largely diluted with water. In this last state it is rather demulcent, emollient, and refrigerant, and hence forms a good drink in fever and in inflammatory complaints, but it should not be taken if there be much gastric or intestinal irritation. It is used likewise in catarrh, and when drank warm is considered to be expectorant. Along with vinegar it forms a good gargle in slight cases of sore throat, and is used with advantage in chronic application in aphthas of the mouth and throat. Owing to idiosyncrasy in some individuals honey causes great uneasiness, or even severe suffering, but it is most likely that such cases originate in the kind of plate in which the honey is collected, or in the measures used to destroy the bees. Smoking them with sulphur must be hurtful, from forming sulphuric acid gas, which may be absorbed by the honey. Humanity as well as economy demands that other means should be employed to procure the honey without sacrificing the life of the industrious insects which collect it. (See the plans of Nutt and Taylor in Taylor's Bee-keeper.

HONEY'SUCKLE. [CAPRIFOLIUM.]

HONFLEUR, a town in France, in the department of Calvados, in 49° 25' N. lat. and 0° 13' E. long., 99 miles in a
straight line north-west or west-north-west of Paris, or 117 miles by the road through Fontaine and Rouen. It is on the left bank of the Seine, very near the mouth of that river. This town is built on the slope of a hill, the crest of which is covered with wood, and crowned with a chapel on which the sailors hold in great veneration. The streets are irregularly laid out and dirty, and the port will not contain more than forty vessels. There are two churches: the principal one is built of wood. The population in 1831 was 8409 for the town, or 8888 for the whole commune. The inhabitants are engaged in the trade, whiting, herring, and mackerel fishery.

There is a beautiful small river called the Île Verte, with Le Havre Steam-boats. Hoisery, coppers, oil of vitriol, and iron wares are manufactured, and ships are built. Considerable trade is carried on with Europe and America.

HONITON, a parliamentary borough, market-town, and parish in the hundred of Axminster and county of Devon, 148 miles west-south-west from London. The town lies on the great western road from London to Exeter, and is pleasantly situated on a rising ground to the south of the river Otter, which forms a fine view of the surrounding country. It consists principally of one broad handsome street, running from east to west, and another of less length, at right angles to it. Through the former flows a small transparent stream, from which the inhabitants are supplied by means of a dipping-place opposite almost every door. (Polwhele's Descriptive, vol. ii., p. 276.) The borough, town, and covered market are all within the limits of the old castle, and the streets are well paved and lighted. The church, distant about half a mile from the town, was originally a small chapel for mendicant friars. The screen which separates the nave from the chancel has been removed; the chancel itself was erected about the year 1482 by Courtenay, bishop of Exeter. The living is a rectory in the diocese of Exeter, and in the patronage of the earl of Devon, with an average net income of £292. (Honniton, though a borough by prescription, was only twice represented in parliament prior to the reign of Charles I. Since that time it has returned two members.)

The prosperity of the town is vested in a portreven and bailiff, who are chosen annually at the court of the lord of the manor. The principal manufacture is lace, of which considerable quantities are annually sent to the metropolis.

The population of the borough and parish in 1831 was 3509. The education of the poorer classes is partly provided for by a free-school for boys and a school for industry for girls, the latter of which is supported by the subscriptions of females.

HONORIUS, one of the Constantines, a great philosopher. He was born at Constantinople, A.D. 384. After the death of his father in 393 Honorius had for his tutor, the emperor Valens, the distinguished general of the Imperial army, and was educated at Milan. For several years after Stilicho was the real sovereign of the West; and he also endeavoured to extend his sway over the territories of Arcadius in the East, under pretence of defending them against the Goths. He gave his daughter Maria in marriage to Honorius, and recovered the province of Africa, which had revolted. At the year 400 the Goths and the Icings, under Alaric and Radagaisus, invaded Italy, but were repelled by Stilicho. In the year 402 Alaric came again into Italy; and spread alarm as far as Rome, when Stilicho hastily collected an army, with which he met Alaric on the left bank of the Tiber; but Alaric, having completely defeated him, obliged him to repress the Noric Alps. After this victory Honorius repaired to Rome with Stilicho, where they were both received with great applause. On the 1st of January Honorius was declared emperor of the Western empire, and at the same time was elected by the senators and people to the highest court, making it the seat of the empire, like another Rome, in consequence of which the province in which Ravenna is situated assumed the name of Romania, Romanidi, and afterwards Radagaisus retired from Ravenna, and the following year Radagaisus again invaded Italy with a large force of barbarians, but he was completely defeated and put to death by Stilicho, in the mountains near Fiesole, in

Etruria. In the next year the Vandals, the Alani, the Alemanni, and other barbarians, crossed the Rhine, and invaded Gaul. A soldier named Constantine revolted in Britain, usurped the Imperial power, and, having passed over into Gaul, established his dominion over part of that country, and was acknowledged by Honorius as his colleague, with the title of Augustus. Stilicho now began to be suspected of having an understanding with the barbarians, and especially with Alaric, to whom he advised the emperor to pay a tribute of 4000 pounds of gold. Honorius gave an order for his death, which was executed at Ravenna in August of the year 408. Historians are divided concerning the fact of Stilicho's treason: Zosimus and the poet Claudian consider it as a calumny. His death however was fatal to the empire, of which he was the only remaining support. Alaric again invaded Italy, besieged Rome, and at last took it, and put to death the effect of the universal ruin Honorius died of the dropsy at Ravenna, in August, 423, leaving no issue.

Colo. of Honorius.

HONORIUS I., a native of Campania, succeeded Boniface V. as bishop of Rome, A.D. 626, with the sanction of the imperial court, and the pallium to the archbishops of York and Canterbury, but he found great opposition among the Welsh clergy, who re-sisted the metropolitan authority assumed by these newly-appointed bishops, and the supremacy claimed by the bishops of Rome. Those members, who had been alienated from the British church differed also from Rome in their manner of computing Easter. (Pinkerton's Enquiry into the Early History of Scotland, edition of 1814, vol. ii., p. 265; Usher; Geoffrey of Monmouth; Honorius II., annalists; Herberstein; with Sergius, patriarch of Constantinople, who favoured the doctrine of the Monothelites concerning the singleness of the will in Jesus Christ. (Erbury.) Two letters of Honorius to Sergius, which are preserved, contain passages apparently in favour of Monothelism, at the same time recommending not to dwell too much upon those subtle distinctions, for fear of creating scandal and schism. In the sixth council of Constantinople the doctrine of Honori-us on this subject was condemned as heretical. Barthol., in his * Apologia pro Honorio,* Barronis and others, have undertaken to refute the charge of Monothelism brought against Honorius. Fabrius, in his *Bibliotheca Graecae,* gives an accurate account of those writers who have treated of the history of Monothelism. Honorius died A.D. 638, and was succeeded by Severinus.

HONORIUS II., cardinal Lambert, bishop of Ostia, was elected by the cardinals, A.D. 1124, after the death of Calixtus II., while most of the bishops assembled at Rome elected Tebaldus, cardinal of Santa Anastasia. Honorius was supported by the powerful family of the Frangipani; and the people being divided in opinion, Calixtus, to avoid further strife, waived his claim, and Honorius himself is said to have expressed doubts concerning the validity of his own election until it was confirmed by the clergy and the people of Rome, which was consequently done. He refused the investiture of the duchies of Apulia and Calabria to Roger, count of Sicily; and Roger having besieged the pope within Benevento, Honorius excommunicated him; and then retired to Rome. In the following year Honorius granted the investiture. He also confirmed the election of Lotarius as king of Italy, and excommunicated his rival Conrad. Honorius died at Ostia in 1130. His

Vol. XII.—4 O
death was followed by a schism between two rival candidates, Anaeletus and Innocent II.

HONORIUS III, Cardinal Cencio Savelli, succeeded Innocent III. in 1216. He employed himself zealously, but with no great success, in subduing the Italian cities, and in having become independent of the German empire since the peace of Constance, seemed to have no other notion of enjoying their independence but by waging war against one another. Another object of the pontificate, however, was to entertain the churches, and especially Frederick II., to undertake a great crusade against the Moslems in the East. Frederick promised everything; in order to be crowned, which ceremony was performed 12th October, 1229, in the cathedral of St. John in Florence. But afterwards Frederick, instead of proceeding to Palestine, tarried in Apulia and Sicily, in order to reduce those countries to complete submission. Honorius was soon disturbed by Strife among the nobles and people of Rome, who drove him repeatedly from that city. After ten years of a very troubled pontificate Honorius died in March, 1227, and was succeeded by Gregory IX.

HONORIUS IV, Cardinal Giovanni Scolari, succeeded March 14, 1227. He showed great zeal for the cause of Charles of Anjou against the Aragonese, who had occupied Sicily; and he even preached a crusade against the latter, qualifying it as a 'holy war.' The Aragonese however, having given him no satisfaction, created the French of Honorius died in April, 1227, and is said to have contrived, during his short pontificate, to enrich his family considerably. He was succeeded by Nicholas IV. He was a profound scholar, and a very famous in our popular poetry, is supposed to have lived in the reign of Richard I. His epitaph, said to have been inscribed on his tombstone near the nunnery of Kirklees in Yorkshire, and first printed in Thomas's 'Doratus Leodensis' (1714), the genuineness of which however has been doubted, makes him to have died '24 Kal. December (perhaps meaning the 24th of December), 1247. Other copies have '14 Kal. December.' It is said to have been composed by his followers.

He was the most distinguished in his time of those numerous warriors who under the tyrannical government of the early Norman kings lived in bands in all the great forests, and combined a sort of principality of the cause of the old national independence with the practice of desperate fighting and robbery. The chief residence of Robin Hood and his followers, as is well known, was the forest of Sherwood, or Sherwood, in Nottinghamshire; but it is said to have also frequented Barnsley, in Yorkshire, and, according to some accounts, Plumpton Park in Cumberland. 'The said Robert,' says Stow, 'entertained an hundred tall men and good archers with such spoils and thefts as he got, upon which occasions they were very dangerous for people to give the onset. He suffered no woman to be oppressed, violated, or otherwise molested: poor men's goods he spared, abundantly relieving them with that by which they had been robbed, or 'the hostes of rieles' (the Scottish historian) blameth for his rapine and theft, but of all thieves he affirmineth him to be the prince, and the most gentle thief.' He seems to have been as famous in Scotland as in England, as is evinced by the honourable mention made of him by both Major and by his predecessor Fordun. 'The personal courage of this celebrated outlaw,' Bishop Percy observes, 'his skill in archery, his humanity, and especially his levelling principle of taking from the rich and giving to the poor, have made him a favourite of the common people.' His exploits appear to have been a common subject of popular song, at least from the time of Edward III., though most of the numerous versions, in all of which the place is the same, and which are a collection of all the antient poems, songs, and ballads now extant, relating to that celebrated English outlaw, 8vo, Lon., 1795. Prefixed to this collection are 'historical anecdotes' of the life of Robin Hood, which consist of an accumulation of all the notices respecting the outlaw that the compiler had discovered in manuscripts or printed books. It cannot be said however that much, or indeed anything, has been added to the real facts of his history by this interesting and spirited attempt to preserve his fame. Robin Hood is, as his name implies, a sort of outlaw or robber, which, however unctual than the manner in which the writer jum-
critics. For the following transactions see Rodney. The
brunt of the action of the 9th of April fell on the van
division, which Hood commanded: his own ship, the Bar-
fleur, had at one time seven, and generally three, antago-
nists. On the great day of the 25th his conduct was
equally distinguished. For these services he was created
an Irish peer by the title of Baron Hood of Cattericking.
After this battle Rodney returned finally to England,
leaving his ship to his class, while he himself was
retained till the peace of 1783. In the memorable West-
minster election of 1784 Lord Hood opposed Fox, and was
returned at the head of the poll. He lost his seat on being
again contested by Charles James Fox (Bonaparte),
founded necessary, and produced a more brilliant result.
In 1794; he was again elected, and was re-elected
again in 1801. He was appointed governor of Greenwich Hospital, and raised to
the English peerage by the title of Viscount Hood of Whitley. He afterwards received the Grand Cross of the
Bath. He died at Middelburgh, in his ninety-second year, June 1816. His professional character has been thus given:
'To great bravery he united great seamanship: he possessed
at the same time a certain promptitude of decision, coupled
with extraordinary coolness, skill, and judgment. These
qualities were the more enhanced in his possession, which
he uniformly possessed; while all under his author-
yielded a ready obedience to a commander, who, when
necessary, always appeared foremost in danger, but never
erred through the imposition of some great object.'

HOOD, ALEXANDER, VISCOUNT BRIDPORT, younger brother of the above, was also brought up to the
navy, and also much oppurtunities of amalgaing his
skill, activity, and bravery, in the lower ranks of his
profession. He was made rear-admiral in 1780, and in 1782
sailed as second in command of the fleet sent under Lord
 Howe to relieve Gibraltar. (Howe.) He held the same
rank in the enterprise of Nelson in 1794; and bore a distinguished part in the
great victory of the 1st of June. In 1795 he engaged a French fleet off
L'Orient, and took three ships of the line; and in the
following year, while, like his brother, he was again
pointed to the command of the Channel fleet, which he
held till April, 1800. He was successively raised to the
Irish and English peerage by the titles of Baron and Viscount
Bridport, the last creation June 18, 1801. Lord Bridport
died at Bath, May 3, 1814. The title is now extinct.

HOOD, SIR SAMUEL, VICE-ADMIRAL, who also
was elected M.P. for Westminster in 1806, is not to be con-
cluded with Lord Hood's namesake and cousin. He
was in Rodney's battle of the 12th of April, served in
the Mediterranean under Lord Hood in the June frigates, and
distinguished himself at Toulon and in the reduction of
Corsoy. Being promoted to the Zéphir, 74, he was
engaged in the battle of the Nile, and otherwise was
usually employed till the peace of 1802. In 1803, being sent
to command on the Leeward island station, he captured
Tobago and the Dutch settlements in Guiana. For these
services he received the ors of the Bath. He lost his
arm off Rochefort, in 1806, in an action in which he captured
three French frigates; but was again engaged in the
expedition against Copenhagen in 1807. He was afterwards appointed to
a command in the Channel, and he died in 1814, much honoured, regretted, and beloved. He
was an admirable officer, cool and prudent, as well as fearless,
possessed of great professional skill, ready resources, and a
moderate coolness under heat.

HOOD, CAPT. ALEXANDER, brother of the above,
another brave and meritorious officer, was killed in com-
mand of the Mars, in action with the French 74 L'Ileurela,
which was captured April 21, 1798.

HOOFIT, PETER CORNELIUS, one of the most emi-
inent poets and prose writers of Holland, was born on the
16th of March, 1581, at Amsterdam, where his father was an
eminent burgomaster. After studying at the high-school
at Leyden he travelled to Italy, the study of whose literature
and poetry chiefly occupied him during his stay there. On
the return of his education, he published his tragedy of
'Granica,' which, for elegance and harmony of diction, is still considered one of the choicest
specimens of the Dutch language. Thus he may be said to
have polished and refined it, from the harshness and stiffness in which he found it, into such melodiousness and flexibility, that he left
others more to imitate than to improve upon. He composed
several other tragedies, and may be considered in some
degree as the founder of the Dutch stage. Many-like those of his great contemporary Vondel, are all on the
Greek model, and interspersed with choruses. But it is
in his lesser productions, his Minnedigte, or amatory composi-
tions, that Hood displays most originality. Many of
these are replete with Anacreontic playfulness, naïveté, and
elegance. Few who have been eminent as poets have ob-
tained anything like equal celebrity as prose writers: but
Hood has been so fortunate as to succeed in this still more
difficult task of establishing a correct and harmonious
style of prose, of which his 'History of the Nether-
lands' is justly esteemed a model, remarkable both for its
tact and its style. His first marriage was terminated by
the death of his first wife in 1624, his second survived him. In her society
and that of his numerous friends the last twenty years of
his life were passed in lettered ease and enjoyment. His
château at Muiden, near Leyden, was the resort of many who were dis-
tinguished for talents. He died May 31st, 1647.

HOOGHE, PETER DE, was born about 1643, but
the place of his birth is uncertain, as well as the master under
whom he studied, though some say it was Berghem. At
the age of 17 he had studied in some good school. 'His pictures,' says a profound
decor. (Dr. Waagen), 'are striking proof that an artist
has but to produce something excellent, in an lower de-
dpartment of art, to attract the most marvellous force and clearness, and to avail
himself, with the finest tact, of all the advantages of his art by
soft gradations and striking contrasts.' His pictures, of
which there are some capital specimens in England, sell at high
prices.

HOOGVEEN, HENRY, was born at Leyden in
January, A.D. 1712. His parents, who were in humble cir-
cumstances, sent him to the gymnasium in his native town,
where, like others of his class, he sold himself in after-life, he did not at first make much pro-
gress in his studies. But as he advanced to maturity, his
merit became apparent, and he was appointed at the age
of twenty co-director of the school of Groningen, and in
the following year (1733) was placed at the head of the
gymnasium at Woerden. He filled successively the office
of rector at the gymnasiums of Kollenburg, Breda, Dort,
and Delft, at the last of which places he died in 1790.

The principal work of Hoogveen is a treatise on the
Greek Particles (2 vols. 4to., Leyd., 1769), of which an
abridgment was made by Schütz (Leip., 1896). He also
published an edition of the Greek Oracles, for which he
made a careful and extensive study; and his numerous
Notes; but neither this work nor his treatise on the
Greek Particles gives us a high opinion of his scholar-
ship. A useful work of Hoogveen is entitled 'Dictionarium
Analogicum Linguarum Graecarum,' which was published after his
death at Cambridge, in 1800. This Dictionary is merely
a list of the words in the Greek language, arranged in
alphabetic order, according to their final letters. All words
with the same termination of course come together, and
are listed to this according. This is the Roman Catholic, enjoyed the friendship of Pope, and was
intimate with most of his eminent literary contemporaries.
Hooke, John, the Chronicles, A the said do), and Laws Hooker about. Dr. the and the A 12) Herbert's Tytler. An archetype of the History, 1553; written for the purpose of regulating and controlling the scientific and political life of the par-liament of England. His printed works were: 1. 'The Order and Usage of keeping of the Parliaments in England,' 4to, London, 1575; 2. 'The Events of Comets or Blazing Stars made upon the Sight of the Comet Pagania, which appeared in November and December, 1577, 4to., Lond., 1577. 3. The Description of the City of Exeter; 4. A Pamphlet of the Offices and Duties of every particular sworn Officer of the City of Exeter,' 4to., London, 1584.

HOOKER, RICHARD, was born at Heavytree, near Exeter, about A.D. 1533, according to Walton, or about 1534, according to Wood. By the kindness of his uncle, John Hooker, chamberlain of Exeter, he obtained a good education in a better condition than might have been afforded; and he was afterwards introduced by the same relative to the notice of Bishop Jewel, who procured him, in 1567, a clerkship in Corpus Christi College, Oxford. In 1569, he was admitted fellow and master of arts in 1577. In 1579 he was ap-pointed lecturer in Hebrew in the university, and in Octo-ber of the same year he was expelled his college, with Dr. John Reynolds, and three other Fellows, but restored the same month. In about two years he took orders, and was appointed to preach at Paul's Cross. On this occasion he lodged with Mr. John Chisholm, whose daughter Joan was married to him the following year. This lady, who Hooker says, "brought him neither beauty nor portion." His fol-lowings being vacated by his marriage, he was presented to the living of Drayton-Beauchamp in Bucks, by John Cherry, Esq., in 1584. Here he received a visit from an old pupil, Edward Coke; and the next year, on the death of Dr. Travers, from his father, the archbishop of York, a promise of pre-ference for him. Through the archbishop's influence he was appointed Master of the Temple in 1586. Here he be-came eminent in the practice of law, and was able to set some points of doctrine with Walter Travers, afternoon lec-turer at the Temple, who had been ordained by the Pres-bytery at Antwerp, and held most of the opinions of the divines of Geneva. Travers being silenced by archbishop Whigfield, appealed to the privy-council, but without suc-cess. His petition to the council was published, and an-swered by Hooker. Travers had many adherents in the Temple, and a grant of land in Antwerp, with a grant of the house of Walton, which induced Hooker to commence his work on the 'Laws of Ecclesiastical Polity.' Finding that he had not leisure at the Temple to complete that work, he applied to Whigfield for removal to a more secluded station, stating that he have the following extract from a paper communicated by Dr. Hooke in 1674 (Phil. Trans., No. 101, p. 12), entitled 'An Attempt to prove the Motion of the Earth from Observation,' wherein he says 'he will explain a system of the world differing from any yet known, but answering in all things to the common rules of mechanical motions, which system depends upon three suppositions. 1. That all ce-teral bodies whatever have an attraction or centripetal power towards their own centres, whereby they attract not only their own parts and keep them from flying from them (as we may observe the earth to do, but also all other corporeal matter within the sphere of their action. 2. All the bodies whatsoever that are put into a direct and simple motion will so continue to move in a straight line till they are by some more effectual power deflected and brought into a motion that describes some curvilinear. 3. That there are no corporeal substances, and no such centripetal power, by how much nearer the body wrought upon is to their own centres. 'This,' observes Mr. Barlow (Ency. Meteo, art. Astronomy), 'was a very precise emunication of universal gravity, before there another similar conjecture had been made. The Hooke were too numerous to mention here; but the reader will find a complete list of those published during his life-time, and also of his posthumous works, in Ward's 'Lives of the Gresham Professors.'

HOOKER, otherwise Vowell, John, an English his-torian, born at Exeter about 1524. His father, Robert Hooker, was mayor of that city in 1529. John Hooker was bred at Oxford, but whether in Exeter or Corpus Christi College, Wood was uncertain. He afterwards travelled in Germany, and studied law at Cologne. Soon after his return to Eng-land in 1544, he was made chamberlain of his native city, being the first person who held that office. He was sub-sequently sent into Ireland upon the affairs of Sir Peter Carew, and was elected burgess for Athery in the parlia-ment of Ireland in 1571. In 1572 he was a member of the par-liament of England. His printed works were: 1. 'The Order and Usage of keeping of the Parliaments in England,' 4to, London, 1575; written for the purpose of regulating and controlling the scientific and political life of the par-liament of England. His printed works were: 1. 'The Order and Usage of keeping of the Parliaments in England,' 4to, London, 1575; written for the purpose of regulating and controlling the scientific and political life of the par-
Church of England, in eight books, under the title of 'The Laws of Ecclesiastical Polity.' This work obtained during the author's lifetime the praise of a pope (Clement VIII.), and a king (James I.), and has ever since been looked upon as one of the chief bulwarks of the Church of England and of ecclesiastical establishments in general. The publication of the first four books has been mentioned above; the fifth was published in 1587. He completed the last three books, but they were not published till several years after his death. The whole work appears to be probably of the last three books is highly improbable, and no doubt can be entertained of their authenticity, though they are certainly imperfect.

The 'Defence of the Ecclesiastical Polity,' Hooker left some tracts and sermons.

The latest editions of his works are those printed at the Clarendon Press, Oxford (1820), and the edition of Mr. Hanbury, London, 1839. The latter contains the 'Christian Letter to Mr. R. Hooker,' occasioned by the publication of the 'Ecclesiastical Polity,' and Dr. Covel's 'Defence of the Five Books of Ecclesiastical Polity,' in answer to the 'Christian Letter.'

(Izaak Walton's Life of Hooker, with Strype's Interpolations.)

HOOLE J. (TASSO.)

HOOPER, JOHN, one of the most venerable martyrs of the Reformation, was born in Somersetshire about 1495, and educated at Oxford, where, by study of the Scriptures and the works of the foreign reformers, he was converted to Protestantism. On this account he found it expedient to leave the University, and to remove to Switzerland, about 1540. For some years he led a wandering life, part of which was spent in Switzerland, the stronghold of the Reformation, where he met with a most friendly reception from the Swiss divines. He was afterwards in the service of Edward VI., in 1547, he returned to England, and settled in London, where he was very diligent, and greatly followed and admired as a preacher. In 1550 he was appointed bishop of Norwich, but his assumption of this office was hindered by the scrupulosity of the use of the episcopal dress. By way of overcoming his reluctance he was confined to his own house, and finally committed, during some months, to the Fleet prison. Even the Swiss divines however respected that his influence in the church should be marred by such considerations, and exalted him to compliance. Finally the matter was compromised. In 1552 he received the bishopric of Worcester in commendam.

While he was bishop, Wood says, 'he preached often, visited his dioceses, kept good hospitality for the poorer sort, and was beloved of many. But when Queen Mary began to reign, in July, 1553, he was pursuivanted up to London, and afterwards committed to the Fleet. In which the Fleet, where remaining some months, he was at length examined several times, and required to recant his opinions; but standing constant and resolute to them, was condemned to death. He was beheaded on the 9th of February, at Gloucester, bearing his torments, which were dreadful, with exceeding courage. His works are numerous, chiefly controversial. (Wood, Ath. Oxon.; Fox's Martyrs; Burnet, Hist. Ref. Soc.)

HOOPING-COUGH. This disease, to which, on account of the violence of the cough that attends it, the Latin term ' Pertussis ' has been applied, and which from the recurrence of this cough the paroxysms has also obtained the popular designation 'coughing kink,' appears to have been unknown to the antients. No mention is made of it in the medical writings of the Greeks, Romans, or Arabs; but during several centuries it has prevailed in the western as well as the eastern world. In which the breath is seized, or suspended, on the 9th of February, at Gloucester, bearing his torments, which were dreadful, with exceeding courage. His works are numerous, chiefly controversial. (Wood, Ath. Oxon.; Fox's Martyrs; Burnet, Hist. Ref. Soc.)

HOOPING-COUGH. This disease, to which, on account of the violence of the cough that attends it, the Latin term ' Pertussis ' has been applied, and which from the recurrence of this cough the paroxysms has also obtained the popular designation 'coughing kink,' appears to have been unknown to the antients. No mention is made of it in the medical writings of the Greeks, Romans, or Arabs; but during several centuries it has prevailed in the western as well as the eastern world. In which the breath is seized, or suspended, on the 9th of February, at Gloucester, bearing his torments, which were dreadful, with exceeding courage. His works are numerous, chiefly controversial. (Wood, Ath. Oxon.; Fox's Martyrs; Burnet, Hist. Ref. Soc.)
afterwards they are easily renewed by any unusual exposure
to cold.

In the cases that prove fatal we find on dissection more
or less redness of the mucous membrane of the larynx and
trachea, especially towards the bifurcation of the bronchi;
a swelling of the bronchial glands, and a viscid mucus ad-
hering to the lining membrane of the trachea, esophagus,
and bronchi, which has been met with on the lining membrane
of the stomach. No other alterations have been discovered that can serve
to characterise this affection. Cerebral congestion and in-
flammation of the meninges and pleuræ are frequent in those
cases which terminate fatally; but it is impossible to say
with certainty which of the morbid changes has been
attributable, or the more important of them, to which
the fatal termination of cases of hooping-cough is almost always
attributable, occur merely as complications, and supply no
explanation of the peculiar character of the disease.

The profuse of the cough, the insufficiency of the
mucous changes we have already noticed to account for
the phenomena of hooping-cough, have led pathologists to
seek for their interpretation in the condition of the pneu-
monic nerves, but hitherto without success. M. Bros-
chei indeed has in two cases remarked in this a redness
externally, and a yellowness of their tissue, but no similar
appearances have been observed by other physicians.

Hooping-cough prevails epidemically, and chiefly attacks
children from birth to the period of second dentition, but it
occasionally occurs in adult and even in old age. Our
own experience furnishes us with an instance in which the
disease was well characterized in a person above the age of
eighty years.

It rarely affects the same individual more than once,
either this sometimes happens. From this circumstance,
and from the fact that most persons have the disease in
childhood and early youth, it is extremely difficult to estimate the predis-
posing influence of age.

It occurs in every variety of climate, and in all seasons,
but is more general and more severe in cold than in trop-
ical climates, and is most prevalent and most favorable
to catarrhal affections. It is of longer duration when it
comes on in autumn or winter, than when it makes its
appearance in spring or summer; and like all other dis-
eases of this class, it is much more severe in some years
than in others.

Hooping-cough is one of those diseases that are com-
nunicable by contagion. It spreads very rapidly among chil-
dren at all ages, and when it finds admission into
a house very few of the young persons who have not pre-
naturally had it escape; but they are protected from the
disease if secluded from those previously infected. Our
own experience furnishes us with two striking instances of the efficacy of the
iso-aeration, both of which occurred during the

The disease was very prevalent in a populous village,
and almost all the children were attacked, with the
exception of those of the clergyman, who secluded his
family of from the rest during the first period of the
crisis. Not one of these children took the disease; they
were confined to the house and to a small lawn surrounded
by a high wall in the midst of the village. A similar exemp-
tion followed the adoption of the same measures in
the family of the clergyman of the adjoining parish.

The contagious nature of hooping-cough, the circum-
stance that a person who has once experienced it is in
general exempt from subsequent attacks, its regular march,
and the peculiar and spasmodic character of the cough,
are sufficient to show that it is a specific disease, and that
it does not consist, as many pathologists have supposed, in
a simple congestion of the mucous membrane of the
air-passages, although it is probable that the inflammatory state
of this membrane constantly exists and forms an essential
part of the disease.

In method of treatment has hitherto been discovered by
which the progress of hooping-cough can be arrested. We
may mitigate its severity and somewhat diminish its dura-
tion, but it will run a certain course, and this course, in
spite of all our efforts, will often be long. At the com-
 mencement of the affection, if the patient is strong and ple-
thetic, and the fever considerable, we may have recourse to
bleeding; but in other cases it is not productive of any
benefit; in some, by increasing the debility, it seems even
to prob the affection, and as a general rule should not
be adopted. During the early stage of the disease the ad-
ministration of emetics has appeared to be much more
beneficial; in children they may be repeated every day, or
every other day, for one or two weeks. Tarter emetic, on
account of its solubility and the certainty of its operation,
is the medicine best adapted to this purpose.

At a more advanced period of the disease, great benefit
is derived from the employment of narcotic and sedative
medicines. Of these there is a great variety, each of which
has had its advocates. We may particularly mention
opium, hyoscyamus, belladonna, but on account of
the powerful influence of the one on the other of the
system, the greatest caution should be observed in their administration

When the paroxysms are regularly intermittent, we may
prescribe a mixture of quinine in the same doses, and almost
with the same certainty of success, as in ague.

In protracted cases nothing is so efficacious in putting a
stop to the cough as change of air, which often succeeds
after all other methods have failed.

At the commencement of the disease, and as long as any
febrile symptoms continue, the diet should be of the mildest
description; afterwards a more tonic and nourishing re-
gimen may be allowed, not only with safety but with
advantage.

Cerebral congestions and inflammations of the lungs and
pleure, when they occur during the course of hooping-
cough, must be treated in the same manner as when
existing under ordinary circumstances.

HOOPE. [Promoaced.]

HOORN, in the province of North Holland, the capital
of the district of the same name, has the best harbour on the
Zeelt, and appears to have been formerly a fortress, and is still surrounded with ramparts on the land
side, but they are not calculated for defence. There are
numerous gardens close to the town, which has a remark-
ably agreeable aspect, the streets are clean, regular, and
the houses very neat. There are some manufactures of woolen cloths and paper-hangings,
and the inhabitants carry on a brisk trade, especially in
cheese, butter, and cheese, for which last article Hoorn is a
staple place. The exportation of the produce of the
fisheries, especially herrings, is considerable; and ship-
building is carried on pretty extensively. The number of
inhabitants in 1800 is 10,000.

HOOTON, Thomas, the navigator Schoutens, who doubled Cape Horn in 1616.

HOPITAL or HOSPITAL, MICHEL DE L', born in 1504,
near Aigupeaure in Auvergne, was the son of Jean de
l'Hôpital, physician to the Connétable of Bourbon, of whom
he hold a small estate. While l'Hôpital was studying
law at Poulouse, his father was involved in the prosecution
of the Connétable, whom he accompanied to Italy; he was
condemned to perpetual banishment, and his property was
confiscated. His son, although only eighteen years of
age, was arrested, confined, and kept for a short time in con-
finement. On being released, he went to Milan to join
his father, who sent him to Padua to finish his studies.

l'Hôpital remained in that celebrated university six years,
during which the Connétable of Bourbon lost his life under the
corruption of his son, and Jean de l'Hôpital sent his
son without a protector in a foreign land. He however
took his son to Rome to see the coronation of Charles V.,
and it was in that city that the Cardinal de Grammont, the
French ambassador, became interested in favour of the
young man, and induced him to return to France, where he
began to practise at the bar of the parliament of Paris. His
merit, added to his having married the daughter of the lieut-
tenant-criminal lron, procured for him a seat on the bench
of the counsellors of the parliament, where, by his assiduity,
his learning, and his probity, he won the favour of the chan-
celler Olivier, and of Duchette, bishop of Tulle and li-
brarian to Francis l. l'Hôpital was named ambassador to the
Council of Trent, which had been just removed by the
pope to Bologna; but the dissensions among the members
of that assembly rendered his mission useless, and he was
recalled to France by Henri II. The duchess of Berry,
his wife, died childless in 1552. A princess from a family
of learning, invited l'Hôpital to her court, and recommended him to her
brother the king, who appointed him superintendent of the
finances. l'Hôpital endeavoured to check prodigality, to
restrain extravagance, and to promote industry by which
course he made himself many enemies. There was another subject upon
which he differed from the court party, and that was the persecution to which the Protestants were subject.

L'Hô-
Hôpital, with the help of his friends Francois de Foix, Du
Frereur, Paul de Foix, Christophe de Thou, and others,
petitioned Henri II. to suspend the proscriptions and exe-
HOP 287 HOP

ections until the newly-assembled council should decide on the religious controversy; but the king considered their re-
monstrances as rebellious, and he ordered Montgomery, the captain of his guards, to arrest Paul de Foix, Louis du 
Pauc, Anne du Bourg, and other members of the parlia-
du Bourg, who had spoken the most boldly, was, soon after hanged, and his body burnt. During the minority of 
Francis II, a special court, appropriately called the 'burn-
ning chamber,' was instituted to punish heretics. The Guises 
were among the first to suffer, and their condemned 
Chancellor Guise himself signed the ordonnance by which the Duke of 
Guise was appointed lieutenant-general of the kingdom. 
The old chancellor died soon after, and Catherino de 
Medici, alarmed at the power of the Guises, called L'Hôpital 
within the walls of the town; and under this pretexts 
Francis II, 1566. His office was not an enviable one in those times. He stre-
nuously opposed the Cardinal of Lorraine, who wanted to es-

tablish the Inquisition in France, and he proposed instead of it to 
give to the bishops cognizance of matters of heresy within 
their respective dioceses. This resolution was proclaimed in 
the edict called 'De Romeramint,' which the chancellor 
laied before the parliament to be registered, observing at 
the same time that opinions can only be subdued by ex-

tutions and reasoning, and not by violence and persecution. 

L'Hôpital's next thought was that of assembling the states-general, which had not met for eighty years, but the Guises and their deputies from Normandy opposed the 
suggestion as fatal to their power. L'Hôpital accordingly contented him-
self with assembling the nobility and high clergy at 
Fontainebleau. Francis II, with his wife Mary Stuart, presided in 
person on the assembly, which was held in the early years of the kingdom, and the religious and civil discontent 
which prevailed. Coligny next presented to the king two 
petitions from the Protestants of Normandy, and Montfue, 
bishop of Valence, and the archbishop of Vienne, strongly 
condemned the suggestion of persecution against the 
Protestants; they spoke of the indulgence of the primitive 
church on similar occasions; they complained of the 
perpetual obstacles presented by the court of Rome to the 
convocation of the general council; they asked the king and his 

L'Hôpital hastened to obtain an edict from the king, convoking the states-
general for the 10th December, 1560, at Orleans, and 
meantime suspending all proceedings on the subject of heresy. But 
in the interval Francis II died, and Catherine de Medici, 
regent for her son Charles IX., hesitated about 
opening the assembly of the states. But the chancellor 
overcame her doubts and fears, and he opened the assembly with 
what is now considered an important speech, in which he 
explained the nature of the assembly, and the business 
for which it had been convoked. The assembly consisted of 
the nobility, the clergy, the seigneurs, and the commoners; 
and the President of the council of peers was 
appointed to preside over it. The assembly was 
given the right to determine the conduct of the state of 
the Catholic clergy. The orator of the nobility, 
reflecting on the wealth and luxury of the church, de-
manded freedom of worship for the Protestants. The orator 
of the clergy maintained that heresy was a capital crime, 
and ought to be punished by the law, and at the same time 
he claimed exemption for his order from all taxes and 
other public burdens. The only useful result of the 
assembly was the passing of an ordonnance prepared by 
L'Hôpital, which limited arbitrary and the 

feudal authority of the nobles, and corrected many abuses 
in the judicial system. Soon after, July, 1561, L'Hôpital 

obtained from the regent Catherine an edict, in the name of 
the state, prohibiting all proceedings on the subject of 
heresy. By another edict Catholics were forbidden, under 
pain of death, from forcing an entrance into the houses of 
Protestants under pretence of dispersing their meetings. 
The parliament of Paris opposed these measures; but the 
chancellor prevailed, and the edicts were enforced. L'Hô-
pital was present at the conference of Pouly, where Berat 
and other Protestant theologians argued on matters 
of doctrine against the Cardinal de Lorraine and other 
Catholic divines, but which ended, as such meetings generally 
end, in mutual recriminations. In January, 1561, L'Hôp-
ital obtained from another assembly, consisting of deputa-
tions from all the parliaments of the kingdom, an edict 
of toleration granting liberty of worship to the Protestants, 
except within the walled towns, and under the condition 
that they should submit to the dominion of the council of Nimes, or to the books of the Old and New Testament.

But soon after, the massacre of Vassy by the 
attendants of the duke of Guise became the signal of fresh 
persecutions, followed by civil war. [Guise]. After the 
death of the states-general, in 1563, L'Hôpital 
endeavored, by which, among 
other conditions, all prisoners on both sides were released, 
and the Protestants were allowed the exercise of their 
religion within the towns which they had occupied during 
during the war. He also prevailed upon Catherine to declare 
the majority of her son Charles IX., whom he afterwards 
induced to make a tour through the various provinces of 
the kingdom. The chance of this opportunity of reading some sharp lectures to the various parliaments, 
especially that of Bordeaux, which had encouraged perse-
cution and civil war. In 1566 L'Hôpital again assembled 
the states-general, with a view to prevent a further 
conflict, and to grant the Protestants the rights of the nobles at Moulin, where an ordonnance was issued for the 

reform of justice, which is one of the best judicial regu-
lations adopted in France previous to the reign of Louis XIV. 

L'Hôpital, who endeavoured, during every cessation from 
active fighting, to restore peace between the two parties. He 
thus became known to the Guises, who desired nothing 
less than the extermination of the Protestants. At last a bull came from Rome authorizing the king to levy 

100,000 écus yearly on the revenues of the clergy, for 
the purpose and on the condition of rooting heresy out of 
his kingdom. The chancellor opposed the bull; he besought 
the king not to intrude himself in these matters of 

life, but he seemed to have prevailed, but soon afterwards 
the seals were taken from him, and he retired to his 
country-house at Vignay, in 1568, despoiling the calumnies of his 
country, which he could no longer prevent. After some 
years of retirement the news of the St. Barthélemy massacre 
came to give the finishing blow to his exhausted frame. 
He was himself in danger of his life, but was spared through 
the intercession of the duchess of Savoy, the former duchess 
de Berry, his early benefactress. His only daughter, who had 
embraced the Reformed religion, was saved by the 

wicked Duchess of Guise, who concealed her in her hotel at Paris. L'Hôpital survived this horrible 
terror only a short while longer, and died at Vignay, on the 15th March, 1573. An upright 
and enlightened magistrate in an age of the worst corrup-
tion and ignorance, a benevolent Christian amidst the 
most furious fanaticism, his memory is deservedly con-
sevated in the annals of his country. His epitaph in the 
Latin 
verse, reflecting on public and domestic occurrences, were, 
and are not without poetical merit. Several of his 
harangues and discourses have also been published, as 
well as his testament. His life has been written by Ber-
nard, and Villenain, in his 'Nouveau Mélanges Litté-
raires,' has also written his biography.

HÔPITAL, GUILLAUME-FRANÇOIS-Antoine 
L', Marquis de Sainte Mesme and Count d'Entremont, 
commonly known as the Marquis de l'Hôpital, was born at 
Paris, in the year 1539, and died in the army at 

an early age, and served during several years in 
the capacity of captain of cavalry; but the weakness of his 
sight and his desire to prosecute the study of the math-

ematics with less interruption than was compatible with 
active service, induced him to quita profession in which 
he might otherwise have followed the footsteps of his 
ancestors. Among other anecdotes which are related 
in the memoirs of this great mathematician, the most 
celebrated is that, at the age of fifteen, happening to be in 
company with a number of savans at the house of the duke de 
Roannez, when great admiration was expressed of a solution 
which Pascal recently gave of a problem relative to 

the cycloid, L'Hôpital pressed on the practice, 
observation was not beyond his own powers, and two days afterwards 
he supported his pretensions by answering it on different 
principles. The name of the marquis de l'Hôpital is ini-
HOP

HOPs. (Botany.) [Humulus.]

Hops (Humulus lupulus of Linnaeus) are extensively cultivated for the flowers or seed-vessels, which give flavour and pungency to beer. They are boldly boiled with the wort in brewing. They impart a pleasant bitter and aromatic flavour, and prevent the too rapid progression of fermentation. Beer which is well hopped will keep long and become very fine, without any of those artificial means of nursing which make brewing an art so much inferior in quality to that which is home-brewed.

Hops were introduced into England from Flanders about the year 1054. The most extensive plantations are in Kent, Sussex, and Hampshire; but there are considerable, in Worcestershire, Wiltshire, Hampshire, Gloucestershire, Surrey, and several other counties.

The hop is a slender climbing plant, which requires a very rich meadow soil and careful cultivation. It is very tender, and the produce is precarious, sometimes giving a great profit to the grower, and at other times failing altogether. The greatest quantity of hops is raised in Kent, but the finest quality in the neighbourhood of Farnham in Surrey.

The soil of a hop-garden must be rich to a considerable depth, or made so artificially. The subsoil must be dry and sound; a porous rocky subsoil, covered with two or three feet of good vegetable mould, is the best for hops. The exposure should be towards the west, on the slope of a hill, or in a well-sheltered valley. Old rich pastures make the best hop-gardens. They should be dug two or more quite deep, and the sods buried at the bottom, where they will gradually decay and afford nourishment to the slender roots of the plants which strike deep. A very large quantity of the richest rotten dung, at least 100 cubic yards per acre, should be well incorporated with the soil by repeated ploughing. The whole is then thoroughly dug in or composted, but not too deep; a dark tint which is the sure sign of an abundance of humus. The ground should be prepared by laying it up with the spade in high ridges before winter, to expose it as much as possible to the prevailing winds. A succession of green crops, such as rye cut out and fed off with sheep, early turnips fed off in autumn, or spring tares, are an excellent preparation, by cleaning the land.

It is better to toor even or three years in preparing the ground and getting it perfectly clean, than to plant the hops in anything but prepared soil.

The young plants are raised in beds, and may be raised from seed; but it is more usual to plant the young shoots which arise from the bottom of the stems of old plants. When they are about 2 or 3 inches high they are cut off and planted in the nursery-bed. Care must be taken to have only one sort of hops in a plantation, that they may all ripen at the same time; but where there are very extensive grounds it may be advantageous to have earlier and a later sort in different divisions, so that they may be picked in succession. The varieties most esteemed are the Grape Hop, the White Vine, and the Golden Hop.

The ground having been prepared for planting, it is divided by parallel ridges, and the plants are inserted into the ground along these lines at six feet distance, so as to alternate in the rows, as is frequently done with cabbage-plants in gardens. At each stick a hole is dug two feet square and two feet deep, which is filled lightly with the earth dug out, together with a compost prepared with dung, lime, and earth, well mixed by repeated turning. Fresh dung should never be applied to hops.

Three plants are placed in the middle of this hole, six inches asunder, forming an equilateral triangle. A watering with liquid manure greatly assists their taking root, and they soon begin to show bines. A stick three or four feet long is then stuck in the middle of the three plants, and afterwards another, and then another, and so on, etc., till the shade of the trees is almost completely shut out, and the plants may be picked from these young plants in the autumn, but in general there is nothing the first year. Early in November the ground is carefully dug with the spade, and the earth being turned towards the plants, is left so all winter.

In the second year, early in spring, the hilllocks around the plants are opened, and the roots examined. The last year’s shoots are cut off within an inch of the main stem, and all the suckers are cut off quite close to the trunk. The shoots are thoroughly cut, so that the jump may be made by the roots. The plants are thus much more agreeable vegetable for the table, dressed like asparagus.

The earth is pressed round the roots, and the cut parts covered so as to exclude the air. A pole about twelve feet long is then firmly set into the ground near the plants; to this the bines are led and tied as they shoot, till they have taken hold of it. If by any accident the bine leaves the pole, it should be carefully brought back to it, and tied till it takes hold again. A stand ladder should not be put up till the bines are about 8 or 10 feet high, when they have obtained their full height. The ground being well bedded and the earth raised round the plants, the produce this year will average 4 cwt. per acre, if the season is favourable.

Some years people dig the ground before winter; others prefer doing it in spring, in order not to hasten the shooting, which weakens the plants. The same operations of pruning the shoots, manuring, and placing poles, which were performed the preceding year, are carefully repeated. Particular attention is paid to the length of the poles to the probable strength of the bines; for if the pole is too long, it draws up the bine, and makes it bear less; if too short, the bines entangle when they get beyond the poles, and cause confusion in the picking.

In September, the flowering containing the seed will be a fine straw colour, turning to a brown; it is then in perfection. When it is over ripe, it acquires a darker tinct. No time is now lost in many hands are proceeding to the service of picking, as can be set a-picking; great numbers of men and women go out of the towns in the hopping season, and earn good wages in the hop plantations. During the picking they sleep in barns and outdoor huts, and the best poles are taken down, and the stems cut 3 feet from the ground; if they were cut shorter it would weaken the root, by causing it to bleed. The poles are laid sloping over a frame, and then they are packed in strong boxes. The boxes are 3 feet high; this is called a bin. A piece of coarse cloth is fixed to this frame by hooks, so as to form a bag, which does not reach the ground. Three men or women, or four of each sex, are placed on each side, and then pick the hops from two poles at a time. Where they are very careful of the quality of the hops, as at Farnham, they divide them into three sorts: the green, which are not...
HOP 289 HOP

quite ripe; the light yellow-brown, which are in perfection; and the very dark, which are past their prime. Some go even further, and make several qualities according to colour and fragrance: for this purpose there are several baskets. The dew should be off entirely before they begin, or otherwise the hops might become musty, or take too long drying, and lose their fragrance. The hops when picked are dried on a hair cloth in a kiln. When they appear sufficiently dry, at whom the state of the weather, however thought by some hop-driers that the turning of the hops is apt to injure them, and that it is best not to do so; but in order that the upper part may be dried equally with the lower, a wooden ladder is laid on the floor of the kiln, the hair cloth, to within a few inches of the surface; this reverberates the heat, and the whole is dried equally. The hops are then laid in heaps on the floor, where they undergo a very slight heating. As soon as this is observed, they are bagged. This is done through a round hole 25 or 30 inches in diameter, with the hair cloth fixed at the bottom and the hop-ropes laid. Under this hole is the burlap, the mouth of which is drawn through the hole, and kept open by a hoop to which it is made fast. The hoop is somewhat larger than the hole, and holds the burlap in place. The hops are gathered in a heap, and the edge of the burlap is folded over in such a way as to make a bag. A bushel or two of hops are put into the bag, and a man gets into it to tread the hops tight. The bag does not reach the top of the bushel, but the top of the bag when more are continually added till the bag is full. It is now taken off the hoop, and filled up with the hands as tight as possible. The corners are stuffed as soon as the mouth is partly tied; when it is tied and sewed closed and tight, it is stored in a dry place till the hops are wanted for sale.

The crop of the third year will average 8 cwt. per acre. In some very extraordinary seasons, on good rich ground, 15 cwt. have been picked per acre; in Flanders, where they manure with urine and the emptyings of privies, this is not an uncommon produce.

Rope cakes, malt dust, and woollen rags are used with success in hop-gardens; bines have been tried, but with uncertain result.

The hop is a diocious plant, i.e. some of the individuals are male plants, and others female, which have respective different construction and different habits. The male or staminiferous flowers, which grow on stalks quite distinct from the female flowers, prepare the pollen, or fertilizing dust, and afterwards wither away, when they are cast away from the anthers, and become attached to the stamens thus, to be by it conveyed to the female flowers. The female flowers are in the form of stroboli, or cones, consisting of scales, which have at their base the germ of the future seed. A hop plant has the habit of making many seeds, and the scales of the fr-cones do, more particularly after the fertilization of the ovule, or future seed, by a quantity of the pollen falling upon it. Though the pollen, from its extreme lightness, is to be wafted to a considerable distance, and some seeds in each cone may be so fertilized, yet it would be well to rear a number of the male plants among the others, or along the hedges of the hop-gardens, to ensure the fertilization of all the seeds. But as the farmers observe that the flowers of the male (term'd, in Kent, seedling, blind, or wild hop; in Sussex, buck or cock hop) wither away, they generally extirpate them at the digging season, as unfruitful cumblerows of the ground. That this is an error may be proved by an appeal to the farmers, but no result of an opposite practice is the most convincing. A bushel of hops, collected from plants of the fourth year, raised from seed, weighed 36 pounds, there being male plants near; a second lot, which contains from plants raised from seeds, but weighed only 35 pounds; while a bushel, grown in a garden where the male plants were not eradicated, weighed 32 pounds. Besides the greater quantity of hops thus obtained, the aridness in warm greater the hopulus, on which the aroma depends, is considered by Planché to be the unapposited pollen dust which has alighted on the scales of the females), and the strength of the bitter much greater. After the period when the males have elaborated the pollen, and the stroboli of the females begin to enlarge, the males may be cut down, and the stalks employed to make cordage for hop-bags against the following harvest. In 1760 the Society of Arts awarded premiums for cloth made from the hop-bine. (Lancee's Golden Farmer, London, 1831.)

The poles are an expensive article; those of chesnut are the most durable, and also the dearest. They should be put into a shed during winter, where this care is taken, they are placed on end in the form of a cone, leaning against each other. If the tops of these cones had a cap of thatch, it would greatly protect them from the weather: the poles are generally erected, after the first treading, in a solution of corrosive sublimate, according to Ryan's patent, remains yet to be proved; if it should preserve them, every extensive hop-grower should have a tank for the purpose.

Besides the use of hops in brewing, they produce a bitter infusion and a tincture which are valuable in medicine for complaints in the stomach. A pillow made of hops has been used with success to produce sleep, where opiates had failed.

The excise duty upon hops is 1s. 6d. per cwt., and collected from the grower. From this circumstance has arisen the practice of quoting the probable duty of all the hops grown in England as an index of the probable result of the crop. The price of hops fluctuates greatly, and there are extensive and sometimes ruinous speculations in this article. Weybeylly, near Andover, is the greatest mart for hop revenue, and the duties amount to 310,794/. 4s. of which nearly one-half was contributed by the county of Kent; Sussex was the next in amount, and then Hereford, Worcester, and Hampshire. But the total revenue to the crown from this source is much less than the duty, as indicated by the duties, will be best shown by the following statement of the number of acres of land in Great Britain under cultivation of hops in the year 1837, and the amount of duty chargeable on the produce in each of the Excise districts.

<table>
<thead>
<tr>
<th>Districts</th>
<th>Number of Acres</th>
<th>Amount of Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>£  s. d.</td>
</tr>
<tr>
<td>Barnstable</td>
<td>63</td>
<td>38 16 4</td>
</tr>
<tr>
<td>Bath</td>
<td>21</td>
<td>22 10 2</td>
</tr>
<tr>
<td>Bedford</td>
<td>34</td>
<td>136 10 2</td>
</tr>
<tr>
<td>Bristol</td>
<td>24</td>
<td>14 8</td>
</tr>
<tr>
<td>Cambridge</td>
<td>31</td>
<td>9 8</td>
</tr>
<tr>
<td>Canterbury</td>
<td>11,125</td>
<td>60,692 3 8</td>
</tr>
<tr>
<td>Chester</td>
<td>2</td>
<td>3 1 6</td>
</tr>
<tr>
<td>Cornwall</td>
<td>6</td>
<td>12 8</td>
</tr>
<tr>
<td>Coventry</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Derby</td>
<td>124</td>
<td>944 19 8</td>
</tr>
<tr>
<td>Dorset</td>
<td>303</td>
<td>48 5</td>
</tr>
<tr>
<td>Essex</td>
<td>325</td>
<td>533 8</td>
</tr>
<tr>
<td>Exeter</td>
<td>8</td>
<td>17 10</td>
</tr>
<tr>
<td>Gloucester</td>
<td>71</td>
<td>44 2</td>
</tr>
<tr>
<td>Grantham</td>
<td>266</td>
<td>155 9 10</td>
</tr>
<tr>
<td>Hants</td>
<td>1,598</td>
<td>8,466 8</td>
</tr>
<tr>
<td>Hereford</td>
<td>10,262</td>
<td>48,627 17 4</td>
</tr>
<tr>
<td>Hertford</td>
<td>110</td>
<td>847 14 2</td>
</tr>
<tr>
<td>Isle of Wight</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Lincoln</td>
<td>6071</td>
<td>4,702 3 6</td>
</tr>
<tr>
<td>Lynn</td>
<td>64</td>
<td>16 5</td>
</tr>
<tr>
<td>Northampton</td>
<td>14</td>
<td>14 3</td>
</tr>
<tr>
<td>Norwich</td>
<td>174</td>
<td>48 0</td>
</tr>
<tr>
<td>Oxford</td>
<td>15</td>
<td>67 19 4</td>
</tr>
<tr>
<td>Plymouth</td>
<td>4</td>
<td>6 6</td>
</tr>
<tr>
<td>Reading</td>
<td>7</td>
<td>30 6</td>
</tr>
<tr>
<td>Rochester</td>
<td>15,422</td>
<td>82,680 8 10</td>
</tr>
<tr>
<td>Salisbury</td>
<td>1,722</td>
<td>5,991 10 6</td>
</tr>
<tr>
<td>Salop</td>
<td>14</td>
<td>14 8</td>
</tr>
<tr>
<td>Stafford</td>
<td>4</td>
<td>6 6</td>
</tr>
<tr>
<td>Stonbridgel</td>
<td>616</td>
<td>3,301 17 4</td>
</tr>
<tr>
<td>Suffolk</td>
<td>1,722</td>
<td>1,024 10 1</td>
</tr>
<tr>
<td>Surrey</td>
<td>147</td>
<td>19 6</td>
</tr>
<tr>
<td>Sussex</td>
<td>12,063</td>
<td>80,873 2 7</td>
</tr>
<tr>
<td>Uxbridge</td>
<td>8</td>
<td>4 2</td>
</tr>
<tr>
<td>Wales-Middle</td>
<td>984</td>
<td>418 18 0</td>
</tr>
<tr>
<td>Wales-West</td>
<td>161</td>
<td>104 10 4</td>
</tr>
<tr>
<td>Wellington</td>
<td>1,884</td>
<td>10,204 3 0</td>
</tr>
<tr>
<td>York</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

46,228 310,794 4 0

VOL. XII.-2 P.
HORAPOLLO, or HORUS APOLLO, the author of a treatise on Egyptian Hieroglyphics. Several writers of this name are mentioned by Suidas, Stephanus of Byzantium, and Photius (p. 336, ed. Bokier), and Histiaeus of Athens is cited (Plutarch), but it is uncertain to which of them the treatise on Egyptian Hieroglyphics should be ascribed.

According to the inscription, which is found in most MSS., the work was originally written in the Egyptian language, but in Alexandria, by the Orders of Philae. Horace was the name of one of the Egyptian deities, who was considered by the Greeks to be the same as Apollo. (Herod., ii, 144-156.) We learn from Lucan (Pro Imag., sec. 27) that Egypt was a country to which the names and gods of the Greeks were unknown.

But whatever opinion we may form respecting the author, it is evident that the work could not have been written before the Christian era, since it contains allusions to the philosophical tenets of the Brahmans, and many ideas of the forces of nature which have been cultivated by the most ancient Egyptian hieroglyphics have been differently estimated. Champolion, and Leesman, in his edition of the work, are disposed to attribute greater importance to it than former critics had been willing to allow. They appear to have been first studied by Aldus (Venice, 1565), with the fables of Asop. The best editions are by Mercier, 1551; Hesychius, 1560; De Pauf., 1727; and Leesman, Anst., 1834, who has discussed in his Introduction the Worship of the HORARY (Astronomy). The horary motion of the sun or a planet is the arc which it describes in one hour, or the angle which are subtended at the eye of the spectator.

The book was written in 1828, 1834, was printed, and published under the title of 'Horus arranged in chronological order,' Camb, 1832, 2nd ed., 1837, with a preliminary dissertation, in which he brings forward many reasons for adopting the order of Bentley.

The poetry of Horace is differently estimated according to the taste of each individual. In our opinion the Satires and Epistles, which are familiar moral discourses, and are none of them worthy of the name of poetry, according to the usual conception of the word, are by far the most valuable of his works. The Odes, which for the most part are little more than translations or imitations of the Greek poets, are generally considered as a very artificial attempt to depict the stronger and more powerful feelings of human nature. The best are those in which the poet describes the pleasures of a country life, or touches on the beauties of nature, for which he had the most lively perception and the most exact and correct knowledge. The Odes have been well translated into English, but there is no good translation in the whole of his works. That of Francis (4 vols. 8vo., 1847) is a poor and lifeless performance.

HORDEIN, the genus of plants to which the corn called Barley belongs. It is distinguished from Triticum, or the Wheat genus, by its spikelets having only one perfect floret in each, and by its glumes being somewhat uniauricled and bearded; Rye, or Secale, differs in having two perfect florets to each spikelet, and in the same additional circumstances as Triticum. As many as fifteen species of Hordeum are distinguished by Professor Kunth, the latest writer on the subject. The names of these species are very various. The species are found wild in various places in both the Old and New World: as many as eight inhabit America. In the application of their botanical names expressions of a like kind is used. Some confusion, one writer distinguishing four species, another six, and some a greater number. It does not appear possible to determine, upon existing evidence, which of these opinions is most correct; the probability however seems to be that there are more than four, if not five, or six, species, which may be readily distinguished by attention to the following circumstances. The one-flowered spikelets of Barley grow in threes, or opposite sides of the ear. If all the spikelets are perfect, and there is no other variety, the ear is usually arranged in six lines or rows; these rows may be distinctly arranged, as in H. hexaestichum, or they may be disposed in an irregular manner, as in H. bigiscum.
Theodory reckoned that the grains are free from the husk, as in naked barley. It is generally supposed that Barleys of the second kind are mere varieties of those of the first kind; but there is no proof of the correctness of the opinion, and probability is against it. These characters and a few others being attended to, cultivated Barleys may be arranged under the following heads:—

1. **Two-rowed Barleys.**
   - Ears conical; awns almost parallel with the ear; grains adhering to the husk.
   - It is the common summer barley of England, and that which cultivators seem to prefer; its ears are not so large as those of *H. hexastichum*, but the grains are heavier.
   - It is commonly stated to be a native of Tartary; Colonel Chesney found it wild in Mesopotamia, upon the banks of the Euphrates.

2. *H.* hexastichum (Linn., *Sp. Pl.*, 125). Ear cylindrical; awns almost parallel with the ear; grains loose in the husk. Naked barley, a species but little cultivated now, is of unknown origin. It is said to have been introduced into England in the year 1215; but it is reported to have preserved its characters unaltered from time immemorial in some parts of Europe.

3. *H.* vulgare of Linnaeus differs from this. Professor Lowe has justly remarked that there is no such thing as a barley with the grains growing in four rows, the circumstance by which Linnaeus defined his *H*. vulgare, and that all such appearances are merely imperfect states of *H*. hexastichum. The native country of this species is unknown; it is the bере, big, or winter barley of farmers, and is particularly valuable for ripening quicker than the common two-rowed barley; its grains are however lighter, and it is considered an inferior species to the last.

4. *H.* hexastichum (Linn., *Sp. Pl.*, 125). Ears cylindrical; awns very long, reaching the ground, and the grains loose in the husk. The origin of this, the naked six-rowed barley, is unknown. It is extremely productive, and in some parts of Europe it is reckoned the most valuable of all. The French call it, on account of its good qualities, *orge claire*.

5. *H*. rigens (Royle's *MSS.*). Ears cylindrical; florets arranged in a confused manner, not in rows; awns soft, short, hooded, and bent downwards; grains loose in the husk. A most curious species, found in the northern parts of Tartary, which is also seen by the Chinese, is sent to England under the name of *Tartarian Wheat*. Its appearance is more that of wheat than of barley, and its naked grains assist the resemblance. It is however a genuine ear of barley. It is not a productive plant, but little is as yet known of its quality in this climate.

Of most of the species there are many varieties, the most striking of which are those called "Black Barleys," on account of their lozenge-shaped pods. They are not of sufficient importance to require particular notice, except in works treating of agriculture in great detail. [BARLEYS, HORIZON (γεώτ, bounding).] The physical horizon is the apparent circle by which the spectator's view is bounded when he is upon a level and uninterrupted plain, such as the surface of the sea. It differs from the astronomical horizon in this: it does not change, the physical horizon *dips*, as it is called, or is not at the same level as the eye; and, secondly, because the astronomical horizon always supposes the spectator to be at the centre of the earth, and not at the surface. If AB represent a spectator standing upright, and C the centre of the earth, then if the circle VAX revolve round the axis BC, the physical boundary is the circle described by T, or TUV, and the astronomical horizon is the plane traced out by CX (indefinitely extended) drawn parallel to BD, or CB; and the angle DBT is called the *dip* of the physical horizon. In consequence however of the refraction of light, by which the rays are curved, as in the dotted line, the horizon will be drawn from the eye, to the dotted circle KLM. The effect of this is to make the distance AT greater by about its twelfth part. The rough rule for the distance of the horizon at sea is to put 125 in the place of the square root of the height of the spectator's eye, *in feet*, gives the distance of the physical horizon *in miles*. Thus at a height of 100 feet, the horizon is 13 miles off.

The astronomical horizon divides the heavens into a visible and invisible part. Properly speaking it is the physical horizon which does this; but the distance of the fixed stars is so great, that the magnitude of the whole earth is but as a point, and the planets traced out by the revolutions of BD and CX may be confounded. It is not precisely the same thing with the planets, and least of all with the moon; but this belongs to *PARALLAX*. For the general case of the astronomical horizon, see *SPHERE, DOCTRINE OF*.

The plane of the horizon at any place is perpendicular to the direction of a plumb-line, or parallel to the surface of the water if any fluid at all be present. When the horizon is at the distance of 12 to 15 feet from the eye, the altitude of any heavenly body, the physical horizon is in tolerably fair weather, sufficiently well defined for the purpose, and, with proper allowance for its dip, is used accordingly. But in land observations with a sextant or other instrument requiring an horizon, the surface of a fluid (generally mercury) is used, which is called an artificial horizon, but might more properly be termed an artificial portion of a horizontal plane. A very slight knowledge of *Astronomy* will show that the angle subtended at the eye by a star and its image in a fluid is double of the star's altitude; this angle, then, being measured and halved, the altitude of the star is found.

HORMISDA, a native of Truamns, succeeded Symmachus in the see of Rome, A.D. 514. Theodoric was then king of Italy, and under his wise administration the country enjoyed peace and prosperity. Theodoric made valuable presents to Hormisdas to adorn the basilica of the Vatican. Cassiodorus, a contemporary writer, speaks in his letters of the magnificence displayed at Rome at the time; and also of the festivities in honor of Jupiter and to the gods. Hormisias repeatedly sent legates to Constantine to the Emperor Anastasius II, and the senate put in answer a present of 500 talents, and a station between the Greek and Roman churches, which had originated with the patriarch Ancius. [GLASIUS I.] 2 P 2
A reconciliation was effected, at least for a time. Hornis- 
das died in the year 223, and was succeeded by John I.  
HORN, a musical wind-instrument, which in its primi- 
tive state, i.e. formed of the horn of an animal, or simply a 
shell, has been known from the most remote ages. Of the 
horns now in use, there are correcty denominated—the 
French-Horn, the Bugle-Horn, and the Russian Horn. 
These are made of brass. The Basset-Horn (Corso Bassetto) 
and the English Horn (Corso Inglese), formed of wood, and 
partaking in no respect of what is generally considered the 
distinguishing character of the Horn, seem to be impro- 
perly named.  
The French Horn, or now, par excellence, the Horn, is a 
tube of about ten feet, very narrow at top, widening consi-
derably at the bottom, and bent in rings for the convenience 
of the performer, as well as to render it more portable. It 
is not provided with holes, as the flute, &c., the produc-
tion of the various sounds depending upon the lips of the player, 
the more or less pressure of his breath, and the insertion 
of the hand in the bell, or wide end, of the instrument. As 
a simple tube, the Horn, governed by the laws of acous-
tics [Acoustics], yields only the generating note, or tonic, and 
its aliquot parts, or harmonies, and, of course, would be 
confined to one key, but for the contrivances just men-
tioned, by which the length of the instrument is adjusted 
to the key required. This consists in crooks and shanks, 
or shifting pieces, added as wanted to the upper end of the 
tube, and that the Horn may be employed in all keys.  
Music for the Horn is always written in the key of c, an 
octave higher than played, and in the treble clef; and the key 
in which the instrument is to be tuned is indicated by the 
composer. Thus, if the piece be in b, the words 
'Corso in c b' are prefixed to the horn part. Example, as 
written:

\[ \text{Horns in } b, \]

The notes actually played are—

\[ \text{The natural scale of the Horn is that of the trumpet, but} \]
an octave lower. It is written as follows—:

\[ \text{But the following are the sounds really produced:—} \]

\[ \text{By introducing the hand into the bell of the Horn, a} \]
tolerably good semitone scale can be produced; and by a 
recent improvement, consisting of two valves added to the 
instrument, the performer can command a still more per-
fected scale of semitones.  

The Bugle-Horn is a tube of three feet ten inches in 
length, doubled up in a small compass. The Keyed-Bugle, 
or a Bugle-Horn with keys, is that now in common use, the 
shape of which is as follows:

\[ \text{The Russian Horn is an unbent brass tube, conical in} \]
shape, of various dimensions: the deepest tuned is eight 
feet long, and nine inches in diameter at the wide end, 
and the highest is two inches and a half in length, by one at 
the wide end. The former gives a, an octave below the first 
space in the base; the latter gives g, the third additional 
line above the treble; or—

\[ \text{Some of these horns, though not all, have keys, producing} 
one or two semitones, but generally every note has its sepa-
rate horn; and a band of Russian Horns counts almost as 
many individuals as diatonic notes in a scale of between 
four and five octaves.  

Basset-Horn, or Corso Bassetto, see Basset-Horn.  

The English Horn, or Corso Inglese, is a deeper-toned 
oboe, but of rather larger dimensions, somewhat bent, the 
lower end very open, and to the latter what the basset-
the Horn is to the latter what the violin is to the violin. 
The tone of this instrument is extremely pathetic, and by 
the Italians is thought so much to resemble the human 
voice, that they sometimes call it the voice umana. 
The scale of the Corso Inglese (by which name it is most com-
monly known by musicians) is from a below the treble staff, 
to b's above, or—

\[ \text{including all the semitones, except the lowest A}. \]

HORN, CAPE. [CAPE HORN.  
HORNBEAM, the common name of the tree called 
Carpinus Betulus by botanists. 

HORNBILL, HORNBILL FAMILY. The Buceridae 
are a family of birds, the construction of whose bill arrests 
the attention at first sight, and ornithologists have not 
been entirely agreed as to the situation which the form 
ought to occupy in the series.  

It is not at all improbable, from the geographical distri-
bution of the species, that some of the species were known 
to the ancients; but whether the Tragopans of Pliny and 
Solinus, or the Tragopomenes of Pomponius Mela, 
belonged to this genus is not clear.  

That the Rhinoceros bird of Hesychius and Varinus was one of the 
species is not unlikely. Aldrovandus, Jenston, and Bonitus, 
give the form the same name, as do Ray and Waurghby, 
the latter of whom gives two good figures of heads. Bon-
tius also describes one of the species under the appellation 
of Corus indicus, and another as Corus rurero cornu, 
Petiver received the bill of one (which he figures) from 
Kamel, under the name of Calao. The description of the 
bird said by Jenston and others to have been killed to 
be flying, when the Christians beat the Turks at the battle 
of Lepanto (Naupactus), agrees well with the characters of 
the genus. 

Brison gives the Hornbills the name of Hydrocorax, 
following, not improbably, Clesius, who speaks of one of 
them under the title of Corvus marsheni gen. 

Linnaeus, in his last edition of the Systema Naturae (1758), 
places the Hornbills, genus Buceros, under the Pice, 
between the Toucans (Ramphastos) and Caphora. The feet 
are not defined as to their terrestrial. Gmelin leaves Buceros 
in the same position. 

Latham also places the Hornbills among the Pice, Dies, 
with walking feet. 

Laudede removes the form far from the Toucans, placing 
it at the head of his Platypodes and in his 16th order (Bill
dentilates), with the Momots, in his second division of his first subclass of birds, or those which have three anterior toes, and sometimes a hind toe, sometimes none.

M. Dumfriil’s second family of his second order, Passer-reaus or Passe-reaus, consists of the Dendrotrior, or Oloentormorphes, including two of the Hornbills, Momots, Plant-cutters (Phytotoma).

Iliger’s Dendrotrior come between the Passerinae Birds and the Momots. It belongs to his 2nd order, Ambulatoria, or Walking Birds.

Cuvier places the Bucoidea at the end of the Syndacty- lous Passe-reaus; they are immediately preceded by the Oloentormorphes. The next to his system is the Scansorial Birds (Les Grimpieurs), headed by the Jacamars (Galbula, Bras.), which are followed by the Woodpeckers. He speaks of the Bucoidea as large birds of Africa and the Indies, whose enormous bill renders them so remiss in all forms as to be, as far as at least, we can conclude from the very imperfect accounts which are transmitted of them. From the strength also of the formation of these birds, and the powers with which they are endowed, they seem to be a title to a place in the vicinity of the group which is typical in the tribe. In one particular however we may detect a deviation from the more perfect structure of that type. The fore-toes of all are strongly united to exhibit the appositeness of the middle toe, as far as to the second articulation; an impediment which must considerably interfere with the free action of the member. This deficiency is, on the other hand, retrieved by the extraordinarily strong and united nature of the whole limb. An analogous defect, and an analogous mode of compensating for it, is observable in the Estrich, a bird also, it is to be observed, closely allied to the typical group of its own family; and in both instances we may pronounce the deviation from the more regular or perfect conformation to be a defect rather to the eye of the observer, an infringement upon what he conceive to be the ideal of the typical character, than a defect in reality.

We may here delay a moment to observe upon the causes that assign so totally remote a station from the present to the Toddae, Meropidae, and Halcyonidae, whose grossorial feet, as they are technically called, are of precisely the same structure as those of Bucoidea. In the one case, the incapacity, accompanied by a corresponding weakness of the whole member, is real, and of sufficient consequence to deprive the bird of the means of using its legs and feet to advantage. The fore-toes of the Bucoidea are in fact transformed into the wings, which are thus endowed with a more than usual share of strength, in order to afford the bird a more than usual assistance in the aerial mode of seeking its food which it is accustomed by its nature to do. The Bud, on the other hand, the grossorial feet are accompanied by a superior robustness, which counterbalances their inferiority in form. And hence the family may consistently maintain its station in the more perfect and typical groups of the Insectores which are now before us. The tendency, already observed, which opposite points of the circle in which a series of affinities is united have to ap-

Mr. Swainson arranges the Bucoidea among the Insectores, the fifth family of his second order (Passerinae, or Passe-reaus), in company with the Be-eaters, Moropidae, and Kingfishers, 5th order.
that all the species of Buceros he has met with in a live state are constantly in the habit of throwing their food up in the air and catching it before it is swallowed.' This propensity Mr. Swainson considers to be an inestimable development of the fissorial economy. We have only to add, that Mr. Swainson does not admit into the family of the Buceros the Monotis (Promities), which he places under a line drawn at the end of the family of Trogonidae. (Classification of Birds. 1837.)

**Organization.**

Some light will be thrown on the proper place of the bird in the animal series by the following account of the anatomy of a young Buceros rhioceros, now Hunterian professor to the Royal College of Surgeons. The subject died in the Gardens of the Zoological Society of London at the Regent's Park, and Mr. Owen's paper was read to the Society in 1833. The tongue was very short, or a triangular form, and very smooth. The air-cells were very large, and that in front of the neck contained the nasopharynx and the trachea. The nasopharynx, as in the Toucan, was very wide, the nearly equal diameter as far as the gizzard. The gizzard was thicker in its coats and of a more elongated form than that of the Toucan: its cuticular lining was very strong, and disposed in longitudinal ridges. After the duodenal fold the remainder of the intestinal canal was disposed in two similar folds, and then extended along the middle line of the back to the cloaca. There were no ceca. The coats of the intestines were stronger than is usual in birds, and the diameter of the canal was more considerable, diminishing however gradually from the commencement of the ileum, as far as the beginning of the rectum, and thence becoming wider to its termination. The whole length of the intestines was 5 feet; that of the bird, from the end of the bill to the vent, being 2 feet 2 inches, of which the bill measured 7 inches. The liver had the usual two lobes, of which the right was the largest. The gall-bladder was of considerable size. The pancreas, of an elongated slender form, had a small oval enlargement at its commencement at the lower end of the spleen, and a flattened oblong mass or head at the bottom of the duodenal fold: it accompanied the duodenum throughout its length, being folded on itself six or seven times. Its secretion was conveyed into the intestine by three ducts; one from its head, which entered the duodenum at the bend of the fold; the others from the elongated lobes which terminated close together at the end of the fold between the insertions of the hepatic ducts; an arrangement, as Mr. Owen observes, corresponding with that described by Cuvier in his 'Leçons d'Anat. Comp.' tom. iv. p. 55, as existing in the Heron. In the cloaca the rudimentary bladder was little more than a line in width, and the ridges bordering it above and below were confined to the back part of the cavity. The bursa Fabricii (which Mr. Owen regards as analogous to the glandular pouch found in so many other classes) was of a triangular form, large, and surrounded, as usual, by a capsule of muscular fibres.

The muscles of the mandibles consisted of a disagasticus, or of a muscle analogous to it, destinat, as is usual in birds, of a middle tendon, a temporal muscle of moderate size, and stygyoides externi and interni, proportionally more developed. There is also a strong ligament occupying the place of the masseter, and a second, destined to prevent dislocation backwards, which passes from the zygomaticus directly backwards to the condyle, or articulate depression of the lower jaw. Disproportionate, observes Mr. Owen, as this apparatus seems to the moving of so large a body as the bill of the Hornbill, it is fully adequate to the weight of that organ by no means corresponding with its size. The cavities in the bones, the arrangement of the columns supporting their parietes, and the air-cells, produce at the same time lightness and strength.

With respect to the other parts of the skeleton, Mr. Owen particularly noticed the extension of the air-cells into the distal bones of the extremities. He remarked that Mr. Hunter observed, how in the Pelican, the air passes not only into the ulna and radius, but 'those bones with the answer to the corpus and metacarpus of quadrupeds.' In the Hornbill Mr. Owen showed that the air passes also into the bones corresponding to the phalanges; and in the posterior extremity of that fruit, it permeates the tibia, tarsoi, and phalanges.

Mr. Owen concluded by some remarks on the affinities of the Hornbill as deductible from its anatomy. Its nearest approach is to the Toucan. The Toucan however, in the want of a gall-bladder, agrees with the Parrot; the presence of that organ in the Hornbill places the bird in more immediate relation with the Crotas. The disposition of the intestines, in long and narrow loops, also agrees with the Ramen. The tongue, so remarkably varied in form and use among the Scansores, resembles in the Hornbill that of the carnivorous Birds. (Proceedings of the Zoological Society of London, 1835.)

**Genus. Buceros.**

*Bill long, very large, compressed, more or less curved or falcated; base smooth, elevated, or slightly surmounted by a casque or helmet-like protuberance; edges of the mandibles smooth or notched; point smooth; interior of the bill, especially the upper mandible and casque, very cellular; mor- tris basal, on the surface of the beak, in a furrow, small, somewhat round, open, pierced in the coriaceous substance of the bill, covered at the base by a membrane. Feet short, strong, muscular; sole of the foot large. Wings moderate; the three first quills graduated; the fourth or fifth the longest.*

---

**Geographical Distribution of the Genus.** — The Old World, Africa, India and its islands, New Guinea.

**Habits, &c.** — Boutillot, in his description of his Corvus Indicus (Buceros Hydrocorax of Linnaeus), a native of the Moluccas and Banda, says, 'More Corvi nostrum gradiat, indole a nostris corvis differt, quod non evadere, sed is suum nucleus muscarum, testa vescatur; isque insigne dmannum infert. Caro eorum quoque delicata est, et sas saporem una pasto aromaticum habet (It walks like the crow of our countries, but differs much in disposition from our crows, inasmuch as it feeds not on carcasses, but most especially on nutmegs, and that greedily, doing a great deal of damage to them. Their flesh also is delicate, and when roasted has an aromatic flavour from their foot).*

Of the Corvus rostro cornu (Buceros Rhinoceros of Linnaeus) he says that it lives on the carcasses and intestines of animals, and that it waits upon the hunters who kill wild cattle, boars and stags, to gorge itself with the entrails of those animals. Willughby, in his account of this bird of his Indian Rarities says, 'It walks after the manner of our Raven, but differs from it in nature and disposition, in that it feeds not upon carrion or dead carcasses, but chiefly upon nutmegs, of which it is very greedy, making them its principal nourishment, to the great profit of the owners. Its flesh is very delicate, and being roasted

---

* A section is figured in the article Bucero, vol. iv., p. 627.
HOR

295

HORNBLende. [Augite.]

HORNBLende Schist. Under this term MacCulloch ranks a variety of mineral aggregates, in which hornblende abounds, and which are mostly but not universally of laminated structure. Hornblende schist is commonly associated with gneiss, less frequently with mica schist, and seldom forms alone any considerable mountain masses.

Buceros coracatus.—Throat, ear-coverts, circle round the eye, and a narrow band at the occipital edge of the pre- económico of the back, black; neck dirty straw-colour, the feathers of the back of the neck elongated; body and wings black, greater coverts and quill feathers tipped with white; thighs, upper and under tail-coverts, white; as is the tail also, with the exception of a broad black band about three inches from the tip; back yellowish, inclining to scarlet at the tip, under mandible black at the base; tarsi black. (Gould.)

Food.—The food of the Buceros coracatus, like that of other Hornbills, consists of fruits, berries, flesh, and even carrion; in short, it may be considered as strictly omnivorous. (Gould.)

Locality. India, Himalaya range, Java, and most of the islands of the Indian Archipelago.

Buceros Rhinoceros.

Buceros coracatus.

HOR

295

hath a plain aromatical relish, contracted from its food.' Of the horned Indian Raven, or Tupa, called the Rhinoceros Bird,' he says, 'This horned bird, as it casts a strong smell, so it hath a foul look, much exceeding the European Raven in bigness.' * * * 'It lives upon carrion and garbage, i.e. the carcases and entrails of animals.' Both these passages are taken from Buffon, as the reader will perceive. Cuvier considers them as omnivorous — 'Il présente toute sorte de nourriture,' and he states that they eat tender fruits, hunt mice, small birds, and reptiles, and do not even disdain carcases. The late Major-General Thomas Hardwicke, who contributed so largely to our acquaintance with Indian animals, in treating of Buceros galeatus (Linn. Trans. vol. xiv.) gives the following description of the habits of the Hornbills:—The progressive motion of the birds of this genus, although their feet are formed for walking, is always by jumping or hopping. I have kept several species alive, and they all moved in the same manner. In a state of nature these birds, in this part of India (Malacca), live on wild fruits. In confinement they feed freely on plantains and on boiled rice. At night they perch with great security, though the largeness of the foot seems better suited to rest on the ground.' M. Lesson sums up the habits of the Hornbills thus:—'Those of Africa live on carrion; those of the East Indies seek for fruits, especially nutmegs, and their flesh acquires from them a delicious flavour. Their flight is performed by repeated strokes of the wings, and the air which they displace, joined to the clattering of their mandibles, occasions a great and very disquieting noise in the forests, when the cause is unknown. This noise, capable of inspiring terror, does not ill resemble those howls of rough and sudden winds (grains de vent brusques et subites) which arise so unexpectedly between the tropics, and blow so violently. The Europeans established at the Moluccas think that the furrows which are seen on the bill of the Hornbill are the result of age, and that each furrow signifies a year; whence the name of Jeravvogel, which they give to these birds. Mr. Swainson remarks that the Hornbills are gregarious noisy birds, generally of a very large size, and are restricted to the Old World; that they are omnivorous, feeding both on animals and vegetables; that some however seem only to partake of the latter food; while others, upon the authority of Le Vaillant, feed upon carrion. The Buceros coracatus dissected by Mr. Owen was observed to be more attached to animal than to vegetable food, and would quit any other substance if a dead mouse were offered to it. This it would swallow entire, after squeezing it twice or thrice with the bill; and no castings were noticed. Mr. Owen however adds that Petiver has borne testimony to its regurgitating habits.

Before we proceed to give examples of the family as it here stands, that is, as consisting of the True Hornbills alone, we may remark that if it should be clearly made out that some species live entirely on vegetable food, while others live on carrion, as has been asserted, there may be good grounds for elevating such species to the rank of genera; for such a total difference of food may in all probability be accompanied by a corresponding difference of internal structure and of general habits. M. Temminck may be considered as the author who has most successfully dissipated the obscurity in which the species were involved; and to his elaborate and beautiful works we refer the reader. We shall select as examples the following two species.

Buceros Rhinoceros.—This species is to be found in most collections, and though there may be some variety from age and circumstances, the bill will be generally found to be about ten inches long and of a yellowish white, the upper mandible red at the base, the lower black. The horn, of casque, varied with black and white. The body black, of a dirty white below and posteriorly; tail about twelve inches, the feathers white at the base and tip, black in the middle; feet and claws obscure grey.

Locality. India and the Indian islands (Sunda, for instance).
It follows the contours of gneiss, and is traversed like it by granitic veins. (Glen Tilt) Hornblende is rarely associated with argillaceous slate, as in Ben Lair, in Skiddaw, Cader Idris, and near the granites of Cornwall. In these cases its origin may perhaps be due to the action of the ocean on the turgid mass of granite masses, and such rocks may be considered 'metamorphite.' They are considerably different from the Hornblende schists of Glen Tilt, Tons, and Rosshire, (Glen Deverich Rocks.)

HORNCastle. [Lincolnshire.]

HORNDON. [Essex.]

HORN-WORK, a fortification usually situated in advance of the principal works of a place. The rampart of its purpose is similar to that of each side of the polygon, supposed to surround a regular fortress; and on each flank a line of rampart returning from the nearest extremity of the front terminates on the ditch, designed to enable the enemy, from them, to project a fire to place. The work is generally strengthened by a ravelin placed before the curtain between two demi-bastions, and by a covered-way and glacis beyond the ditch; these, together, appear to have enabled the enemy to have attacked such a work with a favourable opinion of them. He gives the preference to such as were formed immediately in front of a bastion; the wings being directed neither to that work nor to the collateral ravelins, but towards and on the flanks of the work. It is impossible, therefore, in such a work, to effect the purpose of strengthening a place in daily expectation of a siege, when there were no outworks and when the bastions were small and very distant from each other. They were therefore disposed in front of the curtains, by the fire from whence the approach of the enemy towards their flanks might be opposed.

The feeble defence which was made by such works when attacked upon the side from which their origin was foreseen, and the natural disposition of occupying beyond the principal fortress some position from which to command the country during the siege, the enemy might be annoyed in forming his approach, or, which, if gained by the latter, might enable him to command the town, almost immediately immediately. The post of the ditch, sufficiently wide, forms it necessary, if the enemy has not already shown the position which its curtailing might be effectively defended. The lengths of the branches of wings were regulated by the necessity of having the ditch and covered-way in front of the salient angles of the demi-bastion, and the angle from the outer line of fortifications towards which the ramparts of the wings were directed, and occasionally the latter were broken, on the plan, so as to form short flanks from whence a fire might be directed towards the nearest of those salient points.

That which has been found occasionally useful is too frequently, by an improper application, converted into a positive evil; this was the case with the works now being described; and at a very early period the mutiny and injudicious disposition of them were subjects of animadversion among the best engineers. It often happened that they were constructed at great expense in situations where no end whatever was to be gained by them, and so close taken, where the branches of it could not have avoided firing upon one another.

In proportion as the means employed in the attack of places were increased the earlier fortresses became inadequate for the building of the troops, and in safety the quantity the artifices and stores which the corresponding augmentation of the means of defence demanded; and hence it was sometimes found necessary to increase to the extent of the advanced works about a place. This was done, at first, not by enlarging the dimensions of the half-bastions and curtain at the head of such works, but by making their head to consist of a demi-bastion, with the angle of fortification at the back, look the name of double, triple, &c., horn-works; but more generally crown-works. At a later time however the importance of advanced works was more highly appreciated; and, both by an improper disposition of them and by giving to their fronts dimensions equal to those of the general fronts of the place, they became not only free from the defects to which the old works were subject, but also capable of making a defence equal to that of a regular fortress.

The defects of the old horn-work consist in the expense of the construction being greater than is warranted by the benefit to be derived from them; the defence, in presenting to the enemy a front which, from its smallness, may be taken more easily than one of the fronts of the enceinte; in the revetment of the latter being liable to be breached by a fire of artillery directed along the ditches of their wings from batteries placed on the glacis opposite the salient angles of the work; and, lastly, in the comparative security with which, by being made a lodge- ment in the work, might carry on his approaches in the interior in a gentle inclination, till, at some distance from thence, forms it one side of a deep valley; and along the brow are constructed, on nearly a straight line, three strong fronts of fortification. The ground is terminated on the east by a ravine, which is crossed by a line of works, part with its covered-way and glacis; and on the right is a valley watered by a rivulet, which, being damned, forms a lake capable of securing the works against an attack on the right.

This work is termed La Junette, or redoubt: that on the right, being surrounded by water, is nearly inaccessible; and that on the left is strengthened by a system of counter-mines.

The advantage of these fortifications, and the directions of their faces, which are such as to prevent them from being enfiladed; the contraries of the ground before the works, by which the enemy would be reduced to the necessity of making his attack on a smaller extent of front than that of the defenders; and finally, the measures taken to secure the flanks, justly entitle this fortification to the character of being the most complete of its kind in Europe.

HORNS, GEORGE, D.D., Bishop of Norwich, was born November 1, 1730, at Oatham, near Maidstone in Kent. At the age of thirteen he was sent to school at Maidstone, under the care of the Rev. D. Bye, and at fifteen was removed to University College, Oxford. He was afterwards elected scholar of Merton College, of which he was Provost of All Hallows, Rushchurch, in the Shades of the Blackfriars; of which he was elected sub-dean of Westminster in 1670; and in 1673 he was vice-chancellor, and was appointed dean of Canterbury in 1781, and bishop of Norwich in 1789. He died January 17, 1792, in his 62d year.

Dr. Horne paid particular attention to the study of Hebrew and sacred literature; in which he adopted many of the principles of Hutchison. His works, which are numerous, consist principally of sermons and addresses relating to questions which have long since been settled, of which a list is given by Jones in his edition of 'Horne's Works,' 6 vols. 4to, 1755. The most celebrated of Horne's works is his 'Commentary on the Prophecies,' which was originally published at Oxford, 2 vols. 4to, 1776, and has since been frequently reprinted. (Jones's 'Life of Horne.')
A watch is a pocket timepiece; a repeater, a watch which, by means of any mechanical contrivance can at pleasure be made to repeat the hours or other parts of the time.  

**History of Clock and Watch making.**—The early history of clocks and watches is enveloped in so much obscurity, that it would be almost impossible to point out any individual person who could with any degree of probability be called the inventor.  

The term horologium is met with very early in different parts of Europe; but this word being formerly applied indiscriminately to a dial, as well as to a clock, nothing decisive can be inferred from its use. The only term which has introduced the term as applicable to a clock that struck the hours appears to be Dante, who was born in 1265, and died in 1321. It would appear from this, that striking clocks were known in Italy as early as the latter part of the thirteenth or beginning of the fourteenth century. It appears also that a fine imposed on the chief-justice of the King's Bench in the 16th of Ed. I, or 1288, was applied to the purpose of furnishing a clock for the famous clock-house at Westminster.  

In the reign of Henry VI, which commenced in 1422, it is said that the king gave the keeping of this clock to William Warby, dean of St. Stephen's, together with five days' wages at the time that the exchequer. St. Mary's at Oxford was furnished with a clock in 1223, out of fines imposed on the students of the university.  

Clock-making also flourished in Germany, particularly at Nürnberg, where the Horloge de la Ville of Nürnberg, among others, has the name of the city. It was introduced into England by John Axton. Thelocks of the clock which we call the inventor of the wheel, according to Beckman's *History of Inventions*, vol. i. The anonymous author of *William, Abbot of Hirshau*, who lived in the eleventh century, has the following passage:—**Natural horological ad fontes** (lib. viii., cap. 4 et seg.) The earliest instruments of which we have been able to discover on this subject are the following:—  

1. It is said the first clock at Bologna was fixed up in 1325.  
2. Henry de Wyck, or Henri de Vic, a German artist, placed a clock in the church of St. George in about the year 1346. 3. Mention is made in Rymer's *Federarum,* of protection being given by Edward III. to three Dutch horologists who were invited from Flanders into England in the year 1342.  

Conradus Daspoytius gives an account of a clock erected at Strasbourg about 1370. According to Froissart, Count John of Hainault and Burgundy had a clock on the tower of the castle at Burgundy in 1382.  

The invention of the clock in England is said to have been made by the duke of Burgundy in 1392.  

5. Nürnberg had a clock in the year 1462; and Venice one in 1497.  

6. It is also said by Renard, an instrument known as a clock, or regulated horological machine; for although the term horologia had been of frequent occurrence in preceding ages, there is every reason to believe it was applied to other horological instruments. The earliest clocks which we have been able to discover are:—  

7. Ferdinand Berthoud has written more on the subject of clockwork than any other person, and he concludes his researches with the belief that there appear to be good grounds—that a clock, such as that of Henry de Wyck, is not the invention of one man, but a compound of successive inventions, each worthy of a separate consideration.  

8. The wheel-work was known and applied in the case of Arrows by the Thresher of 1745.  

9. The great or main wheel from those of the pinion in which they were Vol. XII.—2 Q.
engaged, would soon be found an indispensable contrivance: 4. The regulation by a fly being subject to such great changes from the variations of density in the atmosphere, and the tendency of a falling body to accelerate its motion, would necessarily give rise to the alternating motion of the balance wheel with which it is connected, and the escapement of some kind must have been coupled; 5. The last-mentioned two inventions are most important ones, and would have induced such a degree of uniformity in the motion of the wheel-work as would not be produced by a damped motion, and it was necessary to add a hand or pointer; lastly, The striking part, to proclaim at a distance, without the aid of a person to watch, the hour that was indicated, completed the list of inventions.

And the invention that De Wyck’s clock was a combination of the successive inventions of different individuals is confirmed by analogy, for the clocks and watches of the present day have been brought to their present degree of perfection by a series of successive inventions and improvements upon what may now be called the rude clock of De Wyck, which is the most ancient clock of which we have a description. De Wyck’s clock was regulated by a balance in the following manner—The teeth of the conversation wheel B, act on two small levers C G, called pallets, which project from and form part of an upright staff or spindle C. In this position, the balance wheel is transferred to an horizontal plane, and the mode of adjusting the clock to time was by shifting the weights W W nearer to or farther from the centre of the wheel.

Although this clock of De Wyck’s, and indeed all those made with a balance for the regulator, without any regulating spring, must have been very imperfect machines, we find that as early as 1464 Walther, and after him the landgrave of Thuringia, introduced the use of a balance-clock for heavenly observations; and such seems to have been the comparative utility of the clock thus early for astronomical purposes, that Gemma Frisius proposed the use of a portable one for astronomical purposes about the year 1530. 1560 Tycho Brahe possessed four clocks, which indicated hours, minutes, and seconds, the largest of which but three wheels, the diameter of one of them being 3 feet, and containing 1500 teeth, a perfect state of clockwork at that period. Tycho also observed irregularities in his clocks dependent upon changes in the atmosphere, but do not appear to have been aware how they were produced.

In 1577 Meestlin had a clock which made 2928 beats in an hour, and by counting the number of beats made during the time of the sun’s passage over a meridian, the sun’s diameter was determined to be 34° 13'. So early in the development of astronomy that the form and principles of horological machines, which in its turn gave rise to some most important improvements in clockwork.

One of the first additions to the mechanism already described was the alarm or alarm, a contrivance dispensable without fusées; but the practice is a departure from principle which can never be tolerated where accuracy of performance is required. In the article Cronometers are given the short history of the alarm in clocks, and how the introduction of the portable clocks gave rise to a new position of the balance by placing its verge or axis horizontally, and having its suspension on thin edges of hardened steel, called knife-edges, it being previously suspended by a string or thread, and for a long period after their introduction the pendulums of portable clocks continued to be suspended in the same way; and Berthoud pronounces the knife-edge suspension superior to that of a slender spring, which is the method adopted by English artists. In order that a pendulum should perform its duty with as little disturbance as possible from extraneous causes, it is necessary that it should possess considerable weight; and we think that M. Berthoud would hardly assert that a knife-edge is a proper support for a heavy body in continual motion.

Such was the case when Galileo Galilei observed that heavy bodies, suspended by strings of the same length, made their vibrations, whether in long or short arcs, in very nearly, if not exactly, the same spaces of time, which he had published at Paris in 1639; and although he never applied himself to perfect a regulator to suspend the balance in clocks, yet his discovery was the prelude to a third era in clock-work, namely, the origin of the pendulum-clock, which in use is a perfect discovery that the earth is not a globe, the most improved form, it seems almost impossible to excel. The honour of first applying the pendulum to a clock has been a matter of much contention, which our limits will not allow us to notice further than to state, that one of these contests between Galilei and Huygens gave rise to an excellent treatise on clock-work, ‘De Horologio Oscillatorio,’ which laid the foundation of most of the subsequent improvements, and which it appears that he undoubtedly made, or directed the making of, a pendulum-clock before the year 1688. Huygens, whether the inventor or not undoubtedly applied it in the most modern way to a marine compass, and hence has generally been considered the inventor.

Notwithstanding what has been said above, justice to the memory of a countryman of our own, who appears to have a still better claim to the honour than either Galilei or Huygens, enables us to mention a London artist named Richard Harris, who invented and made a large pendulum clock in 1641; and this assertion is supported by very satisfactory evidence. Very soon after the application of the pendulum to a clock, we find it was to be realized by the ingenious Huygens in the construction of a marine clock. He also discovered that its pendulum vibrated slower as it approached the equator, which has led the way to a subsequent discovery that the earth is not a globe, but an oblate spheroid. The discovery by the same individual that the isochronal property which Galilei ascribed to the pendulum was only true in circular arcs when the arcs remained the same; longer arcs requiring of some what longer time, gave rise to his cycloidal clocks, which caused the ball of the pendulum to move in the involute of a cycloid, which, with the pendulum in a detached state, would produce a perfectly isochronous motion. Though beautiful in the extreme, both in theory and practice, as regarded the simple pendulum in a detached state, proved of no service in a clock pendulum. Other sources of error, arising from the alteration in length of the pendu- lum by heat and cold, and of the string by which it was suspended by moisture, and the impulse given by the clock to the rod through the medium of the fork or crutch (another invention of Huygens), caused the before-mentioned clocks to be abandoned.

In 1676, Barlow, a London clockmaker, invented the repeating mechanism by which the hour last struck may be known by pulling a string. Several artists followed in the same line, of whom we mention Collier, Larby, Thiott, &c., on the Continent. Clocks were soon after this made to show not only mean but apparent time. The principal artists employed in this more curious than useful art of horology were clockmaker, Father Alexander, a Benedictine, in 1692, Le Bon and Le Roy in 1717, Kriegersen, Enderlin, L’Admiraud, Passement, Hirr, Graham, and others.

We now pass over an important addition to the improvements in clocks, namely, the invention of the anchor escapement, which, like most others that have stood the test of time, belongs to the English. Even Berthoud confesses this to have been the work of one of his London employees. The great advantage of this escapement over the old crown-wheel is, that it allows the escape to take place in a small angle of vibration, thereby preventing the necessity for the maintaining power acting upon the pendulum with so great a force as by the old plan, and, by the introduction of a heavy ball, leaving that to be done by
the uniform power of gravity which before was dependent upon the impulse given by the wheel to the pallets. This change in the escapement introduced the practice of suspending the pendulum below a sheet and flexible spring; another invention of Clement's; though this invention, both of the pendulum and spring, is also claimed by our ingenious countryman Dr. Hooke. The seconds pendulum, with this escapement, was called the royal pendulum. Though the practice of suspending the pendulum was said to have commenced with the beginning of the eighteenth century. The expansion and contraction of metals had been known above fifty years; and although the use of the clock for astronomical purposes was from the beginning compensated for the lengthening and shortening of the pendulum by heat and cold, art had not yet supplied this desideratum, until, in the year 1715, George Graham, by substituting a jar of mercury for the pendulum-ball, succeeded in retaining the point of suspension and the centre of oscillation at the same distance from each other. The principal objection to this pendulum is its liability to breakage, of which its author felt the full force, and in consequence suggested the idea of the opposite expansions of different metals as a compensation for a pendulum. John Harrison immediately turned his attention to the subject, and by dint of perseverance overcoming all the difficulties of his long and retired situation, not only astonished the world by his improvements in horological machines, but absolutely constructed with his own hands a timekeeper which determined the longitude with an error as low as 2', 30" to prevent the parachute effect of 20,000/, [fig. 2]. Harrison, with this escapement previously mentioned was a great improvement upon all that had preceded it, still it was subject to objections, not one of the least of which was that at every vibration in the pendulum the impulsion of the impeller is reversed, and the reader may comprehend this term, it is necessary to observe that the pendulum, being a heavy body, vibrates a considerable distance after the tooth has performed its office of oscillation; the former is impulsive, the latter is not. By the time the impact is completed, the tooth falls from the pallet to which the impulse has just been given, and another tooth falls on the other pallet, which is at the time moving, together with the pendulum, and in the interval in which it is free to move when it receives its impulse from the tooth; and from the peculiar form of the pallets, a retrograde or backward motion is given to the wheel, which motion is called the recoil, and this escapement is thence called the recoil escapement. The inconveniences of this escapement were however removed (about the same time with the invention of Harrison's pendulum) by Graham, who introduced what is called the dead-beat escapement, which is both simple and beautiful in its execution, and its performance is not equal to that of any other that has ever been made: with this escapement, and with a gridiron or marcurial pendulum, having a heavy ball moving in a very small orbit, the calculated timekeeping is so close, that the average variation is less than a quarter of a second daily.

Description of an Eight Days' Spring-Clock.—A B C D (fig. 1) represents the front plate of a clock (which is supposed to be transparent), and is attached to another of similar form by five strong pillars, between which the wheels here shown are placed. E E are two barrels containing springs; the one on the right gives motion to the train of wheels called the going or works, and the other to the striking train of wheels f, g, h, and i. f is the main wheel of 96 teeth, acting in the centre-wheel-pinion k of eight leaves, to which is attached the centre-wheel b, which revolves in an hour, and acts in the third-wheel-pinion f, on which is fixed the third wheel c, acting in the swinging or escape wheel pinion m (not seen in the cut), to which is fixed the swinging wheel d, whose teeth act alternately on the two pallets n, o, and thereby give motion to the pendulum by means of a piece called the pallet-wheel q. When the pallet-wheel enters a slit made in the pendulum for its receptacle, FF are the two fuses, the use of which will be found in the article Chronometer. The method in which the fuses are actuated by the pallets is shown in fig. 3, where is the main wheel of 96 teeth hollowed out to receive the clock b and its spring c, which are attached to the wheel, the ratchet d being attached to the under side of the pallet-wheel q, to which is fixed the escape wheel, listing 84 teeth, which drives the pallet-pinion p of eight leaves, on which is the pin-wheel f of 64 teeth, into the rim of which are put eight pins to lift the hammer s, by acting upon its tail t; the pin-wheel g drives the pallet-pinion q of eight leaves, on which is fixed the pallet-wheel r of 36 teeth acting in the warming wheel-pinion o of seven leaves, on which is the warming wheel a, of 48 or 60 teeth acting in the fly-wheel o. When in action a pin in the pin-wheel catches the tail of the hammer q, and raising it, the hammer-head r recedes from the bell; and as soon as the pin leaves the tail of the hammer, the force of the spring o allows the pallet-wheel q to move, and the escape-wheel r to move, and thereby to prevent confusion. (See fig. 2.) On the centre-wheel-pinion k (fig. 1), whose arbor comes through the front plate about one and a half inches, is placed the minute wheel a (fig. 2), which revolves with the centre-wheel in 12 hours, and carries the minute-hand of the clock: this wheel has a pipe nearly as long as the centre-wheel arbor, the upper end of which is squared to receive the minute-hand; and by means of a small spring beneath the wheel, which rests upon a shoulder just above the upper surface of the front plate, and acts against the under surface of the wheel, the wheel, together with the hand, is forced against a pin on the arbor: the whole of the wheels in this group can therefore be moved forwards or backwards without disturbing the internal mechanism of the clock, or rather that part of it which is called the going or watch train, and which is that part on which the time-keeping depends; the minute wheel is divided into two parts, namely, the main wheel b, which, as it must revolve also in an hour, has the same number of teeth as a. A pinion in the centre of the wheel b has six leaves, and acts in the hour-wheel c of 72 teeth, and is actuated by a rack which is driven by two little cutters, and consequently arrives once in 12 hours, and has screwed to its socket, at the upper end, the hour-hand. To the socket of the hour-wheel, about one-eighth of an inch above the top of it, is riveted another pinion of which includes an angle of 30°, or a twelfth part of a circle; this piece is called the small, and is represented by d, the use of which we shall shortly describe. e is a rack with a stud on the end of it, which turns around a pin which is driven by means of a pipe about half an inch long, and on to the upper end of which is riveted the rack-tail g, in which is a short pin A, pointing perpendicularly downwards to the front plate of the clock. This rack lies against the teeth of an inch above the front plate; but the pipe which acts on the stud is long enough to carry the rack-tail just clear of the stall when the rack is forced back by the spring s, whilst the pin b is long enough to strike against the steps in the stall, and yet so short that it cannot revolve. f is called the rack-hook moving freely on a stud; h is the lifting piece, also moving freely on a stud p; i is the tail of the lifting-piece firmly pinned on to the other part, and moving with it; j is the pallet-wheel of the hammer, which turns in a hole through it, and is fixed upon the square end of the bar q of the wheel g (fig. 1), which revolves once for every blow given by the hammer, as will be seen by referring to the number 64 in the pin-wheel, the number of pins which act on the hammer being eight, and the number in the pinion q being eight also. It must be borne in mind that a pin in the warning-wheel A always stands in the same position when the stall part is at rest, which is the position represented in fig. 1. On the end of the lifting-piece is a small piece q (fig. 2), which passes through a slit in the front plate, and resting on the bottom of the stall, keeps the lifting-piece in its proper position. The gathering pallet r on which a pin r in the rack s is driven acts when the pin enters the slot of the leak-wheel q; the pallet-wheel q, by means of the pin in the wheel A (fig. 1) coming in contact with the piece q (fig. 2) on the end of the lifting-piece, and arresting their further progress (this is called the warning).
soon as the hand arrives at the hour, the pin in wheel \( b \) will have passed the tail of the lifting-piece, which will fall, and with it the piece \( g \), which again releases the striking-train, and the pins in the wheel \( f \) (fig. 1), acting on the hammer-tail, cause the clock to strike; the number of strokes being regulated by the number of teeth to be taken up by the pallet \( q \) (fig. 2), one being taken up by the short end of the pallet for every revolution of the wheel \( g \) (fig. 1), on whose arbor it is fixed. The rack in fig. 2 is retained in its situation by part of the rack-hook, which falls successively into different teeth as they are taken up. The long end of the pallet \( q \) passes over the rack, meeting with no obstruction till all the rack-teeth are taken up, when it comes in contact with the pin \( r \), where it remains till the next hour, when the pin \( h \), by falling upon another step of the snail, causes a different number of rack-teeth to pass the pallet \( q \), and a different number of strokes is the result: \( x \) is a piece called the pull-piece, by pulling a string at the end of which the lifting-piece is raised, and the clock is made to repeat the hour last struck at any required time: \( y \) is a spring to force the pull-piece \( x \) against the pin \( z \) fixed in the plate of the clock; \( z \) is another pin to limit the motion given to the pull-piece \( x \) when the string \( t \) is pulled.

After what has been advanced, it might be supposed that the clock had received its finishing stroke as regarded its further improvement; but even after this, we find so many alterations, if not improvements, in the escapement, mode of compensation, &c., that to notice only those which have produced some sensation at the time of their introduction would fill a volume. The principal contrivances of clock escapements are Grignon, Mudge, Cummins, Nicholson, Hardy, Harrison, and others, in England; and on the Continent, Julien and Peter le Roy, Sully, Du Tertre, De Bethune, Le Pautre, Amat, Robin, Berthoud, &c. Since, Graham and Harrison, Elliott, Cummins, Nicholson, Troughton, Smeeaton; Reid, Ritchie, Ward, and Captain Kater have each given us a compensation pendulum. The inventors in France have been Regnauld, Depravieux, J. le Roy, Cassini, and Berthoud.

Watch.—Having entered at some length into the history of those inventions which have contributed to the present perfection of the art of horology, it will not be necessary for us to say much concerning watches. We have described a watch to be a pocket timepiece, and the same general principles apply equally to both a clock and a watch, except that the regulation in the former is a pendulum, and in the latter a balance and spring.

It would be a matter of some difficulty to determine what artist first reduced the portable spring-clock to the dimensions of a watch to be worn in the pocket. The small clocks prior to the time of Huyghens and Hooke were very imperfect machines; they did not even profess to subdivide the hours into minutes and seconds until the invention of the balance-spring, which is to the balance what gravity is to the pendulum, and its introduction has contributed as much to the improvement of watches as did that of the pendulum to clocks. The honour of this invention was warmly contested by the last-named individuals previous to 1655; but so far as priority of publication is concerned, the honour is due to Hooke.

Maintaining Power.—When clocks and watches had acquired a certain degree of accuracy in their performance, the time lost in winding up (especially when it had to be done every twenty-four hours) became a matter of importance, and there have been several inventions to remedy this evil. By Huyghens the clock was kept going while winding by means of an endless cord, as in figure "Endless Cord." It is the clock-barrel; \( C \), that portion of the line which comes from the barrel to the weight; \( P \), a pulley for the line to run under, and to which is attached a small weight \( W \). It will be seen by inspection that the hand applied to that part of the line marked \( a \) will be able to raise the weight \( W \) without depriving the barrel \( B \) of any portion of the power by which it is urged forward, and which power in this arrangement is equal to one half of the weight \( W \).
The forcing spring (fig. 1) gives another plan, in which a lever A, whose centre of motion is c, has a notch cut in its end, into which a small lever c, whose centre of motion is e; this small lever is kept in its proper position against the bottom of the notch, as shown in A, and also in B (which is only another position of the lever), by a slight spring e. D is a strong spring which acts constantly on the lever A, having a tendency to force it into the position represented by B, in which it is not in action. Previous to winding the clock up, the end E of the lever is depressed, and brought from position B to that of A, and in its progress in passing a tooth of the wheel the small lever c assumes the position represented in fig. 2, which it is allowed to do by the very slender spring e. As soon as the tooth is passed, the pressure of a obliges the lever c to return to its original place, and by the pressure of its opposite end, e, brings the end B, on the bottom of the notch in which it is inserted, the lever A is prevented from regaining its former position by the pressure of the piece e on the tooth of the wheel, until the wheel shall have advanced so far as to have allowed its escape, when the lever regains its position B, where it remains till another winding becomes necessary. It will by this time have become evident that so long as e remains on a tooth, the wheel will be urged forward by the action of the spring D, e, and are two pins which are fixed in the plate of the clock, and serve to determine the quantity of motion given to the lever A.

But Harrison's contrivance for the same purpose is the one in general use, both in clocks and watches, and is admirably adapted to the purpose, as it requires no attention from the person who has to wind up the machine, like the last, but is always in its place, and ready for action the moment the operation is performed. We shall describe this as applied in a watch. When this principle is applied to a fusee, it is termed a giving fusee; but maintaining power, as a more comprehensive term, is now generally applied.

Maintenance Power, Going Fusee.—Into the hollow of the fusee-wheel is placed a circular spring a b c, which is secured to the wheel by a pin at about one-fourth of its circumference from the end a, viz. at b; the wheel has a short notch cut through it, near the other end of the spring; the spring passes over this notch, and by means of a pin c, fixed firmly in the spring and projecting through the notch in the wheel, a motion is allowed to the spring, which in extent is equal to the difference between the length of the notch in the wheel and the thickness of the pin which passes through it, and it is the reaction of this spring through the short distance already mentioned which maintains the motion in the watch during the time of winding up; as will be seen when all the parts of this contrivance have been described. Instead of any click and spring being attached to this fusee-wheel, as has been shown in fig. 1, in our description of an eight-days' clock, a circular disc of steel, rather larger than the bottom of the fusee-wheel, and smaller than the fusee-wheel, having very fine ratchet-teeth cut in its edge, and two clicks a and springs e on its upper surface, in which the ratchet is fixed on the under side of the fusee, and called the fusee-ratchet, is placed in the centre of the fusee-wheel retaining it in its situation, and the pin c, which we have described as projecting through the notch in the fusee-wheel, also projecting upwards just equal to the thickness of the arbor, through which it likewise passes; the pin exactly fitting the hole in the ratchet. In this situation the wheel and ratchet are ready to receive the fusee with its ratchet; but it must be borne in mind, that though the pin c fits exactly in the hole of the ratchet, yet the bottom of the fusee-wheel, though it is round, does not prevent its having as much motion as the spring itself has in the notch in the fusee-wheel; the spring must also be conceived to have been forced into its place with the teeth of the spring strongly forcing on the bottom of the notch o. The fusee is now attached to the wheel by passing its arbor through the hole in the centre of the wheel, and is secured in its place by a pin and collet on the opposite side, which prevents the teeth from being forced out of the fusee-wheel, allowing the fusee to turn with a moderate degree of force. In this state the fusee, &c. must be considered as placed within the frames of the clock or watch in connection with the other parts of the train of wheels. &c. A click, or, as it is sometimes called, a detent, is also placed between the frames, and by means of a slight spring is made to act in the teeth of the auxiliary-ratchet.

Mode of setting the spring put on, the watch is wound up, say one turn. As soon as the force by which it has been wound up is taken off, the main-spring, through the medium of the chain, pulls the fusee, and with it the auxiliary-ratchet, in the direction of the main-spring, &c. till the click, or, as it is sometimes called, a detent, is also placed between the frames, and by means of a slight spring is made to act in the teeth of the auxiliary-ratchet.

The escape—Whether the spring a b c is set on, or wound up, the watch is in the same state. If the power be again applied to wind up the watch, the main-spring, during the time that power is applied, ceases to act on the auxiliary-ratchet, the spring a b c regains its original position by the endeavours of the spring a b c to regain its former situation, having the pin c at o, but the detent, which is in a tooth of the auxiliary-ratchet, prevents its return; the spring a b c acts constantly on the auxiliary-ratchet till it reaches a tooth, when it ceases to act on it, and the tooth, which is in the train of the main spring, forces the fusee-wheel in the direction of the arrow with sufficient strength to maintain the motion in the watch during the time of winding-up. The space through which the spring a b c acts in the notch p q with sufficient force to maintain the motion of the watch is about equal to two teeth of the fusee-wheel, and the time in which the fusee-wheel goes through a distance equal to different watches from 10 to 15 minutes, a time more than sufficient for the operation of winding. It will have occurred to the reader that as the detent is at all times in action upon the auxiliary-ratchet, the instant power applied in winding is taken off the pin c regains the position p, and the spring a b c is ready to set with all its energy as soon as rewinding is commenced; so that in winding a watch with a common key, where the hand is taken off on an average ten times per ten minutes there are ten portions of ten minutes during which the motion is kept up by the main-spring of the watch, and ten portions during which it is kept up by the spring a b c.

Escape.—The word escape ment is a term applied to a combination of parts in a clock or watch, which has for its object the conversion of the circular motion of the wheels into a vibratory motion, as exhibited in the pendulum, and in the description of a clock which is about to wind; the wheel, the pallets with their anchor or axis, and a bent lever attached thereto, called the crutch, which last piece main-
tains the motion of the pendulum. In a watch this combination consists of the escape-wheel, together with all the parts lying between it and the balance, and which are concerned in converting the circular motion of the wheels into the alternating one of the balance. In the dead-beat escapement the distance between the centre of motion of the pallets and the centre of the escape-wheel is equal to one diameter of the escape-wheel, and the pallets take the motion of the pendulum. In a watch this combination consists of the escape-wheel, together with all the parts lying between it and the balance, and which are concerned in converting the circular motion of the wheels into the alternating one of the balance. In the dead-beat escapement the distance between the centre of motion of the pallets and the centre of the escape-wheel is equal to one diameter of the escape-wheel, and the pallets take...
remains of the detached fixed small to brought the other, which is secured to a stud $r$ fixed in the plate, and the other pinned fast to a small collet, which goes spring-tight unto the axis of the verge, and is seen just under the balance. The following figs. 2, 3, 4, represent some of the parts separately—2, the main-spring in a relaxed state, as it would appear out of the barrel, to which, when in, one end of it is attached, the other being held by a hook in the arbor of the barrel, which comes through the plate, as shown in fig. 1, and is kept from turning by a ratchet $s$ and click $t$, the spring being wound up by the chain acting on the barrel and pulling it round, which operation is performed by turning a key placed on the squared end of the fuse-arbor. The effort of the spring to unbend itself after being wound up causes the barrel to revolve in a contrary direction to that in which it moved whilst winding up, and thereby gives motion to the fuse, and with it the fuse-wheel and the rest of the train. Fig. 3 represents the barrel and fuse, with the chain attached. Fig. 4 shows the balance-wheel, balance, and verge, with the hair-spring attached to it.

**Duplex Escapement.**—AA is the escap-wheel, 1, 2, 3 being the teeth of repose, and $a$, $b$, $c$ the teeth of impulse, which are triangular, and stand perpendicular to the plane or surface of the wheel. CD, the impulse pallet, fixed upon the arbor of the balance, and standing just above the surface of the wheel AA, receives its motion from the teeth $a$, $b$, $c$, &c. After the tooth $a$ has passed the pallet $CD$, the tooth $b$ comes in contact with a small roller made of ruby, and placed on the lower part of the axis of the balance, where it remains till the balance is brought back by the balance-spring to such a position that the notch, shown by the dotted line in the ruby roller, will allow the tooth 1 to enter it, and thereby pass the balance-arbor, or escape, which it does by the wheel AA being constantly urged in the direction from 3 to 1. As soon as tooth 1 escapes from the notch, tooth $b$ gives a fresh impulse to the pallet CD, and the act of escapement is thus repeated; the wheel moving forward one whole tooth, and the balance making two vibrations for each impulse given by the upright teeth.

**Lever Escapement.**—The figure represents a detached lever-escapement, in which the lever $l$ is placed on the pallets in a position at right angles to that in which it is usually placed in a watch, by which means we think the principle will be more apparent to the general reader. AA is the escape-wheel moving in the direction of the arrow; $b$ the pallets, whose centre of motion is $c$; to the pallets is pinned the lever $l$, in which is the guard-pin $e$, pointing upwards from the lever $l$; the roller $f$, fixed on the axis of the balance, and stands just above the lever $l$, having a piece cut off from its circumference to allow the guard-pin $e$ to pass and repass the roller, which it does when the escape takes place; $o$ is a ruby pin fixed in the roller, and pointing downwards through the notch in the end of the lever $l$. When the balance is quiescent, the pin $o$ is in the notch in the end of the lever $l$ and the guard-pin $e$ in the position shown in the figure, where the tooth 1 acts on the pallet $b$, which causes the balance to vibrate, the guard-pin $e$ proceeds a short distance to the right of its present position, and the lever is prevented from returning by the guard-pin $e$ coming in contact with the circular edge of the roller, if any sudden jerk which the watch might receive should overcome the locking which takes place in this escapement, and which will be presently described. The effect of the locking is to retain the pin $e$ at a very small distance from the edge of the roller during the vibration of the latter; for if the pin $e$ rubbed against the roller during the vibration, the friction occasional thereby would materially affect the motion of the balance, if not altogether stop the watch, and moreover the escapement would cease to be a free or detached one. When an impulse is given by a tooth to the other pallet $d$, the lever $l$ impels the ruby pin $o$ to the left hand, where precisely the same effects take place with regard to the guard-pin $e$, &c., as have been already described.

If the pallets $b$ and $d$ were of the form shown by the dotted lines (which are supposed to be circular arcs concentric to the centre of motion $c$ of the pallets), it is evident it would be a perfect dead beat, like the clock-escapement previously described; but in order, after the escape has taken place, that the guard-pin $e$ may be retained at a small distance from the roller, that part of each pallet on which the tooth rests when it falls on the pallet is taken off, as shown in the figure; and as the faces of the wheel-teeth are considerably undercut, the wheel advances a small distance, after having fallen on that part of either of the pallets which is within the dotted line. This further advance of the wheel draws the pallet down towards the centre of the wheel, and thereby keeps the guard-pin $e$ at a slight distance from the edge of the roller $f$. By this advance of the wheel and drawing down of the pallets after the teeth have fallen upon them is produced what is termed the locking of the pallet, which means holding the pallets and lever $l$ in such a position that the guard-pin shall be very near but not quite touch the edge of the roller. If the watch
should receive a jerk so violent as to effect the partial unlocking of the pallet, the pin would for an instant of time touch the roller \( p \) but the constant force of the wheel to go forward would immediately relock the pallet and bring the guard-pin \( e \) away from the edge of the roller. As soon as the balance has performed so much of the returning vibration as to bring the ruby pin \( o \) into the notch in the lever, the momentum of the balance, acting through the medium of the ruby pin \( o \) upon the lever, moves it a short distance, and thereby lifts the pallet outwards from the centre of the wheel and unlocks it, during which unlocking the wheel retrogrades (before it can get upon the face of the pallet to give a fresh impulse) just as much as it had previously advanced after falling on the pallet. By this retrograde motion the tooth gains the inclined plane or face of the pallet, gives a new impulse, and the same process is repeated by another tooth on the opposite pallet, of falling on, advancing to lock, retrograding to unlock, and then giving impulse to the pallet; \( p, p \) are two pins, called banking-pins, against which the lever \( f \) presses when locked, and which prevent the guard-pin \( e \) from being drawn too far away from the edge of the roller \( f \), when the locking takes place. This mechanism admits of a very large angle of vibration, and when well executed performs very well.

**Horizontal Escapement.**—\( ABD \) represents the balance on its axis, which is a hollow cylinder \( C \) cut away in its circumference, as shown in the figure; the teeth of the casing of inclined planes, which stand on stems perpendicular to the plane of the wheel, the inclined part forming the extreme edge or actuating-face of the tooth. These planes coming in contact alternately with the two edges of that part of the cylinder which has the least portion of its circumference taken away, when a tooth is in the cylinder, the point rubs against the internal surface until the balance by its vibration gets into such a situation that the tooth can act upon the stem, when it impels the cylinder in the direction from \( D \) to \( A \), until the highest part of the plane escapes from the inside of the cylinder, and the next tooth falls upon the outside, where it continues the motion of the balance, completes its vibration, and has returned so far as to permit the point of the tooth, which has been rubbing on the outside of the cylinder, to get upon its edge, where it gives impulse to the cylinder, and when its heel escapes, the point falls on the inside of the cylinder, and the former process is repeated. That part of the cylinder on which the inclined planes act occupies about 210 degrees of a circle, 130 degrees being taken away; the part below the place of action has a still greater portion of its circumference taken away, which is done for the purpose of enabling it to clear that part of the plane of the wheel which supports the stem, and against which, but for this contrivance, the edge of the cylinder would strike during the vibration of the balance. 1, 2, 3, &c., are teeth of the horizontal or scape-wheel, one of which is seen inside the cylinder; the dotted lines represent the face or inclined plane of the tooth, which is just coming in contact with the edge of the cylinder; the direction of the motion of the wheel is from 1 to 3; the proportion of the cylinder to the wheel is such, that a tooth of the wheel, when in the cylinder, may just have sensible shake, and the outside diameter must be sensibly less than the distance between two teeth. We have thought it unnecessary to give a more particular description of this escapement, as its use has been almost wholly superseded by that of the lever.

**Detached Escapement.**—\( A \) is the escape-wheel, made either of brass or steel, the teeth 1, 2, 3, &c., of which are considerably undercut on the face; the steel-roller or main-pallet \( B B \), which is fixed on the arbor of the balance, has an opening in it, the face of which is also much undercut as shown near \( B \), and has set in it a piece of hard stone, such as a ruby, for the points of the teeth to act upon; \( S \) is a stud firmly fixed to one of the plates of the timekeeper, and to which stud the detent-spring \( E, E \) is secured by a screw \( c \): this spring is made extremely slender and weak in the part \( E \) near the stud, and it is only by the yielding of this thin part of the detent-spring that any motion can be given to the detent for the purpose of unlocking the wheel, so that some part of this spring may be considered as the centre of motion of the detent; \( D \) is a stud also fixed to the plate of the watch, into which is inserted a screw \( d \), against the head of which the detent rests; \( o \) is a ruby pin inserted in the detent, pointing downwards from the detent, so that one of the teeth of the wheel which is supposed to \( p a \) under the detent may rest on the pin, and in this state the wheel is said to be locked; the screw \( d \) serves also to adjust the distance of the ruby pin from the centre of the wheel, and consequently the strength of the locking: \( \theta \) the inner side of the detent is attached a very delicate spring, called the lifting-spring, which rests upon and extends a little beyond the end of the detent. Concentric with the main pallet, and just above it, is a small lifting-pallet \( q \), which should be flat on its face or lifting-side, and rounded off on the other side.

**Mode of action.**—In the position given in the figure, the lifting-pallet \( q \) is just coming with its face in contact with the lifting-spring \( p \), which in the course of vibration it lifts and with it the detent (on whose point the lifting-spring presses), so as to raise the pin \( o \) clear of the wheel-tooth \( A \). By the time the wheel is free from the ruby-pin, the main-pallet has advanced so far as to be ready to receive an impulse from the tooth 1; and before the tooth escapes the lifting-pallet \( q \), parts with the spring \( p \), and the detent resumes its place on the head of the screw \( d \), in which position the ruby-pin receives the point of tooth 6, as soon as tooth 1 has escaped from the ruby-face of the main-pallet \( B B \). The balance, having performed this vibration by the impulse given to the main-pallet, returns by the force of the balance-spring, and with it the lifting-pallet \( q \), the round-edged side of which, pressing against the lifting-spring \( p \), raises it from the detent, and passes without disturbing the detent, which is not again lifted till the balance has completed the present vibration, and returning for the next, again brings the face of the lifting-pallet in contact with the lifting-spring, which (with the detent) it raises, and the act of escaping again takes place, the balance making two vibrations for every impulse, as in the duplex. This escapement, which was invented by Earnshaw, stands unrivalled for simplicity and for performance.

For further details connected with the subject of this article see **Pendulum**.
HORREBOW, PETER, a Danish astronomer, was born in the year 1679. After studying medicine for several years he became the pupil of the celebrated mathematician and astronomer Olaus Roemer, whom, in 1716, he succeeded as professor in the University of Copenhagen. The duties of this chair he discharged with signal success, until about the year 1740, when he resigned in favour of his son Christian. Horrobow died at Copenhagen in 1764, at the advanced age of eighty-five years. His works are: 'On the Astronomical Table of the Stars,' 1747, 4to., an attempt to explain the formation of the planets on the system of Descartes; 'Copernicus triumphs, sive de Paralaxi Orbis Annul Tractatus Epistolario, ib. 1744, 4to., an essay in support of a preference from Roemer's observations, that Sirius and a Lyre have each 390 of annual parallax; 'Atrium Astronomiae, sive Tractatus de invencionibus Refractionibus, ObligatiIter Eruptionis, ib. 1732, 4to.; 'Basis Astronomiae, sive Astronomiae praemissamenta,' ib. 1735, 4to.; 'Consilium de novi Methodo Paschal ad perfectum Staturum pertutuam, al de incipiens omnibus Christianis commendanda,' ib. 1736; 'Elementa Philosophiae Naturalis,' ib. 1748, 4to. Besides a few papers upon astronomical subjects in the 'Acts of Leipzig.' His works were collected and reprinted in 1748-41, at Copenhagen, in 3 vols. 4to. To his 'Basis Astronomiae' is prefixed the 'Life of Roemer,' in which he has recorded to the last everything that could tend to perpetuate the memory of his predecessor.

HORREBB, CHRISTIAN, son of the above, died in 1776, and besides a Latin treatise on Spherical Trigonometry, (De Sphaerica Angulis), his 'Astronomia Demonstrata, ex Observationibus Ann. 1742 et 1743 ducta,' was published, Copenhagen, 1744, 4to. 'De Paralaxi Fixarum Annul. et Rectaeplanibns quantum post Roemerum et Paralacis observat. ib. 1747, 4to.' (Montucla, 'Hist. des Math.,' tom ii.; and the 'Biography Universelle.')

The account given by Horrocks of his observation of Venus, November 24, 1639, entitled 'Venus in Sole visa,' was printed by Hevelius at the end of his 'Mercurius in Sole visa,' published at Danzig in 1662. The remainder of the works of Horrocks were published by Dr. Wallis, London, 1672, some copies bearing the title-page 'Opera Horrocks, insulae. ' And therefore except those given in the Lalande states that he had a copy with a third title-page, dated 1678, and containing some additional tracts of Wallis. This publication contains various astronomical tracts, with extracts from Horrocks' papers of a previous period, and Horrox, whose Horrons had been understood that the University of Oxford is about to publish some letters of Dr. Wallis relating to this subject, from the collection of Lord Macclefield.

The death of early marks took place January 3, 1641 (old style). Costard ('Hist. Astron.) calls him a young clergyman, but we cannot find that he was in orders. In the 'Companion to the Almanac' for 1837 will be found a list of the astronomical works in his possession, taken from a list written by himself at the end of his copy of Langbarg's 'Tabule Perpetua,' which was preserved by his friend Townley. The spelling of his name is taken from his own handwriting in this work.

William Horrocks, who died a few months after his friend Horrocks, at a very early age, was a clothier at Broughton near Manchester, and many of his observations were printed by Wallis in the works above cited, and afterwards in the discussion about Gassowgy, presently to be mentioned.

3. William Milburn, curate at Braceysest near Dur ham, was, according to Sherburne, well versed in algebra, having extracted the approximate root of an equation of the fifth degree before he had seen Harriot's work. In the astronomy he had, by his own observations, detected the errors of Linsgas's tables, and verified those of Kepler. His observations were employed by the great contemporary astronomer, Flamsteed, in 1669, and some tables which he had sent to London for publication were, in 1675, in the hands of Sir Jonas Moore.

4. William Gassowgy, of Middletown in Yorkshire, was killed, about of early marks for Charles I. at Marston Moor. He invented methods of grinding glasses, and Sherburne states that he was the first who used two convex glasses in the telescope. When Auzout announced, in 1666, his invention of the micrometer, Richard Townley, nephew of Christopher above mentioned, presented Hook with a modification by himself of a similar instrument made by Gassowgy; and it appeared from a letter written by Crabtree to Horrocks, that Crabtree had seen Gassowgy's instrument, and used it in similar experiments he had generally admitted that Gassowgy was the original. The micrometer of the wire micrometer, of its application to the telescope, and of the application of the telescope to the quadrant; but that at this time no one, even in England, until the undoubtedly independent inventions of Auzout and Picard had suggested their publication.

Sherburne particularly mentions these four, with some others of less note, in consequence of an assertion of Wallis, in his edition of Horrocks, that there were very few of that day in the north of England who cultivated the sciences. Among the lesser stars was John Shackerley, whose 'Tabule Britannica,' published at London in 1653, were compiled mostly from papers of Horrocks, which were afterwards destroyed in the great fire of London. The rest of Horrocks's papers were rescued by the Curate of Braceysest, afterwards rector of Hackney, from Crabtree's representatives. A lately published work informs us that Crabtree, the friend of Horrocks, is supposed to have perished in the civil wars; the papers of Horrocks himself were burnt after his death, 'by a marauding party of soldiers.' We imagine that the death of Crabtree is here confounded with that of Gassowgy, and the papers of Horrocks with those of Milburn.

HORSE. The family of horses, Equidae, consist of quadrupeds whose form is altogether peculiar. They have but a single finger or toe terminating each extremity; and this finger or toe is incased in a horny hoof or shoe. But though the mode of feeding and walking is very different, there are on each side the metacarpus and metatarsus two small rudimentary processes which represent two
Iternal toes. The following is the form of dentition belonging to this family of Pachyderms:

Inciusors, 6; Canines, 1—1; Molars, 7—7, 1—1; = 42.

We shall not detain the reader with the various fabulous species recorded in the descriptions and figures of some authors, such as 18; the following is a more correct, bisected foot with the whole length of the animal from head to tail, and figured by Jonston as the Pachthias Pferd, Equus Albicus, or the Wild Ass, Equus, figured by the same author, a monocorne, and the middle of the fore foot, in some respects to the different species. These may be classed with the figures of monstrous horses collected by Alfredus, a horse with a human head and face for example, and another with hands by way of fore feet. It is the same horse which, according to Aristotle, belonged to Julius Caesar, and would suffer no one else to mount him—Caicus Julius Caesar utheto equo insigni pedibus prope humanis, et in modum dictorum ungulae basis, &c. This last was probably a case of malformation of the hoof; but the painter has given the animal two human hands, with four fingers and a thumb on each, and nails to match. Leaving these romantic writers, we proceed to draw the reader's attention to the views of some of the modern and more sober-minded zoologists.

Linnaeus, in his last edition of the Systema Naturae (12th), left to the reader the task of describing (Equus) among his Belus (the sixth order of Mammalia), and many of the genera Hippopotamus, Sus, and Rhinoceros. His genus Equus consists of the following species: E. Caballus, E. Ainus, and E. Zebra, and is thus defined by him—Inciusors 6; Canines, 1—1; Molars, 6—6; first sect: 1, of the species bisulcated feet; second sect: 1, species with solidungulous feet; six below more prominent; canines (Lanarii) solitary, included, remote on each side. Feet with an undivided hoof.

Grolfinn, in his edition of the Systema Naturae (13th), added to the above definition, Types 2, inguinal; 1, divided the genus into two sections—1, species with bisulcated feet; 2, species with solidungulous feet. The first section consists of one species only, E. binucleus, the Equus peregrinus; the second sect: 1, E. H. Nata, which was not, probably a Llama. The second section embraces the following species: Equus Caballus, E. Ainus, E. Quagga, E. Zebra, and E. Quagga.

Cuvier places the Siphides at the end of his Mammiferous Pachyderms, and makes this family to consist of only one genus, Equus, with the following species:—Caballus, Ainus, Zebra, Quagga, and Montanus.

Mr. Gray, in his "Revision of the Family Equidae" (Zool. Journ. vol. 1), observes that the Horse, Mule, Onager, Ass, and Zebra, the last of which they generally describe as having the body (corpus) striped with black, brown, and white bands, three inches broad, and the white of the outer side of the hoof; but on Jonston's figure they are distinctly banded. After referring to other figures in Jonston and to Molin's Gmelin, or Huxley, Equus binucleus of Grolfinn, which, if it exists, Mr. Gray wonders if it be possibly a species of Llama (Lama cheia), he notices the figures in Edwards' "Eelings," the species recorded by Linnaeus, Pallis, and Burchell,—the Quagga sent by Captain Gordon from the Cape to Amsterdam, where it was first described and figured from his drawing in the Dutch edition of Buffon, and afterwards in the supplement of the French editions, and L'Anne Isabelle de Le Vailant, with regard to the last, which is described as a race of the Equus peregrinus, the species itself, 1834, he was informed by Mr. Crox, a species said to be of this species was brought from the Cape to Amsterdam.

Mr. Gray thus defines the Family of Equidae:—This family (which is distinguished from all other animals by its undivided hoof, formed of the two anterior toes soldered together, its simple stomach, and its female having the testis placed on the thighs) may be divided into two very distinct types of form; the one, the Asses and the Zebras, which are always whiter and more or less banded with blackish-brown, and always have a distinct dorsal line, the tail only being at the end, and having warts only on the hins and none on the hins; and the true horse, which are not

...
broke the proud spirit of this noble animal and reduced it to obedience and servitude. The books of Genesis and Exodus abound with passages which prove that the Horse had been long under the dominion of man at the date of the events then recorded. It was expressly prohibited (Deut. xvi. 16) that the king should multiply horses to himself, or should cause the people to return to Egypt, to the end that he should multiply horses. Solomon however does not seem to have regarded this prohibition, for his stables were filled with those noble animals; he had 40,000 stalls of horses for his chariots, and 12,000 horsemen. (1 Kings, iv. 25.)

An ancient description inJob (xxxix. 19-25) is familiar to most, but not to Egypt (1 Kings, x. 26), and not Arabia, seems to have been the source whence Solomon’s supplies were obtained. In very early Egyptian monuments the horse is seen in battle, and under circumstances which denote long suffering and experienced training.

It seems to be quite clear that the wild horses of Tartary are as many of the descendants of a domesticated race as the wild horses of America, whose ancestors were introduced by the Spaniards; nor have we any evidence to show the time when the Horse existed in a primitive state of nature.

**Equus**

Genus *Equus*.

**Natural History and Dentition of the Horse.**—It has already been observed that the native country of the horse is the great grassy plains of Asia, and that it has been found in almost every part of the Old World, but his appearance on the continents and the islands of the New World, whether of the Atlantic or Pacific Ocean, is of comparatively late date. Equus is generally considered the most useful of the servants of man, and he yields in intelligence to the dog alone. In the earlier ages of the world he seems to have been devoted to the purposes of war or of pleasure, while the ox was our agricultural servant; but his beauty, and strength and tracery have now re-announced him, directly or indirectly, with almost all the purposes of life. If he differs in different countries in form and size, it is from the influence of climate and cultivation; but his beauty, and strength and tracery have now re-announced him, directly or indirectly, with almost all the purposes of life. If he differs in different countries in form and size, it is from the influence of climate and cultivation; but his beauty, and strength and tracery have now re-announced him, directly or indirectly, with almost all the purposes of life.

He is naturally and of choice an herbivorous animal. His thin and muscular lips, his firm and compressed mouth, and his sharp incisors, are admirably adapted to seize and crop the grass; and although we know nothing of him in his natural state, yet when he has escaped from the bondage of man, and follows his own propensities, the grass is his chosen food. In his domesticated state however, is the development of the true nature of the animal, and that of a much harder kind—the various species of corn; therefore while man and the carnivorous animals can only champ and crush their food, a provision is given to the horse, in the structure of some of the bones of the face, by means of which he can comminate and grind down his food as perfectly as in the herbivorous mill.

The teeth of the horse require some lengthened consideration, not only from their admirable adaptation to this purpose, but as indicating, by the various changes which they undergo, almost beyond the possibility of error, the age of the animal. He may, when young in years, be reduced hourly to the degree, from the seventh to the tenth, by those who ought to be his most zealous protectors; the cavity above the eye may be deepened, the under lip may fail, the limbs may be bow’d, and the feet may be battered and disturbed; but it is not easy to alter the character of the teeth.

The colt is generally dropped with the first and second molar and grinding teeth having forced their way through the gums. When about seven or eight days old the second central front or incisivum has erupted above and below. At the expiration of five or six weeks the two next incisors may be seen. At three months they will have overtaken the central ones, and both pairs will have nearly attained their natural size. At four months the upper incisors will have come in, and a little before or after the eighth month the third nip- per, above and below and on each side, will be seen. The colt will now have his full complement of front or cutting teeth.

These teeth are beautifully adapted to their purpose. They have in front an elevated cutting edge of considerable sharpness. It is formed of enamel, a polished substance almost too hard to be acted upon by the file, which covers the tooth. This elevated edge is bent somewhat inwards and over the tooth, so that there is a depression behind it which forms the root, and constitutes what is called ‘the mark’ in the mouth of the colt or horse.

This elevated edge of enamel, hard as it is, is gradually worn down in line with the horizontal cutting the grass; and as it wears away the hollow behind becomes diminutive, and is at length totally obliterated. By the degree in which this mark is effaced, the horseman, not only with regard to the first, but the permanent teeth, judges of the age of the animal. This is the normal degree to be met with at their early age. At six months it is sufficiently evident in the four central nippers. At a year and a half the mark will be very faint in the central nippers, diminished in the outer two, and the surface of all of them will be flattened.

At twelve months a fourth grinder protrudes, and a fifth, at the expiration of two years.

These are all temporary teeth. They were only last during a very early period of the life of the animal; and when his jaws were considerably expanded, they were destined to give way to a more set, larger, firmer, and that would probably last during life. The permanent teeth had already been formed in the womb, and had been pressing upon their roots, and that pressure had caused an absorption of these roots, until at length they lost all hold and were displaced.

When the animal is three years, or the true central pair of nippers, above and below, are thus removed, and two fresh teeth, easily distinguishable from the first by their increased size, make their appearance, so that a three-year-old colt is easily recognised by these two new and enlarged central nippers.

A three-year-old colt has its form and energies much more developed than a two-year-old one, and is considerably more valuable; therefore some disposed breeders endeavour to pass him on to another as a two-year-old one, and are readily imposed upon, mainly through their impatience.

The third and fourth years of the horse are a period of transition from one class to another; the young animal is now thoroughly independent of its parents, and is learning to conquer difficulties on its own account.

The fourth year is more than half way through the horse’s life, and, with his powers more distinctly marked, he is ready for his work. The first nine months of this year are occupied in the colt’s increase and strengthening, under the care and protection of its nurse, until, by the time of the fall, it is almost ready to break away from the mare, and to find his own way about the world.

The following are the changes which take place during this period:—The colt begins to develop a more active lightness of foot, more agility, and a quicker speed, and the tendons and ligaments begin to assume that strength which they never perfectly attain until the age of six years. The appearance is more distinct, and the muscles are better formed, and, from the exercise of the animal, he is better able to support the weight and to run against the resistance of the world. It is, in short, his peak of strength and beauty. The horse then begins to show the distinction of his race, and the more developed vigour of his condition is more and more evident.

In the fifth, or sixth year the horse is fully trained, and begins to show the extent of his capabilities. He has now passed through the period of his greatest increase and strength, and is ready to make his appearance in the world of action. He has now reached the maturity of his age, and is capable of performing the highest feats of his species, and emulating the best of other animals. The horse, in the sixth year, begins to show indications of age, and the decay of his frame begins to be evident, from which it is impossible to leave it in its first prime. This year also shows evidence of the deterioration of the Russian breed of horse, the Russian horse being much more delicate in the fifth year than the English horse, that is, in the sixth year of age.
considerably nearer to the former than the latter, and particularly so in the lower jaw. The use of these teeths in the domesticated state of the horse is not evident; but they were probably designed as weapons of offence in the wild state of the animal. Attempts are too frequently made to hasten the use of them, but the horse is not the creature he has been in the same manner as described with regard to the first, and the gum is often deeply lanced in order to hasten the appearance of the tush.

This mark on the central puffers will be diminished, if not obliterated. A depression and a mark of rather brown hue may remain, but the deep blackened hole in the centre will no longer be found. The other incisors will generally be worn, and then the tush will be nearly disappeared, and the tush will be rounded at the point and edges.

At eight the mark will have disappeared from all the inner teeth, and the tush will be evidently rounder and blunter.

At this period another piece of trickery is occasionally practised. The breeder had, till the animal was five years old, been as far as his manner could naturally give it impossible to say anything satisfactory. Many have exceeded thirty, and some of them even forty; but, from ill usage and over exercise, the majority come to their end between nine and ten years of age.

The Proper Conformation of the Horse.—A very general account only can be given of this, for it varies essentially with the breed and destination of the animal. There are so many exceptions which are valuable, and which do not answer the description. The head should not be disproportionally large, and should be well set on, i.e. the lower jaw-bones should be sufficiently far apart to enable the head to form that angle with the neck which gives free motion and a graceful carriage to it, and prevents its bearing too heavy on the hound. The eye should be large and a little prominent, and the eyelid fine and thin. The ear should be small and erect, and quick in motion; the lip-ear indicates dullness or stubbornness; and when it is habitually laid too far back upon the neck, there is too frequently a disposition to mischief. The nostril in every breed should be somewhat extended, but not so much as to make the race, the hunter, the roadster, and the coach-horse, for this animal breathes only through the nostril, and would be dangerously distressed when much speed is required of him, if the nostril could not dilate and admit to return the air. The neck should be loose rather than second; pulatate the animal to graze with more ease, and to throw his weight more forward, whether he is in harness or galloping at the top of his speed. It should be muscular at its base, and gradually become fine as it approaches the head. The withers should be somewhat bigh in every horse, except perhaps that of heavy draught, and it does not harm him, for there is larger surface for the attachment of the muscles of the back and shoulders, which are the principal ones by which the horse is worked. A slanting direction of the shoulder gives also much mechanical advantage, as well as an easy and pleasant action, and a greater degree of safety. It must not however exist in any considerable degree in the horse of draught, and particularly of heavy draught. The chest must be capacious, for it contains the heart and the lungs, the organs on which the speed and endurance of the horse depend. Capacity of chest is indicated by the curve of the ribs, but this is not of the chest admits of variation. In the waggon-horse the circular chest may be admitted, because he seldom goes at any great speed, and there is comparatively little variation in the quantity of air expired; but in the racing horse, and when the horse is in action, there is much variation. The quantity of air expired in the gallop is many times that required in hard work. Here we must have depth of chest, not only as giving more room for the expansion of the lungs, but also for the expansion of the chest, which admits of that expansion. That which is somewhat straight may be easily bent into a circle when greater capacity is required; but the chest which is already curved is much worse.

A few words more are all that our limits permit us to add, and they contain almost all that is necessary to be added on the conformation of the horse. 'The loins should be broad, the quarters long, the thigh muscular, and the hocks well bent and well under the horse.'

General Management of Horses.—The foal, as soon as it is dropped, should be turned with its dam into a sheltered and good pasture, in which there is a liberal supply of grass and hay; and the water in the spring and the rain. Some hay or corn for both, should be allowed, if it is early in the season, or the grass has scarcely begun to shoot. There is nothing so detrimental to the colt as insufficient food. It should be fed in plenty, and fresh water given in the spring, and well water till the growth is checked by starvation, beauty and energy and sturdiness will rarely be displayed in after-years.

In five or six months, according to the growth of the foal, or the condition of the animal, the first rognery or plowing should be allowed, unless it be an animal which is to be used for draught, in which case the first rognery will be the plowing, and the animal will be ready for the plowing, and the animal will be ready for the plowing. The colt should be removed from his former haunts to some distant rick-yard, or confined to a stable, until he becomes a little reconciled to the loss of his dam.

In the ensuing period of the animal's existence, a process on which will materially depend the temper and value of the horse, and the pleasure of the rider. The foal should be handled and harnessed, and led about by the servant who has charge of him, and admits of great experience; the principle, says the author of 'The Horse,' on which the after-usefulness of the animal is founded, is early attachment to and confidence in man, and obedience, resulting principally from these.

With regard to the racing colt, the processes of breaking and training are injuriously and cruelly completed in the second year, and thousands of horses are irreparably injured by this early extasy of labour and speed; but in the hunter, the rognery, the racing, and the agricultural, the most serious part of this business is not entered upon until the third year.

A horse is well broken when he has been taught impert and cheerfulness of spirit, and does not shuffle into his rider or driver, and dexterously in the performance of his work. A dogged, sullen, spiritless submission may be enforced by the cruel and brutal usage to which the breaker so frequently has recourse; but that prompt and eager response to the slightest intimation of the rider's will—that manifest aim to anticipate every wish, that gives to the horse so much of his value, must be built on habitual confidence and attachment. The education of the horse should be considered as the child. Pleasure should be such as is possible associated with the early lessons; while firmness, or, if need be, coercion, must establish the habit of obedience.

The breaking being accomplished, the management of the horse will vary according to his breed and destination; but the good usage of our domesticated slaves should be from a principle that ought never to be violated. The agricultural horse is seldom overworked, and on large farms, is generally well taken care of; he is generally more above his work. This however is an error on the right side. A very slight inspection of the animal will always enable the owner to determine whether he is too well or not sufficiently fed. The size of the farm, the distance he has to work, and the season of the year, will make considerable difference in the quantity and the quality of the food. The following accounts will sufficiently elucidate the general subject:

A common horse, with a capacity of seven acres per week, the year through, on strong land with a team of three horses, and allows to each weekly two
bushels of oats, with hay, during the winter six months, and during the remainder of the year one bushel of oats per week, with green food. Mr. Ellman, of Glynde in Sussex, allows two bushels of oats, with peas-haulm or straw, with but very little hay, during 30 winter weeks. He gives one bushel of oats with green food during the summer. There is very little difference in the management of these two gentlemen, and that probably arising from circumstances peculiar to their respective stations. The principles of feeding with reference to agricultural horses are, to keep the animal rather above his work, to give him good and wholesome food, and, by the use of the nose-bag, or other means, to be worked more than four or five hours without being bated.

The horse of quick work, the stage-coach horse and the poster, should be allowed as much as he will eat, care being taken that no more is put into the manger than he will readily dispose of. The quantity actually eaten will depend on the degree of work and the natural appetite of the horse, but it may be averaged at about 66 pounds of chaff, 173 pounds of beans, and 77 of oats per week. When work is unusually hard, the quantity of oats may be diminished, that of beans increased, and a portion of barley added.

During the sporting season the hunter is well fed, and with a kind of food which contains a great proportion of nutrient in little compass. A small quantity of hay, rarely more than eight to ten pounds per day, is allowed, and less than that on the day before work. The quantity of corn may, of course, be increased, in proportion as it is found that the most hunting stables, and probably well founded, against chalk, and it is seldom that the beans and oats are bruised. A bran-mash is given after a day of more than usual fatigues, and a special meal, when the work has not been more than ordinary work, provided that at least two days are suffered to elapse before the horse is again taken into the field.

No horse should be urged on after he has exhibited any equivocal symptoms of distress, such as a drooping pace, a staggering gait, a heavy bearing on the hand, a rapid inspiration like a hurried sigh, and a peculiar convulsive action of the diaphragm, as though the heart were violently beating against the ribs. The least of these symptoms, even if the horse has not been more than ordinary work, provided that at least two days are suffered to elapse before the horse is again taken into the field.

The hunting season having passed, the horse used to be turned into the field as soon as the grass had begun fairly to sprout, his feet being trimmed, and his horn done and his hovel, into which he might retreat from the sun or the storm, he remained until the middle of June, or the flies began to trouble some. It was delightful to see how much he enjoyed this shelter, and the good and well handled horse of the autumn may, of course, be expected to carry the load of the spring. It is probable that horses have become the fashion to confine him to a box, whence he is not except for an hour's walking exercise on the road, until he is taken into training for the next winter's business.

Nothing can be so erroneous or cruel as this. There are few horses that have not materially suffered in their legs and feet before the close of the hunting season. There cannot be anything so refreshing to their feet as the damp coolness of the herbage they tread at that period, and there is no physic which so safely and effectually as the spring grass carries off every humour that may be lurking in their frame.

The training of the race-horse is a simple affair. It is by means of exercise and of physic, getting rid of all superfluous fat and flesh, without debiliting him. The physic is useful; it is indispensable; but the chief local advantage is to train the use of every power that he possesses, without too much hurrying his breathing or overstraining or injuring him.

The training of the race-horse is of a similar character, but is more slow and of a different form; and his endurance must be tested to the utmost. The hunter has to carry his rider gallantly and well through perhaps a long burst, and if he tires, and the sportsman has the good sense to stop, there is no danger to him, even if the evil is some temporary suffering to him, and disappointment to his master; but if the race-horse breaks down, or if his capabilities have not been accurately calculated, the most serious loss may be sustained. Thence arises the necessity of training and of testing every power in the preparation of the turf horse; and thence too it happens, from the strange and impolite sacrifice of the endurance of the modern racer to speed during short distances, that so many young horses break down and become perfectly useless in their training.

The convenience of a horse is a very important but disregarded portion of his general management. The kind of water has not been sufficiently considered. The difference between what is termed hard and soft water is a circumstance of great importance. The former contains certain saline principles which decompose the crust, as in the curdling of soap; and prevent the solution of others, as in the making of tea, the boiling of vegetables, and the process of brewing. It is natural to suppose that these different kinds of water would produce somewhat different effects on the animal frame, and such is the fact. Hard water, freshly drawn from the well, will frequently roughen the coat of the horse accustomed to it, or cause griping pains, or materially lessen the animal's power of exertion. The racing and the hunting grooms are perfectly aware of this; and so is the horse, for he will refuse the purest water from the well, if he can obtain access to the running stream, or even to the stagnant, which it proves to him.
time for preparation varies from two to four months. On the
day before work the horse should have exercise enough to
empty the bowels. If he is kept for half a day, he should have
no less than six hours of starting, nor water within four
hours, nor corn within three hours; but if he has five or six
miles to go to cover, these restrictions are less necessary.
The working days will vary according to his condition and the
weather. He may have to go out every second day, and sometimes not more than once in six or
seven. His spirits and appetite, and the state of his legs,
will decide this. Even on the slack days some exercise
should be taken in order to evacuate the bowels and create
an appetite.

Coaching.—The horses are best prepared for their
work by good feeding and gradual increase of speed and
distance. A coach has a working length of a mile, so
that a horse is required for every mile, or a coach running
between two places forty miles distant employs forty horses
to take it away and bring it back. The pace being calcu-
lated at from nine to eleven miles an hour, no horse works
quite an hour in the day, and some not more than three-
quarters of an hour, except that, occasionally, an able horse
may perform a double journey in order to relieve a sick
company. No horse therefore leads so easy a life as an
English coach-horse in a well regulated establishment.

The muscular exertion is severe while it lasts, but it is soon
over. The excitement however of high keep and excessive
exertion gradually wears the horse down, and it is rarely that
he can continue a fast coach more than four years.
Nimrod, On the Road.

Carting.—Cart-horses usually work from eight to ten
hours, six days a week. The pace varies from two
miles a mile and a half per hour, and the weight on
his back exceeds 24 cwt., besides the cart, which probably is seven or
eight more. All beyond this in weight or in time of work is
cruel.

Ploughing.—The average work is about eight hours in
the day. The severity of it depends on the pace, the
nature of the soil, and the breadth of the furrow-slice. The
pace is from a mile and a half to two miles per hour; the
furrow eighteen, or nine inches to five and a half, the distance
travelled is from twelve to sixteen miles. The horse and
the man can well support this as long as the ploughing
season continues.

Diseases of Horses.—It may be readily supposed that the
animal doomed to the manner of living just traced in every
variety of the horse will be peculiarly exposed to numerous
forms of suffering. Every natural evil will be aggravated,
and many new and formidable sources of pain and death
will be superadded.

Interest and humanity require that we should become
acquainted with the nature and causes and remedy of the
diseases of the horse. Only a slight sketch of them can be
given here, but sufficient to serve as a basis from which
the student may recognise their existence, to avoid their causes, or to induce him to apply to the proper quarter for their removal or alleviation.

The principal diseases of the horse are connected with the
circulatory system. From the state of habitual ex-

citement in which the animal is kept, in order to enable
him to execute his task, the heart and the blood-vessels will
often act too impetuously. The vital fluid will be hurried
along too rapidly, either through the frame generally or
some particular part of it, and there will be conges-
tion, accumulation of blood in that part, or there will be inflam-
enation, either in general, disturbing the functions of
some organ or of the whole frame.

Congestion.—Take a young horse on his first entrance
into the stables; feed him somewhat highly, and what is the
consequence? He has swallowing sickness; he should have
motion of the joints, or perhaps of the lungs. Take a horse
that has lived somewhat above his work, and gallop him to
the top of his speed: his nervous system becomes highly ex-

cited—the heart beats with fearful rapidity—the blood
pumped into the lungs faster than they can discharge it—
the pulmonary vessels become gorged, fatigued, and utterly
powerless—the blood, arrested in its course, becomes viscous,
and stagnates in the heart vessels. We have but one chance of
saving our patient, viz., the instantaneous and compulsory
excretion of blood; and one means of preventing the recur-
rence of this dangerous state, namely, by not suffering too
great an accumulation of the sanguineous fluid by over-
feeding, and, by regular and systematic exercise, inuring
the circulatory vessels to prompt and efficient action when
they are suddenly called upon to exert themselves. The
cause and the remedy are sufficiently obvious, and the horse
are small, and pursue a very circuitous and winding course.
A horse highly fed, and full of blood, is suddenly and
sharply excited, as the course of its blood vessels is accelerated
in every direction, and to the brain among other organs. The
vessels that ramify on its surface or penetrate its substance are completely distended and gorged with it. Perhaps they are ruptured, and the effused blood presses upon the brain, and the animal suddenly drops powerless. A prompt and copious abstraction of blood, or in other words a diminution of this pres-
sure, can alone save the life. Here is the nature, the
cause, and the treatment of apoplexy.

Sometimes this disease assumes a different form.
The horse has not been performing more than his ordinary work,
or perhaps he may not have been out of the stable. He is
found with his head drooping and his vision impaired. He
is staggering about; he falls, and lies half unconscious, or
he struggles violently and dangerously. There is the same
congestion, with the addition of the great amount of nervous origins, but produced by a different cause. He
has been accustomed habitually to overload his stomach, or
he was, on the previous day, kept too long from his food,
and then has been at last too violently excited, and until his
stomach was completely distended and unable to perform
its usual functions, towards the abstraction of its accumulat-
ted contents. Thus distended, its blood-vessels are compressed, and the circulation through them is impeded or altogether suspended. The blood is still forced upon the heart, and driven in accumulating
quantity to other organs, and to the brain among the rest;
and there congestion takes place, as just described, and
the animal becomes sleepy, unconscious, and, if not speedily
relieved, he dies, or entirely broken, by a spasm of
the horseman calls it stomach staggers. Its cause is improper
feeding. The division of the hours of labour, and the
introduction of the nose-bag, have much diminished the
frequency of its occurrence. The remedies are plain,—
bleeding, physicking, and the removal of the contents of the
stomach by means of a pump contrived for that pur-
pose.

Congestions of other kinds occasionally present them-
soever. It is no uncommon thing for the blood to loiter in the
complicated vessels of the liver, until the covering of
that viscus has burst, and an accumulation of congested
black blood has presented itself. It is the same with the
abdomen. The horse is a machine and therefore an
animal; horses are subject when they stand too long idle in the
stable. Congestion is the source of many of the accumu-
lations of serous fluid in various parts of the body, and particularly in the chest, the brain, and the cord.

Infiammation is opposed to congestion, as consisting in an
active state of the capillary arterial vessels; the blood
rushing through them with far greater rapidity than in health, from the excited state of the nervous system, by which they are
supplied.

Infiammation is either local or diffused. It is confined
to one organ, or to a particular portion of that organ; or it
takes place by the blood coursing or surging through the whole
frame. In the latter case it assumes the name of
fever. Fever is general or constitutional inflammation, and
is said to be symptomatic or symptomatic when it can be
reduced to a single focus, or to the plain, and a symptomat-
ous, or we cannot so trace it. The truth probably is that
every fever has its local cause, but we have not a sufficient
knowledge of the animal economy to be able to discover it.

Infiammation may be considered with reference to the
membrane or to the muscles and muscles.

The mucous membranes line all the cavities that compu-
te with the external surface of the body. There is
frequent inflammation of the membrane of the mouth.
Blister, or hoar, is a small bulla or vesicle which runs
along the side of the tongue. Its cause is unknown.

It should be lanced freely and deeply, and a little aperient
medicine administered. Barb, or paps, are smaller en-
largements, found more in the neighbourhood of the h indifference

310 HOR
of the tongue. They should never be touched with any instrument; LUPUS is inflammation of the palate, or enlargement of the bars of the palate. The roof of the mouth may be slightly lanced, or a little aperient medicine administered; but the sensibility of the mouth should never be destroyed by the application of the heated rod. Canker, or wounds in the mouth, from various causes, will be best remedied by diluted tincture of myrrh, or a weak solution of alum. Foreign bodies in the gullet may generally be removed by using the whole interior of the horse, by timely recourse to equal parts of vinegar and water injected into the stomach, after the poison has been as much as possible removed by means of the stomach-pump. For anemic or corrosive sublimate there is rarely any antidote. SPASMODE COLIC is too frequently produced by exposure to cold, or the drinking of cold water, or the use of too much green meat. The horse should be walked about; strong friction used over the belly, and spirit of turpentine given in doses of two ounces, with an ounce each of nitric and spirit of nitrous ether, in warm water or ale. If the spasms are not soon relieved the animal should be laid, an aseptic hall administered, and injections of warm water with 1 oz. of arsenic nitric made; or exposure to cold and a little liquor, with a warming poultice on the bowels, when long continued, is liable to produce intravenous, or entanglement, of them, and the case is then hopeless. SUPERPURGATION often follows the administration of astringent purgative, and the torture which it produces will be evident by the agonized expression of the countenance, and the frequent looking at the flanks. Plenty of thin starch or arrowroot should be given by the mouth and nostrils, with weak and, if required, hours having passed without relief being experienced, chalk, catechu, and opium should be added to the gruel. WORMS in the intestines are not often productive of much mischief, except they are very gross. Sometimes, in doses of emetic tincture with a little ginger, may be given to the horse half an hour before his first meal, in order to expel the round white worm; and injections of linseed-oil or aloes will remove the ascariads, or non-worms.

The respiratory passages are all lined by the mucous membrane. CATAARRH, or cold, inflammation of the upper air passages, should never be long neglected. A few marshes or a little pale pepper used, if it is suspected, and occasionally, in defiance of all treatment, it will degenerate into other diseases. The larynx may become the principal seat of inflammation. Laryngitis will be sharp and acute, or the membranes of breathing))*sanitised, a strange roaring noise, and an evident enlargement and great tenderness of the larynx when felt externally. The windpipe must be opened in such case, and the best advice will be to remove the membranes, the suffocations of the trachea, before or when it first enters the lungs, will be the part affected, and we have bronchitis. This is characterized by a quick and harsh breathing, and a peculiar wheezing sound, with the coughing up of mucus. Here too drastic measures must be adopted, and a skilful practitioner employed. So should he be in distemper, influenza, and epidemic CATAARRH, names indicating the same disease, and produced by atmospheric influence, varying to a certain degree in every season, experienced, it may be, in the mucous surfaces, and by rapid and utter prostration of strength, and in all demanding the abatement of that inflammation, and yet no expenditure of vital power.

Coughs may degenerate into inflammation of the lungs; or this fearful malady be developed without a single prurient symptom, and may prove fatal in twenty-four or even in twelve hours. It is mostly characterized by dryness, the eyes surrounded by a very redness of its lining membrane, singularly anxious countenance, constant gazing at the flank, and an unwillingness to move. A successful treatment of such a case can be founded only on the most prompt and fearless and decisive measures. The lance must be freely used; counter-irritants must follow as soon as the violence of the disease is in the slightest degree abated; sedatives must succeed to them, and fortunate will be he who saves his patient after all the decisive symptoms of pneumonia are on developed.

Among the consequences of these severe afflictions of the lungs are cough, not always much interfering with the usefulness of the horse, but strangely aggravated at times by any fresh accession of catarrh, and too often degenerating into thick wind, which always materially interferes with the speed of the horse, and in a great proportion of cases terminates in bronchitis. Generally, therefore, of either of these diseases admits of cure, nor does that obstruction in some part of the respiratory canal, and varying in almost every horse, which produces the peculiarsound termed roaring.

Glanders, the most destructive of all the diseases to which the horse is exposed, is the consequence of breathing the atmosphere of foul and vitiated stables—the winding up of the most frequent and almost every horse is said to have been brought on by frequent resort to fox-hunting. Catarrh, or WARTS, are frequently met with, and vary in almost every horse, which produces the peculiar sound termed roaring.

The urinary and genital organs are also lined by mucous membranes. The horse is subject to inflammation of the kidneys from eating muddy oats or mowburnt hay, from earth taken by the mouth in exposure to cold, and, being agitated, to friction. Inflammation of the bladder, caused by this or by drinking of opium, will yield only to the abstraction of blood and the administration of opium. A catheter may be easily passed into the bladder of the mare, and the urine evacuated, but it will require a skilled and experienced surgeon to effect this in the horse. A stone in the bladder (turbid) is to be removed by the practitioner, and may be extracted with comparative ease. The sheath of the penis often becomes diseased from the presence of corrosive mucous matter; it may easily be removed with warm soap and water, and the inflammation of the nostril on the same side with the enlarged gland. Its contagiousness should never be forgotten, for if a glandered horse is once introduced into a stable, almost every horse in it will sooner or later become infected and die.

The serous membranes are of great importance. The brain and spinal marrow, with the organs of the nerves, are enveloped in the meninges; the pericardium, or sac, develope the brain, produced by over-exertion, or by any of the causes of general fever, and it is characterized by the wildest delirium. Nothing but the most profuse bleeding, active purgation, and blistering the head, will afford the slightest hope of success. Tetanus, or Locked jaw, is a
constant spasm of all the voluntary muscles, and particularly those of the neck, the spine, and the head, arising from the injury of some nervous fibres—that injury spreading to the origin of the nerve—the brain becoming affected, and the body becoming speechless and palsied. This is the result. Bleeding, physic-ing, blistering the course of the spine, and the administration of opium in enormous doses, will alone give any chance of cure. Epilepsy is not a frequent occurrence in the horse, but it is admitted of, and it is very apt to return at the most distant and uncertain intervals. Palsy is the suspension of nervous power. It is usually confined to the hinder limbs, and sometimes to the fore limbs. The massage, blistering, and medicinal, and blisters, and the spine, are the most rational applications, but they too often utterly fail of success. Rattles, or madness, is evidently a disease of the nervous system, and once being developed, it is almost invariably a violent cure. The utter destruction of the bitter part with the lavender caustic, soon after the infliction of the wound, will however, in a great majority of cases, prevent the development of the disease.

Pleurisy, or inflammation of the serous covering of the lungs and the lining of the cavity of the chest, is generally connected with inflammation of the substance of the lungs; but it occasionally exists independent of any state of the lungs. In this case hard thick and smooth; the extremities are not so intensely cold as in pneumonia, the membrane of the nose is little reddened, and the sides are tender. It may be of importance to distinguish between this and a previous one, because any more severe the inflammation may be pursued, and the effect of counter-irritants will be greater, from their proximity to the seat of disease. Copious bleedings and sedatives here also should be had recourse to. It has been observed that a serous fluid is effused in the chest, the existence and the extent of which may be ascertained by the practised ear, and which in many cases may be safely evacuated. Bleeding by a serous membrane, the pericardium, that secretes a fluid, the interposition of which prevents any injurious friction or concession in the constant action of this organ. If this fluid increases to too great a proportion, it is certain that the organ will be impaired and destroyed—this is dropy of the heart; it is difficult to detect, and more difficult to cure. The heart itself is often diseased; it sympathises with the inflammatory affection of every organ, and therefore is itself occasionally inflamed. Carditis, or inflammation of the heart, is characterised by the strength of its pulsations, the trepidation of which can be seen, while the sound can be heard at a distance of several yards. Speedy and copious blood-letting will afford the only hope of cure.

The outer coat of the stomach and intestines is composed of a serous membrane, the peritoneum, which adds strength and firmness to their texture; attaches and supports and covers the respective parts. This prevents any injurious friction between them. This coat is exceedingly subject to inflammation, somewhat gradual in its approach; the pulse quickened, but small; the legs cold; the belly tender; there being constant pain, and every motion increasing it, there also being rapid and great prostration of strength. These symptoms will sufficiently characterise peritoneal inflammation. Bleeding, aperient injections, and extensive counter-irritation will afford the only hope of cure.

The time for castration varies according to the breed and destiny of the horse. On the farmer's colt it may be effectually performed not more than six months; while it is comparatively seldom that a fatal case then occurs. For other horses much depends on their growth, and particularly on the development of their fore quarters. Little improvement has been effected in the old mode of castrating, except the opening of the scrotum, and the division of the cord by the knife, instead of the heated iron.

Sympathetic or joint membranes are interposed between the dorsal and the bones, and frequently between the tendons, in order to secrete a certain fluid that shall facilitate motion and obviate friction. Occasionaly the membrane is lacerated, and the synovia escapes. This is termed opened joint, and sometimes gives rise to severe pain. The duty of the practitioner is to close this opening natural as quickly as possible. Nothing is so effectual here as the old application of the cautery. A great deal of inflammation and engorgement is produced around the opening, partially, if not altogether, closing it; or at least enabling the coagulated synovia to occupy and obliterate it. Perhaps, in order to assure the desired result, the whole of the joint should be blistered; a bandage should then be firmly applied, and kept on as long as possible. If after this the lacerated synovia, the cauterity must again be had recourse to.

The Nervous Disease is a bruise, or inflammation, or perhaps destruction, of the cartilage of the navel bone, or possibly the cartilage of the horse bone; and is considered as not at all likely to reach the coffin-bone. The veterinary surgeon can alone ascertain the existence and proper treatment of this disease. Spavin is an enlargement of the inner side of the hock. The disease is a consequence of those of the hock sustaining a very unequal degree of concussion and weight, the cartilaginous substance which unites them to the shank bone takes on inflammation, it becomes hypertrophied, and the disposition to this change being set up in the part, bony matter continues to be deposited, until a very considerable enlargement takes place, known by the name of spavin, and there is considerable lameness in the hock joint. The bony tumour is blistered, and probably fried, but there is no diminution of the lameness until the parts have adapted themselves, after a considerable process of time, to the altered duty required of them, and then the lameness materially diminishes, and the animal is considered perfectly well. Card is an enlargement of the back of the hock, three or four inches below its point. It is a strain of the ligament which is scarce the tendons down in their place. The patient should be turned to the side subjected to the injury, and this applied over the back of the tumour, and, occasionally, firing will be requisite to complete the cure. Near the fetlock, and where the tendons are exposed to injury from pressure or friction, is an inflammation of the flexor tendon, which is lubricating mucous fluid constantly escapes. In the violent efforts which the horse occasionally has to perform these become bruised and inflamed, and enlarged and hardened, and are termed horse ulcers; if they are ruptured, or escape, there is no cause of lameness after the inflammation has subsided, unless they become very much enlarged. The cauterity will then be the best cure. Immediately above the hock enlargement of the synovia, which is often very serious; for, from the deep-seatness of the mucous bag, it is almost impossible to act effectually upon it. It is termed bag or blood spavin.

The other place which fills the interspaces of the various organs, or enters into their texture, is the seat of many diseases. From the hardness of the harness, or the bruising of the attendant, the poll of the horse becomes contused. Inflammation is set up, considerable swelling ensues, and an ulcerative process soon commences, and chasms and sinuses of the most frightful extent begin to appear. The withers are probably bruised, and the same process takes place there, and sinuses penetrate deep beneath the shoulder, and the bones of the withers are frequently exposed. These abscesses are termed poll evil and cutaneous ulcers, and in the treatment of the horse the surgeon usually employs ales and plasters, but a better mode of management has however been introduced: seotons are passed through the most dependent parts, no collection of sanious fluid is permitted to exist, and milder stimulants are applied to the skin of the ulcer.

An abscess of a peculiar character is found between the branches of the lower jaw in young horses: it is preceded by some degree of fever. It is usually slow in its progress, but at length it attains a considerable size, including the whole of the half of the bone, and it is very hard. There is one uniform mass of tumefaction. This is strangulates. It seems to be an effort of nature to get rid of something which oppresses the constitution, and the treatment of it is very simple—to let it escape. It is cut with a knife and bisepted: it is punctured as soon as the fluctuation of a fluid within it can be fairly detected, the pus speedily escapes, and there is an end of the matter.
To one disease of the absorbent system a brief reference must be made. 

**Farcy.**—While the arterial capillaries are engaged in building up the frame, the absorbents are employed in removing that which not only is useless, but which would be poisonous and destructive. They take up the matter of the glands and of every ulcerating surface, and they are occasion-ally irritated, inflamed, and ulcerated, from the acrimo-
nious nature of the poison which they carry. The absorb-
ents are furnished with numerous valves; the fluid is for
while arrested by them, and there the inflammation is
greatest, and ulceration takes place. This is the history of
the farcy cords and buds.

The skin of the horse is subject to various diseases. Large pimples or lumps suddenly appear on the skin and, after remaining a few days, the cuticle peels off, and a circular sealy spot is left. This is called suft. The cause is obscure, but principally referrible to indigestion. A slight bleeding will always be serviceable; physic rarely does good, but alternatives composed of nitre, black antimony, and sulphur will be very beneficial. **Mange** is a disease of a different character. It is the curse of the stable into which it enters, for it will almost certainly affect every horse. Thorough dressings with Barbadoes tar and linseed oil, in the proportion of one of the former to three of the latter, will be the most effectual external application, while alternatives and physic should be given internally. Hide-
band is a very apropos term for the thongs of the hude to the ribs when a horse is out of condition. The subcutaneous adipose matter is all absorbed. The alter-
tive above recommended will be very useful here. **Grease** is an undue secretion of the fluid which was designed to lubricate the skin of the heels, and that secretion being also altered in quality. The hind legs begin to swell, a fluid exudes from the heels, the hairs of the heels become erect like so many bristles, and the skin of the horse is grey. Soon after these cracks appear across the heel: they discharge a thick and offensive matter, and then deepen. They spread up the leg, and so does the tumefaction of the part. In process of time the skin, inflamed and ulcerated, undergoes an alteration of structure; prominences or granula-
tions appear on it, assuming the appearance of a collection of grapes, or the skin of a pine-apple. They increase, and a fistulous discharge appears from the crevices between them.

The cause is generally neglect of the horse. He is suf-
fected to stand in the stable with his hoofs cold and wet, and this must necessarily dispose them to inflammation and disease.

In the first stage of grease, bran or turnip or carrot poultices will be serviceable, with moderate physic. Then astringents must be employed, and the best are alum or sulphate of copper in powder, mixed with eight times the quantity of Bole Armenian, and sprinkled on the sore. These should be alternated every three or four days. The grayish heels are a disgrace to the stable in which they are found, and admit not of radical cure.

As to the structure, shoeing, and diseases of that admirable organ the foot of the horse, the reader is referred to Goodwin's *On Shoeing,* Blaine's 'Veterinary Outlines,' and the treatise on *The Horse,* published by the Society for the Diffusion of Useful Knowledge.

**Genus.** Asinus. (Gray.)

*Asinus Hemionus,* Equus Hemionus of Pallas; the Dabkhetel, Dlaggetel, Dregthali, or Dregchel.—Voyeurs of the Chinese.

**Description.**—Male-like in form, with the head and ears large; colour Isabella yellow; mane, tail, and dorsal line black. Mr. Gray observes that the winter coat is very long, and that of the summer short.

**Locality.** Central Asia; the sandy deserts of Mongolia, on the borders of Tibet and China, where Pallas met with it in troops. M. Dureau saw it held in Hindustan; and M. Lesson adds that it is said to be very common in the Himalaya chain. There is a living Dabkhetel in the gardens of the Zoological Society at the Regent's Park.

*Asinus vulgaris.* [Aer, vol. iv.] We have to add to the article quoted, that the Ass of Dakhun (Deccan) is very

little larger than a good mastiff or Newfoundland dog, according to Col. Sykes. (Zool. Proc, 1830-31.)

---

**Arien Quagga,** the Quagga. Less than the Zebra, with the hinder parts higher, and the ears shorter. For of the head, neck, mane, and shoulders blackish brown banded with white, the ground colour gradually becoming paler, and the bands less distinct and diffused, as we pro-
ceed along the back, till it is greyish on the rump; the dorsal line is black, margined on each side with a white line. Belly, tail, and legs white; ears with two irregular black bands and white tip. The young is pale brown, with the mane, a few scattered spots, and the dorsal line of a deeper colour, the latter of which is slightly extended down the tail. The belly and legs whitish grey, with a dark ring just above the hoof. The forehead, cheeks, neck, and mane marked with transverse whitish bands, which are visible in peculiar positions on the back also. (Gray.)

**Locality.** Southern Africa, near the Cape of Good Hope. Mr. Gray observes, that according to Captain Gordon, Quaggas are employed by the natives for the purposes of draught, but he goes on to remark that as Buffon very justly observes, it is curious that he could only get a young specimen. Mr. Gray further states that an individual at Exeter *Change* was not very docile, being much more wild than the Zebra; its name, he adds, is derived from its voice, which resembles the barking of a dog.

Mr. Gray informs us (loc. cit.) that when the skin of the animal, which he considers to be and which agrees with M. Buffon's figure of the young of this species (except in having the brown ring above the hoof), was shown to Professor Temminck by Mr. Children, he declared it to be the *Ass Isabella* of Le Vaillant; but with all due respect to the knowledge of M. Temminck, who, Mr. Gray observes, so greatly excels in the knowledge of species, he is sorry that he cannot agree with that naturalist in this instance, although he allows that M. Temminck ought to know Le
Vaillant's animals better than any other person, as that celebrated traveller constantly corresponded with M. Temmich. 'If it be that animal,' Mr. Gray continues, 'Le Vaillant must have overlooked the bands, and I can hardly call it Isabella colour.'

*Equus Burchelli* (Gray), Burchell's Zebra. Body white; head with numerous narrow brown stripes, which gradually unite together and form a bay nose; the neck and body with alternate broad stripes of black and narrow ones of brown, the latter of which nearly fill up the inter-spaces between the black stripes, and only leave a narrow whitish margin. The dorsal line is narrow, and becomes gradually broader in the hinder part, distinctly margined with white on each side. The belly, legs, and tail quite white; the mane alternately banded with blackish and white. Mr. Gray, whose description is this, has given a figure of the animal (Zool. Journ., vol. i. pl. ix. fig. 1) from the skin in the British Museum, which was brought home by Mr. Burchell.

**Locality.** Southern Africa; the flat parts near the Cape. (Burchell.)

In the catalogue of the African Museum, lately (1838) dispersed, No. 24 was stated to be *Equus Burchelli*, the same animal, we presume, as that described by Mr. Gray under the name of *E. Burchelli*. 'This,' says the catalogue, is the young of a species intermediate between the South African Quagga and the Zebra, which was found occurring in herds in every district north of the Orange River, and during the expedition. In the districts south of the river, on the other hand, it is very rarely met with, its place in the colony being supplied by the Equus Quagga of Linnaeus. It is an animal that admits of being tamed to a certain extent with considerable facility, and occasionally a half-domesticated specimen is exposed for sale at Cape Town, with a rider on its back. The persons however who have had most opportunities of becoming acquainted with its character regard it, even in the most tractable state to which it has yet been reduced, as wicked, treacherous, obstinate, and fierce.

Mr. Gray remarks that the hoofs, as Mr. Burchell very justly observes, offer a good distinguishing character between the Zebra of the Mountains and that of the Plains and, in the latter, *A. Burchelli*, the edge of the hoof is narrow and sharp, the hinder part is flatshaped, and the centro is extended and concave; and in the former or true Zebra the edge and hinder part are thick and convex, and the centre deep and contracted. Figures of the hoofs of the two species are given in the plate above quoted. Figs. 2. and 3.

*Equus Zebra*, the Zebra. White, with close narrowish black bands on the body, neck, and legs, and brown ones on the face; nose, bay; dorsal line indistinct from the others. Belly and inside of the thighs banded. Tail blackish. Mane erect, thick, bushy, banded with white. Ears with two black bands and white tips. The Zebras live in troops, on hard dry herbs, and are incapable of being tamed unless they are taken very young. (Gray.)

**Locality.** Mountainous districts near the Cape (Burchell and others), Congo, Guinea, and Abyssinia (Ludolph). Mr. Gray considers this species to be the *Equus montanus* of Mr. Burchell.

---

**HYBRIDS.**

The offspring of the male Ass (*Equus Burchelli*) and a Mare is a Mule, which has generally the form, in a great degree, of the dam, and the head, ears and tail of the sire. The Spanish mules are well known for their symmetry, sureness of foot, and unwearying activity, and are the produce of a breed of asses far beyond those of this country, in stature, shape, and general appearance. The *Hinnay*, which is the offspring of the Horse and the female Ass, is altogether inferior, and is less esteemed than the *Mule*. Hybrid Mules have been bred in the Zoological Garden, and Ass breeding with the Zebra or the Quagga. Two mules that belong to the Zoological Society are the offspring of the Ass and the Zebra. The earl of Morton bred a female hybrid amongst some fine male Quagga and a Mare of nearly pure (seven-eighths) Arabian blood. It may be expected that we should here notice the question as to the power of reproduction in animals so bred between different species. Mr. Bell, in his 'British Quadrupeds,' has treated this subject in his usual lucid manner. After observing that the inquiry how far the power possessed by two animals of producing young on the one hand, or fertile young on the other, bears upon the generic or specific identity of the parents, is one of the greatest interest in the investigation of zoological relations, he proceeds thus:—'It has been supposed, and with very considerable probability, that the production of male and female progeny which are fertile separately is to be considered in itself a positive proof that the parents are of the same species, how much soever they may differ in external form and appearance. It is well known that there are many instances of sterile or distinct producing young, which become fertile in conjunction with one or other of the parent kinds. This has been proved in the case of several species both of gallinaceous and natural birds in a domestic state; but there is not, I believe, any instance in which a sterile male and fertile female hybrid being mutually fertile. On the other hand, the production of sterile hybrids between distinct species of the same group is a circumstance so commonly occurring, as to remove all allusion; and the term 'sent animal' (the Mule) 'is a sufficient illustration of the fact. But the power of reproduction even of such progeny is considered by some as indicative of a generic relation between two species, and it is the account of the separation of the Horse as a distinct genus from the Ass and its congeneres. Before this observation however can be allowed to have any weight, it rests with the objectors to define the precise meaning and limits of a genus; and until this has been done, which has never yet been satisfactorily attempted, such an argument is a mere begging of the question. The Mule has been occasionally known to produce young with the Horse or the Ass: these cases are rare, it is true; and the objectors to the separation of the species have made use of the testimonies of the statements which I have already made, as there is no instance on record of two Mules having bred together.' Mr. Bell notices the following fact, as one which must doubtless be attributed to the same cause:—'I have long been in the Mule. A small Mare was turned into a paddock in the Gardens of the Zoological Society of London (Regent's Park), in company with a male white Ass, and a male hybrid between the Zebra and the Ass. She had a foal which was distinctly marked with black stripes across the legs. While upon this subject, we may as well advert to the curious point, that the characters of the male parent of the mother's first progeny show themselves in her subsequent offspring by other males, however different those males may be in form or colour. Mr. Bell observes that this truth has already been illustrated by him when treating on the Dog and on the Hog, and he adds that it is a noble and interesting confirmation from the case of the Mare (belonging to the earl of Morton) quoted by him and above alluded to. In that case the Mare was young, and after producing the female hybrid by the Quagga, had first a Filly, and afterwards a Colt, by a fine male Ass. They were both reared in the dark line along the back, the stripes across the forehead, and the bars across the legs: in the Filly the mane was short and stiff, like that of the Quagga; but in the Colt it was long and banded, arch upwards and hang clear of the sides of the neck: in other respects they were nearly pure Arabian. This and other such cases should not be forgotten by breeders of animals, because they afford the clearest indication of the perfection of their stock, and should make them particularly careful as to the male influence which first makes its impression on the female.
Remains of Equus occur abundantly in the third period of the Tertiary series, and are found in Eocene deposits, in superficial gravel, sands, and clays, in the Osidirous Caverns, in the osseous breccia, in the Eppleside sand, &c. Bones of the horse are also found abundantly, among the remains found by Captain Cautley lying on a mound among the ruins of fallen cliffs, and partly in situ in the sandstone in the Sewallik Mountains at the southern foot of the Himalayas, between the Sulule and the Ganges. Some species, which we shall have occasion to enumerate, have been recorded, but we must not forget the opinion of one well qualified to judge on the point, that there are not sufficient data for specific distinctions. Cuvier informs us that he had carefully distinguished the remains of horsemanship of those of the Mule, the Ass, the Zehra, and the Quagga, and he never could find a character sufficiently fixed to enable him to pronounce on a species from an isolated bone. Size, he remarks, furnishes but incomplete means of distinction; horses and asses vary much in this particular, from their state of domestication; and he adds, that though he had not yet procured the skeleton of a Dshikketi, he doubted not its resemblance to that of the other species as much as they resembled each other in the same particular. He therefore seems to be borne out in his opinion that comparative anatomy cannot solve the question whether the horse whose remains are found in a fossil state resembles the horse of the present day. The five most recorded authors are Equus fossilis (Equus Adamitieus of Schlotheim); Equus (Caballus) primigenius; Equus (Mulus) primigenius; Equus (Antius) primigenius.

In the year 1757, the Musculus Hippocastanum of botanists; it is said to derive its name from the practice among the Turks of feeding their horses on the seeds of this tree.

HORSE-RADISH, the pungent root of the Coelisaria Armocarica of botanists.

HORSE-TAIL, a name given to weeds common in stiff ill-drained soil, belonging to the genus Equisetum.

Horsely, Samuel (born 1733, died 1800), a distinguished prelate of the English church, successively bishop of St. David's, Rochester, and St. Asaph. He was the son of John Horsley (whose father was originally a non-conformist), who was for many years the clerk in orders under Martin's-in-the-Fields, and who held two rectories, Thorsley in Hertfordshire, and Newington Butts in Surrey. The bishop was educated at Westminster School, from whence he went to Pembroke College, Cambridge, and had the rectory of Newington, which his father resigned to him soon after he had taken orders in 1759.

His more public career he may be said to have commenced when he was elected a Fellow of the Royal Society, to which body he became the last survivor in 1773. His earliest publications were certain small tracts on scientific subjects; but in 1766 he projected a complete and uniform edition of the philosophical works of Sir Isaac Newton.

This design was not accomplished till 1784, when the fifth and last of the five quarto volumes made its appearance.

In the earlier years of his public life he found patrons in the earl of Aylesford, and in Lord, bishop of London; but we pass over, as uninteresting and unimportant, the presentations to his various livings, and the dispensations which the number of his minor preferments rendered necessary. In 1761 he was appointed archdeacon of St. Alban's.

The two last dates last mentioned that he first appeared in the field of theological controversy, in which he soon showed himself a very powerful combatant, powerful from the great extent of his knowledge and from the vigour of his intellect. His chief antagonist in this respect was Dr. Joseph Priestley, a minister among the Presbyterians, whose papers in a series of publications defended with great subtilty and skill the doctrines of pre-destination, original sin, the atonement, antinomianism, and Unitarianism. Dr. Horsley began his attack in 1771 on the question of Man's Free Agency; it was continued in a Charge delivered in 1773 to the Clergy of his Archdeaconry, in which he added certain notes on the history of Dr. Priestley's "History of the Corruptions of Christianity."

The late date last mentioned that he first appeared in the field of theological controversy, in which he soon showed himself a very powerful combatant, powerful from the great extent of his knowledge and from the vigour of his intellect. His chief antagonist in this respect was Dr. Joseph Priestley, a minister among the Presbyterians, whose papers in a series of publications defended with great subtilty and skill the doctrines of pre-destination, original sin, the atonement, antinomianism, and Unitarianism. Dr. Horsley began his attack in 1771 on the question of Man's Free Agency; it was continued in a Charge delivered in 1773 to the Clergy of his Archdeaconry, in which he added certain notes on the history of Dr. Priestley's "History of the Corruptions of Christianity."

He was one of the three non-conformists on whose behalf the subscribers to the "History of the Corruptions of Christianity" wrote in 1771 a memorial to the Duke of Devonshire, and which, after being rejected by that nobleman's council, was published in 1772.

In 1772 Dr. Priestley published "Letters to Dr. Priestley," and Dr. Horsley, to the shock of his friends, wrote a reply in the form of a pamphlet, in which he retorted on the attack of Dr. Priestley, and defended the charge of Dr. Priestley's "History of the Corruptions of Christianity." In 1775, this pamphlet was reprinted by Dr. Priestley, who retorted on the charges of Dr. Horsley in "Seventeen Letters to Dr. Priestley," a work which was regarded by the friends of the church as a most masterly defence of the orthodox faith, and as the sure secure foundation of a high and lasting theological reputation.

The tide of preferment now began to flow in upon him. Thurlow, who was then chancellor, presented him with a prebendarial stall in the church of Gloucester, observing, as it is said, that "thoso who defended the church ought to be supported by the church;" and in 1788 he was made bishop of St. David's.

In parliament he distinguished himself by the very hearty support which he gave to the measures proposed by Mr. Pitt's administration, and some of his declarations in his "Remarks on the administration of government" were thought by many persons to be as little in accordance with the true spirit of the English constitution as with the spirit of the man himself. But in judging on such a point as this, the circumstances of the question ought to be considered; opinions are strong in another direction being by many persons promulgated, and a disposition manifested by some to act according to them. His political conduct however gained him the favour of the court; in 1793 he was translated to Rochester, and in 1802 to St. Asaph.

We have mentioned but a few of his published writings, which are very numerous. But a list, it is believed, complete, may be found in a work which is an immense storehouse of information respecting many of the distinguished persons of the last century,—Literary Anecdotes of the Eighteenth Century, by John Nichols, F.S.A., in six large volumes, published in 1812, with several volumes of supplementary matter.

HORTENSIUS, Quintus, born b.c. 114, of an equestrian Roman family, began to plead at a very early age, and he had already gained a great reputation in his profession when Cicero made his appearance in the bar. It is not till that time Cicero and Hortensius were considered as professional rivals, but they lived on friendly and even intimate terms with each other, as Cicero acknowledges in several of his writings. At the beginning of the "De Oratore," Cicero pays an eloquent and apparently sincere tribute of praise to the memory of Hortensius, who was then lately dead. He styles him his friend and adviser, who often assisted him in the discharge of some of his services, and was very much honoured, a rival or detractor of his fame, but a fellow-labourer in a glorious vocation. And yet in some of his letters (Epist. lib. i. of the 1st book Ad Quintum Praetorem) Cicero had bitterly complained of the duplicity and ungenerous conduct of Hortensius towards himself; and he was obliged to quit Rome in the Cidianus business. Hortensius went through the regular career of public offices and honours; he was successively quaestor, edile, praetor, and lastly consul, with C. Cecilius de Munatius b.c. 69. He appears to have acquired great wealth, which he spent liberally, and yet bequeathed an ample inheritance to his children. His villa at Tusculum, at Baull, at Laurentum, and other places are mentioned. He was charged by Cicero with having used bribery and other means to gain his causes, and to have received presents from his clients. Hortensius died b.c. 50, while Cicero was returning from his government of Cilicia (Epist. v. of the 6th book Ad Atticum; Brutus, c. 64, 94); and Cicero considers it a continuation of the good fortune which had attended him through life, that he died just before the breaking out of the civil war, and was thus spared the grief of seeing the fall of the republic. The Orations of Hortensius which are mentioned by Cicero and Quintilian are lost, as well as his Annales, and some erotic poems which he is said to have written. The work of Quintus Hortensius b.c. 92, 95 has given his own opinion of the character of Hortensius as an orator.

Horticulture. [Gardening.]

Hosea (הושע; 'הושע, LXX.), one of the twelve minor Hebrew prophets. We possess no particular respecting the place of his birth, or his history; but it appears probable that he was a man of Sardaria, since his prophecies relate principally to the ten tribes. We know from the inscription of the book that he was the son of Beeri, and that he lived 'in the days of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah,' and the days of Jeroboam the son of Joash, king of Israel.' The reigns of Jeroboam were bordered from b.c. 823 to 783; and that of Hezekiah began b.c. 726. It is therefore evident, if this inscription is correct, that Hosea could only have entered upon his prophetic duties in the latter part of the reign of Jeroboam, and this proposition is also rendered probable by the tenor of his prophecies.

284
cies, which describe the kingdom of Israel as in a weak and divided state, and oblige to seek assistance from foreign powers; whereas in the book of Kings (xiv. 25—28) the affairs of the kingdom of Israel are represented as in a very prosperous condition during the reign of Jeroboam II. But the prophecies of Hosea are quite in accordance with the book of Kings, xvi. 6, and foreign invasions which followed the death of Jeroboam II. (2 Kings, xvi. 6.) It is therefore probable that the prophecies of Hosea extended over a period of about 60 years (c. 784—724); and that he was contemporary with Isaiah, Micah, and Amos.

In the second part, the symbolic representation is dropped; and the prophet foretells in express language that the country would be devastated by the Egyptians and Assyrians, and that the people would be carried away into captivity; and he concludes with an exhortation to repentance, and a promise that God would heal their backslidings, would love them freely, and would turn his anger away from them. (xii.)

The style of Hosea, Bishop Lowth remarks, exhibits the appearance of very remote antiquity: it is pointed, energetic, and concise. It bears a distinguished mark of poetical composition, in that primitive brevity and condensation which is so conspicuous in the book. It has since been observed that later writers have in some measure neglected this peculiarity. It has not escaped the observation of Jerom, who remarks that this prophet is altogether laconic and sententious. (Pref. in xii. Proph.) But this very circumstance, which antiquity was supposed to impart uncommon force and elegance, in the present state of Hebrew literature is productive of so much obscurity, that although the general subject of his prophecies is never completely obscure, there is a certain opacity and perplexed of all the prophets. (Pref. xxi.) Compare also Bishop Horsley's remarks on the style of Hosea, in the preface to his translation of this prophet. (p. xxix—xlii.)

The canonical authority of the prophecies of Hosea has never been disputed. They are frequently quoted in the New Testament; compare Hos. vi. 6, with Matt. ix. 13, xii. 16, Luke xi. 11; Hos. xi. 1, with Matt. ii. 15; Hos. i. 10, ii. 23, with Rom. ix. 25, 26, and 1 Peter ii. 10; Hos. xiv. 2, with Hebr. xiii. 15. (The Introduction of Eichhorn, Jahn, De Wette, Augustii, and Hengstenberg; Porcher's Commentary on the Prophecy of Hosea, Oxford, 1868; Kautzsch's Hosea Oracula, Liefmann et Lassalle, Leip., 1792; Horsey's Hosea, translated from the Hebrew, with notes explanatory and critical, Lond., 1801, 1804; Swete's Hosea Prophetica, Leip., 1826, a useful work.)

HOSPITAL. The principal seat of the hospi
tory manufacture in England is in the three midland counties of Leices
ter, Nottingham, and Derby. In the first of these woolen hospi
tories forms the principal branch of the manufacture, while in Nottinghamshire the material chiefly used is cot
ton, and in Derbysilk goods are mostly made. It is computed that the numbers engaged in the manufacture of hosiery in the three counties amounts to 30,000.

The stocking-frame, by means of which this manufacture is carried on, is, next to the common warp and woof loom, the oldest machine in existence applicable to textile fabrics. It is said that in the close of the 16th century hosiery was worked by the Reverend William Lea, of St. John's College, Cam
bidge, but a considerable time elapsed before the produce of this frame took the place of the trunk-frame then worn by women and children in the form of silk stockings. The reason for this is, that Mr. Lea settled at Rouen, in Normandy, where his manufacture was carried on under the patronage of Henry IV., but the assassination of the king and the political troubles of that event called for the abandonment of Mr. Lea's establishment, and that gentleman shortly after died in a state of poverty at Paris.

From the time of its first invention the stocking-frame -- nev regarded as an industrious improvement, but at the moment (July, 1828) stocking-frames with a rotary action, and worked by steam-power, have been successfully brought into use at Nottingham, and bid fair to supersede altogether the use of the old reciprocating engine. The economy in the process of manufacture that will be thus effected is very great, and may be the means of securing to our manufacturers for some time longer the supply of the woolen hosiery of foreign countries, a branch of trade which was fast leaving us.

The working of a rotary machine impelled by steam-power, in which twelve fashioned stockings are made at the same time, will require the superintendence of only one man and a boy, whereas in the former method one stocking can be made at once by a single workman. The principal seat of the woolen hosiery manufacture abroad is at Chemnitz, in Saxony, where to the low rate of wages are added the advantages of the machinery. At Nottingham, goods are made, with yarns imported from Lancashire, at prices which have excluded English goods from third markets, and have even brought them into com
sumption in this country after paying a duty of 20 per cent. Notwithstanding this fact, the hosiery trade in England has been and continues in a fair state of prosperity, owing to the extension of the home market. More stockings are worn now than at any former period, their use having increased, with the progress of general improve
ment.

The substitution of steam-power frames for the old lo
cen frames may be considered as the production of the present race of cotton stocking makers, only a part of whom will, for a time at least, be able to find employment in the rotary frames; but it may be hoped that the great exten
sion of demand which is always found to accompany a consid
erable change in the manufacture will speedily remove this evil by causing employment for at least as many hands as may at first be disengaged. The cotton branch of the hosiery manufacture differs from the woollen and silk branches of that manufacture in the relative proportions of the cost of labour as compared with the cost of the material, and it therefore does not appear probable that the manufacturers of Leicestershire and Derbyshire have so far improved the ingenious invention of the stocking-frame by the manufacture of cotton goods that the manufacturers of Nottinghamshire stocking-weavers have encountered. In cotton hosiery the cost of labour constitutes from two-thirds to five-sixths of the value of the goods, while in woollen hosiery the labour does not exceed two-fifths of the value, and in silk goods the proportionate cost of labour is still much smaller.

It is not possible to furnish any statement of the quantity or value of the shipments of hosiery from this country, because the custom-house returns include with hosiery many arti
cles of haberdashery, under the name of 'small wares.' The value of the shipments of cotton and woolen hosiery and small wares, in each of the ten years from 1828 to 1837, was as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Value of Cotton Hosiery</th>
<th>Value of Woollen Hosiery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1828</td>
<td>£1,165,763</td>
<td>£201,216</td>
</tr>
<tr>
<td>1829</td>
<td>1,041,855</td>
<td>178,453</td>
</tr>
<tr>
<td>1830</td>
<td>1,175,153</td>
<td>242,005</td>
</tr>
<tr>
<td>1831</td>
<td>1,188,072</td>
<td>150,155</td>
</tr>
<tr>
<td>1832</td>
<td>1,175,003</td>
<td>136,655</td>
</tr>
<tr>
<td>1833</td>
<td>1,341,317</td>
<td>192,048</td>
</tr>
<tr>
<td>1834</td>
<td>1,175,219</td>
<td>158,129</td>
</tr>
<tr>
<td>1835</td>
<td>1,246,284</td>
<td>205,135</td>
</tr>
<tr>
<td>1836</td>
<td>1,326,925</td>
<td>237,598</td>
</tr>
<tr>
<td>1837</td>
<td>912,192</td>
<td>167,564</td>
</tr>
</tbody>
</table>

HOSPITAL (sometimes called simply hospital, from the French hôpital), a place endowed for the reception of the sick or support of infirm persons. Hospitals intended merely for the relief of poor and indigent persons in England are peculiarly called Alms-houses. At an earlier date hospital signified a place of shelter or entertainment for tr
velers upon the road, more especially for pilgrims. Spenser, in the 'Faerie Queen,' uses the word in this sense:

They spy'd a goodly castle, placed
Forby a river in a pleasant Dale,
Where were lodging for that evening's hospital,
They bide them march'd.

The Masion de Dieu at Dover, St. John's Hospital at Warwick, and some others, were expressly founded for the reception and entertainment of pilgrims and travellers.

Many of the charitable endowments in England are called hospitals, and are incorporated bodies, consisting of a
HOSPITALS. Hospital, in its literal acceptation, was originally the name for an hospital, in order to receive the poor or stranger; from the Latin hospitalarius, a word found only in the language of the lower age. The Knights Hospitallers were an order of religious formerly settled in England, and whose general hospital was built at Jerusalem for the use of pilgrims going to the Holy Land, dedicated to St. John Baptist. The first business of these knights was to provide for such pilgrims that were driven by famine, cold, or disease, and for itself, which was founded upon the road. They were instituted about A.D. 1092, and were very much favoured by Godfrey of Bouillon and his successor Baldwin king of Jerusalem. They followed chiefly St. Austin's rule, and wore a black habit with a white cross upon it. They soon came into England, and had a house built for them in London A.D. 1100; and from a poor and mean beginning obtained so great wealth, honours, and exemptions, that their Superior here in England was the first lay-baron, and had a seat among the lords in parliament; and some of their privileges were extended even to their tenants.

There were also sisters of this order, of which one house only exists in England, at Buckland in Somersetshire. Upon many of their monastic and estates in the country the Knights Hospitallers placed small societies of their brethren, under the government of a commander. These were called cisters, congoes under their care, and accounted for the remainder to the grand prior at London. Such societies were in consequence called Commanderies. What were commanderies with the Hospitallers were called Preceptories by the Templars, though the latter term was in use with both orders.

The Knights Hospitallers had several other designations. They were at first called Knights of St. John of Jerusalem; afterwards, from their fresh place of settlement, Knights of Rhodes (Co.-Litt., 76-); Knights of Malta, from the island which had been bestowed upon them by the emperor Charles V. (Tanner, Notit. Monast., edit. Nasmith, prof. p. xv.; Newcourt, Report. Eccles., vol. i., p. 509; ii., p. 199; Dugdale, Monasticon Angliae, new. edit., vol. vi., p. 786.)

HOSPODAR is the title of the persons sent by the Turkish sultan to govern Moldavia and Wallachia, the two provinces north of the Dniester. These governors have been taken from the principal Greek families of the Fanar, such as Maurocondato, Souto, Caradja, Mosev, Callimachi, Ypsilanti, &c. These Hospodars or governors have governed the two provinces in a manner much esteemed as 'Most Serene Highness.' They held in their respective capitals, Bucarest and Iassy, a numerous council, consisting chiefly of Fanarite Greeks, and were in fact almost absolute sovereign during the time of their administration, which however might be shortened at the pleasure of the Porte, which often recalled them, and put them to death. At the time of the Greek revolution in 1821 the Hospodar of Moldavia, Prince Michael Souto, escaped into the Russian territory, and his relative the Hospodar of Prince of Wallachia was poisoned. For the present government of these two principalities, as agreed upon between Russia and Turkey, see MODAVIA and WALLACHIA.

They were formerly by gardeners to a heap of fresh stable litter in a state of fermentation, upon which a glazed box is placed for the cultivation of certain plants requiring heat and moisture in greater quantity than those agents exist in the internal air. Formerly these methods were more exclusively used for various purposes in horticulture than they now are. This is owing to the perfection to which other means of producing and applying artificial heat have now attained; but the employment of London字符 children of disturbed fevers, are entitled to a third of his personal estate. (Co-Litt, 176-177; 2 Bl. Com.)

HOTHOUSE, in horticulture, is a structure in which exotic plants are cultivated under circumstances approximating as closely as is possible to those under which they naturally exist; or it is used for accelerating the production of flowers and fruits of either indigenous or exotic plants. Hothouses appropriated to the latter purposes are very frequently termed forcing-frames.
HOT S 313

In the beginning of the seventeenth century that de-
scription of hothouse generally termed the greenhouse be-
gan to be constructed in Germany; and one in the Apotho-
caries' Garden at Chelsea is mentioned by Ray in 1694.

These, like many others of later construction, had glass
only in the front, which was perpendicular; and the mode
of applying artificial heat exhibited little more knowledge
of means for the end than the remains of flues found in the
ruins of ancient Roman baths and heating apparatus.

In 1724, when Switzer published his treatise entitled
'The Practical Fruit Gardener,' the principles of managing
hothouses were still very imperfectly understood; for he
observed that 'Peaches, Apricots, and Apricots do not
love to be fored; at least the fruit is very seldom
good: there being much occasion to keep the glasses close,
the fruit is always rendered flat and insipid. This is not
pure speculation, but the result of the practice that I have
observed of the glass houses at Hampton Park.'

Considerable alterations, particularly in houses for
grapes, were made towards the end of the last century.
The most material improvement was the substitution of a
slanting glass roof for a perpendicular glass front; but
advantages of this were much diminished by the heaviness
of the sashes, and the large quantity of opaque matter
which it was thought necessary to employ in order to
ensure the efficacy of the construction.

In the present century great advances have been made
in hothouse building, and more particularly since 1815.
The application of heat by steam or hot water, and the
admission of the rays of light through glass windows or
bars instead of wooden sashes, are the principal features
of these improvements.

The principles by which the construction of hothouses
must be governed have reference to three great agents in
adaptation to moisture, heat, and light.

With regard to heat, the building must provide for a
sufficient amount to raise the internal temperature of the
house, from that of the lowest degree of external air that
occurs in the climate in which it is situated, for any length
of time in the countries of which the plants intended
to be introduced are natives. This rule is unex-
ceptionable as far as plants strictly tropical are concerned;
a slight refrigeration may be allowed in some cases with
regard to plants of temperate climates, such as, for in-
stance, the vine when it is only intended to be forced late
in the season, after the severity of the winter is over. With
regard to the Eygptian climate, the range of temperature
should always be made the data for calculating the extent
of the requisite heating power. The consequences of too limited a heating power will, in
many instances, be exhibited for several years. Vines in a
greenhouse, if not sufficiently heated, will wither and die by night in January, 1838, that the crop was not only lost, but the vines themselves so much injured as not to be worth preservation. This shows the necessity of always providing for a few degrees more warmth, since a deficiency of that for only a few hours may occasion an injury that cannot be remedied in as many
moons.

Moisture is of very great importance, and a due propor-
tion of it is frequently more difficult to maintain in the
atmosphere of the house than heat, and more so by some
modes of heating than by others. It therefore follows, that
as all applications of fire-heat have a tendency to produce
too great a degree of dryness, that mode is the best for
the growth of plants which allows the greatest quantity of
vapour to remain uncondensed in the atmosphere of the
house.

Some tribes of exotic plants, natives of the torrid zone,
are adapted for existing under a very dry atmosphere.
Instead of developing a thin expanded foliage, they form
thick succulent masses, which no degree of atmospheric
dryness seems to injure. Plants of such a nature of course
require a dry house; and a period of extreme dryness
is perhaps as necessary for their future vigorous development
as the cold of winter is to the deciduous trees of the north.
But with regard to the generality of plants from tropical
regions, a much different condition is necessary. Within in
not too dry tropical, the dryness of the air seldom exceeds 10° of Daniell's
hygrometer; whereas, in the neighbourhood of London,
between 20° and 30° are frequently indicated during the
day. The atmosphere of this place is saturated with moist
to during the night, or at least it is but very rarely
otherwise in the open air. But if due precautions be not
taken, and temperature only is attended to, without regard
to moisture, a degree of dryness will prevail at night
in hothouses, which is double that of the tropic during the
Arctic winter. The excessive dryness at this time, under
day-sitting tendency, the necessity becomes obvious of adopt-
ing such modes of construction and heating as will afford
the best means not only of supplying but of maintaining
moisture; for which may be raised, not only to the house
at the period of the sun's rays, and yet causes may encore
as to occasion a speedy condensation and a consequent
dryness.

Light cannot be admitted too freely into hothouses. This
will appear evident from the circumstance of the most trans-
parent medium that can be used reflecting a great propor-
tion of the sun's rays when they impinge obliquely on its
surface. According to Bouguer's Table of Rays reflected
from Glass of various degrees of transparency, 54 per cent.of
the sun's rays are reflected; and at angles of incidence

<table>
<thead>
<tr>
<th>Angle</th>
<th>Reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°</td>
<td>87%</td>
</tr>
<tr>
<td>10°</td>
<td>77%</td>
</tr>
<tr>
<td>15°</td>
<td>70%</td>
</tr>
<tr>
<td>20°</td>
<td>60%</td>
</tr>
<tr>
<td>25°</td>
<td>50%</td>
</tr>
<tr>
<td>30°</td>
<td>40%</td>
</tr>
</tbody>
</table>

23 per cent.

But if wooden rafters are employed, 15 per cent. addi-
tional must be added, making in this case a loss of 38 per
cent. In old and heavily constructed houses, it certainly
would not be too much to state the loss of rays at 50 per
cent.; and under this privation of light it is not surprising
if the plants are found to exhibit a yellow sickly foliage.

The above calculation, the reflection of rays is made
on the supposition that the pitch or elevation of the roof
forms an angle with the horizon corresponding with the
latitude of the place, say for London 51°, or forming an
angle with the plane of the horizon equal to the complement
of the latitude, or 28°. The pitch of the roof is most
advantageous in spring or autumn equinox. A plane elevated to the above
angle would have the sun's meridian rays more nearly per-
pendicular throughout the year than could be the case with
any other angle of elevation, except perhaps in the case of a very early
forcing viney or peach-house, where the direct rays of the
sun are more especially required at an early period of the
season. The principal objection to this elevation is, that
it occasions the house to be built too high in proportion to its
width; and the heat accumulates in the upper angle where
it is least wanted; in short, the higher the back wall, the
colder is the air of the house at its base, and the warmer at
the top, compared with the mean temperature throughout
the house. It will therefore be proper to inquire how far
the above elevation may be deviated from without greatly
affecting the transmission of light. If the slope of the
roof were lowered so as to form an angle of 20° with the horizon
the loss from reflected rays at noon would average about
3 per cent.; but in the morning and afternoon the loss
would be considerably greater, more especially in the winter
season; and it is of course proportionally less in summer.
So far therefore as light is concerned, any angle may be
chosen that is found in other respects the most convenient
between 20° and 30°. Pine pits and frames are even lower
than 20°, and yet, as regards the supply of light, as well
as the descent of the sun, it is not advisable to have the roof
flatter than 20°.

Although the necessity of admitting as much light as
possible is now generally acknowledged, and although in
many cases advantages have been rendered as transparent
as possible, yet the generality of
tropical plants do not thrive in bright sunny weather when placed in a hot-house, as the sun's rays do not rise higher than one so exposed in this climate frequently does, notwithstanding the greater general coldness of the air. These rays, of about the same intensity as that of Lunn's sun at 80° F., for a thermometer placed in the sun to rise 50° F. above one in the shade. At Cumana, Humboldt never found the sun's rays to have the effect of raising the thermometer more than 3° at all seasons; but the rays of the sun appear to be more intense in this climate. Between lat. 80° and 81°, Captain Scoresby states that the thermometer was 18° below freezing on one side of the ship, whilst on the other the pipe was heated to a temperature of 90° or 100°. This is a greater radiating effect than has perhaps ever been observed in this climate, and certainly unequalled in the tropics. The body of the atmosphere surrounding the earth is supposed to have the form of an oblate spheroid, flattened at the poles and elevated at the equator. Indeed if this were not the case, as it is found to be considerably denser at the poles than at the equator, a different barometrical indication would be the consequence; but the tendency of the sun's rays to cause a perturbation of the atmosphere is evident. This difference in density may have some effect in weakening the sun's rays, but probably not so much as the circumstance of the atmosphere having a much greater capacity for preserving the heat than water. The sun, however, requires more moisture to be produced, saturation, and at the same time the process of evaporation is so powerful that the atmosphere is maintained on an average much more than the point of saturation, and it is at the poles that these circumstances doubtless contribute greatly to temper the solar rays.

Plants from a great elevation, from within the tropics as well as from the temperate region, are more tender than those from the level of the earth. The rays of the sun have been ascertained to be more powerful at 4000 feet above the level of the sea on the mountains of Jamaica than at Port Royal. Hence the potato, a native of the high table-land of South America, will not thrive under glass unless placed very near it; and if placed at a distance from it at which the pine-apple, a native of the same country, but near the shore, will grow robust, the potato will become pale and languid.

These facts are too important to be omitted in explaining the principles by which the construction of hot-houses is ought to be regulated, and it will be found that those houses are the most adapted that are adapted to the propagation of plants in which such principles have been most considered.

With regard to the means of supplying artificial heat, the old system of using brick flues is now rapidly being superseded by that of hot water. Brick flues occupy a large space; and are liable to crack and emit sulphurous effluvia to such an extent that the crops of early forcing fruits have often been entirely destroyed. These objections do not apply to hot-water pipes. When once fitted up they require no repairs for many years; whereas the brick flues must be frequently broken up in order to clear out the soot. By hot water the distribution of heat can also be better regulated, and the uniformity of temperature better maintained than by any other known methods. The methods of heating by hot water are various. The oldest and perhaps the best for small houses is extremely simple, consisting of a boiler, and, at the further end of the house, a cistern on a high platform. A pipe is led near the bottom of the boiler, and communicating with the cistern at the same level, conveys the heated water slowly from the former to the latter. Another pipe, situated lower than the previous one, conveys the water through another cistern, and the whole of the water from the cistern to the boiler. This is frequently called the return-pipe. A principle is thus established in consequence of the hottest and therefore the lightest water lying at the top of the boiler. A process by which the colder water descends and displacing the colder in the upper pipe, which from its greater density tends to subside at the lowest level, which is in the lower or return pipe. Here it would remain stationary, but the pipe communicating with the water in the boiler, a few inches above the bottom of the latter, and the heated water in the boiler being unequal to the balancing of the colder and more rapidly descending water, a continual ingress from the latter takes place into the boiler.

This extremely simple form of the hot-water system has received various modifications. Circulation has been obtained on the motion principle, the pipes being elevated above the level of the boiler, the water being formed in them by pumping out or otherwise displacing the air, which is replaced by the water, so that a greater descent is afforded for the water in the return-pipe. Instead of large pipes, however, smaller pipes have been employed, and coils of such pipes have been enclosed in a furnace instead of a boiler; a large extent of radiating surface is thus made to absorb a considerable portion of the rays. If the water becomes heated, a degree of pressure corresponding with its expansion takes place; this however requires to be regulated by an expansion tube to prevent explosion. Steam forced through pipes has also been extensively used as a heating agent. Such modes undoubtedly afford the means of raising the temperature more rapidly, and their application in some cases may be attended with advantage; but as the cooling, if the fuel is not supplied regularly, takes place in the same ratio of rapidity, it becomes a question whether a mode that produces a slow and lasting heat, or one that is rapid in its production and decline, is to be preferred. In order to solve this, it becomes necessary to take into consideration the length of time required in hothouses relative to time. At noon, or soon after, the natural temperature of this climate is generally at the highest, and the temperature of the hothouse should also then be greatest. As the temperature of the heat of the sun's rays is radiating, and therefore more moisture is required to produce saturation, and at the same time the process of evaporation is so powerful that the atmosphere is maintained on an average much more than the point of saturation; it is at the poles that these circumstances doubtless contribute greatly to temper the solar rays.

Plants from a great elevation, from within the tropics as well as from the temperate region, are more tender than those from the level of the earth. The rays of the sun have been ascertained to be more powerful at 4000 feet above the level of the sea on the mountains of Jamaica than at Port Royal. Hence the potato, a native of the high table-land of South America, will not thrive under glass unless placed very near it; and if placed at a distance from it at which the pine-apple, a native of the same country, but near the shore, will grow robust, the potato will become pale and languid.

These facts are too important to be omitted in explaining the principles by which the construction of hot-houses is ought to be regulated, and it will be found that those houses are the most adapted that are adapted to the propagation of plants in which such principles have been most considered.

With regard to the means of supplying artificial heat, the old system of using brick flues is now rapidly being superseded by that of hot water. Brick flues occupy a large space; and are liable to crack and emit sulphurous effluvia to such an extent that the crops of early forcing fruits have often been entirely destroyed. These objections do not apply to hot-water pipes. When once fitted up they require no repairs for many years; whereas the brick flues must be frequently broken up in order to clear out the soot. By hot water the distribution of heat can also be better regulated, and the uniformity of temperature better maintained than by any other known methods. The methods of heating by hot water are various. The oldest and perhaps the best for small houses is extremely simple, consisting of a boiler, and, at the further end of the house, a cistern on a high platform. A pipe is led near the bottom of the boiler, and communicating with the cistern at the same level, conveys the heated water slowly from the former to the latter. Another pipe, situated lower than the previous one, conveys the water through another cistern, and the whole of the water from the cistern to the boiler. This is frequently called the return-pipe. A principle is thus established in consequence of the hottest and therefore the lightest water lying at the top of the boiler. A process by which the colder water descends and displacing the colder in the upper pipe, which from its greater density tends to subside at the lowest level, which is in the lower or return pipe. Here it would remain stationary, but the pipe communicating with the water in the boiler, a few inches above the bottom of the latter, and the heated water in the boiler being unequal to the balancing of the colder and more rapidly descending water, a continual ingress from the latter takes place into the boiler.

This extremely simple form of the hot-water system has received various modifications. Circulation has been obtained on the motion principle, the pipes being elevated above the level of the boiler, the water being formed in them by pumping out or otherwise displacing the air, which is replaced by the water, so that a greater descent is afforded for the water in the return-pipe. Instead of large pipes, however, smaller pipes have been employed, and coils of such pipes have been enclosed in a furnace instead of a boiler; a large extent of radiating surface is thus made to absorb a considerable portion of the rays. If the water becomes heated, a degree of pressure corresponding with its expansion takes place; this however requires to be regulated by an expansion tube to prevent explosion. Steam forced through pipes has also been extensively used as a heating agent. Such modes undoubtedly afford the means of raising the temperature more rapidly, and their application in some cases may be attended with advantage; but as the cooling, if the fuel is not supplied regularly, takes place in the same ratio of rapidity, it becomes a question whether a mode that produces a slow and lasting heat, or one that is rapid in its production and decline, is to be preferred. In order to solve this, it becomes necessary to take into consideration the length of time required in hothouses relative to time. At noon, or soon after, the natural temperature of this climate is generally at the highest, and the temperature of the hothouse should also then be greatest. As the temperature of the heat of the sun's rays is radiating, and therefore more moisture is required to produce saturation, and at the same time the process of evaporation is so powerful that the atmosphere is maintained on an average much more than the point of saturation; it is at the poles that these circumstances doubtless contribute greatly to temper the solar rays.
place at the same time. This loss of heat and transmuta-
tion of moisture resulting from the radiation of the glass,
although little attended to, demands the most serious care.
It admits of no remedy but the interposition of some
medium between the glass and cold sky; and such sub-
stances as are the worst conductors of caloric, and which
will also keep the glass dry, are of course the best.
A woolen net mounted on a roller with pulleys attached,
would have a very beneficial effect if closely covered by
light wooden shutters or a tarpaulin. And as it has been
proved that the rays of the sun are frequently too powerful for
the sate of the glass, a little water is likewise occasionally
useful as a shade; and with this pro-
vision the roof cannot be made too transparent, as pre-
viously stated.

It has been shown that iron roofs occasion an obsuc-
ration of light to the extent of only one-third of that which
takes place when wood is employed. The iron roofs are
therefore preferable, although, apart from the greater or-
iginal expense, there are still some objections to them.
Formerly the chief objection was the breakage of glass
likely to result from the expansion of the metal; but the
severity of the frost in 1838 has proved that this objection
was groundless; for very little breakage occurred in the
iron roofs compared with what took place in wooden ones;
and it may be fairly asserted that none whatever was broken
from contraction of the metal: nor can any breakage take
place from its expansion if the glazing is performed in sum-
mer, that the glass is allowed to fit in the frame, or the plates
made one-thousandth part of an inch less than the bed be-
tween the rebates of the bars in which they are placed. The
principal remaining objection is that of the rapid abudon-
ance of water, a very great stimulant to rust, which is as
bad as that of wood, and this is probably owing to the
wood being a slower conductor of caloric. Supposing a bar
of iron is heated to 100° by the sun's rays, and then syringed
with water, it will instantly become watered in consequence
of evaporation; and if any plant be in contact with it, or
nearby, the juices will experience a chill. In many in-
stances therefore where plants require to be close to the
glass, it is better to build a certain number of ventilators
with wood, which is infinitely more preferable to iron. Again, when a wide and also
lofty house is to be glazed iron is more proper; for besides
the quantity of rays lost by reflection of glass and obstruc-
tion from rafters, those that do pass in the interior are un-
weakened, that when they reach vegetation remote from the
glass they do not appear to be effective in performing the
requisite functions in a perfect manner; but of course better when the roof is of iron than when wood is employed.

Various modes of ventilating houses in which we con-
idered a great improvement has not been found to be
so, namely, the having ventilators in front at the lower
angle, and corresponding ones in the back wall near the
tops of openings in the south side of the parapet. Sometimes
this mode appears to have little effect, and the temperature
ascends too high, till the movement of a slight breeze out-
side causes instantly a rush of cold air by means of openings
in the sides, or by means of ventilators fitted in. Ventilation should
be so contrived as to be sufficiently effective in preventing
excess of heat; but at the same time it should be perfectly
at command, so that it may be employed when requisite in
the most limited degree. No method should be finally
adopted until it is put to the test by trying whether, under
any agitation of the external air, a candle will burn steadily
inside if placed near the apertures by which the air is ad-
mitted.

In all forcing-houses tanks should be placed for sup-
plying water of a temperature more suitable to the nature of
the vegetation than that from a pump out of doors. Nothing
can be so much to the interest of the plants as the top of the
roots and tops of tropical plants, or others in a forcing shade,
under a high temperature. The rain and dews which sup-
ply the plants of warm climates cannot be much below the
maximum temperature of the climate; and if only equal to the
minimum, still it would be between 20° and 30° above that of
spring-water in Britain.

To these general remarks upon the principles of con-
struction of hot-houses, a few observations of detail require to be added. Greenhouses and conservatories are
e included in the appellation of both. The only difference
between them is, that fires are seldom used in the
greenhouses unless in very severe weather, while the
hot-house is constantly kept at a high temperature; but so far
as the building is concerned they may be considered as the
same. A greenhouse is for keeping and growing the plants
of temperate countries; while a hothouse is used for forcing
fruits, or for growing plants which are indigenous to tropi-
cal regions. Hothouses may be classed under four differ-
ent heads, namely, the dry stone, the damp stone, the bark
stone, and the forcing. stone.

The dry stone, as the name implies, is used for the culti-
vation of plants which do not require much water; such as
the different species of Cacti, some Euphorbias, and other
Suculentas of like habits. The management of such a
house is most simple. The temperature of the forcing
months should never exceed 65° of Fabr. No water should ever be given at that period, unless the plants show signs
of suffering from want of it; indeed very little water should
be given at all, excepting in the evening.

In spring, or early in summer, most of the plants will
show an inclination for growth, and then they may be
watered about twice a week, this must be done with
great caution, otherwise they are very apt to rot. During
summer fires may be discontinued, and plenty of air given
in fine weather. The plants will probably get covered
with dust and will be unsightly; in this case they may be
syringed, but caution must be used in doing this, especially
with melon-shaped Cacti, as the water lodges in their
hollow tops, and eventually destroys them, if allowed to
remain.

The damp stone requires treatment of an opposite descrit-
tion. Instead of being kept dry like the last, its atmosphere
should be always excessively humid, except in the winter
season, when the sky is generally cloudy, and the sun's rays
weak. Various methods are adopted to keep the atmo-
sphere in its right state; and during two or three of the
most favorable months a glass vessel, containing some
with common smoke fluxes, the most simple way is to throw
water frequently upon them, and also upon the passages
and other places, from which it will evaporate, and sur-
round the plants, and thus keep the air continually sar-
eted. In summer, the water vapor is formed from the
channel is formed with cement, upon the upper surface of
the flue, which keeps the water running off. This is
a very excellent plan, as it may be so made that it will
be continued without intermission, the water being
continually evaporating, and serve the same purpose as that
of a person frequently throwing water upon it. When
the house is heated with hot-water or steam-pipes, it is a good
plan to get small ridges or stones upon the sides of the pipes, if
they are flat, or, if they are round, and insert a plate of
lead or zinc will answer the purpose, which can be used in
the same manner, and will have the same effect as the
channel upon the smoke flue. With the exception of a few
months in the winter, when they are considered as over-
heated, they require very little attention. In summer the
plants may be syringed twice every day. This is indispen-
sable to the health and vigorous growth of the plants, and also necessary
in order to keep down insects. The quantity of water which
these plants require is, therefore, regulated by the state of the
weather and their own growth; in winter they will need little, as spring advances they may be watered
more freely, and in the summer season they will all require
liberal watering, and the ventilation should be of course greater than those which are growing vigorously will require the most.
It is a very bad plan, although one which is too
often practised, to water almost at random, giving all the
plants almost an equal share, regardless of their different
capacities. Some will require a very abundant and constant
supply, others will almost live upon the atmosphere mois-
iture that surrounds them. Another thing to be attended
to in the management of this store is the number of plants.
Most of the kinds grow very freely, and if they have a
plenty of room they will very soon get crowded, and instead
of growing bushy and handsome, the result will be an
ugly specimen, with a long bare stem and a few leaves
upon its top. To prevent this, they should be turned over,
tied up, and kept clear of each other; elevating some,
compressing others, and giving the whole not only enough
of room but also a natural appearance. The temperature
within the house, in this stage, is very high; the dryness
of the air is the same at all seasons; in winter, when the plants are in a
tropial state, 65° or 60° of Fabr. is quite enough; when
vegetation begins to take place, as spring advances, it may
be kept within 55° or 60° of Fabr.; if the weather is very
hot in the middle of summer, fires may be discontinued for about
three months; but this must depend entirely upon the
weather. The thermometer should never be allowed to sink
lower than 50°.
The Be "\textit{hkorat}, when it is of large dimensions, consists of a pit in the middle of the house surrounded by a brick wall, leaving as much room round the sides as will form a passage to walk in. This pit is generally from four to six feet in depth, one-half below and the other half above the level of the floor of the house; but this depth chiefly upon the level of the roof and the object in view. In smaller houses no space is left for a passage, and the inside is entirely occupied by the pit. The pit is filled with bark (commonly called tan, from its having been used previously by the inhabitants of the Ecclesiastic libraries) and manure as an additional element, the pots containing the plants are plunged more or less deep as prudence may suggest. It is dangerous to plunge the pots too deep at first, before the heat of the bed is strong. If this precaution is not observed, the roots of the plants are very liable to be burned; the better way is to plunge the pots only about one-third at first, and deeper afterwards. Sometimes leaves are mixed with the tan; the reason being that they are in some parts of the country more easily procured. When the heat begins to decay, the bed must be turned over and a little fresh tan added; and whenever a new bed is made, a little of the old tan should always be mixed with the new. This stove is heated independently of the bark, of which the principal use is to warm the roots of the plants. A bark bed is found useful in the cultivation of all those kinds of plants which are grown in the damp stoves, for it supplies them with moisture in this way. The treatment of it, so far as the temperature, watering, and syringing are concerned, is precisely the same as is recommended for the damp stove.

The pots called "Palm-houses, Musa-houses, Orchidaceae-houses, &c." are merely damp stoves of different dimensions, for the cultivation of those different subjects.

The only other hothouse distinct from those already noticed is the "forcing-house." The treatment which this requires is essentially different from any which has been described, the object being not merely to grow the plants, or to make them produce flowers, but to obtain fruit, and the sooner the better. Hothouse plants are peculiarly liable to the attacks of insects, and unless carefully and constantly attended to, these little destroyers do a vast deal of mischief. The most common kinds are the Gretna-fly, Thrips, Red-spider, Brown-scale, and Mealy-bug. The first of these is easily conquered by fumigating the house with tobacco, or syringing the plants with an infusion of the same substance. The best remedy for the thrips and red-spider is to syringe them in a strong solution of a saline substance; but the insects cannot live in excessive moisture; a little of the flowers of sulphur shaken upon the leaves will also destroy them. The brown-scale and mealy-bug are the worst of all that infest plants, especially in hot-houses. The passages and other parts of the house are said to destroy them, but these must be used with great caution, as they may not only kill the insects, but the plants themselves. Various other substances are employed to destroy them, but after all, the best and surest remedy is to wash them off. This is perhaps rather difficult where these little intruders are numerous, but after the plants are once clean, it is an easy matter, with a little attention and diligence, to keep them so.

HOTMAN, FRANCOIS, called also by his Latinized name HOTHOMANUS, was born at Paris in 1524, of a family originally from Silesia. He studied law in the university of Orleans, after which he proceeded to the bar. In 1543, he embraced the Reformed religion, in consequence, it was said, of seeing the constancy with which Anne de Bourg, a counsellor to the parliament of Paris, supported the ignotimously (meaning an unknown one) changed, with a great alteration of his religion. [\textit{Hôpital, Dr L.}]. His father having, in consequence of his change of religion, refused him his support, Hotman repaired to Switzerland, where he taught humanities in the college of Geneva, and in 1559 he was appointed professor of law at Strasburg. He afterwards returned to France under the protection of the king of Navarre, and became professor of law at first at Valence, and then at Bourges, until 1561, when he has considered himself during the massacre of St. Barthélémy, and repaired to Geneva, and then to Basel, where he died in 1570. A collection of his works, in 3 vols. fol., was published at Geneva in 1599. His principal works are: 1. \textit{Commentaria in Juris Civilis Libri}, \textit{I.}; 2. \textit{Commentaria in Juris Canonici}, \textit{II.}; 3. \textit{Commentaria in Juris Canonici}, \textit{III.}; 4. \textit{De Juris Canonici}, and \textit{I.} 5. \textit{De Juris Canonici}, \textit{II.}. 6. \textit{Antiquitatum Romanorum Libri}, \textit{III.}; 7. \textit{Commentarius in Orations M. T. Cicernon, et maxime in Juris Questione continent}, \textit{IV.}; 8. \textit{Commentarius in Epistolam Civitatem ad Quirinum de Vinicio bene administranda}, \textit{V.}; 9. \textit{Consiliori et Sacris Litteris}, \textit{VI.}; 10. \textit{Ad Remedium Rufum Defensorem Romanorum Pontificem contra Carolum Molimienon de Statu Primitivo Ecclesiae Libri}, \textit{VII.}; and \textit{VIII.}. He afterwards produced a work which he wrote in English, proving that France was an elective and not an hereditary king dom; 12. \textit{De Furtibus Gallicis et de Credo Diplomatis, \textit{IX.}} 13. \textit{De Anti-Tribonian, ou Discours sur l'Etude des Loss.} 14. \textit{De Antiqua eorum quae ad Ecclesiam Ecclesiae Congregations}, \textit{X.} 15. \textit{Epistolae ad Episcopos Hispaniae de Statu Ecclesiae}, \textit{XI.}. A biography of Hotman is prefixed to the collection of his Latin Epistles, \textit{4to.}, Amsterdam, 1700.

HOTTENTOTS. \textit{Cape of Good Hope.}

HOTTINGER, JOHN HENRY, born at Zurich in 1620, after studying in his native country repaired to Leyden in 1639, where Golius the Orientalist engaged him as his assistant. Hottinger learned the Arabic and Turkish languages under a native of Moracco, and gradually became a distinguished Oriental scholar. He made his Oriental studies subservient to his principal object, that of illustrating the Hebrew text of the Bible. He was appointed Professor of Scriptural Theology at Zurich, and in 1655 Elector Palatine of him to conduct in the library, and fill the chair of oriental languages. He was afterwards made Rector of that University, which flourished greatly under his administration. Being recalled to Zurich in 1661, he was employed in important governmental, and in many important affairs. In 1667 the university of Leyden offered him the chair of theology, which he accepted, but while on the point of reaching his destination he was drowned by the upsetting of a boat in the river Limmat. Hottinger left many numerous works, chiefly on Oriental learning, the principal of which are:—1. \textit{Historia Orientalis}, which contains dissertations on the religion of the Sabae, Nabathaemi, and other ancient Arab tribes; 2. \textit{De Princ. et Raphis Palatinis} of him; 3. \textit{Practicae et laboris thoro} of his; 4. \textit{Topographia Ecclesiastica Orientalis,} and also a \textit{Compendium Theologiae Christianae Ecclesiae Orientalis.} He also wrote \textit{Historiae Ecclesiasticae Novi Testamenti; vols. i. and ii.} in 1687. His son John James Hottinger, professor of theology at Zurich, wrote an \textit{Ecclesiastical History of Switzerland.}

HOT-WALL. Hot or fixed walls are constructed in cold countries, for the purpose of affording warmth to trees placed against them, so as to counteract the effects of frost in autumn, when the wood and buds are maturing, and in spring, when the blossoms and leaves are unfolding. If hot-walls are nearly equidistant, the temperature of the air caused by the heat of the wall keeps the trees, and of great benefit to the plants which they shelter; but if, as often happens, in addition to this it is attempted by their aid to advance the ripening of fruit in any considerable degree, hot-walls are found to be of little use. Success arises from the exposed condition of the surface of the wall, and the consequent liability of the heat to be dispersed as rapidly as it is generated, either in consequence of the heat of the air being taken away by the current of cold air, or because the plants themselves are cooled, or by cold swirling winds, which prevent any accumulation of warm air from being formed. In mild weather, a hot-wall with a south aspect will forward vegetation very considerably; but in proportion to the extraordinary excitement of the air, there will be at the same time chilling blasts which this variable climate is so subject to in the early part of the season. Besides the dissipation of heat on the south side, an equal, if not a greater, portion is dissipated from the north side of the wall, and may be said to be entirely lost. It is therefore evident that where;
ever oranges are expensive, hot-walls are not to be recommended, except for the assistance towards opening the wood in autumn, and warding off the effects of frosty nights in spring.

One furnace is allowed for heating about 40 feet of wall, that is, 20 feet on each side of the place where the fire is situated. The fire is sunk a little below the surface of the ground, and the upper 1½ or 2 feet below the coping. An improvement consists in admitting, by means of a portion of the side, the second course of the furnace into the second course of flues. A thick double wooden netting ought to be provided for the protection of the plants on the wall, and so attached to rollers as to be easily made to move, or cease. The weather sometimes happens, a glass case is erected in front of a hot-wall, a hot-water pipe should be made to pass along in front of the trees, about two feet from the wall, and the return pipe only ought to be placed in the wall. The saving of the fuel would be the consequence of such an arrangement.

HOUBIGANT, CHARLES FRANCIS, a priest of the Oratory, and an eminent Biblical scholar, was born at Paris in 1866. He was educated in early life by his great-uncles, and lectured successively on the belles-lettres at Jullly, on rhetoric at Marseille, and on philosophy at Sissonne. He afterwards removed to Paris, where his devotion to study and the duties of his profession produced a serious result, his mind was entirely thrown into the study of the Hebrew language, in which he followed the system of Maslel, who was a strenuous opponent of vocal points. In 1732 Houbigant published his Racines Hebraiques; and in 1746, his Prolegomena to a new edition of the Hebrew Bible, in which he attempted to show that numerous errors had been introduced in the text. The great work, entitled Biblia Hebraica cum Notis Criticis et Versione Latina ad Notas Criticas facta, appeared at Paris in 1773, in 4 vols. fol.; each page is printed in two parallel columns, one of which contains the Hebrew text, and the other the Latin translation. The work is written by Van der Hooght's without points; and in the margin of the Pentateuch the various readings of the Samaritan Pentateuch are given. The notes and emendations of the text are printed at the end of each volume. Those who wish for further information concerning the critical value of this work may consult Bishop Marsh's Divinity Lectures, part ii., pp. 101-104. The critical notes and prolegomena were reprinted at Frankfort, 2 vols. 4to, 1777; and the Latin version, which is usually considered very elegant and correct, at Paris, 5 vols. 8vo. 1753. Houbigant learned the English language late in life, and translated into French Shakspeare's 'Shakespeare's Five Comic Poems,' and Peter's 'Thoughts on Natural Religion.' Houbigant died on the 31st of October, 1783, in the 79th year of his age. An account of Houbigant's life, together with a list of works given by Ady in the Magasin Encyclopédique, May, 1856.

HOUD (from the German Hund), a name generally applied in the British Islands to those varieties of the dog which are employed in hunting the Deer, the Fox, the Hare, and other small animals. They are found at the head of the pack or side, and used much as in the old Border times, was called a blood-hound. [Blood-Hound.] The Greyhound, which follows this four-footed game by the eye (Grayhound), is used in hunting the proper succession of the term adopted by sportsmen; for that application is confined to those varieties of the dog which are trained to that species of chase called hunting, which implies that the dogs so employed follow their four-footed game by the scent principally.

In addition to the Blood-hounds, the Stag-hound, the old Southern Hounds to Fox-hounds, the Harriers (Harriers), and the Beagle (Beagle), were the hounds of greatest note. Some of these varieties, the old Southern Hounds for instance, which was slow but very sure, and with a fine deep-toned voice when it gave tongue in earnest, are gradually disappearing; and of the others, for the most kinds of hunting, except otter-hunting, but especially in fox-hunting, has brought into demand a breed of hounds whose keenness requires the heat and fastest horses. The greyhound and fox-hound was bred; for, if one find himself nowhere on a good day in Leicester-shire, could be now present. His horses and hounds were bred with a view to endurance rather than speed; and, if he were to improve a sporting day, he went at, was kept in the English style of fox-dogs, and it is with the phrase, 'The revolution has taken place in the system. Whether this is an improvement is a question which will be answered different'y, as according as the respondent may prefer the old-fashioned slow hunting, where all the advantages of the modern have been developed, without a good deal of 'music,' or the rapidity which makes a good run now-a-days very like a race. The young, bold, and well-mounted rider will naturally prefer the latter.

The Southern Hound, which is supposed to have been of very high antiquity in Britain, is large in size, strong and of majestic aspect, long but round in the body, deep in the chest, and his ears and long and sweeping. The tone of his voice is very clear, and his sense of scent, and persevering long after lighter hounds have given it up; but he is very slow. The author of 'Rural Sports' saw a pack of these hounds in Lancashire, where they were kept in a hunt of twenty-two-inches. The huntsman went with a pole on foot.

As a contrast we may notice the celebrated match made between Mr. Barry and Mr. Meynell, to run a couple of each other's fox-hounds a drag from Stratford to Newmarket town-end, the starting-post of the Beacon-course, for five hundred guineas. The match came off on the last day of September, and was won by Mr. Barry's Bluecap and Wanton, which came in very close for the winner. They were a most beautiful sight, and were ridden by Mr. Barry, who was then in his fiftieth year, being beat by upwards of a hundred yards. The ground was crossed in eight minutes and a few seconds; and of sixty horses that started with the hounds only twelve were up. Cooper, Mr. Barry's huntsman, came in first, but it is asserted that the mare that carried him was completely blind at the conclusion of the run. The famous Will Cran, who rode Rib, a king's plate horse, was only in the twelfth. Colonel Gorham, the polo-hunter, was sold in 1750 for four houghsheads of claret, the seller to have two couple of beer wheals, a private trial of four miles in seven minutes and half a second. Our limits do not permit us to go into the details of this, too interesting subject; and we must refer the reader to Somervile's 'Chase;' Beckford's 'Thoughts upon Hunting; 'The Sportsman's Cabinet;' Daniel's 'Rural Sports; 'the Sporting Magazines; and, most especially, 'Nimrod,' for further information.

HOUR, HOUR-CIRCLE, HOUR-LINE. The first word always means the twenty-fourth part of a day, by what revolution soever the day may be measured. [Time.] In angular measure (Arms) it signifies the twenty-fourth part of a complete revolution, or 1°.

Any great circle on the sphere which passes through the two poles is called an hour-circle, because the hour of the day is kept by the motion of the sun, ascertained upon which the sun is for the time being. But the two semicircles into which the poles divide such a circle belong to different hours, and are twelve hours audier. In fact, it is a semicircle which is spoken of under the term hour-circle. [Strewel, Descrise.] The hour-lines of a diar are the lines in which the shadow falls at different hours, and are the intersections of the hour-circles with the plane of the dial. In the times pre-
In the lower part of this model, which has two stories, there is a court surrounded by the walls of which are rather a little higher in a sweep. The door into the court is low and roughly constructed, the hinges being merely wooden pins let into a socket above and below. The stairs leading to the upper part appear to be formed of a solid beam placed between the piers and with the treads of the stairs notched out. The risers bear a proportion to the tread of six to one. The walls are plastered, and the door and doorcase are painted red. As much of the roof as is shown in the model is of wood. There are three doorcases, and partly framed square-shaped doors to the mouths of the granaries. In the court a figure is represented kneeling bread, from which it might be inferred that the building was a bakehouse, and the doors those of ovens.

In No. 68 of Rossellini's work is a section representing an Egyptian house. The doorway is similar in form to the doorway of an antient Egyptian temple; above are folding windows, not unlike the latticed windows of the houses of Cairo as described by Lane: a staircase leads up to the floor where the windows appear, and above them is an open gallery supported on columns; the garden, in a court, is shown attached to the house. The best description of a modern Egyptian house is given by Lane in his 'Manners and Customs of the Modern Egyptians.'

Vitruvius (vi. 10) gives a general description of a Greek house, which differed from the Roman in not having a vestibule and atrium; and the Greek practice of separating the apartments of the females from those of the males, led to an entirely different internal arrangement.

It appears from the oration of Demosthenes against Aristocrates (c. 347 B.C.) that houses of this kind were in their time very magnificent; while in the time of Themistocles and Miltiades they were comparatively mean; and indeed it may be inferred from various passages in the orators and other writers, that the houses of the Athenian houses continued to be very small and inconvenient. A Greek traveller who visited Athens about B.C. 300 says that most of the h. uses were mean, and only a few small.

The modern Greek house is a quadrangular form, with a court in the interior; the staircases are placed on the external part of the house, leading to a gallery round the first floor. The entrance is in the centre of the quadrangle; over the entrance is the sitting apartment of the women; a bow-window is placed in this apartment over the door: here, on a dais, the women sit and amuse themselves by watching the passers by. In the lower story the cattle are often placed. The best description of a modern Greek house is given by Lane in his 'Manners and Customs of the Modern Greeks.'

The accompanying plans, with a description of the disposition of the various apartments of two of the principal Roman houses in Pompeii, will serve to convey some idea of their arrangement and uses.

The ground plan of the house of Pansa is an entire insula, about 200 feet by 100, part of which however is occupied by shops, and part by a garden.

1. Prodomylum, paved with mosaic. 2. Tuscan atrium. 3. Impluvium, paved with mosaic, serving as a passage to the peristyle, 4. There is also however a passage (fauces) 6, beside it; and through the tablinum was left open for the sake of the effect produced by thus lengthening the whole length of the house visible at once. It was probably closed by a bronze or wooden railing, as only to allow the master of the house or the family to pass through it. 7. The apartments on each side of the atrium probably were more for the reception of the guests, and hospitality, who came to the house of Pansa when pleasure or business brought them to Pompeii. The larger room beside the tablinum marked 10 might serve for a winter reception-room for men. 8. The triclinium. 9. Open court. 10. Private entrance to the peristyle. 11. Basin. 12. Bed-chambers. The centre one seems to have been a peristyle, or anteroom, since it communicates with the one beyond it. It is called by Donaldson the library; by Marzi a pantry, or room to 2 7.
arrange the dishes before they were introduced into 14, the triclinium. 15. Winter court, or triclinium; Donaldson calls this room the lararium. 16. Large summer court. We may call this a cyzyxene court, or hall, so called by the Greeks. It is spacious, has a northern aspect, and a large opening towards the garden. 17. Fauces leading from the peristyle to the garden, to avoid making a passage-room of the court. 18. Kitchen. 19. Servants' hall, with a back door to the street. 20. Cabinet looking to the garden. 21. Portico of two stories, a clear indication that this house had at least one upper floor. The staircase however has so entirely perished that its site is unknown, although there is some indication of one in the passage (25). 22. Garden: in one orner, 27, is a reservoir supplying a tank. 23. Four shops let out to tenants. 24. Shop belonging to the house, intended for the sale of the spare produce of the owner's estates. The produce of the farms of the Italian nobles is still vended in the same way, in a small room on the ground-floor of their palaces. 25, 29. Two baking establishments. 26. Baker's shop. 26. Entrance to the peristyle from the side street. On the pier, between the two doors, is a painting representing one of the guardian serpents, by the side of which is a projecting brick to receive a lamp lighted in honour of the Dii Custodes. In the centre of the large apartment are three mills, Α, Β, and next them a large table. Flanking the entrance to the oven are three large vases, Α, and in the left-hand corner is a kneading-trough, Ε, with two copper basins filled with furnaces. The apartment 31, from its communication both with the shop and the bakery, was probably used as a store-room.

The two compartments marked 30 are houses of a very mean class, having formerly an upper story. Behind the last of them is a court which gives light to one of the chambers of Pansa's house. On the other side of the park are two houses (32), small, but of much more respectable extent and accommodation, which probably were also meant to be let; or we might conjecture that one or both served as hospita. The view above offers to the eye successively the doorway, the prothyrum, the atrium, with its impluvium, the Ionic peristyle, and the garden wall with Vesuvius in the distance. The entrance is decorated with two pilasters of the Corinthian order. Besides the outer door there was another at the end of the prothyrum, to secure the atrium against too early intrusion. The latter apartment was paved with marble, with a gentle inclination towards the impluvium. Through the tablinum the peristyle is seen with two of its Ionic capitals still remaining. The columns, a sort of pseudo-Corinthian, are sixteen in number, fluted, except for about one-third of their height from the bottom. The dripings of the roof were conducted by metal conduits into the central basin of the peristyle, which is about six feet in depth and was painted green. In the centre of the basin was a jet d'eau. This apartment, if such it may be called, was unusually spacious, measuring about 65 feet by 59. The height of the columns was equal to the width of the colonnade, about 16 feet. Their unfluted part is painted yellow, the rest is coated with white stucco.

The floor is elevated two steps above the level of the tablinum. In the kitchen is a singular painting, representing the worship offered to the Lares, under whose protection and custody the provisions and all the cooking utensils were placed. Another object of interest in the kitchen is a stove for stews and similar preparations, very much like those charcoal stoves which are seen in extensive kitchens in the present day.

\*Inferior to the house of Pansa, and to some others in size, but second to none in elegance of decoration and in the interest which it excites, is a house in the street leading from the gate of Herculaneum to the Forum, called by some the house of Actaeon, from a painting found in it; by others the house of Caius Sallustius. It is remarkable that the architects of Pompall seem to have been careless for the
most part whether they built on a regular or irregular area. The practice of surrounding the owner's abode with shops enabled them to turn to advantage the sides and corners of any piece of ground however misshapen. Thus in the

1. Prothyrum. 2. Large hall serving as a vestibule, as is pretty obvious from its arrangement. In the comparatively humble edifices of Pompeii we cannot expect to find a splendid provision for the convenient reception of a crowd of importunate suitors, as in the spacious palaces of ancient Rome; still it is interesting to trace the same disposition of apartments on a smaller scale, especially as this throws some light upon the contested question of the Greek or Roman origin of the private houses. There are four doors: one opening to the prothyrum, another to the street,—a large opening, closed, according to Mazois, with quadrivalve doors, or doors folding back upon themselves, like window-shutters. Of the other two, both communicate with the atrium, one directly, the other through an intermediate room, 16, probably the cells ostarii, the porter's closet; so that at night, when the doors of the atrium were closed, no one could enter without his knowledge. 3. Shop communicating with the house for the sale of the produce of the proprietor's estates. Jars are set in the counter, probably to receive his oil or olives. 4. Shop. 5. Shop called a thermopolium, with two rooms backwards. Between 4 and 5, in the party wall, is the opening of a cistern, common to both. 6. Bake-house. There were rooms over it, as is proved by a staircase. The four first steps, steep and inconvenient, were of stone, and still remain. The sites of three mills a a a are laid down. 7. Oven. 8, 9. Rooms belonging to the bakehouse. 10. Tuscan atrium. 11. Marble impluvium. 12. Antechamber of a large exous, or hall, 13, which perhaps was the winter triclinium. This corinon is founded partly on its neighbourhood to the oven, which would keep it warm and dry, and in a comfortable state for winter use; partly from its size and shape. The length is about 24 feet, the breadth 15, which exactly agrees with the descriptions of Vitruvius, that the length of a triclinium should be double its breadth. A further reason for thus appropriating it may be found in its central situation, which is such that it must have been very ill lighted, if lighted at all. It was probably therefore intended chiefly for evening use. 14, 15. Rooms, probably for the reception of strangers, which, where there was no hospital, generally were placed round the atrium. The walls of 15 are preserved up to the cornice, and are stuccoed and painted. 17. Alc. That on the right opens into a cabinet, probably that of the atriensi. To correspond with the doorway, there was in the other sala a false doorway, which served as a lararium, as the paintings which were found in it prove. 18. Open room and staircase leading to a winter apartment placed above the oven. 19. Tablinum. 20. Fauces. 21. Portico. 22. Summer triclinium. 22. Cabinet. 24. Garden, or xystus. 25. Tri-

The general view of this house is taken from the street in front, and runs completely through to the garden wall. One of the pilasters which flank the doorway has its capital still in good preservation. It is cut out of grey lava, and represents a Silenus and a Faun, side by side, each holding one end of an empty leather bottle thrown over their shoulders. Ornaments of this character are common to Pompejan houses. On the right is the large opening into the vestibule. In the centre of the view is the atrium, easily recognised by the impluvium, and beyond it through the tablinum are seen the pillars of the portico. Beyond the impluvium is the place of a small altar for the worship of the Lares. A bronze hind, through the mouth of which a stream of water flowed, formerly stood in the centre of the basin. It bore a figure of Hercules upon its back. The walls of the atrium and tablinum are curiously stuccoed in large raised panels, with deep channels between them; the panels being painted of different colours, strongly contrasted with each other. The altar in the atrium, and the little oratory in the left hand sala, belong to the worship of the lares domestici or familiares, as is indicated by the paintings found in the false doorway. They consist of a serpent below, and a group of four figures above, employed in celebrating a sacrifice to these gods. In the centre is a tripod, into which a priest,
his head covered, is pouring the contents of a patera. On each side are two young men, dressed alike, apparently in the pretexa. In one hand each holds a patera; in the other each holds a leaf of a cow's horn perforated at the small end, through which a stream is spouting into the patera at a considerable distance. In the back ground is a man playing on the double flute.

Passing through the tablinum, we enter the portico of the xystus, or garden, a spot small in extent, elegantly decorated by the hand of art, and set apart as the favourite retreat of festive pleasure. The portico is composed of columns, fluted and coved, the lower portion of them painted blue, without pedestals, yet approaching to the Roman rather than the Grecian Doric. From the portico there is an ascent by three steps to the xystus. Its small extent, not exceeding in its greatest dimensions seventy feet by twenty, did not permit trees, hardly even shrubs, to be planted in it. The centre therefore was occupied by a pavement; and on each side boxes filled with earth were ranged for flowers, while, to make amends for the want of real verdure, the whole wall opposite the portico is painted with trellises and fountains, and birds drinking from them, and above with thicketts enriched and ornamented with numerous tribos of their winged inhabitants. Exactly the same style of ornament is described by Pliny the Younger, as existing in his Tuscan villa. (Plin. Ep., lib. v. 6.) At one end of the garden, which is shaped like an L, we see an interesting monument of the customs of private life. It is a summer triclinium, elegantly decorated. The couches are of masonry, intended to be covered with mattresses and rich tapestries when the feast was to be held there; the round table in the centre was of marble. Above it was a trellis, as is shown by the square pillars in front, and the holes in the walls which enclose two sides of the triclinium. These walls are elegantly painted in panels in the prevailing taste; but above the pannelling there is a whimsical frieze, appropriate to the purpose of this little pavilion, consisting of all sorts of estacles which can be introduced at a feast.

In front a stream of water pours into a basin from the wall, on which, half painted, half raised in relief, is a mimine fountain, surrounde by a stag. Between the fountain and the triclinium, in a line between the two pilasters which supported the trellis, was a small altar, on which the due libations might be poured by the festive party. In the other limb of the garden is a small furnace, probably intended to keep water constantly hot for the use of those who preferred warm potions. At the other end of the garden, opposite the triclinium, was a cistern which collected the rain-water, whence it was drawn for the use of the garden and of the house. There was also a cistern close to the triclinium.

On the right of the atrium a suite of apartments existed, carefully detached from the remainder of the house, and communicating only with the atrium by a single passage. The disposition and the ornaments of this portion of the house prove that it was a private veneration. The strictest privacy has been studied in its arrangements; no building overlooks it; the only entrance is closed by two doors, both of which we may conjecture, were never suffered to be open at once; and beside them was the apartment of a porter, whose duty was to prevent intrusion. Passing the second door, the visitor found himself under a portico supported by octogonal columns, with a court or open area in the centre, and in the middle of it a small basin: at each end of the portico is a small chamber, with appropriate paintings. These rooms were paved with marble, and the walls lined with the same material. Among other things found in one of these chambers were eight small bronze columns, which appear to have formed part of a bed. Both chambers had glassed windows, and it is conjectured that there were other similar ones. The ground of the walls is black, while its sombre aspect is redeemed by a profusion of gold-coloured ornaments, and bright green and red colours, composed in the most elegant taste.

The columns were painted with a strip of red ochre, of brilliant tint. Between the chambers is a large painting representing the story of Acteon, from which the house derives one of its names. The large apartment 35 was a triclinium for the use of this portion of the house: over the left-hand portico there was a terrace. The space marked 36 contained the staircase which gave access to it, a stove, connected probably with the service of the triclinium, and other conveniences. It is not a little remarkable that in many Italian houses this essential part of the house is close to the kitchen, and often in the kitchen itself.

The walls of Roman houses were decorated with arabesque paintings, which added an agreeable charm to the light and airy appearance of the hot climate.

The houses of which we are speaking are among the most extensive hitherto discovered in Pompeii: most of the dwellings are on a very small scale; but the principal feature, the atrium, is found in almost all of them. The decorations vary according to the wealth of the occupier. Though the houses in the city resemble each other in the principle of their arrangement, there is one house without the walls of Pompeii very different in this respect. This dwelling is called the Suburban Villa of Dumesdes, and is described at length in the volumes on Pompeii, published by the Society for the Diffusion of Useful Knowledge, from which, with a few verbal alterations, the account above given of the Roman house is taken.

Three centuries ago the English house was constructed in a very different manner from the houses of the present century. The chief materials were wood and plaster, and a common but peculiar feature was the projecting upper floors. The internal arrangement was adapted to the daily life of the day, and the external architecture had often a picturesque appearance. The Butter-market at Ipswich contains a remarkable specimen of a house of this period. After the great fire the advantage of the use of brick or stone became so apparent, as well as the adoption of some regularity, that a great change took place in house-building in the metropolis, which extended by degrees to the houses of the middle class, from time to time, throughout the country. In this gradual change there have almost entirely disappeared the projecting floors with large bow-windows, the wooden galleries round the quadrangular courts, the boldly-projected dripping eaves, and the high-pitched roofs with their large windows. In the latter part of the last century an act of parliament was passed for the improvement of house-building in the metropolis, as far as regarded strength, protection from fire, and the gradual removal of the old-fashioned notions. This system has no doubt gradually led to improvements in house-building all through England.

The modern English house, which is most commonly of brick, varies in its arrangement according to the wealth of the occupier, or the skill and taste of the architect. The houses of the middle class, especially in cities, are nearly the same in their chief features.

In cities, and particularly in London, for want of space, the basement is generally on a level with the lowermost floor of the building, that is to say, almost on a level with the street. The ground-floor, or the first floor, is usually built with the ground-floor, and the following manner:—the entrance is mostly at the side, leading into a passage, at the end of which is the staircase, which in double flights, with landings between, ascends to the top story. On one side of the passage-way is usually placed the dining-room, and the drawing-room.
is placed on the first floor above the ground-floor. On
the other floors are arranged the bed-rooms: the highest
floor is called the attic. In the houses of the wealthy
the drawing-room is formed of a suite of rooms, and the
apartments are much more numerous. The servants' rooms
are often placed in a contiguous wing of the house, near
enough to be within immediate call, and yet so separated
from the house as not interfere with the privacy of the
family. The best arranged English houses are the country
mansions of the rich.

English houses are in general well provided with means
for preventing the heat and water and all impurities which require
be removed from the premises. The large towns of England
which have sprung up or greatly increased within the pre-
century, and particularly London, contain numerous
houses which are built on the model of the older
holds, and thus are kept in a state of cleanliness and
propriety which no other houses in any country enjoy in an
equal degree. The convenient arrangement of halls is also
one of the striking features in a good English house, and is
where so general as in England.

The floors of English houses are constructed of wood, and
hoarded; and the roofs, which are pitched, or at an angle,
are covered with slates or tiles. The rooms are heated
open gratings, with flues over them, the exit for which is
above the roof.

The chimney-flue is a very important feature of an
English house, as upon its construction depends the comfort
of the rooms. According to Nicholson, 'In stone walls of ordinary buildings the most
common dimensions for the sections of the flues of sitting-
rooms are from 12 to 14 inches square, and for the brick-
work of an inner flue of the register 24 inches breadth to
tracted to this size, forming the throat of the flue, it being
much wider immediately over the opening of the fireplace.
To prevent smoke, the chimney ought to be so constructed that
the current of air may pass immediately over the fire,
as so as to be ravelled in its passage, and not to pass entirely
through the fire, as many have erroneously imagined.
For this purpose the throat should be so near the fire as to prevent
the flue from being longer than the wall, and its horizontal
dimension in the thickness of the wall should not exceed
4½ inches or 5 inches at the most."

The necessary construction 'is to be formed by facing up
the back, and bevelling the coverings, so that no cold air may
be admitted by the ends of the flue; by thus obliging the
overplus above the quantity necessary to produce combus-
tion to pass over the fire, it becomes so heated as to consume
the smoke in part, and to drive the remaining portion before it
without inconvenience or nuisance."

The coverings are generally placed at an angle of 135
degrees with the back and breast of the chimney, and should
be made to form an abrupt plane on their top, so as to break
the wind, and yet so as to have a bad effect on the
flue. The greater the quantity of rarefied air that passes up
the flue, and in general the higher the chimney, the more
celerity and force will it ascend with. The flue ought
therefore to be carried as high as convenience will admit.

The tops of flues should not have such wide apertures
as to permit a greater quantity of air to rush down
the chimney and counteract the force of the ascending
rarefied stream.

Smoky chimneys are frequently occasioned by the situa-
tion of doors in a room, the grate being placed too low or
the mantel too high."

'Flues with close sections are, with some reason,
supposed to be more favourable for the ventilating of smoke than
those whose sections are square or rectangular. (Nichol-
son's Dict., art. 'Chimney.')

The staircase of an English house is usually constructed
in the manner detailed. The principal stair is of
wood, and requires a skilful workman to execute it. (Nichol-
son's Dict., art. 'Handrail'.)

Every convenience which ingenuity can contrive is now
found in the numerous and highly cultivated English
houses, some of which do not belong to
the wealthy class. These luxuries which the rich nobles
would not formerly procure at any price, are now at the command
of every man of a moderate income. The windows
are hung with pulleys and weights, so that they are opened
and shut with the greatest ease. The shutters which close
them at night are made to fold and to fall into the smallest
possible compass. The ceilings and walls are all
beautified with plastered, and the latter, if not painted, are carefully
papered with paper printed of various colours; and the
wood-work is often painted in imitation of the most costly
materials.

The houses of the poorer classes are generally called
cottages. In their construction, economy, convenience, and a
wholesome ventilation should be mainly kept in view, and
they may be as much as one would hope the nature of the materials will admit of without increasing
the expense. In cottages of two stories the upper should
be warmed by a flue from the fire in the lower; in order to
prevent such a flue from being cold, the sides of the
rooms which are on the flue should be as thin as possible. In a single cottage of twelve
or fourteen feet square the conveniences should consist of
a common dwelling-room on the ground floor, and a sleeping
apartment on the upper floor, which should be partitioned
off to separate the sexes.

When cottages are built in rows they may be arranged
with a living-room on the ground floor, about sixteen
feet square, with a door and window in the front, and a door
leading into a lean-to at the back. The fireplace
should be on the side away from the door, with an oven opening
into it by means of a flue; under the stairs a pantry with
shelves may be formed. The object of the lean-to is for
fuel, the tools, the servant's bed, and occasional articles of
utensils. The English and Scotch cottages differ in their external
appearance and arrangement. The walls of the old English
cottages were formed of clay, mud, or turf, kept together
by means of a bevelled joint, and bound with wooden brackets; the roof was steeply pitched, that is, with
an acute angle at the top, which was done to remove any
great pressure from the walls, and to throw the rain off
rapidly. In others, the roofs were lower, and may
have been carried right up singly in one or both ends of the building, and for the most part they projected on the outside of the wall.
The roof was covered with straw, reeds, or slate. An upper
chamber was sometimes formed in the roof, lighted by a
dormer window in the side of the roof. The best English
and Scotch cottages were generally carried
up singly in one or both ends of the building, and in the latter,
most of the walls were left unfinished, the walls
were continued downwards beyond the top of the wall
and projected from it. This method preserved the building in
some measure from damp. The chimneys, which formed
the main strength of the building, were generally carried
up singly in one or both ends of the building, and in the latter,
most of the walls were left unfinished, the walls
were carried up singly in one or both ends of the building, and
in the latter,
the chimneys are either carried up in one or both gables, or in a partition wall, which separates the two from the hearth length; when they are carried up in the ends, as the walls are always made sufficiently thick to receive the flues, the materials, which are of crude stone cemented with mortar, not being of sufficient value, the walls do not form an ingredient of the chimneys in order to save them. The chimney shafts are finished with a coping of hewn stone.

In many old constructions of Scotch cottages the chimneys are formed of a large mass of walling round the fire, which gave great advantage, in admitting more than double the number which the modern construction admits of. The old roofs of thatch, turf, or heath, have given place to slate and tile. The common kind of the present cottages in the north are made very wide, either to receive a framed bedstead and press, or to form recesses, by means of a partition, for the reception of the bed and clothes, on the side of the apartment opposed to the window.

Some valuable information on cottage-building is contained in Loudon's 'Architectural Magazine,' and in the 'Encyclopædia' of the same author.

As the French and Italians of the middle classes do not generally inhabit separate houses like the English, but on floors containing a series of rooms, it follows that the arrangement of their houses differs from that of the English. The staircase, as in public chambers, is common to each floor, and is generally placed at the end, and generally with a passage or balcony on one side: chimneys are rare, stoves being most commonly used to heat the rooms. The windows are not hung with pulleys and weights, but are each of two folding glass doors on hinges. The Mezzanine (Mezzanine) is common in French and Italian houses. The houses have generally projecting roofs with often broad overhanging eaves, while in England the gutter is usually concealed within a parapet wall. French and Italian houses are not so richly ornamented as the English; the floors are seldom boarded, being paved with glazed tiles or unglazed bricks. So rare are bricks in Paris that it is not unusual to see the chimney shafts painted in imitation of red bricks; bricks are however employed in the construction of their flues.

The Spanish houses are very spacious; they have large courts in the interior, and are formed with galleries round the inside of the quadrangular courts; families occupy the separate floors, as in France and Italy. The chief door, which is large, has a small wicket, from which any one applying for admission is first scrutinized. It is a peculiarity of the Spanish house, at least in the south of Spain, that it is without chimneys.

The houses in Switzerland are smaller than those in Italy, France, and Spain; and the people are accustomed, as in England, to live in separate dwellings. The most remarkable of the Swiss houses are those which are built in the neighbourhood of the great pine forests; these are really log-houses, though they are generally finished very carefully and constructed with great accuracy. The walls are formed of and are built from square or rectangular timbers, and are laid end to end, the ends being the gables; the roofs are of well-timbered wood. The inhabitants of the United States of North America.

Many of the cottages have wooden chimneys, the whole of the flue being formed of and lined with wood; the smoke, which is always visible, prevents the smoke from being carried away. The beams supporting the roof are formed into bold cantilevers, and the principal front is often carved, sometimes with elaborate ornamens, and inscriptions in German text are painted in several colours. These houses have altogether a picturesque appearance, and are much warmer than houses of stone or brick. The houses in many parts of Germany are probably nearer to the English in their arrangement than the French and Italian houses. In many places the houses are a framework of wood, and the interfaces are filled with unskilled and bricks, and are staggered in such a manner that the rooms and heatings houses in Germany and Switzerland are principally by stove (fien), which, in the better houses, are so arranged that the domestic feed the fire without entering the apartment which is heated.

In North Prussia the peculiar feature of the houses is that they are framed of wood with bricks between. In the same country the upper stories project over the lower, and are supported on columns, generally of wood.

The houses of the Rossi family, both in their effect and arrangement, resemble the architecture of Italian and French houses, except that the roofs are covered with sheet-iron painted with vivid colours, mostly green and red. The windows are double. The village houses are all log-houses (mostly of rounded logs), and very similar to the Swiss log-house, with the exception that the staircase is for the most part in the interior of the house; the roof is high, and covered with sawed boards projecting on the front from the walls; while the Swiss roofs are flat, and generally covered with wooden shingles. The chimney of the Russian house is of brick. On the less frequented roads the village houses are of much rude construction; the rafters project from above the roof, without any form of covering; the projections above the ridge are sometimes cut off, and the ridge-piece is introduced, on which is rudely carved the representation of the head of some animal.

The Rossi stoves are well adapted for economizing heat. The flue is carried up and down, so as to fill a space of about four feet square, and to the height of about ten feet; it is thus carried off; these stoves stand in the corner of the room, so that they can warm them; they are built of hollow porous brick, which of course contains the heat. The external surface is of white glazed and ornamented tiles. The fuel is usually birch, and when the fire is left, the doors are opened so that the heated air thus enclosed diffuses itself through the rooms. The stove requires to be heated for an hour in the morning, and another hour at night, to maintain a high temperature (70 Fahrenheit for instance) during the twenty-four hours.

For the external design of modern house architecture the English are principally indebted to the Italians. This style, which was invented by the great Italian architects and executed in many of the Italian cities, is mainly characterized by the judicious arrangement, proportion, and decoration of the openings in the elevations, the windows and doors, and by the bold cornices which surmount the whole front. These masterpieces are deservedly studied by modern architects, and their principal features are sometimes judiciously introduced into their designs. The cities of Roma, Genoa, Verona, Venice, and Bologna, with many others, contain houses in many parts of Germany which belongs, a style which might be advantageously employed in this country to a greater extent than it has been.

Houses are generally ventilated by means of the openings, the windows, and doors. The method of ventilation adopted in some large covered markets, ast by Liverpool, and some large hospitals, might be adopted with advantage in certain classes of dwellings, as in workshands, and in many parts of Germany. This is based on the adoption of fine air-holes on the line of the floors, which keep up a gradual fresh current of air, without a rapid draft.

The large cities in all countries are, in some degree at least, adapted to the climate. The houses of hot climates are large, with lofty and well ventilated apartments; while those of cold climates are more particularly arranged with a view to protect the inhabitants from cold.
HOWARD, CHARLES, LORD HOWARD OF EFINGHAM, second of that title, grandson of Thomas, second duke of Norfolk, was born in 1540, and was much service by land and sea, he was appointed in 1555 lord-high-admiral of England, and in that capacity had the chief management of the preparations made in defence of England against the French. It was well-known as a natural jealousy existed between the old soldier and the young favourite; and that was enough as the measures to be pursued. However the town was taken, and the ships in the harbour destroyed. [Ex. Earl of Essex] For this service to his Majesty, he retained his high consideration at court, and was employed in several distinguished capacities. He died at the advanced age of eighty-four, December 14, 1624, some years before which he had resigned the office of lord-high-admiral in behalf of the favourite, Villiers, then earl of Buckingham, receiving in exchange a pension of 1000l. and the acquittal of a debt of 1800l. due to the crown. "He left behind him a large fortune in heirloom, and his services were distinguished." [Bishop. Britann.]
HOW 330

was renewed in 1773, when, as sheriff of Bedfordshire, he had charge of the prisons of the county. Shocked by the misery and abuses which prevailed, he set diligently to work to inquire into the nature and remedy of the evil. In that year he visited, in two journeys, most of the town and county prisons in England and accumulated a large mass of information, which, in March, 1774, he laid before the House of Commons. This was the commencement of prison reform in England; for in the same session two bills were introduced, relieving杨幂 prisoners from payment of fees, the other for preserving the health of prisoners. Once actively engaged, he became more and more devoted to this benevolent pursuit; insomuch that the remaining years of his life were more than a diary of his journeys. He travelled repeatedly over the United Kingdom, and at different periods to almost every part of Europe, visiting the most noisome places, relieving personally the wants of the most wretched objects, and noting all that seemed to him important either for warning or example. The first fruit of these labours was a 4to. volume, entitled 'The State of the Prisons in England and Wales, with some preliminary observations, and an account of some Foreign Prisons,' 1777. 'As soon as it appeared the world was astonished at the mass of valuable materials accumulated by a private unaided individual, through a continual presence, research, and study of life, in consequence of the infectious diseases prevalent in the scenes of his inquiries. The cool good sense and moderation of his narrative, contrasted with that enthusiastic ardour which must have impelled him to the undertaking, were such that he was immediately regarded as one of the extraordinary characters of the age, and as the leader in all plans of ameliorating the condition of that wretched part of the community for whom he interested himself' (Alkin).

The House of Commons having seconded his views by the introduction of a bill for the establishment of houses of correction, Mr. Howard, in 1776, undertook a fresh tour, personally to visit the celebrated houses of holit, but he continued his route through Belgium and Germany into Italy, whence he returned through Switzerland and France in 1777. In the same year he made another survey of Great and Ireland. In these tours he extended his views to the investigation of hospitals. The results were published in 1780, in an 'Appendix to the State of the Prisons in England and Wales,' 8vo. In 1781, having now travelled over all the south of Europe, except Spain and Portugal, through which he went in 1783, he visited Denmark, Sweden, Russia, and Poland; and continuing at intervals his home inquiries, published in 1784 a second appendix, together with a new edition of his original work, in which the additional matter was comprised.

The importance, both in prisons and hospitals, of preventing the occurrence or spread of infectious diseases, produced in Mr. Howard a desire to witness the working and to learn the secrets of the perfect system of quarantine, more especially as a safeguard against the plague. Danger or disgust never turned him from his path; but on this occasion he went without even a servant, not thinking it right, for convenience sake, to expose another person to such a risk. Quitting England in 1785, he travelled through the south of France and Italy to Malta, Zante, and Constantinople; whence he returned to Smyrna, where the plague was raging, for the purpose of sailing from an infected port to Venice, where he might undergo the utmost rigour of the quarantine system. He returned to England in 1787, resumed his home tours, and in 1789 published a second important volume, entitled 'An Account of the principal Lazarettos in Europe, &c., with additional Remarks on the Present State of the Prisons in Great Britain and Ireland.' The same year he renewed his inquiries in Paris, having travelled to Madrid, meaning to go into Turkey and the East through Russia. He had however proceeded no farther than the Crimea when a rapid illness, which he himself believed to be an infectious disease, in preserving his life, cut short his end to his life, January 20, 1790. He was buried at Cherson, and the utmost respect was paid to his memory by the Russian government.

Mr. Howard's pen was deep and fervent, and his moral character was so rare and simple. His education had been neglected, so that his literary accomplishments were small; neither were his talents brilliant. But he was fearless and single-minded, untriting, and did great things by devoting his whole energies to one good object. The influence of his disinterestedness and integrity is remarkably displayed in the ready access granted to him even by the most absolute and most suspicious governors, who invariably paid to his person, and the weight attached to his opinion and authority. His character is well portrayed by Bentham in a striking passage already quoted. [Bentham, p. 548.]

He was strictly economical in his personal expenses, always travelling with the same bundle which he had brought him to Constantinople, and which he carried in great fatigue; both his fortune and his constitution were freely spent in the cause to which his life was devoted. His property, and home, when he had one, were at Car- rington, in Nottinghamshire, until 1803, when he was married to his second wife, to whom he was devotedly attached, died in 1755, after giving birth to an only son, who unfortunately became insane. Mr. Howard was a strict, and has not ceased a charge of being a severe parent; whom his behaviour to which increased circulation has recently been given. In Lockhart's 'Life of Scott' (vol. vii., p. 110), Sir Walter speaks of Howard's harrowings to his son. We are enabled to contradict this statement through the kindness of a correspondent, who derived his information from Dr. R. W. Darwin of Shrewsbury, who lived on terms of intimacy with Mr. Howard's son at Dr. Blacklock's in Shrewsbury, and visited him in his last days. The memoir of Dr. Darwin, Howard's son always spoke with the greatest affection and veneration of his father; and on one occasion, being asked by Dr. Darwin whether his father would be angry at the want of compliance with a certain wish, be answered 'not angry, but unhappy.' (Alkin's Life of Howard.)

HOWDBN. [YORKS.]

HOWE, RICHARD, afterwards Viscount Howe, the second son of Emanuel Serres Howe, governor of Barbadoes, and Mary Sophia Charlotte, daughter of Baron Kielmensegge, master of the horse to George I., when elector of Hanover, was born in 1729. At the age of fourteen he served in the Netherlands under the command of Commodore Anson, was sent to war upon the western coasts of Spanish America. On his return he received an appointment in the Burford, and was one of the flag officers of the British fleet. Shortly after he joined the Greyhound frigate (Capt. Noel), and, with his assistance, engaged two French ships at Loach Noy, but did not succeed in capturing them. On the 1st of August, 1743, he engaged in the Flora, off the port of Cadiz. When he arrived in England he was raised to the rank of Captain, and, at the request of Rear-Admiral Knowles, was sent to join his squadron on the Jamaica station, where he arrived too late. On the 1st of October, 1747, he took the Conway, of 24 guns, near the Bermudas, the only French ship that has been sent home under his orders. In 1751 Captain Howe obtained a commission for the Glory, of 44 guns, destined for Africa, and, on his return from thence, was successively appointed to the Mary yacht, and the Dolphin frigate, in which he acquired much valuable knowledge of the navigation on the Barbary shores. In 1755 the command of the Dunkirk, 80 guns, was given to him, and he sailed with Admiral Hoseware. The fleet took up a position off Cape Race, Newfoundland, in order to intercept the French fleet. The fog enabled the main body of the enemy to escape; but two ships, the Lys and the Aetna, struck to Captain How's and another important

In 1756 Howe was employed in the Channel service; during the following year he commanded the Magnanime, under Sir Edward Hawke, but the expedition proved unsuccessful, for being too late he was forced to turn back. On the 1st of June, 1756, he hoisted his flag in the Essex, as commodore of the fleet destined to blockade Brest. Con- trey winds forced them to put back, a month after their departure; and while in pursuance of their mission he died, on the 1st of July, 1756, at the age of 24 years and 6 months.
rried Mary, daughter of Chiverton Hartop of Welby; and after
soon, losing his brother Viscount Howe, he succeeded to his
and estate. In 1759 Lord Howe was re-ap-
pointed to the Magnanime, and the 20th of June en-
gaged with the squadron under M. de Confins, in which
Howe took the Thieue and the Formidable. His reputa-
tion was now so high that George II. complimented him by
saying that his life had been one continued series of
services to the country.
After he had been again absent in the Princess Amelia,
he returned home; and peace being proclaimed, Howe
occupied a seat at the Board of Admiralty for two years,
and was appointed to the command of the English
Navy, and was returned to parliament for Dartmouth. 

In 1776 he sailed on board the Eagle for North America. He
was successful in a brilliant action with D'Easting's squadron
off Rhode Island, which he quitted September 27th, and on
the 30th October landed at St. Helen's. On a change of
ministers, his friends, who came into power, appointed him
Admiral of the Blue, and to the command of the Victory; but
falling in his attempt to intercept the West Indian traders,
he soon returned to Spithead. He was then sent to relieve
Gibraltar, which he accomplished, and arrived in England
on the 14th November. Lord Keppel having resigned his
office, Lord Howe succeeded him as First Lord of the Admi-
miralty on the 1st of December, and assumed the command
on board the Janus. In three months he was obliged to resign,
on another change of the ministry, which restored Lord Ke-
ppel. At this time he was created Earl Howe, in acknow-
ledgment of his services. Lord Howe proceeded to
Langar to his eldest daughter. On the 22nd of June, 1790,
he was appointed to the command of the Channel fleet,
with the additional and peculiar distinction of being ordered
to take the first hoist, and to be present at the main, on board
the Queen Charlotte of 100 guns; but, after cruising about in
a fruitless search for the Spanish fleet, he anchored at Spith-
head, 14th September, and enjoyed repose on shore for a
considerable time; having been operatively engaged, with a
several convays to the Lizard, and the same day discovered
three frigates outside of Brest harbour. On the 25th May
two French corvettes were taken; on the 28th May several
French vessels were seen, to the south-east, and the
Bellerophon engaged with the Revolutionnaire. The ene-
my's motions having been watched during the night, the
two fleets continued in the same relative position on the
morning of the 29th: on the 30th and 31st the state of the
weather made a further engagement of any kind impossible,
and the action commenced at 9 A.M. The Marlborough,
Defence, Queen Charlotte, &c., broke the enemy's line: ten
of the enemy's ships were disabled; seven were taken,
three were captured; two ships of 4 pounders, and 31 inch
broad, were taken, and Lord Howe had the glory of towing into Portsmouth six ships of the
line.

Lord Howe's health now began to fail; but notwithstanding
his infirmities, he consented to go in person to quell the
mutinies that had arisen at Portsmouth, Spithead, &c.; he
ascertained the causes of complaint, and endeavoured to
remove them by causing the obstruction officers to be su-
peredced; his concessions were judicious, but they did not
escape censure.

This was the last public act of his life. With his
wife and daughter he spent the rest of his life in retirement at
his house at Park Lodge, in the enjoyment of the income
of ten pounds a year, which he had disposed of his
commission in 1788, and which situation would probably produce an effect equal to that
which would result from the concentrated fire of a whole
broadside of solid shot; and should the shell strike near the
surface of the water, it might even immediately sink the
ship. But this remained as a merely theoretical experiment, and it is sufficient to
prove that destructive consequences would ensue
on the bursting of a shell when so loaded; and, not-
withstanding the danger supposed to exist in keeping loaded
and they were employed, on account of the risk of their
being accidentally ignited, it is probable that, in a future
war, one or both of the hulks will have recourse to
this formidable means of obtaining victory on the ocean.

HOTH.

HOYA. [Hoyowerv]

HUDDERSFIELD, a market-town, parish, and township in
the upper division of the wapentake of Agbrigg, and in

2 U 3
Hudson.

The West Riding of Yorkshire. It was created a parliamentary borough by the Reform Act of 1832, sending one member to parliament. The borough extends over the entire township, and includes a population of 19,035, and 1,140 houses of 100 and upwards. The township of Huddersfield comprises about 3,700 acres of land, while the surrounding district has five hundred acres for the maintenance of the highways, viz., Huddersfield, Fartown, Bradley, Deighton with Sheepridge, and Marsh with Paddock. The parish of Huddersfield consists of seven townships, viz., the Borough of Huddersfield, Goler Carr, Lockwood, Lindley, Lockwood, Colne, and the Borough of Greenhead, on his own land; its cost was 12,000£; it is in the pointed Gothic style. St. Paul's church was built by the parliamentary commissioners on a site given by Sir John Ramsden, and has an average attendance of 500 people; it is endowed by John Whitacre, Esq., on an annuity at Woodhouse, on the north of Huddersfield. The other places of worship are: one for Catholics, two (very large) for Wesleyans, one for Primitive Methodists for Indian dependents, and one Friends' meeting-house (at Paddock). There is no endowed grammar-school at Huddersfield, nor in the immediate neighbourhood, but there is an intention to establish a Church of England Collegiate school on an enlarged and comprehensive system of education. There is also a college for the education of persons of all sects. There is a national school for boys and girls, an infants' school, and an endowed school, to educate about 500 children. The Sunday-schools and religious and educational societies connected with the town and county are liberally sustained. The Philosophical Hall and Library were erected as a Greengrocer's Society, and the society sprung out of a Mechanics' Institute formed in 1823. This edifice cost about 300£; the members have a library, a small museum, and laboratory, and there is a good lecture-room in the building. There are also subscription and law libraries, and a commercial and mechanics' institute. The waterworks are admirably constructed; they are situated in the townships of Longwood and Goler, about four miles west of the town, from whence the water is brought by the hilly and undulating country for any increase in the population which may be looked for during the ensuing century. The town is lighted with gas. The Huddersfield and Upper Aghrig Irrigatory is a large and elegant stone dyke, in the Green Dray style, which was erected in 1830 by voluntary donations amounting to 10,000£; out of this sum a partial endowment was also effected towards its future support, though it is chiefly sustained by annual subscriptions. Nearly the whole of this large amount was obtained by the personal exertions of Samuel Clay, a humble tradesman of the town, since deceased. In the year 1836 this institution relieved 3,524 out-of-work men. The church schools in the town, in 1818, had in 1836 deposits amounting to 53,000£, belonging to 1,011 individuals and 44 societies. Lockwood Spa baths are about half a mile from the town. The buildings are elegant, and the water strong, cold, and saline, and comprise cold, tepid, warm, and shower-baths. The income from the Dole Land (32 acres) is distributed by the vicar annually on St. Thomas's day; the other charities of this nature are very inconsiderable. The introduction of the New Poor Law into this district was met by much opposition in 1837; but the obstacles which were thrown in the way of its operation are now removed.

Hudson, Henry, is eminent among these early navigators who sought a shorter passage to China than the circuitous route round the Cape of Good Hope. Nothing is known of him before 1607, when he was employed by some London merchants to command a ship fitted out to search for the Shakespearian route to the Pacific, or to explore the eastern coasts of Greenland beyond the 80th degree of latitude, before he was stopped by the ice. In 1608 he kept more to the east, and in a lower latitude; but was again unsuccessful in 1609. In 1609 he tried again the north-eastern route; and being again unsuccessful, bore away for America, along the coast of which he ran down as far as Chesapeake Bay, whence he remained for some time on the coast of Virginia. Early in 1610 he again attempted the north-western passage, and having found persons willing to adventure their money in the lottery of maritime discovery, he undertook a fourth voyage, in hopes of discovering a north-western passage, in April, 1616. The fleet of June and July he sailed through the Strait, and discovered the Bay, both of which have since been called after his name; and hoped for a time that
HUDSON'S the much coveted object was attained. But finding that
great inland sea to be but a bay, he resolved to winter in
the southern part of it, hoping to pursue his discoveries in
the following spring, and show the whole enterprise
him and his companions to great hardship, and at last
proved fatal to his scheme. The men became discontented
and insubordinate; Hudson on the other hand seems to
have been generally patient and fairly, and, at least, they were in a
Strait on the voyage home, some of the boldest of the muti-
neers seized the captain and eight of his staunchest followers,
and sent them adrift in an open boat; and they were never after
heard of. The Hudsonians of those old sailors, to know that in his first voyage
Hudson's crew consisted of ten men and a boy; his last and
largest ship's complement was only twenty-three men. For
an account of his adventures, see Purchas's Pilgrims
Harris's Voyages. He has a full account in the 'Biog.
British.'

HUDSON, JOHN, D.D., was born at Wedeshop in Cumber-
land, about the year 1652. He entered the University of
Oxford in 1676; took the degree of M.A. in 1684; and was
soon afterwards elected a Fellow of University College,
of which he was tutor for many years. In 1701 he was ap-
pointed principal librarian of the British Museum;
and in 1712, principal of St. Mary's Hall. He died on the 27th of
November, 1719.

Hudson published editions, with critical notes, of several
of the classical authors: namely, 'Velleius Paterculus,'
1693, 2 vols. 8vo; 'Claudii Tertulliani Acta Sanctorum,
1702, 4 vols. 8vo; 'Veterum Graeciorum, et Romanorum
Scriptorum Graeciores, et Romaniores,' 4 vols. 8vo, 1698-1712; 'Dionysius of Halicar-
asus,' 2 vols. 8vo, 1704; 'Longinus,' 1716, 1719; 'Morris
Atticus,' 1717, 4 vols. 8vo; 'Horatius,' 2 vols. fol., 1720, which was printed as far as the fourth index
under the author's own superintendence; the last few pages
were edited by his friend Hall, who has prefixed to the
work an account of the life and writings of Hudson.

HUDSON, RIVER. [New York.]

HUDSON'S BAY is an extensive maritime sea
on the eastern side of North America, and connected with the
Arctic Ocean by the eastern passage of the Mackenzie,
greater than that of any of the inland seas of the Old
Ctinent, the Mediterranean only excepted. Its southern
part is called James's Bay. From the most southern corner
of James's Bay to Repulse Bay, which he entered the University
of Cambridge in 1676; took the degree of M.A. in 1684; and was
soon afterwards elected a Fellow of University College,
of which he was tutor for many years. In 1701 he was ap-
pointed principal librarian of the British Museum;
and in 1712, principal of St. Mary's Hall. He died on the 27th of
November, 1719.

Hudson published editions, with critical notes, of several
of the classical authors: namely, 'Velleius Paterculus,'
1693, 2 vols. 8vo; 'Claudii Tertulliani Acta Sanctorum,
1702, 4 vols. 8vo; 'Veterum Graeciorum, et Romanorum
Scriptorum Graeciores, et Romaniores,' 4 vols. 8vo, 1698-1712; 'Dionysius of Halicar-
asus,' 2 vols. 8vo, 1704; 'Longinus,' 1716, 1719; 'Morris
Atticus,' 1717, 4 vols. 8vo; 'Horatius,' 2 vols. fol., 1720, which was printed as far as the fourth index
under the author's own superintendence; the last few pages
were edited by his friend Hall, who has prefixed to the
work an account of the life and writings of Hudson.

HUDSON'S BAY is a wide, extensive, and
inland sea, lying between the northern coast of
North America and the tundra of Labrador, and
connected with the Arctic Ocean by the eastern passage of the
Mackenzie River. It is about 1,200 miles long, and 600 miles
wide, and contains about 1,000,000 square miles. It
is divided into several bays and inlets, the chief of
which are James's Bay, Somerset Bay, and
Repulse Bay. The boundary of the bay is
constituted by the east coast of Labrador,
the west coast of North America, and the
northern coast of the tundra of Labrador.

The shores of the bay are generally rocky
and barren, with some islands of
coniferous trees. The entrance is narrow,
and the water is generally clear and
deep. The bay is accessible by sea
for most of the year, and is
frequented by sealing and
whaling vessels. The
inhabitants of the bay
are the Inuit, or
Eskimos, who
engage in
catch fish and
seal. The
principal
settlers
are
the
Russians,
who
have
established
several
trading
posts
along the
coast.

The
principal
products
of the
bay
are
seal,
whale,
and
fish. The
Inuit
are
also
known
to
hunt
for
caribou,
and
fish
for
bear
and
seal
bait. The
principal
cities
and
towns
in the
area
are

Repulse
Bay,

Hartford,

and

Fort

Cumberland.

The

bay

is

also

an

important

trade

route

for

the

Inuit,

and

is

a

key

to

the

Arctic

Ocean.

The

bay

is

also

an

important

trade

route

for

the

Inuit,

and

is

a

key

to

the

Arctic

Ocean.

The

bay

is

also

an

important

trade

route

for

the

Inuit,

and

is

a

key

to

the

Arctic

Ocean.

The

bay

is

also

an

important

trade

route

for

the

Inuit,
grounds which enclose the bottom are usually from 100 to 150 feet above it, and exhibit towards the Rocky Mountains in some places an undulating, but in others, especially towards the south, a broken surface. But towards the Barren Grounds their surface rises rapidly into high hills, which in many places attain from 600 to 1000 and even 1500 feet of elevation, and frequently run parallel to the course of the river. White spruce-trees grow at the base of these hills as far as 68° 11' N. lat, north of which they become scarce, and birches and aspen take their place; and birches alone are found as far as 69° N. lat. The delta of the Mackenzie, which is 90 miles in length (from 67° 40' to 69° 10' N. lat.), and from 15 to 40 miles in width, is formed by the junction of several branches, and is occupied by a lake, whilst their borders are higher, and well clothed with white spruce-trees. The trees terminate suddenly in 68° 40' lat. The Rocky Mountains, which separate the countries now under survey from the North-western Territory, seem to attain the greatest elevation where the sources of the Abatlabasea river approach the course of the Columbia river. Mount Hooker is stated to rise to 15,700 feet, and Mount Browne even to 16,000 feet above the sea. Their elevation farther north seems to be considerable, as the range of elevation of another and the upper part of the Peace river is always covered with snow: farther north however they decrease in elevation; and where the Mackenzie river approaches them, they are less than 4000 feet high. The region of the Great Plains, which is traversed by Arctic Oceans and lakes, where they are free from snow in summer. As far as our information goes, they seem to consist of a number of parallel ridges, with longitudinal valleys of moderate depression lying between them. The most eastern ranges seem to be the highest, but they do not constitute the watershed, as several rivers originate in the ridges farther west, and break through the more elevated ridges which form the boundary-line of the countries of which we are talking. Numerous large rivers traverse this extensive country. One of the most important, not on account of the country which it drains but on the situation of the Hudson's Bay Company, and at no great distance from the upper branches of the Ottawa river; and they are accordingly used as the most convenient means of communication between both countries, and are the most frequented road from Hudson's Bay to the great commercial town of Montreal. The Abatlabasea lake, which may be considered as the outlet of the Great Lakes, is about 60 miles long, and somewhat less than one-third of that amount in breadth, and is diversified by numerous islands. The river, which issues from it, runs west, but afterwards diminishes to the north. The Moose river (Mackenzie) is about 900 miles long, and is carried on by another river, which rises in the vicinity of the Great Slave Lake, and joins the Moose river near Fort McLeod. This river, after a course of about 290 miles, falls into the Great Slave Lake. The northern branches in the Mackenzie river, which rises in the eastern declivity of Mount Browne, and flows first in a general north-eastern direction, and then north until it falls into the western portion of Abatlabasea Lake. Lake Abatlabasea, called also the Lake of the Hills, is nearly 200 miles in length, and extends from west to east, and 140 miles in width. The river which issues from its north-western extremity is called Stone River, but at its confluence with Peace River it takes the name of Slave River. The Peace River rises on the western side of the eastern range of the Rocky Mountains, within 300 yards of the Tacootchese or Fraser River, which falls into the Pacific. Within the mountains it is a large stream navigable for boats, where it makes its way through a narrow channel bounded by lofty mountains covered with eternal snow. (Richardson, Fauna Boreali-Americana.) It flows through the plains more than 300 miles in a direct line until it joins the Stone river. The upper portion of the Peace, which is about 100 miles below its mouth, is about 1700 feet wide, and in a northern direction to Great Slave Lake. Great Slave Lake is the largest of the numerous lakes of this country. It extends between 109° and 117° 30' W. long., or about 230 miles from east to west, with an average breadth of 50 miles. It covers a surface 130,000 square miles, or half the extent of Ireland, and is probably larger than Lake Ontario.

From the north to the northwest, the mouth of this lake issues the Mackenzie River, which varies in breadth from one to three miles, except in a few places, where it is narrowed by rocky hills. It flows first nearly west, declining by degrees to the west-north-west until it meets the Mountain River, or, as it is called, the Great Bear, which, with the Peace and Slave, forms the Mackenzie. The remainder of its course lies to the north of the north-west, until it reaches the Arctic Ocean, in 65° 10' N. lat. At 67° 40' N. lat. it begins to divide into several branches, in which their mouths are placed at a distance of 40 miles along the shores of the Arctic Ocean. The northern branch of the Mackenzie originates, like the Peace River, within the mountain-ranges of the Rocky Mountains, and probably less than 150 miles from the shores of the Pacific. Its course is little more than 1000 miles in length, and is not distinctive enough to make a great circuit before it leaves the mountains. East of the mountains it still runs about 200 miles. Near 66° N. lat. the Great Bear-Lake River falls into the Mackenzie; it is the chief tributary of the Great Bear, which supplies its water. This lake lies between 65° and 67° N. lat., and 117° 30' and 123° W. long., and has a very irregular form, it probably covers an area of 8000 square miles. The Mackenzie rises in the northern part of the Mackenzie branch, traverses 15 degrees of latitude, and is supposed that its
whole course does not fall short of 2000 miles, which is more than that of the St. Lawrence.

East of the mouth of the Mackenzie and close to the shores of the Arctic Oceau is a great lake, called Esquimaux Lake, which communicates with the sea, and whose waters invariably freeze to be breakish. It has not been visited by Europeans.

Besides the Mackenzie, the Coppermine River traverses the northern part of the countries, and falls into the Arctic Ocean. There are yet two other rivers, the last to be mentioned shall be the Thlewweedalzh, or Back River, which obtained the latter name from Captain Wall, who in 1834 discovered and descended it from 10°8 to its mouth (64° W. long.). In its course, which extends to more than 300 miles, it is fed by a number of small springs, or the springs on the Grouns, and forms several lakes. In the present state of our knowledge of these countries it is impossible to say whether the sea into which it falls is to be considered as a branch of the Arctic Ocean. In winter the ice is, of course, covered in 67°15' N. lat., and between 94° and 95° W. long.

We observed above, that the climate of the sterile region is much colder than Greenland under the same latitude. At about the same latitudes which in Europe consist of a great number of islands, and on which the mean annual temperature does not exceed 6°8' of Fahrenheit; the maximum of heat observed is 54°, and the minimum —42°. At Fort Franklin, which is about 250 feet above the sea, and has an extended course of 20°2' lat. and 140°32' (13° W. long.), but situated in the Vale of the Mackenzie, the mean annual temperature is 17°50', the maximum of heat 80°, and the minimum —56°. But though the other parts of the country are situated in latitudes where the temperature even at Fort Chipewyan on the banks of lake Athabasca (58°43' N. lat.) does not rise above the freezing-point, being 30°, whilst the maximum of heat is 97°, and the minimum —44°. At Cumberland House, on the Athabasca (53°57' N. lat.) the mean annual temperature in only 32°11'; the maximum heat 87°, and the minimum —44°. But at the last-mentioned place grain may be cultivated, as is proved by experiments, and the different rise and fall of temperature between Cumberland House and Fort Chipewyan we should conjecture that agriculture might be extended to the southern banks of Lake Athabasca, when the variations of the seasons with respect to agriculture are understood.

In winter the country is, of course, covered with snow, but it is stated to be rarely more than 18 inches deep, which is considerably less than falls in the northern countries of Europe. The aurora borealis is a very common phenomenon in latitudes 68°15' and 62° of these countries, but it does not occur frequently about Lake Winnipeg.

Though a great portion of the country is covered with woods, and at several places iron, copper, lead, and coal, as well as silver and calcium, is abundant, the principal wealth of the country consists in its animals, especially rein-deer, musk-ox, moose-deer or elk, different kinds of deer, bears, wolves, wolverines, foxes, beavers, otters, raccoons, and in the abundance of different kinds of birds; also of the flesh or their skins. The number of water-fowl is also very great, and fish is abundant in the numerous lakes which are dispersed over nearly all these countries.

The native tribes consist of Esquimaux and Indians. The Esquimaux occupy nearly the whole of the sterile region, on both sides of Hudson's Bay [Esquimaux], and the latter wander about in the other regions. The southern tribes of the Indians belong to the Creees [Creees]; but the northern seem to have sprung from another stock. They are all divided into small tribes, rarely consisting of a hundred families, and yet each tribe respects and holds in esteem the territory of country. As they mainly rely for their subsistence on the produce of the chase, they are frequently exposed to starvation, which diminishes their numbers, or at least prevents their increase. The number of Europeans amongst them is considerable, and may amount to some thousands. They are either settled in the establishments of the Hudson's Bay Company, for the purpose of receiving the furs and forwarding them with its new developments through these countries for the purpose of collecting them. These travellers are commonly French Canadians, and are called voyageurs. Among the Europeans there is also a considerable number of the half-breeds of the Hudson's Bay Company are divided into two districts. The southern district comprehends the settlements on the East Main, or western escut of Labrador, together with the more numerous establishments in the country enclosing James's Bay and as far as the banks of the Albany River. The principal depot at is at Moose Fort, near the mouth of Moose River. The northern district comprehends all the others as far north as Fort Good Hope on the Mackenzie River, including the Polar Circle. Its chief settlement is York, on the Hayes River.

Labrador was discovered by John Cabot in 1497, and it is probable that his son Sebastian entered and partly surveyed the coast of this island in the year 1512. The first English settlement was made by Hudson in 1610. Meanwhile the French had colonized Canada, and from thence carried on an active fur-trade with the Indians inhabiting the countries west of Hudson's Bay. But in 1660 Prince Rupert sent a vessel, the 'Wrest,' which established the trade of the city of York on the bank of Hudson's Bay. It was in 1670 the Hudson's Bay Company was incorporated, and it soon rose to prosperity. [Furs.]

(Horatio's Travel to the Coppermine River; Machiazo's Voyages from Montreal to the Frozen and Pacific Ocean; Franklin's First and Second Journey to the Polar Sea; Richardson's Fauna Boreali-Americana; Capt. Back, in the London Geographical Journal.)

Hudson's Bay Company. [Furs and Fur Trade.]

HUE and CRY was the old common-law process of pursuing with horn and voice all felons and such as had dangerously wounded another. It seems to have been practised in the Bay of Hudson's Bay by the Atlantic Ocean. It extends between 60° and 80° W. long., and 68°0' and 64°36' N. lat., and its general direction is nearly south-east and north-west. Its length is about 300 miles, and between its shores it narrows at some places to less than 80 miles. Near the eastern entrance it widens to about 150 miles, the Bay of Ungava stretching far into the peninsula of Labrador. At Cape Cornwall, and on the banks of the River, Hatton's Headland, on the island of Resolution, which is an extensive mass of high rocks, and unhabited. The western entrance is formed by Cape Wolstenholme on the south and north banks of the Hudson's Bay. This navigation of this strait is always difficult and dangerous, on account of the high and rocky coast which lines its shores, and still more so on account of the large masses of ice which are frequently thrown against it by which vessels are frequently beset for many days. It can only be attempted during the months of July and August. There are several islands in the Strait, which are mostly inhabited by Esquimaux.

HUDSON'S BAY COMPANY. [Furs and Fur Trade.]

HUERTA, VICENTE GARCIA, DE. "El Mexicano, an important leader in the revolution, was born in 1779, at Zafras in Extremadura. Actuated both by national and academic pride, he became, through his numerous poetical effusions, the successful leader of that revolution which in the middle of the last century took place in Spain against the exotic Gallic school, which had been imported to Spain. Huerta's contributions to the world of literature and art are many, and among the greatest is his work on the "Elementos de la Historia de España," which was translated into French and other languages. Ulloa, his adversary, is said to have been envious of his works, and to have said that his rival was much more accomplished than he. Ulloa was a charlatan, and his pretensions were never accepted by his fellow poets and scholars." (El Conc; Stephen's Criminal Law.)

In 1799, he was arrested and imprisoned, but was soon released. He continued to write and publish his works until his death in 1836.

After his war with Portugal, Don Pedro the laborious author of the 'Commentarios de la Pintura Eneáctica del Pincel,' and of *De las Líneas de Apeles y Protegones,* nor with another academician, Francisco de de Cartes, *Poema de la Defensa de los Literatos de España,* nor with Lopez de la Huerta, who wrote the 'Examen de la Posibilidad de Fijar los Sinomios de la Lengua Castellana.'

Hull was taken in 1546.

HUrT. Peter Daniel, Bishop of Avranches, was born at Caen on the 8th of February, 1630. He was originally intended for the profession of the law; but he is said to have been induced to devote his attention to subject of general literature by the perusal of the 'Principles' of Des Cartes, and Bochart's 'Sacred Geography.' In 1652 he accompanied Bochart to Sweden, and was solicited by the queen to settle there; however he refused, and returned to France, where he acquired so great a reputation that he was appointed in 1670 sub-tutor to the Dauphin. During the next 20 years he was principally engaged in superintending the publication of the editions of the classics, known by the title of 'In Unum Delphini.' The first idea of this edition was started by the duke of Montausier; but we are indebted to Huert for the plan and arrangement of the work. In 1674 he was elected a member of the Royal Academy; and in 1681, taken orders in the Catholic church in 1676, at the age of 46 years, he was appointed to the abbey of Aunay near Caen, where he composed the greater part of his works. In 1685 he was made bishop of Avranches, but was not consecrated till 1692, in consequence of some disputes between the pope and the French government. He resigned his bishopric in 1699, in order to enjoy more time for study; and he obtained in 1701 of the Electors of Trier the gift of the keys of Caen. During the latter years of his life he lived principally at Paris in the Maison Professe of the Jesuits. He died on the 26th of January, 1721, at the age of 91.

The best known of Huert's works is his *Demonstratio Evangelica,* which was published originally at Paris in 1679, and has since been frequently reprinted. This book, like most of Huert's other works, is written with more learning than judgment. The most important of Huert's other works are: 'De Interpretatione libri duo,' Paris, 1661; 'Origines Commentarii in Sacram Scripturam,' Rouen, 1663, 2 vols. fol., reprinted at Cologne, 1663, 3 vols. fol.; 'Censura Philosophiae Cartesianae,' Paris, 1685, 1694, 12mo.; 'Opuscula Philosophica,' Paris, 1701, 12mo.; 'De la Situation du Paradis Terrestre,' Paris, 1691, 12mo.; 'Huertii Commentarius de Rebus ad eum pertinentibus,' Amsterdam, 1716, 12mo., of which the title page contains a curiously instanced of bad Latin; 'Traité Pluriforme de la Faiblesse de l'Esprit Humain,' published after the author's death, by his friend the Abbé d'Olivet, Amsterdam, 1717.

HUGUENOTS was the name given to the early followers of the Reformed or Calvinist religion in France. The origin of the name has been variously accounted for. It is said to be derived from the German word 'Edigmosen' ('bowed together by the shoulders'), which was afterwards adopted by those citizens of Geneva who promoted the alliance of that republic with the cantons of Fribourg and Berne, in opposition to the partitions of the duke of Savoy, who were called Mameluca, i.e. slaves. The word Edigmosen, being transferred into the French language, was corrupted first into Eugenot, and lastly Huguenots, (Fringer. Histoire de Genève). The Reformation began in Geneva, the party which favoured it, being in great measure the same which had supported the Swiss alliance, retained the appellation of Eugenots, or Huguenot, and the name came from or were connected with Switzerland, and especially with Geneva, the name spread into France, and was applied to the partisans of religious reform during the time of religious persecution. The Catholics used the name of Huguenots as a word of reproach against heretics. The word is now obsolete, and has been replaced by that of 'Réformés,' which is given to the disciples of Calvin, or of the church of Geneva, in contradistinction to that of French Protestants. Portraits of the battles, wars and persecutions of the Huguenots are mentioned in the articles BARTHOLOMÆW, ST.; CHARLES IX.; COGNOS and HÖPFELD.

HULL, the ancient borough of and county town of, is a borough and county of itself, and one of the principal seaports of the United Kingdom. It is the chief town in the East Riding of Yorkshire, and is situated on the north side of the Humber and is about 15 miles from the coast to the north of Hull. It is distant from London 174 miles north, from Beverley 9 miles south, from York 38 miles south-east. Hull returns two members to parliament. It has its old constituency, a Duke of Gloucester, and it was once a borough of importance. The borough comprises the parishes of St. Mary, Holy Trinity, Sculcoates, Drypool, and Garrison-side, as well as other extra-parochial places within these parishes. The population may be thus stated:

<table>
<thead>
<tr>
<th>Description</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>The town part of the town and county</td>
<td>38,958</td>
</tr>
<tr>
<td>Sculcoates parish</td>
<td>13,468</td>
</tr>
<tr>
<td>The county part</td>
<td>46,426</td>
</tr>
<tr>
<td></td>
<td>3,335</td>
</tr>
<tr>
<td></td>
<td>49,761</td>
</tr>
</tbody>
</table>

For municipal purposes Hull is divided into seven wards, with fourteen aldermen and forty-two councillors.

History.—This place took its name of Kingsbottom from its purchase by Edward I., who saw the great natural advantages of the town for the building of a fortified town and port. The researches however of a recent historian of Hull satisfactorily establish the fact that it was a place of considerable mercantile importance for more than a century prior to 1296, the date which its foundation is usually referred. (See notices relative to the 'Early History of the Town and Port of Hull,' by Charles Frost, Esq., F.S.A.) The following circumstances indicate its early importance. For many centuries the town was the port of Hull and the free port of the cookes of both Fries of Caen and England. For many years of Edward I. the duties on exports received at Hull amounted to nearly one-seventh of the aggregate sum received throughout the whole kingdom; and in the twenty-eighth of Edward I., it was appointed, by a royal ordinance, for establishing mints, one of the places for the erection of furnaces. Other proofs of its early mercantile importance might easily be offered. Several visitations of the plague, at intervals during the fifteenth, sixteenth, and seventeenth centuries, as well as the subsequent suffering from iniquities inflicted by the visitation of 1633 was accompanied by famine, as the country people were afraid of bringing in supplies of provisions. At the breaking out of the disensions between the Elector of Hanover and Charles II., fell with the name of Hull. The authorities of the town refused to receive the earl of Northumberland, whom the king sent to take possession of the town in his name, and after some hesitation they admitted Sir John Hotham, as governor, who went to the House of Commons and parliament. At this time the magazines of Hull contained more warlike stores than the Tower of London, and it was the policy of the parliament to have them conveyed to London. On the 3rd of April, 1642, Charles I., accompanied by his son, afterwards Charles II., with a train of from two to three hundred servants, and attended by many gentlemen of the county, set out from York to Hull, and when within a few miles of the town sent an officer to inform the governor that he was intended to dine with him that day. Sir John Hotham was not disposed to accept this honour, and he sent a message to the king humbly beseeching him to forego his intended visit, as the governor could not without betraying the trust committed to him open the gates to such a great train as his majesty was attended by. The king then demanded entrance for himself and twenty of his followers. The governor pleaded the trust committed to him, at the same time declaring himself to be a faithful and loyal subject of his majesty. The king, finding that threats and entreaties were alike unavailing, retired to Beverley, where he had spent the night. That night the king dispatched a herald to Sir John, summoning him once more to open the gates on pain of being proclaimed a traitor, and with a promise of forgiveness for the past if he complied. The herald proved unsuccessful, and the king returned to York grievously disappointed. This was the first act of hostility be-
the king and the parliament. A short time after this the king laid siege to the town, which was defended by Sir John Hotham and Sir John Meldrum, who was sent by the parliament to his assistance. Sir John Hotham received overtures by means of Lord Digby for delivering up Hull to the king. His treachery was suspected by the Parliament, and they were induced to watch his movements. This called forth a stir to the office of general of the parliamentary army in the north gave great umbrage to Sir John Hotham, and he was induced to seek opportunities to deliver up Hull to the Royalists. Sir John Hotham, however, was in this purpose. Sir John found means, when his designs became known, to escape to Beverley, where he was taken, and sent with his son to London; they were both charged with having traitorously betrayed the trust reposed in them by parliament, and were executed on Tower Hill. After these events Hull was again laid under siege by the marquis of Newcastle, and was successfully defended by Lord Fairfax and Sir John Meldrum. During the short period of excitement which terminated the Stuart dynasty and placed William III. on the throne of England, Hull was again a scene of warlike activity. The town, fort, and citadel were in the hands of the Catholic party. But measures were concerted and acquiesced in such decision and promptitude that the governor was taken in quarters before he had even heard of such a design. The anniversary of this event is still celebrated by the name of the town.

Commerce.—The exports of Hull formerly were chiefly wool, woollens, and leather; its imports were timber. At present the coasting-trade, of which Hull has a greater share than any other port in the kingdom, is one of the most profitable. It has also an extensive commerce with the Baltic, with the north of Germany, Holland, and Denmark. The Greenland fishery owed its revival, about 1765, and its subsequent importance, to the facilities of communication between Hull and the interior of the kingdom are numerous; the Ouse, Trent, Aire, and Calder, all communicate with the Humber, and these means of internal communication are employed by the Leedes and the Scawlies and will be again augmented by the continuance of the line from Selby to Hull, which is at present in progress. It is computed that the manufactured goods, coal-stone, &c., yearly introduced into Hull from the West Riding of Yorkshire alone, amount in value to at least five million sterling. In some years within the present century more than sixty ships left Hull for the whale fisheries of the North Pacific Ocean. But this number has been gradually diminishing; in 1834 twenty-seven ships were sent out, and the number has continued to decrease since that time, though Hull may still be regarded as the principal seat of the northern whaling. The extension of the city of Hull, about twenty miles up the Humber, has caused the general commerce of Hull to decline in a slight degree since the year 1828. Within the last few years Hull has become a principal steam-ship station. These packets may be classed as sea-packets and river-packets. Of the former are two sets employed by Hull and London; seven between Hull and Hamburg; three between Hull and Rotterdam; and four between Hull and New York. Ocean-steamers to Berwick, Aberdeen, and Yarmouth also pass between these places and Hull at regular intervals. The river-packets and steam-tugs are more than twenty in number. They go to and from the east and west, and between all the larger towns in the north. The prosperity of Hull has been greatly increased by the progress of steam-navigation, and it may be considered as the second great centre of this most important branch of business. The old Dock was formed in 1775; its length is 1703 feet, breadth 254 feet, and depth 24 feet; its wharfs and quays occupy an area of 13 acres; the entrance to it is a mile in length and 300 feet wide; and which has the advantage that part of it, which is called the Old Harbour. The Humber Dock, at the west part of the town, was commenced in 1807; its length is 914 feet, breadth 342 feet, and depth 31 feet; the wharfs cover a space of more than 30 acres; The Dock was completed in 1826, and completed in 1829; as its name imports, it connects the Old Dock and the Humber Dock. Its dimensions are as follow: length 645 feet, breadth 407 feet, area 29,191 square yards; it will contain 60 square

rigged vessels. The area of the quays is 15,643 square yards; the locks are 120 feet long, 36 feet broad, and 25 feet deep; the two bridges are each 24 feet wide. It may be here remarked, that the Huddocks occupy this part of the Sait's fortifications, and encircle the part which was the old town with water in place of its former walls. Attached to the Humber Dock is a capacious basin, with its wharfs, slip, &c., for the river traffic occasioned by the steam-packet trade. Hundreds of passengers land here daily, for whose accommodation the extension of the pier to lower-water mark would be an improvement so obvious, that its accomplishment may be looked for at no very distant period.

Manufactures.—The manufactures of Hull are neither numerous nor extensive. The expressing and refining of oil from linseed is effected by wind-mills and steam-mills; the residue of the seed is prepared as food for cattle. Rape oil is also refined by similar means. There is a large sugar-house, a soap manufacture, several white-lead works, ship-builders' yards, turpentine and sail-cloth manufactories, extensive road-making, and several breweries. A flax and cotton mill has recently been erected on a large scale, which at present employs 200 persons; when completed it will employ 500. New lines of houses for the workpeople have risen up in the neighbourhood of William III. in the Market-place, which is covered with leaf gold. The Wilberforce Memorial is a fine fluted Greek Doric column, which stands on a square pedestal, on each side of which is a triglyph and architrave. The column contains the name of William III., the first stone of this memorial was laid on the 1st of August, 1834, the day on which negro slavery was abolished, and that it was erected by voluntary subscription. Above the capital of the column is a small circular pedestal, on which stands a statue of Wilberforce in his senatorial robes. The column with the figure is 80 feet high. This monument was executed by Messrs. Myers and Wilson of Hull.

Education.—The religious and educational charities are—the Trinity House school for 36 boys, who receive a naval education; the Vicar's school for 50 boys; Cogan's charity-school for 40 girls; the national school, which is open to children of all denominations, and which contains 400 children of both sexes, and 11 schoolmasters and mistresses; each of which contains upwards of 300 children; the Catholic free-school, which is attended by nearly 100 children; the British and Foreign school, which will accommodate nearly 400 boys and 300 girls; the children's Bank school, which is supported by the managers of that institution, which contains about 250 children; and the Sunday-schools, which are attached to the various denominations of Christians. There are also three free schools, which are attended by the children of the poorer class. The free grammar-school was founded by Bishop Alcock, a native of Beverley, in 1486. [Beverley.] Originally the sons of freemen received a classical education at this school, but since 1559 it has been opened to all, and at present there are no classical scholars, and the more common branches of learning are taught. Many men who have risen to eminence received some part of their education here, among whom may be named-as Dr. Dr.}

P. C., No. 766.
Watson, bishop of Llandaff, and William Wilberforce.

The educational wants of the town have been met to two new projects, one of which is the denominating the Hull College, and the other the Kingston College. The latter is exclusively for education on the principles of the Established Church; the other is open to all. Both are in full course. Hull College has 150 students, and Kingston College 129. Both have preparatory schools attached to them, where it is intended that the better parts of the infant system shall be carried out. The other educational institution is the Literary and Medical Society, to which possesses an excellent museum; the Mechanics' Institute, which has a good library of nearly 6000 volumes; the Hull Subscription Library of 15,000 volumes, and of which the late Richard Pearson was a founder, and of which a large number of the most valuable classical works are published; and the Lyceum Library, containing 6000 volumes. The Hull Philosophical Society occupies a part of a splendid pile of buildings in Kingston Square. These rooms were erected for public meetings, concerts, and lectures. Hull has several medical societies, and a convenient theatre.

Medico-Iurgical.-The General Infirmary of Hull was commenced in 1762. The present building is of brick with stone dressings; it has accommodations for 80 in-patients. On the town in front of the building is a neat monument in memory of the late Dr. Alderson, by William Westmacott, jun. The other medical institutions are the Dispensary, established in 1814, the Refuge for the Insane, the Infirmary and Dispensary, founded in 1849, the Hull and East-Riding School of Medicine and Anatomy. The Botanic Garden, established in 1811, is about a mile from the town, comprises five statute acres, and is the property of 800 shares.

Places of Worship.—The Holy Trinity church is the most antient in Hull, and is said to be one of the largest and most spacious edifices in the kingdom. It is 72 feet long from east to west; the height of the nave is 144 feet; the breadth of the nave of the transept under the tower is 39 feet; and the length of the chancel is 100 feet; the breadth of the nave of the church is 127 feet; the length of the transept 95 feet; and the breadth of the chancel 75 feet. This church is covered with composition, and is said to be the oldest brick building, not Roman, in England.* This church is thus mentioned by Rickman, in his "Gothic Architecture;"—"The east end to the south is decorated. It is a cross church, and in the centre has a very lofty and beautiful tower. The western part is perpendicular, of good character, remarkably light, and with very small piers. The transepts are of very early decorated work, and the great window of the south transept is various from its tracery and mouldings. Only a part of the nave is paved; the chancel is open and has a very fine effect; there is in it a decorated monument, with rich canopys and butresses, and some there is in the wood screenwork. The font is large, and much enriched.† The other churches are those of St. Mary's, St. John's, the Mariners' church, the parish churches of Drypool and Sculcoates, St. James's church, and Christ church. In dissenting chapels, the Unitarians, Swedenborgians, Primitive Methodists, New Connexion Methodists, Church Methodists, Catholics, Friends, and Jews, have each one; the Baptists have three, the Wesleyans four, and the Independents six; there is also a floating-chapel, at which service is gratuitously performed by the Methodist, Independent, and Baptist ministers.

The endowed charities which have not yet been enumerated are the Charter-house, which has fifty-seven apartment houses, and over a hundred almshouses—Gregg's, Harrison's, Ratcliff's, Weaver's, Cross's, Lister's, Cowie's, and Watson's. Each of these establishments receives a certain number of poor and the widows of the late proprietors, who设有 residence, a small weekly sum of money, and other advantages. The other charities are the Lying-in Charity, the Poor and Strangers' Friend Society, the Benevolent, and the Royal Benevolent.

The persons of eminence connected with Hull are: the Dean Poles, afterwards duke of Suffolk; Luke Foxe, who revived the attempt to discover a north-west passage in 1631; Andrew Wren, admiral Sir John Lawson, commodore Edward Thompson, John Mason, the poet, Benjamin Thompson, the translator of the 'Stranger,' and many other German dramas, Daniel Sykes, and William Wilberforce.

HUMÁIUN, NISIR-EDDIN MOHAMMED, the son of Baber, and the second emperor of the Tartar, or as it is more usually called, the Mogul dynasty in Hindustan, was born at Cabul, a.h. 913 (A.D. 1506). He accompanied his father Baber on his invasion of Hindustan in 1525, and commanded the right wing of the army in the decisive battle of Panipat, in which the Afghan Sultan Ibrahim Lodí was entirely defeated. After this battle, Hu- mání was sent against two Afghan chiefs, who had assembled an army of forty or fifty thousand men east of the Ganges; and after having defeated them he rejoined the army of Baber, and was present at the battle fought with the native Hindu princes at Biana near Agra, in which he greatly distinguished himself.

Humání ascended the throne on the death of Baber, a.h. 937 (A.D. 1530). Humání does not appear to have possessed that energy and decision which characterised his father; in consequence of which the active policies of Hindustan quickly renounced their allegiance to the Mogul dynasty. Humání was however at first successful in reducing them to subjection; Bahadur, the powerful monarch of the Poles, was captured; and the latter was afterwards defeated in Bengal. But while he was employed in reducing these provinces, Shir Khan, the Afghan governor of Bahar, revolted against him. A battle was fought between them on the banks of the Ganges in 1528, in which Humání was entirely defeated, and obliged to retreat to Lahore. Soon after this he was deserted by his brothers Kamrán and Hindal; and after wandering for a year in the neighbourhood of the Indus, exposed to many hardships and dangers, he at length took refuge in the territories of Tahmâk Mirzâ, king of Persia; who received him most hospitably, and assisted him with troops to enable him to recover his dominions. In a.h. 929 (A.D. 1549) he again entered Cabul, and was engaged in a contest with Kamrán, who, though repeatedly conquered and as often pardoned by Humání, did not cease making war against his brother till he was deprived of his eyes. In a.h. 932 (A.D. 1551) he again obtained possession of that part of Hindustan which had been conquered by Baber. Humání died on the 11th of the month Robby in Avil. a.h. 943 (21st of January, 1546), in his 48th year, in consequence of a fall from the terrace of his palace. He was succeeded by his son Akbar.

Humání was distinguished by a greater love of justice and humanity than we usually meet with in Oriental sovereigns. He frequently pardoned his brothers who rebelled against him, and was with great difficulty persuaded to consent to the marriage of Kamrán with his daughter. Perhaps, that he devoted himself to the sciences of astronomy and geography, and not only wrote dissertations on the nature of the elements, but had terrestrial and coelestial globes constructed for his use. He also wrote several poems, which were extant in the time of Firishta.


HUMBER. [YORKSHIRE.]

HUMBLE-BEE. The technical characters of the insects called humble-bees are given under the head Bombus; in the present article the habits and economy of the species are all that will be noticed. In the autumnal months, when the cold weather begins to be felt, and the various honey-yielding flowers disappear, the male and neater humble-bees die, having performed their allotted task, and then pass away for the winter, as far as we can see, to be that of feuding certain plants, by conveying the pollen from the male to the female flowers; a task which is unavoidably accomplished by their visiting different flowers for the purpose of gathering honey and pollen to rear their young. Some female humble-bees also die, whereas others...
339

HUMBOLDTITE, mineral, white of iron. This substance occurs crystalline and massive; the crystalline form is undetermined. Fracture uneven, earthy; colour brightish yellow; density of lustre; opaque. Specific gravity variously stated from 3.8 to 4.9. It is sufficient to scratch gypsum, but is scratched by mica.

It is insoluble in water, but dissolves in nitric acid without effervescence, and imparts a yellow colour to it.

The mass is irregular, small, flattish, reniform pieces, of a fine earthy structure; colour greenish yellow.

Analysis by Rivero:—

Oxalate of iron.

HUMBOLDTITE. This mineral is a boro-silicate of time, and is therefore a variety of diatholite, unless indeed it be identical with it, which has been supposed to be the case.

It occurs rarely, as Primary form an oblique rhombohedron; cleavage parallel to the oblique diagonal of the prism; fracture conchoidal; hardness 4-5, 5/0; colour white and yellowish white; streak white; lustre vitreous, transparent, translucent. Specific gravity 3-5.

Found in the Tyrol, in the Harz, in North America, and near Edinburgh.

HUME, DAVID, was born at Edinburgh on the 25th of April, 1711. His father's family was of branch of that of the earl of Home, or Hume; but it was not a wealthy family, and Hume, being besides a younger brother, inherited but a slender patrimony. He was destined by his father to enter the church; he was always too young for the profession of the law; but for this he showed a strong inclination, and it was eventually given up. The following is his own account of the matter:—I passed through the ordinary course of education with success, and was selected of the university as a very early writer, and for a little, with a view to ruling passion of my life, and the great source of my enjoyment. My studious disposition, my sobriety, and my industry, gave my faculty a notion that the law was a proper profession for me. I sent an argument to everything but the pursuits of philosophy and general learning; and while they fancied I was poring upon Veoet and Vinius, Cicero and Virgil, were the authors which I was secretly devouring.'

We proceed with quotations from his autobiography. — My very slender fortune however being unsuitable to this plan of life, and my health being a little broken by my present active occupation, or rather forced, to make a very feeble trial for entering into a more active scene of life. In 1734 I went to Bristol, with some recommend—

* The above is the meaning of the paragraph of the author quoted, but it is not a close translation. — Hume's "Hospitals for the poor", or charity hospitals, was an attempt to educate the poor, and to aid them in finding work. He was well aware of the fact that many of the poor were not fit for work, and he aimed at training them for work that was suitable for them. He also believed that education was the key to improving the lot of the poor.

** Histoire Naturelle des Insectes—Hymenopodes, tom. i.
utions to eminent merchants, but in a few months found that scene totally unsuitable to me. I went over to France with a view of prosecuting my studies in a country retreat, and I then laid that plan of life which I have steadily and successfully pursued. I resolved to make a very rigid frugality suppry my deficiency of fortune, to maintain unimpaired my independency, and to regard every object as contemptible except the improvement of my talents in literature.

Hume first went to Rheims, and then to Paris, where he lodged in two places, being chiefly at the latter, he composed his 'Treatise of Human Nature.' He returned to London in 1737, and published his treatise the year after. 'Never,' he observes, 'was literary attempt more free from temptible obstructions. The liberty of my 'Treatise' was Total. It fell dead-born from the press, without reaching such distinction as even to excite a murmur among the restless.' But the disappointment did not affect him much or long; and discourse, in which formed the second part of his Essays, secured his studies with vigour. In 1742 he published at Edinburgh the first part of his Essays, which was on the whole favourably received, and the success of which consoled him in some measure for the failure of his first literary attempt.

Hume, in 1745, went to live with the marquis of Annandale, whose state of mind and health was such as to require a companion. I made him a companion, and, as it appeared, a handsome salary. He had immediately after an invitation from General St. Clair to attend him as secretary to his expedition, which was at first intended against Cumberland, but ended in nothing. Hume went on the coast of France. Hume took the appointment, and the next year, 1747, went to serve as secretary in the general to the military embassy to the courts of Vienna and Turin.

'These two years were almost the only intervals which my studies have received during the course of my life; I passed them agreeably and in good company, and my appointments, with my frugality, had made me reach a fortune, which I called independent, though most of my friends were indigent like myself; in short, I was now master of near a thousand pounds.'

On his return to England he went again to his brother's house, and living there two years, composed his 'Political Discourses,' which formed the second part of his Essays, and his 'Enquiry concerning the Principles of Morals.' These two works were published in 1752, the first in Edinburgh, and the second in London. 'Of the first he tells us that it was well received abroad and at home,' but the other 'came unnoticed and unobserved into the world.' In the same year he was appointed librarian to the Faculty of Advocates, an office which he continued with emolument, that tells us, he used to carry home a considerable library. He now formed the plan of writing the History of England. 'Being frightened,' he says, 'with the notion of continuing a narrative through a period of 175 years, he related his impression. 'I thought,' he adds, 'at the age of the Horatii and Curiatii, of that epoch of life in which it likely, the misrepresentations of faction began chiefly to take place.' Priding himself much on his own impartiality, he was latterly disappointed when, on the appearance of the first volume, he was accused on all hands of one-sidedness. 'I was assaulted by one cry of reproof, disapprobation, and even detestation; English, Scotch, and Irish, whig and Tory, churchman and sectary, freethinker and philosopher, patriot and courtier, united in their rage against the man who had presumed to shed a generous tear for the fate of Charles I. and the earl of Strafford; and after the first embellishments of their fury were over, what was still more mortifying, the book seemed to sink. Mrs. Miller told me, that in twenty-two months she sold only forty-five copies of it.' *

I was, I confess, discouraged; and had not the war been at that time breaking out between France and England, I had certainly retired to some provincial kingdom where I should have changed my name, and never more have returned to my native country. But as this scheme was not now practicable, and the subsequent volume was considerably advanced, Mr. Dr. Hume, his friend, and the owner of the 'History of England,' which embraced the period from the death of Charles I. to the Revolution, was published in 1756. 'This performance,' he says, 'happened to give less displeasure to the whigs, and was better received. It is not only rose itself, but helped to buoy up its unfortunate brother.' The History of the House of Tudor was published in 1759; and the two volumes, containing the earlier English history, which completed the work, in 1761.

At this point in his autobiography, he remarks: 'Notwithstanding the variety of winds and seasons to which my writings had been exposed, they had still been making such advances as to make a'eminent Philosophers,' he says, 'already much exceeded anything formerly known in England; I was become not only independent, but opulent.' He retired to his native country of Scotland, determined never more to set foot out of it; and retaining the satisfaction of having never had a hand in making advances of friendship to any of them. His determination was not long adhered to. He received in 1763 an invitation from the earl of Hertford to accompany him on his exit, 1767, to Paris, where he near prospect of being appointed secretary to the embassy, and, in the meanwhile, of performing the functions of that office. He at first declined the offer, but, on its being repeated, he availed himself of it. At Paris, as was to be expected, his literary fame brought him much attention; and he was greatly delighted with his residence there. When Lord Hertford was, in 1765, appointed Lord Lieutenant of Ireland, Hume remained behind; but was appointed Dr. Hume. He returned to England in the beginning of 1766, and the year after was appointed Under-Secretary of State. He held this appointment about two years, and the last the prospect of enjoying long my ease, and of seeing the increase of my reputation.

In the spring of 1772 he was attacked by a disorder in his bowels, which at first caused him no alarm, but which ultimately carried him off. In the spring of 1776 he was recommended to go to Bath, to try the effect of the waters; and just before going on the journey, he wrote an autobiography from which we have quoted so largely. The waters were of no avail, and he shortly returned to Edinburgh, thoroughly resigned to his fate. He died on the 25th of August, 1776.

Together with Hume's autobiography was published, shortly after his decease, a letter from Dr. Adam Smith to Mr. Strachan, giving an account of his last days and of his death. He died composed, and at peace. Of Hume's personal character, Dr. Smith, who was one of his chief friends, speaks in that letter thus: 'His temper seemed to be more happily balanced, if I may be allowed such an expression, as was perhaps the case with some of the most eminent philosophers. He was not free from indigence, but at the same time he was not the man of conceited arrogance; the firmness of his mind or the steadiness of his resolutions. His constant pleasantry was the genuine effusion of good-nature and good-humour, tempered with delicacy and modesty, and without even the slightest tincture of vanity or sensuality, so frequently the disagreeable source of what is called wit in other men. It was never the meaning of his raillery to mortify. . . . And that quietness of temper, so agreeable in society, but which is so often accompanied with frivolous and superficial qualities, was in him certainly attended with the most severe application, the most extensive learning, the greatest depth of thought, and a capacity in every respect the most comprehensive. Upon the whole, I have always considered him, at a time when many in their death, as nearly to the idea of a perfectly wise and virtuous man, as perhaps the nature of human frailty will permit.'

As an historian, Hume is to be viewed principally in two ways, as an historian and as a philosopher. The merits and the demerits of his history are generally very well known. It is written in a very easy and animated as well as thoughtful and polemic style; but at the same time it is figured by partiality, misrepresentations, and want of accuracy. He could not tolerate the labour of research into original documents, and he had not sufficient knowledge of the subject to it. But his second volume of the 'History of England,' which embraced the period from the death of Charles I. to the Revolution, was published in 1756. 'This performance,' he says, 'happened to give less
acute and ingenious, but not profound; and the remark is just, if applied to what he has done, rather than to what he perhaps might have accomplished. His treatises contain no complete system of any branch of philosophy; and the separate essays are chiefly valuable for acute observations and the suggestion both of great facts and of certain obscure and private words. Many of them will suggest further matter for reflection, though we think that few can be viewed as possessing the character of completeness. His observations on the action both of great events and of ordinary features in the world present a style of writing which is not easy to characterize. He sometimes like a familiar letter, and other times like a learned and long essay. In his essay on Miracles, the ingenuity and the value of his remarks on evidence are generally admitted, even by those who do not follow him in all the consequences which he deduces from them. But those who have read the first and second parts of the essay will have the idea that the thesis of this essay has been to a certain extent misunderstood, even by those who would not have agreed with the author simply for the consequences which flow from his principles of evidence. As a political writer, Hume cannot be ranked in the first class. The justness of many of his strictures on the absurd fiction of the 'Original Contract,' as applied to any existing government, stands in striking contrast with his admission of an original contract, as expressed in the following terms: 'The people, if we trace government to its first origin in the woods and deserts, are the source of all power and jurisdiction, and voluntarily, for the sake of peace and safety, permit the same authority, founded in the fundamental laws from their equals and companions.' An assertion so monstrous, so unsupported by any evidence, and expressed in words involving so many assumptions and contradictions, is not a little surprising in a man who wrote 'Tyranny.' To many moderate readers of Hume we should assign a higher degree of merit than perhaps, at the present day, most people are disposed to give him. They appear to us to contain many most important truths expressed with great facility; and if we seldom or never exhaust the subject, they perhaps always dispose the reader to further investigation. In his 'Enquiry concerning the Principles of Morals' he has made many ingenious elevations of the passions, and the fundamental principles of morals, but he has at the same time admitted a principle of conscience, independent of that principle of utility. The editions of Hume's History are innumerable; and, as is well known, it now always goes along with that of Smollett. In the last edition which has been published, the narrative is carried on to the present time, from where Smollett left it. By Mr. Smith, Early Man of Emmanuel, Cambridge. The best edition of Hume's philosophical works is one published in Edinburgh, in 1829, in 4 vols. 8vo.

HUMITE. This mineral occurs in attached crystals, the primary form of which is a right rhombohedron. Close to the middle of the primary form a fracture uneven. Hardness 6 1/2 to 7. Scratches glass readily. Colour, various shades of yellow and brown, sometimes nearly colourless. Translucent, transparent. Luster, subadherent. M. of 2. Lame. In true, the blow-pipe, it becomes opaque, but not fusible; with borax it gives a transparent glass.

HUMMEL, JOHANN-NEPORUK, a composer and performer particularly distinguished during the present century, was born at Preshburg, in 1763. At a very early age he received instructions in music from his father, a master at the military institution of Warberg, and evinced so decided a talent, that, when he had scarcely completed his seventh year, he was sent to Vienna, and placed under Mozart, who, though he had a natural repugnance to teaching, took so promising a genius into his house as a pupil, where he remained two years, and imbibed much of the knowledge and love of music, and at a later period of life were developed in so striking and profitable a manner. In his tenth year he set out on a visit to the principal cities of Germany, Denmark, and Holland, and reached London in 1791, where he was much noticed, and had the honour to perform at Buckingham House before the royal family.

At the expiration of six years, Hummel returned to Vienna, and made many brilliant concert performances, and further improved himself by friendly intercourse with Salieri. In 1803 he engaged in the service of Prince Esterhazy; and a few years after, when the Imperial Theatres were closed on account of the war, the emperor, who was highly pleased with his performances, presented him with a house and a large sum of money. Hummel returned to Petersburg and Moscow, and two years after to Amsterdam. In April, 1830, M. Hummel arrived in London, and immediately gave a concert at the Hanover-Square Room, at which he was so successful, that his concert compositions made so great a sensation, that it was followed by two other concerts in May and June, which were as fully attended as the first. This success induced him to return the spring of the following year, when he also gave three concerts; but trusting too much to his individual exertions, they proved rather less attractive than those of the preceding season. In 1833 he returned his visit to London, and a single concert convinced him that his popularity had deserted him; he was no longer new, and had no connection to supply the want of that novelty for which in our fashionable circles there is so insatiable a thirst. M. Hummel returned to Weimar, and had his orders for the White Eagle given on him. He died, of fever caught in the coach to Hanover, 1837, leaving a widow and two sons amply provided for by a good fortune acquired by his talents and accumulated by his prudence.

M. Hummel's compositions are very numerous. Of his operas, Mathilde von Guise is the best; and in his two masses—in D minor and B flat—are clever and charming movements. But his reputation will rest on his piano-forte works; and will in some measure depend on the value of this article, which is quoted, changing the present into the past tense, 'Like a man of taste, he interwove them so skilfully with his own, that there is nothing heterogeneous in the composition of the whole. As a performer he was master of all styles, but excelled more in the brilliant than in the pathetic, though he never carried the former to excess. . . . The strength, and still more the equality, of his fingers, were among the distinguishing features of his playing; and the pendulum-like accuracy of his timing was too remarkable not to be noticed by all who heard him. . . . His execution was perfect, but his good sense taught him that great velocity renders it impossible to maintain the necessary tension of an air or the beauty of a modulation—that racing and leaping on the piano-forte are generally resorted to by those who are conscious of possessing none of the higher powers, and feel obliged to make up for the want of pure taste and deep feeling by mechanical dexterity.'

HUMMING BIRDS, the name of a brilliant family which includes the smallest of birds. [TROCHILIDSE.]

HUMULUS LUPULUS, a perennial plant belonging to the natural order Urticae (the female inflorescence of which forms the substance called hops, the use of which in brewing is so well known), is a coarse twine inhabiting hedges in many parts of Europe, and also found apparently wild in the United States of America. It has tough, opposite, cordate, lobed leaves, and numerous greenhouse flowers, of which the sexes are distinct. In the male hop the flowers form loose drooping panicles, and each consist of 5 sepals, 5 stamens, and a convex central ovary. In the female the flowers are arranged in little axillary, stalked, seedy tuffs; each consists of a naked ovary, with two spread- ing downy stigmas, and is enclosed by a concealing bract. These bracts increase in size after the flower is past, and collected into a loose head of imbricated scales, within which are placed the small seed-vessels, or seeds, as they are usually called.

HUMULUS LUPULUS. The female flowers, termed cones, stroboli, or catkins, of this plant, when ripe, constitute the hops, which, independent of their employment in brewing, are of considerable utility in medicine. The mature cones consist of a papery involute sheath, composed of the bracts having the fruit at their base; the surface both of the scales and of the fruit is studded with aromatic glands, which
HUNGARY

HUNDRED: HUNDRED COURT. (Shire.)
HUNDRED WEIGHT. (Avordupois.)

HUMUS. [ARABLE LAND. VOL. II., p. 221.]

HUNDRUCK. [GERMANY.]
HUNGARIAN BANAT. [HUNGARY.]

HUNGARY. This name has been sometimes in a more general, sometimes in a more limited sense. Under the denomination of Hungarian Hereditary Dominions are comprehended Hungary Proper, Slavonia, Croatia, Transylvania, Dalmatia, and the Military Frontier. The kingdom of Hungary united under the same civil government, as determined after the peace in 1815, comprehends Hungary, Slavonia, and Croatia, the last of which is divided between Carlistad (which previously made part of Illyria), and the Hungarian Littoral, or sea-coast, were annexed in 1822. The Military Frontier, though geographically a part of Hungary, is politically an independent and separate portion of Government. The kingdom, within the above limits, is bounded on the north by Moravia, Silisia, and Galicia; on the east by Transylvania; on the south by the Military Frontier (which separates it from Turkey), and by the Gulf of Quarnero; and on the west by Illyria, Styria, Lower Austria, and Moravia. It extends from 14° 30′ 29″ (the most westerly point at Plumeon the sea-coast), to 25° 4′ 24″ (the most easterly point of the county of Marmaros on the Bistrița); and from 44° 43′ 20″ (the most southern point of the Banat, near Neu-Nömláva) to 49° 34′ 45″ N. lat. (the most northerly part of the Arva on the mountain of Zalesy). The area of the kingdom, according to the Survey and Statistical General Office of the Dept. of Agriculture, is 33,282 square miles: namely, the Hungarian counties, 78,373; the Hungarian districts (not included in the counties), 2301; Slavonia, 3616; and Croatia 3629 square miles. The population of the kingdom of Hungary at 11,064,256. The most remarkable increase in the population has been that of the Jews, who in 1785 were 25,377; in 1884, 63,905; and in 1827, 191,570. From the differences in the accuracy of the returns, and the different dates at which they were made, the several items will not strictly agree with the sum total.

Divisions.—The kingdom of Hungary is divided into Hungary Proper, Slavonia, Croatia, and certain privileged districts, viz. 1. in Hungary, Jaszyca (Jaszág), Great Kumania (Nagy-Kunsag), Little Kumania (Kis-Kunsag), the Heyduke towns (Hény-Kovács), and sixteen towns of the county of Zips; 2. in Croatia, the Hungarian Littoral or sea-coast.

I. HUNGARY PROPER is divided into four circlets.

The Circle on this side of the Danube has an area of 22,368 square miles, 2,659,633 inhabitants, 26 cities, of which three are bishoprics: see, 176 towns, 2,597 villages, and 53 hamlets, called præcia. It includes 13 counties, and 3 small districts. Presburg (area 171,460 inh.) contains 179,210 inh.: chief towns, Presburg, 35,836 inhabitants; Tyrnau, 6790 inh. 2. Neitra (area 2362 sq. miles, 389,327 inh.) chief towns, Neitra, with a Roman Catholic bishop, 4680 inh.; Neuhausen, 6760 inh.; Skalitz, 1726 inh.; Freundorf on the Waag, 4000 inh., a splendid country-seat of Count Eredy; Neustadt on the Waag, 4700 inh.; Mjawa, 6600 inh. 3. Treinitz (area 1843 sq. miles, 294,745 inh.) chief towns, Treinitz, 3256 inh.; Rajecz, 4860 inh.; Theresienau (area 11,366) 447 sq. miles, 39,462 inh.) chief town, St. Martin, 1900 inh. 4. Arva (area 785 sq. miles, 101,734 inh.): chief towns, Alsokubin, 1100 inh.; Trezienau, 2650 inh. 5. Liptou (area 692 sq. miles, 74,278 inh.): chief towns, St. Nicholas, 3009, 4160 inh.; Deutsch-Liptich, 3600 inh.; Rosen- berg, 2352 inh. 6. Sohit (area 7010 sq. miles, 91,043 inh.): chief towns, Neusohl, 10,690 inh.; Bries, 3500 inh.; Harpfen, 3600 inh. 7. Duls (area 1033 sq. miles, 137,210 inh.): chief towns, Alt-Shono, 5500 inh.; Klingsberg, 3800 inh. 8. Houth (area 906 sq. miles, 123,427 inh.): chief towns, Schennitz, 23,000 inh.; Pukanze, 2512 inh. 9. Gran (area 359 sq. miles, 54,636 inh.): chief town Gran, an archbishop's see, with 45 houses, and 4000 inhabitants; but half the town was destroyed by the late inundation of the Danube in the spring of 1835. 11. Neograd (area 1629 sq. miles, 153,740 inh.): chief towns, Balassay-Gyarmath, 4300 inh.; Gatsch, 4600 inh.; 12. Pest (area 301 sq. miles, 438,419 inh.): chief towns, Pesth, which became the seat of the late inundation.
HUN 313 HUN
d and 3860 houses, and 65,000 in., besides the garrison of 10,000
men; but above 1200 houses having been destroyed, the actual
population cannot be stated: many thousands of the inhabitants have
taken refuge at Olten (or Oden) on the other side of the Danube, the
capital of the kingdom, which has 30,000 in.; Winterthur, 11,271 in.; Ketschelmen, 30,876
in.; Great Koros, 13,697 in.; Little Koros, 8000 in.; Czernowitz, 8000 in.;
13. Basa, or Batsch: chief towns, Zombor, 21,985
in.; Maria Theresaenst (or Theresaipel), 34,924 in.;
Neustadt, 20,231 in.; Saja, 14,534 in.; Szentis, 13,537
in.; Neudorf, 12,932 in.; Bitani, 5262
inhabitants; and Munkacs, the seat
of a Greek bishop, 8000
inhabitants.

The Circle beyond the Thaya has an area of 29,328
square miles, 212,875 inhabitants, 2 cities, 17 towns,
243 villages, and 12 pristria; chief towns, Neusatz, or Great
Banya, 4928 inhabitants; Great Katz, 4700
inhabitants; Ungarisch-Neustadt, or Felso Banya, 4700
inhabitants; Steinhauer, 14,279 inhabitants. 3. Mennaros has an
area of 3570 square miles, 130,705 inhabitants, 5 towns,
21 villages, 1 pristria; chief towns, Gyula, 13,751
inhabitants; Beszesz, 6500
inhabitants; Hushat, 2712 inhabitants; Visk, 2066
inhabitants; Korosmez, the largest village in the county, has
3656
inhabitants. 4. Bikar has an area of 4200 square miles,
167,229 inhabitants, 21 towns, 243 villages, and 11
pristria: chief towns, Gross-Wardek, 16,000
inhabitants, a bishop's see; Kastend, 45,375 inhabitants. 5. Ugors
has an area of 474 square miles, 41,143 inhabitants:
chief town Nagy, 4,059
inhabitants; Szentur, 1300
inhabitants; Staryusz, 1200
inhabitants; the largest in Europe, having 22,143
inhabitants. 7. Grunberg has an area of 1302 square miles,
198,335 inhabitants, 1 city, 3 towns, 16 villages, 21
pristria; chief towns, Gyula, 13,751
inhabitants; Beszesz, 6500
inhabitants; Hasznato, 2712
inhabitants; Alkard, 51,672
inhabitants. 8. Csnad has an area of 611 square miles, 41,545
inhabitants; 2 towns, 91 villages, 30
pristria: chief towns, Mako, 17,146
inhabitants; Csanad, 6730
inhabitants. 9. Tchel has an area of 2876 square miles,
249,500 inhabitants, 1 city, 2 towns, 16 villages, 27
pristria: chief towns, Alt-
Arad, 13,824
inhabitants; Pecsko, 13,440
inhabitants.
The following three circles form the district called the
Banat.
10. Torontal has an area of 2772 square miles, 249,500
inhabitants, 9 towns, 186 villages, 9
pristria: chief towns, Nagy Beczkerek, 12,023 in.; Nagy St. Miklos, 10,200
inhabitants; Nagy Niska, 8445
inhabitants; chief towns, Gross Sausch, 8445
inhabitants. 11. Temes has an area of 2486 square miles,
285,776 inhabitants, 2 cities, 9 towns, 186 villages, 3
pristria; the chief towns are Temesvar, 12,866
inhabitants; Versec, 17,600
inhabitants. 12. Krosnow has an area of 2299
square miles, 16 towns, 249 villages, and 10
pristria: chief towns, Lunos, 6150
inhabitants.

Besides these 46 counties Hungary includes the follow-
ing privileged districts: 1. Jaszy (Jasen), in the county
of Pest, has an area of 370 square miles, 48,926
inhabitants:
chief town Jaz Bereny, 15,529
inhabitants. 2. Great Kumania (Kuny-Kunsag), situated north-east and
south-east of Jaszy, has an area of 430 square miles,
and 49,200
inhabitants; chief town Kuny, 11,077
inhabitants. 3. Little Kumania (Kis-Kunsag) consisting of five
portions, is larger than Great Kumania, having an
area of 1029 square miles, 52,290
inhabitants: chief town Velyhaz, 13,000
inhabitants; Tornyos, 12,700
inhabitants; seven Heydye towns, within the county of Szabolc, has an
area of 350 square miles, and about 40,000
inhabitants: chief town Bosromeny, 14,660
inhabitants.
Germany; chief towns, Illyc, the capital, and Ruma, 6170
inhabitants.

II. CROATIA. [See article Croatia.]
The entire Military Frontier is a tract of land extending
from the Adriatic Sea along the Turkish frontier to the
Buckowina. It has an area of 18,123 square miles. At the
close of the last century the population was estimated
428,859; in 182 the it was estimated at 1,018,786; in 1827
1,083,475.
Frontiers.—Hungary is on all sides separated from its
neighbours by natural boundaries. From Pressburg to Ski
itz, the capital, and the river Danube, from Sklitz to
the Carpathian Mountains, which run in a north-east
direction to Mount Trojatska, thence eastward, near the
frontier of Galicia, and afterwards to the south-east to the
vicinity of the Buckowina. From the border of Transylvania the
frontier runs, with many great bends, first to the west, and
then to the south, to Orsova and Mount Athos, on the
Danube. On the south, from Orsova to Essek, the Danube
separates the kingdom from Servia and Slavonia; and from
Essek to the Styrian frontier the Drave separates it from
Slavonia and Croatia. On the west various small rivers
divide Hungary from Styria and Austria. Neither the natural
ruptures of the Carpathianould protect the Hungarians against the incursions and cruelties
of the Tartars, nor the Danube against the Turks. The
kingdom now derives greater security from being surrounded,
more internally by mountains and sparsely inhabited tracts of
which, by their situation, are, subject to the Austrian sceptre: to the south it is
defended against the Turks by a living rampart of 798,743
miles. From these ancient enemies, weakened as they now are, the Hungarian can scarcely have anything to fear;
but they are a powerful and ambitious Russian approaches his
frontier.
Face of the Country, Soil, Climate.—The northern and
western parts of the kingdom are very mountains. The
Carpathians on the north, and the Alps on the
frontier from South of the Danube, surround the almost the whole kingdom like a girdle, and send out numerous branches which cover
nearly thirty-three counties, with elevations varying in
many cases, of from 1800 to 4820 feet. These beautiful valleys drained by large and small rivers, verdant meadows, rich corn-fields, and gardens yielding a
variety of excellent fruit, vineyards many leagues in extent,
and vast forests. The Carpathians, which begin at Pressburg and sweep round the northeeast frontier of Hungary and
Transylvania, cover all the country between the 48th and
49th degrees of latitude, and are divided into several groups,
distinguished by different names. The most elevated
portion is that called Tatra, in the counties of Zips and Liptau.
The loftiest summits are the Einthal (8100 Vienna feet),
the Lonnitz (8133 feet), the Hundsdorff, Cesbi, Wysoka,
Mengedz, Naor (each 7800 feet), and the great Kryan
(according to Wahlenberg, 7538, and Towneau, 7600
feet high). The mountains on the south side of the Danube are branches of the Styrian and Julian Alps, among which the
Rissiak, north-east of Fiume, attains an elevation of 4890
feet, and the Schneeiseh, near Kamienik, 4760 feet.

CARPATHIANS. Of the numerous valleys enclosed in the
Carpathian mountains, the Waagthal (Valley of the Waag)
is generally considered the most beautiful, but there
are numerous others perhaps equally picturesque; for in-
stance, the Mengsdorftthal, which is distinguished by the
grandeur of its forms, its magnificent views, and noble
waterfalls. But while one part of the kingdom is covered with
mountains, another extends out into fine extensive plains, some
resembling the Pampas of South America, and others
being oceans of sand, like the Sahara. In the Carpathians
and in other mountains there are innumerable caverns,
some of which are remarkable for galleries of extraordinary
beauty, and in others are found the fossil remains of
enormous animals, the gigantic inhabitants of the primitive
world.

4800 miles of the whole of Hungary lies within the basin of
the Danube, which is shown by all the numerous rivers falling into the Danube, with the single exception of the
Poprad, which flows in a northern direction. The Theiss,
its tributary, is the basin of the Danube, one of the chief rivers, and its basin is nearly 500 miles in length and
contains a distinct part of Hungary. The Drave, the Rabh, the Lois, the March, the Waag, the Gran, &c. flow into the Danube.
The Zagyva, Sajo, Herand, Bodrog, Koros, Maros, Temes,
&c. flow into the Theiss. Of the lakes the most
considerable are,—1, the Plastencze (Balkat), 48 miles long,
and from 3 to 69 broad; 2, Neusiedl, about 24 miles long,
and from 3 to 7 miles broad; both of which are in the west
part of the country. Lake Poltisch in the county of Bar
is 14 miles in circumference. There are numerous lakes
which are remarkable by their great depth, viz., 8133 feet
above the level of the sea. On the banks of the Danube, Theiss, Drave, and other rivers there are extensive
marshes which cover 2000 square miles. The Hamag, in
the country of Donaun, divides the river into the Bodrog,
18 miles in length and 9 in breadth, and contains
some small lakes, or meres. It is overgrown with reeds,
rushes, and in many parts with low bushes, and has some
little copuces of alder and beech. Many years ago (1813) a canal several miles in length was dug through the
Hamag; but it was nearly destroyed by inundations in
the same year. Many canals have been made in different
traces of Hungary, partly to drain the marshes, and partly
for the purposes of commerce. The soil of Hungary is for the most part clayey and
sandy. The best and richest mould is in the southern part,
on the rivers Koros, Theiss, and Danube; the northern
part is in general clayey and often stony. The counties next
the Carpathians are the most barren. The climate varies
considerably. In the counties nearest the snow-covered
mountains it is so cold, and the winter so long, that the
snow remains well into June. In the south, and
northern counties the air is so warm, and the winter so short, that the snow seldom 
lies on the ground more than two or three weeks. When the heat in the Banat is tolerable, those of the
Carpathians covered with snow, and fires are necessary
in the middle of summer. Foreigners in general have a
very unfavourable opinion of the climate of Hungary, which
they decry as extremely unhealthy; but M. Beudant, an
Austrian traveller, maintains that the climate of Hungary
is in general very healthy, and that disorders are neither so
frequent nor so fatal as in the neighbouring countries.

In the abundance, variety, and value of its natural
productions Hungary ranks first among the countries of Europe. Grapes and the fruit of other trees
produce in quantity here, which are exceptional in other
countries. Corn is the main product of Hungarian agriculture, but in
the north there is not sufficient for home consumption, 
while the south not only supplies the deficiency of the
north, but exports to Germany and Italy. Barley and rye
are grown in the north; oats everywhere in great abundance;
wheat, millet and maize, in the south. Maize is more extensively cultivated than in any other part of Europe, and the Banat is renowned for its bountiful harvests
of 60 feet. Potatoes are now cultivated to a great extent. Garden vegetables of every kind are of good quality and
abundant. More millet is produced than is required for home consumption. Fruit grows everywhere, even on the foot of
the Carpathians, is not inferior in quality to that of
Wieselburg, or Wittenberg. In the south are chestnut and
chestnut trees. In the south, lemon and orange trees
blossom the whole summer in the open air, and the fruit ripens perfectly well. No country in the world, France
perhaps excepted, produces such an abundance in variety of wines as Hungary; and with respect to quality, aroma,
sweetness, strength, and fire, no wine in the world perhaps
is a Hungarian writer, is equal to that of Hungary; at
least the wine of the Hegyalia district is renowned
throughout the world by the name of Tokay.

The land employed as vineyards is estimated at a million
of acres; and the annual produce, even of middle years, is
1,018,786,000,000 quintals of grapes. The annual consumption of wines is estimated at 110,000,000 florins. Timber is abundant,
there being 5,000,000 acres of forests of oak, beech, lime,
hick, maple, and pines. In some counties however so
much timber has been destroyed by fire, that the present
smelling-houses, that fuel and timber are six times as
dear as they were 60 years ago. Tobacco grows everywhere,
even in a few of the colder counties, and is nearly as
good and cheap as the American. The usual price of
Timber is estimated at 160 cwt, of which 200,000 cwts are
exported. Of domestic quadrupeds the horned cattle bred
on the luxuriant pastures of Hungary are some of the finest
in Europe; a race peculiar to the country, of a greyish
white, and beautifully marked. The sheep, particularly the
British, are very fine for size and beauty. The horses are small and weak, but swift and
hardy. Of sheep it was stated in 1811 that there were
8,000,000, though others affirm there were not above

Digitized by Google
There are great advantages in a continued state of peace, which are not perhaps equal to or even comparable with those which are derived from the constant impulses of war; and the sequence which follows:—gold, 10 cwt.; silver, 40 cwt.; copper, 40,000 cwt.; lead, 25,000 cwt.; antimony, 5000 cwt.; quicksilver, 130 cwt.; iron (not certain, but supposed to be) 190,000 cwt.

Hungary produces likewise a great variety of precious stones, such as amethyst, agate, jasper, Hungarian diamonds, garnets, &c. The more useful mineral products are coals, 400,000 cwt.; salt (especially in the counties of Saros and Marmandol) 1,000,000 cwt. The country abounds in mineral springs, with the vassel itself, the largest of which is 64,000, many of which are highly celebrated, and much frequented for their medicinal virtues.

Manufactures and Trade.—Though considerable improvements have been made in manufactures since the encouragement given by the late government, the productions of Hungary are not yet equal to those of Austria, owing to the narrow limits of the country, the poverty of the people, and the small consumption and taste of a warlike and agricultural people. The natural produce of the kingdom; the imports chiefly, though not entirely, of manufactures (of which woollens, cottons, silks, and linens make one-half of the whole imports), such as lace, worsteds, silks, and linens. This trade exceeds that of the imports by a third, so that the balance, as Hungarian writers say, is from 6,000,000 to 8,000,000 florins in their favour.

The Revenue is derived partly from the income of the inalienable domains of the crown, which amount to 120,000 florins (one authority states the income at 400,000 florins), and partly from certain regalia, of which that of salt is the most considerable, being estimated at 2,000,000 florins, and the mines and iron workings, 110,000 florins. The amount of revenue is of course variable, the average may be taken between 34 and 4 millions sterling per annum: the extraordinary subsidies granted by the nobility in time of war, not being annually given, cannot be taken into account.

The Military Establishment consists of 13 regiments of infantry (2 of which however belong to Transylvania), and 10 complete regiments of hussars, all of which are among the choicest troops in the army. The total number of infantry is 3857 men, and each regiment of hussars consists of 1695 men; making nearly 64,000 men. They are not kept up at their full complement in time of profound peace. In time of war an extraordinary levy, called the infern信息, is made on a call from the crown.

The Constitution of Hungary is a limited monarchy, of which it has indeed all the forms, but aristocracy is predominant, and the nobles have very great power. The king possesses great prerogatives, but often finds very obstinate opposition in the diet, especially if he attempts to restrict the importation of Capitol ships, to restrict the vassals paying their annuity to their grandees, and to prohibit all matters of importance. The constitutional powers of the Catholic prelates, the magistrates, the representatives of the inferior nobles, and the representatives of the towns. These classes call themselves the nation, and the peasant is an inferior race, whose business is to pay all the taxes (the nobles being exempt) and to labour and to bear all kinds of burdens. Those to whom this constitution gives most enormous powers and privileges, are of course enthusiastically attached to it. Hence a late writer says, "It was here that the late government (that of Francis I.) met with insurmountable obstacles, raised on the ground of the wretched constitution which originated in an age of the most licentious barbarism, ignorance, and luxury, and which the nation has for ages been divided by political national pride and obstinate adherence to hereditary intolerant principles. Open resistance, insurrection, revolt, were the inevitable consequences of any violation of supposed rights, the maintenance of which was a continual impediment to all improvement, and condemns the great mass of the people to the most wretched slavery, disgraceful to humanity and to our age. That great idol the constitution is therefore unchangeable, and it remains, as it always has been, the justification of centuries behind the age." Another writer says, "I am satisfied with my own position in society, and envy none of my fellow-citizens their rights and privileges, his possessions, or his position in the regiments of his country, and his soldiers, to which he gives my heart to see the sentiments of the inhabitants of my beloved country in a condition, in which poverty and contempt reduce the great mass to a condition of life, that they are unable to support themselves from their moral and intellectual debarment or to a condition of greater respectability, worthy the dignity of human nature."

The Papal and imperial influence in Hungary is partial and alternating. It is now the primate of Hungary. The capuchins are under the jurisdiction of the patriarch of Lateran, and have charge of all the convents and churches of the kingdom. The Protestant clergy are well provided for, but the inferior clergy have inadequate incomes. The Protestant clergy are in general ill provided for, though Joseph II dissolved 600 of them.

With respect to education Hungary is in a very backward state, though there are schools in every parish. There are also a few academies, many gymnasia, a lyceum at Pesth, and university at Eger, a universal academy at Pesth, two famous mining-school at Schenmin, and many others. One great obstacle to Hungarian literature has been the great variety of languages and dialects, which has led the learned writer to the use of Latin in all the debates in the diet, &c., but even in ordinary life. Of late years great efforts have been made to introduce the Hungarian language into public transactions, and even recent attempts have been made to introduce it into the public schools, though they have not yet declined to assimilate to this innovation. Though Hungary has produced some very able writers and learned men, Hungarian works are little known in foreign countries. The great Hungarian nobles are highly educated and polished men, and in general well versed in foreign languages.

The Constitution of Hungary is called a limited monarchy, of which it has indeed all the forms, but aristocracy is predominant, and the nobles have very great power. The king possesses great prerogatives, but often finds very obstinate opposition in the diet, especially if he attempts to restrict the importation of Capitol ships, to restrict the vassals paying their annuity to their grandees, and to prohibit all matters of importance. The constitutional powers of the Catholic prelates, the magistrates, the representatives of the inferior nobles, and the representatives of the towns. These classes call themselves the nation, and the peasant is an inferior race, whose business is to pay all the taxes (the nobles being exempt) and to labour and to bear all kinds of burdens. Those to whom this constitution gives most enormous powers and privileges, are of course enthusiastically attached to it. Hence a late writer says, "It was here that the late government (that of Francis I.) met with insurmountable obstacles, raised on the ground of the wretched constitution which originated in an age of the most licentious barbarism, ignorance, and luxury, and which the nation has for ages been divided by political national pride and obstinate adherence to hereditary intolerant principles. Open resistance, insurrection, revolt, were the inevitable consequences of any violation of supposed rights, the maintenance of which was a continual impediment to all improvement, and condemns the great mass of the people to the most wretched slavery, disgraceful to humanity and to our age. That great idol the constitution is therefore unchangeable, and it remains, as it always has been, the justification of centuries behind the age." Another writer says, "I am satisfied with my own position in society, and envy none of my fellow-citizens their rights and privileges, his possessions, or his position in the regiments of his country, and his soldiers, to which he gives my heart to see the sentiments of the inhabitants of my beloved country in a condition, in which poverty and contempt reduce the great mass to a condition of life, that they are unable to support themselves from their moral and intellectual debarment or to a condition of greater respectability, worthy the dignity of human nature."
three general insurrections: that in 1797 amounted to 250,000 to 300,000, and that in 1809 to 40,000, in which the free cities and privileged districts furnished in addition 45,000 infantry and cavalry, making a total of 85,000. The singular institution of the Military Frontier was founded under Military Frontier Act

History.—The oldest known inhabitants of the country were the Pannonians. In the year 377 the Huns established a power here, which was vastly increased under Attila, but was completely exterminated by Trajan and Ger-main. They reached the Lombards, and when the latter removed to Italy, in 568, the Avari entered, who extended their dominion to Bavaria, but were conquered and compelled to embrace Christianity by Charlemagne. In the year 1074 the Turks invaded the country, and in the following century, penetrated into the country, and conquered it in ten years. Their chiefs divided the country among them: Argut, their leader, took half for his own share; the remainder was divided among the inferior chiefs and their followers, and the peasant inhabitants became slaves. Argut's grandson Goya embraced the Christian religion, and his son Stephen, the last duke, assumed in the year 1098 the title of king, and submitted to the Kings of Hungary. Ladislaus I. and Coloman subdued Slavonia and Croatia, and, after many wars, Dalmatia: Bela II. obtained Bosnia; Eugene, Servia; and Andrew II. and his son Co-loman recovered the fainting sun, and renewed the male line in 1301. In 1310, Charles, brother to Louis IX. of France, was crowned king of Hungary, which he raised to a high degree of splendor. Charles having married a sister of Casimir, king of Poland, Louis, one of his bastard sons, succeeded his father at 15 years of age. King Louis, who was called Louis the Great, reigned from 1342 to 1382, and his united kingdoms extended from the Baltic to the Adriatic. On his death Poland and Hungary were again separated, and internal troubles broke out. Louis II. reigned from 1386 to 1437, lost almost all the annexed dominions, the Turks approached the frontiers, and took part in all the intestine broils. Albert, archbishop of Salzburg, and of the Huns, was married to the daughter of King Louis, and was pronounced to the crown in 1437, but died in the campaign against the Turks in 1439. Under Ladislaus V. and VI. these powerful enemies were successfully resisted by the brave John Hunyady, whose son Matias Laka, the last king in 1458, proved a very able and fortunate king: he brought under his dominion Moldavia, Wallachia, Moravia, Slavonia, Lucania, and great part of Austria, forming an empire of 860,000 square miles of king, about 1459, to the present sovereign of Hungary. After his death in 1490 the kingdom fell to piece; civil commotions and bad government made it easy prey to the Turks; and Louis II. lost his throne and life in the fatal battle of Mohacs, which so severely shook the Hungarians that it took several years to free their country from the enemies of Christendom. Ferdinand I. of Austria, who had married the sister of Louis, being raised to the throne, the strength of Austria was increased to that of Hungary, but he was obliged to leave Ofen and the finest part of Hungary in the hands of the Turks, who were not expelled till 1668. This was partly owing to the unpopularity of the house of Austria, whose despotic habits and religious intolerance were most distasteful to the Hungarian nobles. Hence arose conti- nued disputes, and frequent insurrections, in which the insurgents even went so far on some occasions as to call the Turks to their aid. This was done by the hated colonel Teperly, who with his infidel allies had nearly got possession of Vienna in 1683, which was chiefly indebted for its preservation to the Poles under John Sobieski. The treaty of (1686) by which the emperor granted to the Turks the right of trading with the emperor and computing the taxes, was ratified by the Duchy of Austria at 1718, the Banat, from the Turkish yoke. The fatal civil wars and insurrections ceased in 1711, and the house of Austria has ever since remained in undisputed possession of the country, whose inhabitants hastened to adopt, in order to conciliate the emperors, the most loyal and devoted subjects of their sovereigns, from the days of Maria Theresa to the present time. The nation has in fact had great reason to be attached to its governors, who have been determined by many people more to improve the condition of the great mass of the people than the nobles have been willing to concede.

HUNTER, William, was born in 1718 at Long Calderwood, near Glasgow. He entered at the university of Glasgow in 1732, and remained there for five years studying for the church; but while hesitating whether he should enter on the study of medicine, he was at that time practising as a surgeon and apothecary at Hamilton. An intimate friendship was soon formed between them, the result of which was that Hunter determined to study medicine, and in 1737 he entered into a partnership with Sommelli, the celebrated accoucheur, and studied anatomy under Dr. Nicholls, and surgery at St. George's Hospital. Dr. Douglas, to whom he brought a letter of introduction, engaged him soon after in his operations, and he was in complete possession of the work which he was publishing, and to educate his son. He resided in the family till 1744, when Mr. Sharpe having resigned a lectureship on surgery to a Society of Naval Surgeons, Hunter was elected to fill his place, and there, under the patronage of the surgeons of London, he commenced lecturing on anatomy, and in 1747 became a member of the Corporation of Surgeons. But he had always preferred the practice of midwifery to that of surgery, and having been disappointed in the apparent prospect of success, he determined in 1749 to confine himself exclusively to the former subject. In 1750 he took a Doctor's degree at Glasgow; in 1754 he was appointed physician extraordinary to the queen; in 1757 he became a Fellow of the Royal Society. His time was now so con-


HUNGERFORD. [BERKSHIRE.]

HUNIS, HUNNI, the name given by historians to several nomads Scythian tribes which devastated the Roman empire in the fifth century. It appears that these people inhabited the plains of Tartary near the borders of the Chinese empire for several centuries before our era, and that they entered into China, by the name of Hong-nu, and also Han. They made many incursions into China, and it was to put a stop to them that the Chinese built their great wall, about two centuries B.C. In after-times they became divided into the Northern and Southern Huns, and passed into Europe, the Chinese about A.D. 35, emigrated westward as far as the Volga, where they met the Alani, or Alani, another powerful Scythian tribe, which they routed and drove beyond the Tanais, or Don. The Huns then encamped in the plains between the Volga and the Tanais, and as far south as the ridge of the Caucasus, where they remained for more than two centuries. Under the emperor Valens they first crossed the Germanic border, drove before them the Ostrogoths and Visigoths, and obliged the latter to cross the Danube, when the emperor granted them lands in Thrace. The Huns were joined by numerous other Scythian tribes, and under their leader, the Chingis, became the Tartars, and invaded the Gothic and Teutonie nations and by the Romans. Their features and general appearance are described by the Roman historians as hideous and repulsive, and their manners as savage in the extreme. (Ammianus, b. 31.) The Huns were in some respects equal in size, and in degree with that of the Calkums of the present day. The Huns being now on the frontiers of the empire, had frequent wars with the Romans, and their invasions were most fatal, and not least dreadful. The Huns, under the leadership of Attila the various tribes under his sway quarralled among themselves, and being attacked by the Goths they were driven back beyond the Tanais. Part of them settled in the Austrian soil, where they founded the present Hungarians, or Magyars, came from a different and much later immigration. The Huns are mentioned in subsequent history as being sometimes at war with the emperors of Constantinople, and at times dethroned the Persians. Under Heraclius many of the Huns embraced Christianity. After that period their name is no longer mentioned in history. (Des Guignes, Histoire des Huns.)

HUNTER, WILLIAM, was born in 1718 at Long Calderwood, near Glasgow. He entered at the university of Glasgow in 1732, and remained there for five years studying for the church; but while hesitating whether he should enter on the study of medicine, he was at that time practising as a surgeon and apothecary at Hamilton. An intimate friendship was soon formed between them, the result of which was that Hunter determined to study medicine, and in 1737 he entered into a partnership with Sommelli, the celebrated accoucheur, and studied anatomy under Dr. Nicholls, and surgery at St. George's Hospital. Dr. Douglas, to whom he brought a letter of introduction, engaged him soon after in his operations, and he was in complete possession of the work which he was publishing, and to educate his son. He resided in the family till 1744, when Mr. Sharpe having resigned a lectureship on surgery to a Society of Naval Surgeons, Hunter was elected to fill his place, and there, under the patronage of the surgeons of London, he commenced lecturing on anatomy, and in 1747 became a member of the Corporation of Surgeons. But he had always preferred the practice of midwifery to that of surgery, and having been disappointed in the apparent prospect of success, he determined in 1749 to confine himself exclusively to the former subject. In 1750 he took a Doctor's degree at Glasgow; in 1754 he was appointed physician extraordinary to the queen; in 1757 he became a Fellow of the Royal Society. His time was now so con-
pletely occupied in the practice of his profession, that he was obliged to give up a part of his lectures, and his brother John, Hewson, and Cruckshank, were successively his partners. He amassed a large fortune, and died in 1783, with a reputation inferior only to that of his brother, of whom it was not his usual custom that he had been the pre-eminent and was heir to the position of the most skilled surgeon in the country, yet still remained a disagreeable and refractory patient for many years before Dr. Hunter's death, in consequence of a dispute relative to their mutual claims to the discovery of the structure of the placenta: which was most in fault is still a mystery, as the patient died in his bed in 1759, but did not cease till William was on his death-bed. Even then the reconciliation was only partial, for he left nearly the whole of his large property to those who were distantly related to him, although his brother was at the time in embarrased circumstances.

William Hunter's principal work was the "Anatomy of the Gravid Uterus," on which he was engaged for nearly thirty years. It contains thirty-four folio plates, most accurately and beautifully engraven from dissections by himself and his brother, illustrative of the most important subjects in obstetrics. A work descriptive of those plates, and containing several other points of great interest collected from the original works of several physicians, was published after Dr. Hunter's death by his nephew Dr. Ballieu. He was also the author of numerous essays in the "Philosophical Transactions," and the "Medical Observations," of which the most important and most valuable is a monograph on the termination of life, the recovery of the insensible, the resumption of the origin of the use of the lymphatics, the retroversion of the uterus, and the membranes decidua reflexa. William Hunter had long wished to found an anatomical school in London, which would give a reputation, and also 4000 copies of a building fit for that purpose, to endow a professorship, and to give his museum and library, if the government would grant him a piece of ground to build upon. This munificent offer was refused, and he therefore bought some ground himself, and built a private house, with a museum and dissecting-rooms adjacent to it. He at the same time added to his museum, which already contained a large number of very valuable anatomical and pathological specimens, having acquired in the Peninsula, a small Latin work, a cabinet of the rarest ancient medals, which cost him 30,000l., and numerous objects of natural history. He bequeathed all these to Dr. Ballieu, who was to hold them for thirty years, and then to transmit them to the university of Glasgow, to which he had also left 8000l. for their maintenance and increase.

If William Hunter was inferior in intellect to his brother John, he was perhaps, perhaps, more of a gentleman. He was a good scholar, a clear and elegant writer, and an accomplished gentleman. He was the most scientific man that ever practised as an anecouncer; and midwivery is as much indebted to him as surgery is to his brother. Each not only improved the practice of his own profession, but contributed to a far greater benefit by introducing the scientific principles of physiology into what, before their time, had been little more than mechanical arts.

HUNTER, JOHN, was born in 1728, at Long Calderwood, in Kilbride, a village near Glasgow, where his father possessed a small farm. Being the youngest of ten children, and his father dying when he was very young, his education was almost entirely neglected. His whole time was devoted to the amusements of the country till he was 17 years old, when he went to stay with his brother-in-law Mr. Buchanan, who was a cabinet-maker at Glasgow, and who maintained him while he attended school in order to fit him for the practice of medicine. He began in London as an anatomical and surgical lecturer, and he wrote to offer his services as assistant in the dissecting-rooms. His offer was accepted, and in 1749 he commenced his practice in London. Having successively practised himself both by his anatomy and his skill. In 1749 he married Miss Anne Pottinger, the daughter of a German commoner at St. Mary's Hall, Oxford, intending to practice as a physician; but he soon seems after to have given up this idea, for in 1754 he entered as a surgeon's pupil at St. George's Hospital, in the hope of becoming a future time a surgeon to that institution. In the same year his brother wrote to him in the school, and he delivered a part of each annual course of lectures till 1759, when his constant and severe labours in anatomy, to which he had lately added comparative anatomy and physiology, began to affect his health so seriously that it was necessary for him to return to his native climate. With this view he obtained an appointment as staff-surgeon, and early in 1771 proceeded to Belle Isle with the arrangement ordered to lay siege to that town. He afterwards went to take the decoration of a doctor of medicine at 1763, when a peace was negotiated, and his health being completely restored, he returned to London, and commenced practice.

At first Hunter met with little success in his profession; the roughness of his manners, the consequence in part of his hasty disposition, but more of his deficient education, prevented him from rising in public estimation. Besides, he paid but little attention to his practice, regarding it, as he always did, only as a source from which he might obtain the means of carrying on the scientific investigations to which he was far more attached, and which he had steadily pursued while in the army. To defray the expenses when these assailed him, he again commenced lecturing on anatomy and surgery; but notwithstanding the talent and extensive knowledge which his lectures evince, they were little appreciated, and he never had a class of more than twenty pupils. At the close of this period, he had a chance for the purchase of animals and other similar purposes, after he had spent on them all that he did not require for the actual necessities of life. Every year however added to his fortune, and in 1767 he was elected a fellow of the Royal Society, and in 1768 surgeon to St. George's Hospital. The latter appointment was of the greatest value to him as increased his income, both by adding to his surgical reputation and by enabling him to take pupils, from whom he received a small fee. Amongst his pupils were Jenner, with whom he remained throughout his life on terms of the closest intimacy, and Sir Everard Home, whose sister he afterwards married. From the time of his appointment to the latter post, his life was one of constant and laborious investigation of every branch of natural history and comparative anatomy, physiology, and pathology, to all of which he devoted every hour that he could snatch from the requirements of an increasing surgical practice. In 1773 he suffered from the first attack of the disease of the heart, of which he ultimately died. He had a severe spasm of the chest, and remained pulseless and cold, though perfectly sensible for three-quarters of an hour. For many years after however his health seemed pretty good, and he was subject to slighter returns of the disease only when much excited or fatigued; but in 1785 the attacks became more frequent, and in the following years he became gradually more debilitated, and the slightest fit of anger, to which he was unfortunately prone, was sufficient to induce severe spasms. In October, 1785, he was engaged in warm disputes with his colleagues at the hospital; and a remark being made by one of them at a meeting of the governors, which Hunter regarded as an insult, he left the room that he might repress or at least conceal his rage, and had scarcely entered the adjoining apartment, when he fell dead in the arms of Dr. Robertson, one of the physicians of the hospital.

The extent and importance of John Hunter's works will be best shown by a brief account of his museum and his influential publications. Thus his collection contained more than 20,000 preparations, illustrative of human and comparative anatomy, physiology and pathology, and natural history. The main object which he had in view in forming it was to give a true idea of its subject of life by preparations of the bodies in which its phenomena are presented. The principal and most valuable part of the collection, forming the physiological series, consisted of dissections of the organs of plants and animals, prepared according to the same plan, and each class arranged so as to present every variety of form, beginning from the most simple, and passing upwards to the most complex. They were disposed in two main divisions: the first, illustrating the general structure of the necessities of the individual; the second, of those which provide for the continuance of the species. The first division commenced with a few examples of the component parts of organic bodies, as sap, blood, &c.; and then exhibited the

2 Y 2
organ of support and motion, presenting a most interesting view of the various materials and apparatus for affording the important results which manucript collections of spontaneous causes of beings. It was succeeded by series illustrating the function of digestion (which Hunter placed first because he regarded the stomach as the organ most peculiarly characteristic of animals) as well as of respiration, &c. These were followed by the organs which place each being in relation with the surrounding world, as the nervous system, the organs of sense, the external covering of skin, and those of the division, respiration, &c. One of the collection contained the sexual organs of plants and animals in their barren and impregnated states; the preparations illustrating the gradual development of the young, and other organs tending to their existence before and after birth. Parts of the same general division, though arranged separately for the sake of convenience, were the most beautiful collections of nearly 1000 skeletons; of objects illustrating natural history, containing animals and plants preserved in spirit or stuffed, of which he left nearly 3000; of upwards of 1200 fossils; and of monsters.

The pathological part of the museum contained about 2500 MS. and printed works in three principal departments: the first illustrating the processes of common diseases and the actions of restoration; the second the effects of specific diseases; and the third the effects of various diseases arranged under the principle of locality. Among the works forming a part of this collection was a collection of about 700 calculi and other inorganic concretions.

These few words may give some idea of Hunter's prodigious labours and his munificent collector. But his museum contained a sufficient proof that he was no mere collector; it was formed with a design the most admirable, and arranged in a manner the most philosophic; and when it is remembered that it was the work of one man, labouring under every disadvantage of deficient education, and of limited and often embarrassed pecuniary resources, it affords perhaps better evidence of the strength and originality of Hunter's mind than any other works, whoso objects he held in which in his museum are made to speak for themselves. Nor should it be omitted, that the manual dexterity exhibited in displaying the various objects is fully equal to the intellectual power which determined their arrangement.

The museum was sold after Hunter's death, to pay the debts which he had incurred in its formation, and to afford the means of support to his family, to whom it was almost all that he had to leave, although for many years before his death, he was living on a very moderate income, having given £15,000 for it, and presented it to the College of Surgeons (London), by whom it has at a very heavy expense been greatly augmented and maintained.

About a year before his death, Hunter had been anxious to form a complete catalogue of his collection, and to embody in one large work the results of all his labours and observations. He died when he had completed but a small portion of his design, and left only the materials, with which his successors might have completed a work which would undoubtedly have been the most valuable of its kind ever published. These materials were contained in nineteen folio MS. volumes written under Hunter's dictation, and the ten most valuable of them contained records of his dissections, of all of which he had made copious notes. The formation of the catalogue was entrusted to Sir Everard Home, the brother-in-law and only surviving executor of Hunter, but from year to year he deferred his task, and after supplying only two small portions of his undertaking, he at length announced that in accordance with a wish which he had expressed before his death, he had burned the manuscripts which he had taken without leave from the College of Surgeons, and among which were the ten volumes of dissections, and numerous other original papers. Thus nearly the whole labour of Hunter's lifetime seems lost: a few only of the least important of his writings remained, unless indeed we reckon as his the numerous essays which Sir E. Home published as his own in the "Philosophical Transactions," and subsequently collected in six volumes 4to. of "Lectures on the Human Body.

Many of these give strong evidence of his having used Hunter's writings in their composition; and the fear lest his plagiarism should be detected is the only probable reason that can be assigned for so flagrant an act. The papers being thus lost, the formation of the catalogue was necessary dependent on the arrangement of the preparations themselves, the published works, and the few scattered manuscript collections the various classes of dissections on which he who had associated with Hunter could give. It is fortunate however that by these means, and by making numerous fresh dissections and comparing them with the original preparations, the collection of specimens has been brought to such a state that although it cannot compensate for the loss of the other, it confers the highest credit on those by whom it has been made.

Hunter's principal published works were the "Treatise on the Natural History of the Human Teeth," 2 vols. 4to., 1771-78; "Treatise on the Venerable Disease," 4to., 1786; "Observations on certain Parts of the Animal Economy," 2 vols., 4to., 1786; "The Wounds, Gun-shot Wounds," 8vo., 2 vols., 1794. Of these the two last afford the best proofs of his genius. The "Animal Economy" consists of a republication of several papers from the "Philosophical Transactions," and of nine others relating to various anatomical and physiological discoveries which Hunter had made. It is difficult to say which deserves the most adoration, the faultless accuracy of the observations themselves, or the clearness and simplicity of the deductions drawn from them. His "Treatise on the Blood," &c., although he had been collecting materials for it from the time of his entrance into the army, was not written till late in his life, when he was worn down by disease; and it was rather carelessly written and not intended for publication. Sir E. Home and Dr. Baillie. It contains his opinions on disease in general, the results of his long experience, illustrated by numerous physiological investigations. As a collection of useful information it is most important, and it is unfortunate that Hunter's reputation has been based upon them rather than upon his museum or his strictly physiological writings, for in the former his mode of reasoning is far more sound, and it is far more general than the evidence warranted. His doctrines were purely vital. The materia materia diffusa, a term which he says was recommended to him by his friends to express the body, and that his opinion is that which he believed to be contained in the blood and all the tissues, and to govern all the functions of the living body, was to him the sole agent in the phenomena of life. But his errors were those of ignorance of collateral subjects, rather than of a deficient acquaintance with that which he made the object of his study; and when we consider that he was so little educated, that he was not even acquainted with his own language, and was ignorant of all others, and that he employed the knowledge of the physical sciences, which every year now shows to have more applications in the study of the living body, we can only wonder the more at the genius which could accomplish so much in so short a time.

Hunter is, by the common consent of all his successors the greatest man that ever practised surgery. Considered merely as a surgeon, and with reference only to the direct improvements which he effected in his practice, he was inferior to few: his improvement of the operation for aneurism [ANEURISM] was undoubtedly the most brilliant discovery in surgery of his century. He first described the important disease of inflammation of the veins; he first published lucid views on the venerable disease; and by his work on inflammation improved the modes of practice applicable to nine-tenths of the diseases which fall within the province of the surgeon. But it was less by individual discoveries than by the general tone of scientific investigation which he gave to surgical practice that he improved it. Before his time surgery had been little more than a mechanical art, somewhat dignified by the material on which it was employed. Hunter first made it a science, and by pointing out its peculiar excellence as affording visible examples of the effects and progress of disease, induced men of far higher attainments than those who had been more directly employed in the study of human anatomy, and who had before practised, to make it for themselves as a science. As an anatomist and physiologist, his museum alone is sufficient to show that he had had no superior; and while his published works confirm this opinion, and exhibit what he knew, they add to it the testimonies of the most sagacious and meritorious men. Hunter's remarks on fossil bones, for example, erine his knowledge of the principle carried...
out by Curvier, by which their investigation might be made
the clue to the history of a former world. His notices, 
through short, of monstronsities prove that he knew the facts 
that they are, as it were, representations of the natural form 
of animals lower in the scale of creation, and possess the 
form natural to themselves at an earlier period of develop-
ment. His hands made large grants of the land of Godfrey
St. Hilare, Meckel, Von Buer, &c.; and it is now certain 
from the drawings which he had made from his prepara-
tions that he was well acquainted with nearly the whole of 
that land. He is one of the Methodist preachers, Mr. Ingham; Lady 
Catherine, another sister, married a clergyman, the Rev. 
Granville Wheeler. Of Ferdinandus Hughes, a brother, 
who died in 1726, at the age of 27, there is an 
agreeable picture of a pious and amiable person in Wilford's 
"Memoriae."

HUNTINGDON. [HUNTINGDONSHIRE.]
HUNTINGDONSHIRE, an inland county of England, 
situated between 52° 5' and 52° 30' N. lat. and 0° 6' and 
0° 20' W. long. It is bounded on the north and north-west 
by Northamptonshire, on the south-west by Bedfordshire, 
and on all other sides by Cambridgeshire. There are two 
outlying portions, the parish of Swineshead, which is sur-
rounded by Bedfordshire, and the parish of Everton, which 
is included between Bedfordshire and Cambridgeshire.

Huntydon.

HUNTINGDON, SELINA, COUNTESS OF, born 
1707, died 1791, a lady distinguished in the religious his-
tory of her time. She was the only child of three 
daughters and co-heirs of Washington Shirley, Earl 
Ferrers; the other two being Lady Kilmorey, and Lady 
Elizabeth Nightingale, the lady for whom there is the monument 
in Westminster Abbey which is so highly 
admired. She married Lord Huntingdon, 1729, and 
Philips Hastings, earl of Huntington, a nobleman of refined 
habits, with whom she appears to have had a very happy life 
until his sudden death on October 17, 1746, of a fit of 
apoplexy. She had many children, four of whom died in youth 
or early manhood.

It was probably these domestic afflictions which disposed 
this lady to take the course so opposite to that which is 
generally pursued by the noble and the great. She became 
deeply religious. It was at the time when the preachers 
and founders of Methodism, Wesley and Whitefield, were 
sowing the seed of a new religion, and all the most 
refined and distinguished men were looking to what were called the distinguishing 
truths of the Gospel than to its moral teachings, to which 
the clergy had gone back for some time chiefly attended in their public ministe-
tries. In these doctrines (painful as some of them must be to the benevolent and 
helpful mind) matter of consolation and delight, and she sought 
to make others participate with her in the advantages 
which she received from them. She became 

trust for the management of her college and chapels after 
her death.

Other ladies of the family of Hastings were distinguished for 
their piety and zeal. Lady Elizabeth Hastings, half-
sister to her lord, died in 1739, when Methodism was first 
beginning to attract very much of the public attention. She 
was a woman of delightful manners and a mind which 
ran a parallel to the development of the embryo. The number of 
individual facts for the discovery of which he has lost his 
due honour by the destruction of his manuscripts cannot 
now be calculated.

As a natural historian, Hunter's merits were of no ordinary 
character, as is sufficiently shown by his descriptions of 
various animals from New South Wales, published in 
Mr. White's 'Voyage' to that country, and by his papers 
on the households, geysers, &c. &c. He seems however to have regarded 
the study of zoology as very inferior to that of physiology, 
and it is probable that the large collection of animals which 
he left preserved in spirit was only intended as a store of 
subjects for future dissection.

The whole of John Hunter's works have been lately 
edited in four volumes 8vo., by Mr. James F. Palmer, who 
has added to those published by himself numerous papers 
from his manuscripts. Hunter's successor was his son, 
taken by some of his pupils, and his Coonian Lectures. 
Biographies of Hunter have been written by Sir Everard 
Home, Mr. Jesse Foote, and Dr. Adams. A Life by 
Mr. Drexel. Ottley is prefixed to Mr. Palmer's edition of 
his Works.

HUNTINGDON.

The county of Huntingdon consists of nearly one 
whole. Other rivers and streams flow past that town 3 miles along the border to the 
junction of a stream from the neighbourhood of Higham 
Ferrers (Northamptonshire), after which it flows in a 
northerly direction about 8 miles to Huntingdon from the first 
7 miles in an easterly direction to Holywell, on the border 
of the county below St. Ives; and from thence 5 miles 
along the border of the county to Earth, where it enters 
Cambridgeshire: its whole length within the county or on 
the border is 23 miles, all navigable. The stream which 
comes from the neighbourhood of Higham Ferrers has a 
course of 17 miles through Northamptonshire, Bedford-
shire, and Huntingdonshire; it passes Kimbolton. A stream about 
the river, as a branch of the Huntydon river, forms the 
border of the county west of Huntingdon; unless, and 
flows south-east into the Ouse at Huntingdon: it receives, just before its junc-
tion with the Ouse, a stream 13 miles long from Hargrave 
in Northamptonshire, and is a branch of the Grand 
Weston, Huntingdonshire. The other feeders of the Ouse 
are all small.

The Nene has no part of its course within the county, 
but only along the border between Northamptonshire, 
below Oundle, from whence it flows northward 4 or 5 miles 
to Wanford; it then turns eastward, and flows about 9 
miles to Standground Sluice, a little below Peterborough, 
where it leaves the county. Nothing is known of the 
river in this part. The old channel of the river, now no longer 
continuously navigable, forms, for the present navigable 
channel at Standground Sluice, and runs first along the 
border of the county, being navigable for a mile or two, and 
then through the county, through Whittlesea and 
Ugb
Meres. Near Ramsey Town it becomes navigable again, and passing close to Ramsey Mere it quits the county and enters Cambridgeshire. It rejoins the present channel at Wisbeach. Whittlesea Dyke, which is partly on the border of Huntingdonshire and partly in Cambridgeshire, is a navigable cut from the short navigable part of the old channel of the Nene at Stanground. Such navigation as follows below Ramsey; and the Forty Foot Drain, or Vermiudain's Drain, is a navigable cut from the Old Nene, near Ramsey, to the Old Bedford River in Cambridgeshire, which belongs to the system of the Ouse. These several navigable cuts, together, no doubt, contribute powerfully to the expansion of agricultural produce, and the import of timber, groceries, and general goods.

The three Meres, Whittlesea, Ramsey, and Ugg, are known as the Whittles Meres. The largest of these is situated in an area of several square miles; it affords excellent sailing and fishing, and is much frequented in the summer by parties of pleasure. These Meres are visited by abundance of aquatic wild fowl. A considerable part of the county is destitute of springs, and is supplied with water from ponds.

The high north road, travelled by the mail to York, Edinburgh, and Ireland, also supplies the north part of the county with water from the Yare to Lincolnshire.

The south-eastern part of the county is occupied by the iron-sand. Whether the formation of this sand was due to consist of dust of burnt chalk and clay, or to the deposition of the ironsand and the adjacent parts of Cambridgeshire and Bedfordshire, extensive iron-sand rocks are not easily identified, nor has it been fully examined, and being covered with the diluvial deposits of the neighbouring chalk range. The iron-sand occurs in Huntingdonshire to low hills. The rest of the county, excepting the Fens, is occupied by the Oxford clay, which forms the separation between the middle and lower assemblage of solities. The thickness of this formation is probably from 500 to 700 feet; its position is nearly horizontal. The hills on the confines of Huntingdonshire and Northamptonshire which overhang the valley of the Nene are of the stonebrash, or forest marl.

Agriculture.—The climate of Huntingdonshire par excellence of those of the inland counties. The low and flat districts, which are mostly drained fields, are subject to fogs, and not so healthy as the higher parts; but when well drained and cultivated their yield of the same crop is much higher. The county contains a surface of nearly 195,000 acres, of which a very small portion only remains unproductive.

The soil varies considerably, and may be said to lie in patches. The chalk and clay habitats are alternated with much alluvial vegetable earth, wherever the level of the surface is lowest, and the waters have formerly flowed over it, or stagnated upon it. Peat is found in many spots and dug out of the soil.

Although water abounds, there is a large surplus of springs, but the inhabitants are supplied from ponds, rivers, and wells. The well-water is not of the best quality: in this respect the county resembles the lower parts of Holland. The farms are generally of the extent of 100 or 200 acres, and are generally situated at an inconvenient distance from the most productive fields. This owing to the nature of the soil; a drier spot, rather higher than the level of the fens, is chosen for the buildings. Leases are not so common in}

county as they might be, with great advantage to both landlord and tenant; and rents are not high in proportion to the produce. The expense of cultivation on the fen land, when it is first drained, bears no proportion to the produce. Paring and burning the surface is the general practice. The ashes being spread and thinly ploughed in, rape seed is sown, which is fed off with sheep the first year, and left to ripen its seeds the next. The stem or straw of the rape is burned on the land, after the seed has been thrashed out; and this is all the manure required to produce a good crop of wheat, if the land is sufficiently mellow. Where it is not productive, and needs no further dressing the expense of agricultural produce, and the import of timber, groceries, and general goods.

The three Meres, Whittlesea, Ramsey, and Ugg, are known as the Whittles Meres. The largest of these is situated in an area of several square miles; it affords excellent sailing and fishing, and is much frequented in the summer by parties of pleasure. These Meres are visited by abundance of aquatic wild fowl. A considerable part of the county is destitute of springs, and is supplied with water from ponds.

The high north road, travelled by the mail to York, Edinburgh, and Ireland, also supplies the north part of the county with water from the Yare to Lincolnshire.

The south-eastern part of the county is occupied by the iron-sand. Whether the formation of this sand was due to consist of dust of burnt chalk and clay, or to the deposition of the ironsand and the adjacent parts of Cambridgeshire and Bedfordshire, extensive iron-sand rocks are not easily identified, nor has it been fully examined, and being covered with the diluvial deposits of the neighbouring chalk range. The iron-sand occurs in Huntingdonshire to low hills. The rest of the county, excepting the Fens, is occupied by the Oxford clay, which forms the separation between the middle and lower assemblage of solities. The thickness of this formation is probably from 500 to 700 feet; its position is nearly horizontal. The hills on the confines of Huntingdonshire and Northamptonshire which overhang the valley of the Nene are of the stonebrash, or forest marl.

Agriculture.—The climate of Huntingdonshire par excellence of those of the inland counties. The low and flat districts, which are mostly drained fields, are subject to fogs, and not so healthy as the higher parts; but when well drained and cultivated their yield of the same crop is much higher. The county contains a surface of nearly 195,000 acres, of which a very small portion only remains unproductive.

The soil varies considerably, and may be said to lie in patches. The chalk and clay habitats are alternated with much alluvial vegetable earth, wherever the level of the surface is lowest, and the waters have formerly flowed over it, or stagnated upon it. Peat is found in many spots and dug out of the soil.

Although water abounds, there is a large surplus of springs, but the inhabitants are supplied from ponds, rivers, and wells. The well-water is not of the best quality: in this respect the county resembles the lower parts of Holland. The farms are generally of the extent of 100 or 200 acres, and are generally situated at an inconvenient distance from the most productive fields. This owing to the nature of the soil; a drier spot, rather higher than the level of the fens, is chosen for the buildings. Leases are not so common in
much has been broken up and converted into arable land. In 1812, according to the survey, the meadows and pastures were nearly equal in extent to half the arable land. It is calculated that the best pastures will produce 400 bales of most per acre, and 4d. per lb., would give five guineas per acre. It is not surprising then that they should not be ploughed up. The pastures are not sufficiently subdivided; a greater number of ditches would keep them much drier and more fertile. There is no encroaching on some of the pastures to enable the sheep to rub their backs. It consists of two short ports put in the ground at ten feet apart, and a strong rail fastened to them a little lower than the ground in which nothing can be put between it and the rail is really too heavy to be ploughed to a sufficient depth with two horses. The cows kept for the dairy are mostly of the Yorkshire or Durham breed of short-horns. The cows bred in the county are not good; too little attention is paid to keep any breed select and pure.

Although Sutton is in this county, and it is asserted that the cheese which bears that name was originally made there, none of that kind is now produced in any of the dairies; all such cheeses are made in Leicester or Lincolnshire.

The sheep are mostly of the Leicester breed. The hogs are in the Leicestershire breeds, with various crosses.

The following are the principal fairs held in the county:—Bluntsesham-cum-Errh, fairs for cattle, on May 4, July 25, and November 1; Godmanchester, Easter Tuesday; Kimberley, Easter Friday, December 11; Leighton-Bromswold, May 12, October 2; St. Ives, Whits Monday, October 2; St. Neots, Saturday before the third Tuesday in January (or the nearest Sunday); Curriesh and Rylmard, December 17; Spaldwell, Wednesday before Whitsunday; Yaxley Holy Thursday.

Divisions of Towns. — The county of Huntingdon is divided into four hundred as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Acres</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norman Cross</td>
<td>N.</td>
<td>52,070</td>
</tr>
<tr>
<td>Huntingdon</td>
<td>E.</td>
<td>77,440</td>
</tr>
<tr>
<td>Leighton</td>
<td>W.</td>
<td>56,130</td>
</tr>
<tr>
<td>Toolland</td>
<td>S.</td>
<td>56,050</td>
</tr>
</tbody>
</table>

There is one parliamentary borough, and county and market town, Huntingdon, including the municipal boroughs of Godmanchester and St. Ives and the market-towns, Kimberley, Ramsey, St. Ives, and St. Neots.

Huntingdon is on the Ouse, 59 miles from Shoreham Church, London, by the road through Ware and Royston. It is on the Ermin Street, and there was a Roman station, the Durocortorum, or Dunstable, once 40 b. in the distance from either of the town or of its suburb Godmanchester. In the year 917 Edward the Elder built, or rather rebuilt, a castle at Huntingdon, of which traces of the entrenchments or outer works still remain. The castle passed to David, earl of Huntingdon, and king of Scotland; but Henry II. had it raised to the ground on account of the disputes which it occasioned between the earls of Huntingdon and the earls of the Barons, and its being a debar from the affections of its reafing to the disaet. Before the Reformation there were several religious houses. The most ancient was a priory of Augustine canons, founded in the tenth century and removed out of the town and enlarged in the reign of Stephen or Henry II. Its annual revenue at the Dissolution was 3237. 7s. 6d. gross, and 1877. 13s. 8d. clear. The other houses were of less extent; they were an Augustine Friary, and two hospitals for lepers and negroes. One of these at the Dissolution a yearly revenue of 37. 4d. gross, or 67. 7s. 4d. clear. Some fragments of the garden-wall of this hospital are the only remains of any of these establishments. In the civil war a garrison of 1000 men of the Parliament met at Huntingdon, and invested it, and the town was taken in 1642. It has a population of 3289. with a glebe-house. There were, in 1832, two infant or dame-schools with 40 children; ten day-schools, one of 60 boys, partly supported by endowment and the contribu-

...
by voluntary contributions, and eight others with 144 children; one-day and Sunday-school of industry, attended by 47 girls daily, and by 100 on Sundays; and one Sunday-school with 125 boys.

Canden fixed the site of the Roman Durolopina, or Durolipona, as Godmay GEOCHEN, and his name by the termination ‘cheter, the frequent ploughing up of Roman coins, and the account of Henry of Huntingdon, that this village was in remote times a noble city; but other antiquaries think it a market town, and better remote in Huntingdon, on the site of the castle ‘rebuilt’ by Edward the Elder. The name, which Camden derives from Duropont (more accurately Dwir Ost pone, signifying in British ‘the bridge over the water One’), is applicable to either position.

Kimbolton is in the hundred of Leightonstone, on the western side of the county, on a branch leading from the high north road into Northamptonshire and other midland counties; it is 4 miles from Hick’s Hall, London. The parish has an area of 6200 acres, and had in 1831 a population of 1584, of which from one-third to one-half was agricultural. The town is pleasantly situated, but is small and unimportant. The church stands at the head of a town with portions of its architecture are deserving of attention. Kimbolton Castle, an ancient stone building, the seat of the Montagues, dukes of Manchester, was the residence of the first earl. After the first earl’s death, however, the estate was divided; it has undergone many alterations since that period. Several of the Montague family are buried in Kimbolton church, where they have monuments. There are three almshouses for old men, meeting three times a week under a little trade: some lace is made. The market is on Friday, and there are two yearly fairs. The living is a vicarage, of the value of which no return has been made. There were in 1833, 350 acres, 100 acres of which is rented out, 35 acres of which are inhabited. The house is a large one, and contains several rooms. The town is well supplied with water, and has a good supply of fuel. The church is small, but contains many monuments. The parish is in the hundred of Leightonstone, in the registration district of the same name, and in the county of Northampton.

Ramsey is in Huntingstone hundred, on the edge of the fens, 69 miles from Shoreditch church, London, and 10 from Huntingdon. The town has an area of 1,600 acres (about 100 acres of which is in North Withford hundred, Cambridgeshire), and had, in 1831, a population of 2026, about half agricultural. The town derives its origin from a Benedictine abbey, founded in the 7th century, and standing on the banks of Ram’s eye, i.e., Ram’s island, in the reign of Edgar, A.D. 965, by Ailwine, duke or earl of the East Angles, at the instigation of Oswald, successively bishop of Worcester and king of Deira. The abbey stood ina great glory and renown. Many of the abbots and monks were men of considerable learning. A school almost coeval with the abbey itself was established within its walls; and the library was celebrated for its stock of Hebrew books, previously belonging to the synagogues at Stamford and Huntingdon, and purchased at the confiscation of the Jews’ property in England, in the reign of Edward I., by Gregory Huntingdon. The abbey church was twice burned, in 1407 and 1674, by the Delph, and another monk, was also eminent for his attainments in Hebrew; and a third, Lawrence Holbeach, of the time of Henry IV., profiting by the labours of his predecessors, compiled a Hebrew lexicon. The Reformation broke up the library, and interrupted the studies that had distinguished this secluded spot in the dark ages. The abbots of Ramsey were mitred. The yearly revenue of the abbey at the dissolution was 15134. 15s. 4d. gross, or 15164. 12s. 4d. net.

Ramsey consists chiefly of one long street running east and west, with another street running northward along the Bury brook, a feeder of the Nene, which waters the town. There is a weekly market, which had on the dissolution of the abbey fallen into disuse, but was afterwards revived: there is also a yearly fair. The church is spacious, consisting of a nave, aisles, and chancel, with an embattled tower at each end. The remains of the church are in the Norman and early English styles intermixed. The only remains of the abbey, which stood not far from the church, are the ruined gateway, a rich specimen of decorated English architecture, but in very dilapidated condition; and a statue of Earl Ailwine, the founder, supposed to be one of the most antient pieces of English sculpture extant. The living is a perpetual curacy, of the yearly value of £27.

In the time of the plague, A.D. 1665–66, four hundred people died of that disease, which was brought into the place by some infected woolen cloth. In May, 1751, eighty of the dwelling-burthens, two of the streets, and most of a great quantity of malt and flour, were destroyed in the town by fire.

There were in the parish in 1833 two endowed day-schools, one for 70 boys, another for 50 girls, and three other day-schools, with 79 children; also two Sunday-schools with 255 children.

St. Ives is in Huntingstone hundred, on the north bank of the Ouse, 59 miles from Shoreditch church, London, and 5 miles from the town of Cambridge. The town stands on an isthmus of land, formed by the confluence of the two Ouse-brooks, three-quarters of a mile broad, and 5 miles long, extending from the west to the north. It has an area of 2330 acres, and had in 1831 a population of 3314. St. Ives was in the Saxon times called Slep, which name is still attached to one of the two manors comprehended in the parish. The church is small, but much larger than is now. St. Ives, a Persian ecclesiastic said to have visited England as a missionary about A.D. 600, and whose supposed remains were discovered here some centuries afterwards. On the top of the hill is a spot called ‘Hulme Green’, on which the manor belonged, built first a church, and then a priory, subordinate to Ramsey Abbey, which priory remained till the dissolution. The town stands on a slope; it was inhabited by the Iceni before the Conquest, the field being inundated in the floods of that river. A good stone bridge of six arches forms the entrance to the town on the London side; there is an antient building, probably intended for a church, a grammar-school, a grammar-school, and a grammar-school.

St. Neots is in Tothland hundred, on the right or east bank of the Ouse, just out of the line of the great north road through Baldock, 56 miles from Hick’s Hall, London. The parish has an area of 4750 acres, and had in 1831 a population of 2617, about one-sixth of the town. There are several dissenting meeting-houses. The living is a vicarage united with the chapelry of Old Hurst and Wood Hurst; no return of its yearly value is made. There are two Sunday-schools, with 55 children; seven day-schools, with 132 children; seven Sunday-schools, with 246 children; also three Sunday-schools with 321 children.

St. Neots is in Tothland hundred, on the right or east bank of the Ouse, just out of the line of the great north road through Baldock, 56 miles from Hick’s Hall, London. The parish has an area of 4750 acres, and had in 1831 a population of 2617, about one-sixth of the town. There are several dissenting meeting-houses. The living is a vicarage united with the chapelry of Old Hurst and Wood Hurst; no return of its yearly value is made. There are two Sunday-schools, with 55 children; seven day-schools, with 132 children; seven Sunday-schools, with 246 children; also three Sunday-schools with 321 children.
Ouse, and there are six arches to the approaches across the low grounds on the banks, which are liable to be flooded. There are three dissenting places of worship. The market is on Thursday; there are three yearly fairs, beside a statute fair at Christmas, which was held during the late war, the yearly value of 16L, with a glebe-house. In the gift of the lord chancellor. There were in 1833 in the parish nine day-schools with 270 children, and four Sunday-schools with 512 children.

The three villages deserve notice. Yaxley is in Nor-
man Cross hundred, just on the right of the road which leads from Norman Cross on the high north road to Peterborough. It is 77 miles from Hick's Hall, London. The poor house is situated near the church, which was built and endowed by John de Yaxley, Bishop of Lincoln, in the year 1340. It is a three-fifths revenue, and is the only collegiate foundation in the county. Yaxley is small, and irregularly laid out, but the houses are neatly built, and the situation, on a fine gravelly eminence, is good. The church has various portions in the perpendicular style, intermixed with others of earlier date; it has a tower and a crocketed spire with pinnacles and flying but-
tresses. At Norman Cross, on the high north road, in this parish, are extensive barracks, partly of wood and partly of brick, used during the late war as a depot for French pris-
ers, of whom many thousands were confined here; the barracks are now partly dismantled. Yaxley is called Tacele in Domesday, it had formerly a market, which, after being forsaken, was in the middle of the last century, but has since fallen again into disuse. The living is a vicarage of the yearly value of 177L, with a glebe-house, in the gift of the lord chancellor.

The old manor, in 1835 gave 100L. to the vicar of the parish. In 1835 a church was erected, and the whole cost was defrayed by the vicar.

Stilton is in Norman Cross hundred, on the high north road, 75 miles from Hick's Hall, London, through Hunt-
tingdon. The parish has an area of 1820 acres, with a population of 1036, and comprises 1761 acres of cultivated land and 7 miles of roads. Stilton is once a market-town, but has dwindled into in-
significance. The Stilton cheese takes its name from this village. The living is a rectory of the clear yearly value of 255L, with a glebe-house. There were in 1853 seven day-
schools, with 124 children, and one Sunday-school, with 100 children.

Divisions for Ecclesiastical and Legal Purposes.—Hun-
tingdonshire is in the diocese of Lincoln, and in the ecce-
siastical province of Canterbury. It constitutes an arch-
deaconry, comprising the five rural deaneries of Huntingdon, St. Ives, Leightonstone, St. Neots, and Yaxley: there are five parishes in the archdeaconry of Belford. The number of inhabited houses in the parish of Stilton is 1861, but of these 20 arc, for ecclesiastical purposes, annexed to or dependent on other parishes; thus reducing the number of benefices to 86, namely, 53 rectories, 27 vicarages, and 6 perpetual curates. These benefices are valued at under 100L., of 29 under 200L., of 13 under 300L., of 12 under 400L., of 9 under 500L., of 5 under 750L., and of 4 over 1000L. Of 3 there was no return made.

The county is included in the Norfolk circuit; the assizes and quarter-sessions are held at Huntingdon, where is the county-gaol. Huntingdonshire and Cambridgeshire form but one shire.

The county returns two members to parliament; the elections are held at Haverhill, Huntingdon, and Stilton. Two members are returned for the borough of Huntingdon, to which the parish and municipal borough of Godmanchester was added by the borough Reform Act made no change in the number of members sent from this county.

History and Antiquities.—Huntingdonshire is generally considered to have formed part of the territories of the Iceni, and the land on the north side of the river, and farther to the east, was the land of the Queadh, or the people of that nation, towards the Catuvexianchi. Upon the sub-
jugation of Britain by the Romans, it was included in the pro-
vince of Flavia Cassiaria. Two Roman stations are considered to have existed in this county: Duroulinum, or Du-
rupontpne, noticed above in the account of Huntingdon, and Godmanchester; and Durobrivae, which is by many fixed at Water Newton, on the Nene, near the high north road. The fort or station appears to have been on the north or Huntingdonshire side, or near the spot which has been called with it, or which rose from it, extended to the northern or

Northamptonshire side. Stone coffins and other funerary
antiques have been dug up in the neighbourhood, as well as many coins. Various fragments of Roman pottery have been dug up at Holywell, near St. Ives, a small urn and a variety of Roman coins on the road from Somersham to Chatteris, in the Fens, and some Roman coins near Sawtry, on the high north road. Of ancient roads the Roman Ermin Street crossed the county, from south-east to north-west, through Duroplinum and Durobrivae, and nearly in the present north-western line of the county. Another road, which some distinguish as the 'British Ermin Street,' is thought to have entered the county from Bedford-
shire, and run due north to Godmanchester, and from there to Whittlesford, which was in a position near Sawtry. The Via Devana crossed the county, passing from near Cambridge by Duroplinum to Ratis, or Leicester.

In the earlier part of the Saxon period this county was included in the kingdom of the Eastern Angles, and it is said to have been even then called Huntingtundensyres, or Hun-
tundensyres: it was subsequently annexed to Mercia, and

shared the fate of that kingdom. In the latter period of the Anglo-Saxon dynasty it constituted a earldom or county, and was held by Siward, a noble of considerable
power in the time of Edward the Confessor. Wulthet, son of Siward, having married Judith, William the Conqueror's niece, was made by that monarch earl of Huntingdon. He laid most of the waste and ruins which still mark the
earldom, and which are still to be seen in the county. Huntingdon was successively conferred on Simon de St. Liz, and David, prince (afterwards king) of Scotland, who married Maud or Ma-
tilda, daughter of William the Conqueror. The dukedoms thereof continued in the royal family of Scotland, until seized by the kings of England in the wars occasioned by the contests of the Bruce and Balliol families for the crown of Scotland. The earldom, after having passed through various families, was conferred by Henry VIII. on one of the Hastings family, in which it continued till A.D. 1759, when it was supposed to have become extinct; but a descendant of a descendant having laid out a good title A.D. 1815, it was re-
vived, and still exists.

Huntingdonshire was in ancient times very woody, and

appears to have been a forest till the time of Henry II.,
who disafforested the greater part: the remainder was not disafforested till the reign of Edward I. There were anciently two abbots in the county; one at Ramsey, noticed above, and one of the Cisterian order at Swytry St. Judith. The yearly revenues of the latter, at the dissolution, amounted to 1092L. 11s. 4d. or 1141L. 3s. 8d. clear: there are no remains of the buildings. Beside other religious houses noticed above, there was a Benedictine nunnery on the site of Hinchingbrooke House, and a priory of the Black Canons at Conington, where the priory was dismantled, and the site was bought of Clapham, Lord Herbert, by one of the men of early English, with a fine spire. Upton and Woot-
ton churches have also some fine portions of early English architecture. Besides Kimbolton and Huntingdon Castles there was one at Conington, on the border of the fens; but there do not appear to be any remains of it.

In the civil wars of Charles I. Huntingdon was plundered A.D. 1645, by the royalists, under the king's own command. In A.D. 1646, the earl of Holland and the duke of Bucking-
am, who had assembled great forces for the relief of Oxford, having been driven from Kingston-on-Thames by the Parlia-
mentarians, and compelled to wander over the country with 100 horse, came to St. Neots, where they were beset by their pursuers. The earl of Buckingham then arranged his way through the enemy, but the earl of Holland surrendered without resistance.

An establishment which existed at this period in the parish of St. Ives, near Huntingdon, was a monastic house called Fosse, or Ferrar, a lawyer of eminence, led by the seriousness of his disposition, purchased the lordship of Little Gidding, re-
quired and fitted up a large dilapidated mansion-house, the only habitation in the village, repaired the church, which had been converted into a barn, and settled there with sev-
eral of his kindred, servants, and others, to the number of nearly forty persons. Having been ordained deacon, he formed rules for his establishment, the members of which passed their lives in fasting, prayer, and good works. Charles I. twice visited the establishment, which was kept

VOL. XII.—2 Z
up after the death of Mr. Nicholas Ferrar. It was broken up by some zealots of the parliamentary army, to whom it had become obnoxious under the title of the Protestant Nun-

cy, which the common people had given to it. In the churchyard are several memorials of the Ferrars.

An incident of rather earlier occurrence, but illustrative of the age, took place at Wartby, in this county, near the close of the sixteenth century. The children of Robert Throckmorton, Esq., having been afflicted by fits of a peculiar kind, and the lady of Sir Henry Cromwell having died, after experiencing similar fits, a family of the name of Samuel or Samwell, consisting of an old man and his wife and daughter (Agnes), were charged with bewitching them; and being found guilty at the Lent assizes, A.D. 1593, were executed. They are traditionally known as 'the Witches of Wartby,' Sir Henry Cromwell, to whom, as lord of the manor, their goods were forfeited, gave them as an endowment for ever for preaching an annual sermon at Huntingdon against the sin of witchcraft; and the sermon continued to be preached long after the statutes against witchcraft were repealed.

(Beauties of England and Wales; Paterson's Roads; Rickman's Gothic Architecture; Clerical Guide; Parliamentary Papers, &c.)

STATISTICS.

Population.—Huntingdonshire is entirely an agricultural county, ranking in 1831 the second in that respect among all the counties of England; in 1811 it ranked the third. None of the periods ending in 1820, 1827, and 1834, were 197, 205, and 313 respectively, making an average of 28 annually in the first period, of 29 in the second period, and of 44 in the third period.

The number of poor tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county rates, were 15, 22, and 27 respectively. Among the persons charged with offences, there were committed for—

1831. 1832. 1833.

Felonies . . . . 11 17 22
Misdemeanors . . . 4 5 5

<table>
<thead>
<tr>
<th>HOUSES</th>
<th>OCCUPATIONS</th>
<th>PERSONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhabited, Families</td>
<td>Uninhabited, Families</td>
<td>Build.</td>
</tr>
<tr>
<td>Families employed in Agriculture, &amp;c.</td>
<td>Families not engaged in the two preceding classes</td>
<td>Married, Females, Male</td>
</tr>
<tr>
<td>Total</td>
<td>Male</td>
<td>Female</td>
</tr>
</tbody>
</table>

| Huntingstone, Hundred | 3,141 | 3,711 | 79 | 2,086 | 585 | 638 | 8,738 | 8,569 | 17,427 | 4,389 |
| Leightonstone | 1,778 | 2,054 | 40 | 1,393 | 461 | 200 | 4,743 | 4,927 | 9,652 | 2,311 |
| Norman-Cross | 1,754 | 1,935 | 97 | 1,240 | 424 | 271 | 4,418 | 4,410 | 8,828 | 2,146 |
| Toscald | 2,600 | 2,008 | 79 | 1,068 | 732 | 645 | 6,935 | 7,210 | 14,145 | 3,912 |
| Huntingdon, Borough | 627 | 679 | 37 | 2,313 | 355 | 1,724 | 2,357 | 370 |
| Total | 9,990 | 11,278 | 40 | 6,231 | 2,940 | 2,107 | 26,377 | 26,810 | 53,192 | 13,601 |

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of—

1801 | £23,367, being 12s. 8d. for each inhabitant. |
1811 | 33,413 | 16 | 9 |
1821 | 32,249 | 16 | 2 |
1831 | 40,474 | 15 | 2 |

The amount expended was—

For the relief of the poor | £26,576 18
In suits of law, removal of paupers, &c. | 1,992 12
For other purposes | 6,169 10
Total | 48,639 0

In the returns made up for subsequent years, the de-
scriptions of property assessed are not specified. In the years 1834, 1835, 1836, and 1837, there were raised 45,500l. 5s., 45,086l. 12s., 35,757l. 15s., and 29,404l respectively; and the expenditure for each year was as follows:—

For the relief of the poor | 23,934 6 | 32,354 6 | 27,754 8 | 21,676
In suits of law, removal of paupers, &c. | 1,166 5 | 846 1 | 1,064 9 | 1,433
Prevented towards the poor | 1,742 13 | 4,263 11 | 4,368 6 | 3,918
For all other purposes | 1,907 13 | 2,324 15 | 1,304 7
Total money expended | 44,465 0 |
The saving effected on the sums expended for the relief of the poor in 1837, as compared with the expenditure of 1834, was therefore more than 36 per cent.; and the saving effected on the whole sum expended in 1817 was more than 37 per cent, as compared with that expended in 1834.

The number of turnpike trusts in Huntingdonshire, as as-
certained in 1833, is 7; the number of miles of roads under their charge is 146; the annual income in 1835, arising from the tolls and parish composition, was 10,707l. 4s. 5d.; and the annual expenditure, 11,406l. 11s. 7d.

The county expenditure in 1834, exclusive of that for the relief of the poor, was 410l. 1st. 5s. 6d., disbursed as follows:—

| Bridges, building, and repairs, &c. | 255 12 9 |
| Gaols, houses of correction, &c., and maintaining prisoners, &c. | 910 18 0 |
| Shire-halls and courts of justice, building, repairing, &c. | 7 5 7 |
| Provisions | 555 19 11 |
| Clerk of the peace | 200 0 4 |
| Conveyance of prisoners before trial | 9 6 8 |
| Vagrants, apprehending, and conveying | 223 9 3 |
| Constables, high and special | 250 0 0 |
| Coroner | 54 6 6 |
| Payment of debt, principal and interest | 1,140 0 0 |
| Miscellaneous | 396 14 7 |

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 197, 205, and 313 respectively, making an average of 28 annually in the first period, of 29 in the second period, and of 44 in the third period.

The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county rates, were 15, 22, and 27 respectively. Among the persons charged with offences, there were committed for—

1831. 1832. 1833.

Felonies . . . . 11 17 22
Misdemeanors . . . 4 5 5
The number of convicts in each of the same years was 14, 18, and 23 respectively.

1831. 1832. 1833.
The number convicted was 9 16 20
Discharged by proclamation 1 3 5

At the assizes and sessions in 1837, there were 67 persons charged with crimes in Huntingdonshire. Of these, 5 were charged with assaults on the person, 4 of which were for common assaults; 2 for assaults on property committed with violence; 52 for offences against property committed without violence; 3 for arson; and 2 for uttering counterfeit coins. Of the number convicted, 2 were sentenced to death, the sentence of one of whom was commuted to transportation for life, and of the other to imprisonment for one year; 7 others were sentenced to transportation for life, 2 for 14 years, and 4 for 7 years; 6 were to be imprisoned for one year or above 6 months, and 24 for 6 months or under; one was fined. Of the whole number of offenders, 46 were convicted, 8 were acquitted, 6 were not prosecuted, and no bill was found against 7. In this number 59 were males and 6 were females; 34 could neither read nor write; 27 could read and write imperfectly, and 6 could read and write well.

The number of persons qualified to vote for the county members of Huntingdonshire is 2,744, being about 1 in 19 of the whole population, and rather less than 1 in 5 of the male population twenty years of age and upwards, as taken in 1831. The expenses of the last election of county members to parliament were to the inhabitants of the county 33s. 6d. per head, and were paid out of the county-rate.

There is one savings’ bank in this county. The number of depositors and amount of deposits on the 20th of November in each of the following years were—

1829. 1830. 1831. 1832.
Number of depositors 776 888 968 991
Amount of deposits £24,474 £24,014 £26,276 £28,650 £30,926

The various sums placed in the savings’ bank in 1835 and 1836 were distributed as under:

1835. 1836.
Not exceeding £20 586 £3,891 666 £4,325
£20 to £50 237 7,092 269 8,181
£50 to £100 105 5,383 96 6,800
£100 to £150 150 5,761 56 6,687
£150 to £200 200 13,208 14 2,369
Above £200 200 3,115 7 2,564

991 28,650 1,108 30,925

Education.—The following summary is taken from the Parliamentary Returns on Education, made in the session of 1835—

Inhabitants. Schools. Scholars. Total.

Infant schools 38
Number of infants at such schools; ages from 2 to 7 years:
Males 257
Females 251
Sex not specified 201

Daily schools 190
Number of children at such schools; ages from 4 to 15 years:
Males 1,932
Females 1,798
Sex not specified 1,263

Total 4,993

Schools 228
Total of children under daily instruction 5,805

Sunday-schools 115
Number of children at such schools; ages from 5 to 15 years:
Males 2,618
Females 2,725
Sex not specified 1,001

6,344

Assuming that the population between the ages of 2 and 15 has increased in the same proportion with the whole population since 1821, when the relative population at different ages was last taken, and likewise assuming that the whole population has increased since 1831 in the same ratio as it did the 10 years preceding that date, we find by approximation that there were 18,209 children between the ages of 2 and 15 in the county of Huntingdonshire in 1834, the time the Educational Inquiry was made. Nine Sunday-schools are returned from places where no other school exists, and the children (334 in number) who are instructed therein cannot be supposed to attend any other school; at all other places Sunday-school children have opportunity of resorting to other schools also; but in what number or in what proportion duplicate entry is made is the same child is thus produced must remain uncertain.

Seventeen schools containing 743 children, which are both daily and Sunday schools, are returned from various places, and therefore duplicate entry is known to be thus created. To give allowance for this cause for a number of children having been entered twice as under instruction, we may perhaps fairly conclude that little more than half of the children between the ages of 2 and 15 are receiving instruction in this county.

Maintenance of Schools.

| Description of Schools | By endowment | By subscription | By gifts | Subscriptions to poor Scholars | Total amount | Scholars.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant schools</td>
<td>—</td>
<td>—</td>
<td>6</td>
<td>—</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Daily schools</td>
<td>29 839</td>
<td>14 603</td>
<td>12 525</td>
<td>12 450</td>
<td>187</td>
<td>2,150</td>
</tr>
<tr>
<td>Total</td>
<td>31 925</td>
<td>15 603</td>
<td>24 525</td>
<td>24 450</td>
<td>199</td>
<td>2,150</td>
</tr>
</tbody>
</table>

The schools established by dissenters, included in the above statement, are—

Schools.

Infant schools —
Daily schools —
Sunday-schools 6, containing 153

The schools established since 1818 are—

Schools.

Infant and other daily schools 97, containing 2,597
Sunday-schools 83

Three boarding schools are included in the number of daily-schools given above. No school in this county appears to be confined to the children of parents of the Established church, or of any other religious denomination, such distinction being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are also included Wesleyan Methodists.

Leading libraries of books are attached to 10 schools in this county.

HUNTSVILLE. [ALABAMA]
HURD, RICHARD, D.D., born 1720, died bishop of Worcester 1809, is eminent rather as an elegant scholar than a divine, and is more spoken of on account of his connexion with Warburton than for his own merits, which were however, of the first order. He was born in Shropshire, the son of John and Hannah Hurd, 'plain, honest, and good people,' as he himself has described them, renting a considerable farm in that county. It was the good fortune of Hurd to live in his childhood near a well conducted grammar-school, that of Brewood, where he had an excellent master, who prepared him well for the university. He went to Cambridge at a much earlier age than is now the custom, about fifteen; and his history from that time is that of a scholar, a learned man, an orator, and divine, taking his degrees, being ordained, gaining some little preferment, which is followed by greater, and publishing sundry sermons, tracts, and books. An ample detail of all this may be read in the sixth volume of Nicholson's 'Literary Anecdotes of the Eighteenth Century.'

Dr. Hurd continued to reside at Cambridge as a Fellow of Emmanuel till 1757, when he became rector of Thurstaston in Cheshire, where he went to reside. In 1759 he was made preacher of Lincoln's Inn, and in 1774, archdeacon of Gloucester, by his friend Bishop Warburton. In 1775 he was made bishop of Liechfield and Coventry, from whence, in 1781, he was translated to Worcester, where he continued till his death, declining the offer which was made him of becoming archbishop of Canterbury on the death of Archbishop Corswallis in 1783. The writings of Bishop Hurd are too many to be particularly named. The most remarkable are his 'Dialogues, his 'Letters on Roman and Chivalry,' his 'English Commentary on the Epistle of St. John.'
Hus 356

Husson on the Art of Poetry and the ingenious Essays published with it, his 'Twelve Discourses on the Prophecies,' his Sermons, and his Life of his friend Bishop Warburton. There is also an octavo volume of the correspondence between Warburton and Hurst, a very pleasing book, and calculated to reveal some portion of the opinion which many persons have formed of the real character of Warburton, and of the nature of that friendship which so long subsisted between 'Warburton and a Warburtonian.'

Hurd, James, was born at Bishopstone, in Sussex, in the year 1763, and brought up at Chichester school, where he early showed a taste for poetry and music. In 1760 he entered at St. Mary Hall, Oxford, and was subsequently awarded the degree of Fellow of the College, in that university, and took orders. In 1788 he published 'The Village Curate,' which seems to have been first produced anonymously. This work was followed by a tragedy, called 'Sir Thomas More,' and some other poetical works, as well as two theological critiques on Genesis, and Remarks on the Arrangement of the Plays of Shakespeare.

In 1793 he was elected professor of poetry in the university of Oxford, and in 1801 he died.

Hurd is now remembered chiefly for his friendship with Cowper, which began about the beginning of the year 1791. Several letters to him appear in Hayley's 'Life of Cowper,' and the compiler hints that these were only a selection made by the editor. We may naturally call attention to him as one of those who awakened or attempted to awaken interest on the subject of Shakspearian criticism, as it is most desirable that all who study Shakespeare should be made aware of the several mistakes which have been made in both his merit and铺, the critical investigation of his writings. (Chalmers's 'Biol. Dict.: Hayley's Life of Cowper.)

HURDWAR. [Hindustan.] [See Hunzawar.]

HURONI, the generic name assigned by Mr. C. Stokes to certain remarkable articulated bodies, of a partially radiated structure, found in the transition limestone of Lake Huron by Dr. Bighly. Until lately these fossils were referred to the Polyzoia, but Mr. Stokes has considered them specimens more complete than those which he first observed. Mr. Stokes has found that the parts represented as lamelliferous corals are really the siphuncular portions of shells of cephalopods, which may be included in the family of Orthocerata.

The structure of the siphuncular parts in these and other chambered shells from the limestone of various parts of North America has led Mr. Stokes to propose a new sub-class, viz. Articulatenae, whose characters, as well as those of Huronia, can only be well traced in comparison with the ordinary structure of Orthoceras, under which head we propose to present a brief account of the whole group of straight chambered shells. (For figures of Huronia, see Geol. Trans., vol. i., new series.)

HURRIA, Dauden's name for certain Indian Colubers, the scales of the base of whose tails are constantly striated, those of the point double.

HUSBAND. [Wife.]

HUSBANDRY. The origin of the simplest arts of life is involved in the obscurity which envelops the early history of the human race. Before there can be any motives to record events, some considerable progress must have been made in civilization. When attention is altogether directed to obtaining the means of subsistence, there is little leisure; nor is it easy to preserve the contiguous, or to continue under the acquired by experience. Warlike achievements are the first things recorded; and the peaceful labours of the husbandman are overlooked. In the fables which in the early ages of the world were new, the name of the husbandman by which we should describe them now—the same implements were then in use, and the same productions raised which are now found in the same climates: but they are only mentioned incidentally. It requires a very advanced state of the arts of literature to produce a treatise on any one practical subject exclusively: and the simpler and more common the arts, the less they are noticed in the early literature of a nation. We have however no other means of tracing the progress of husbandry than by the works of those who have written on the subject, until we come to our own times, when everything is noted and commented on, and every one who makes all discovery or improvement is anxious that the public should be acquainted with it. We have already mentioned some of the early Greek authors [Arable-land, vol. ii., p. 229], and likewise some of the Latin authors, and the investigation of the art of husbandry in general. (De Re Rustica.) From these authors we learn that considerable progress had been made in the tillage of the ground and in the breeding and rearing of cattle, and in the art of husbandry. Over the Romans their victorious arms, they also introduced improved methods of cultivation. The practice of fallowing land, to restore its fertility, can be clearly traced to them. For a long time the Latin authors were the source from which all writers on husbandry derived their knowledge; and hence many useless and absurd rules, which were connected with the pagan superstition were perpetuated.

The Mediterranean Sea and the countries situated around it were once the centre of all the arts, which had slowly travelled westward from Asia and from Egypt; and the colonies which the Greeks and Romans planted on all the coasts of this sea, and in the countries which they conquered, contributed to the extension of this science on the earth. The irruption of the barbarians into the Roman empire greatly checked the progress of husbandry; but the destruction of the Eastern empire, while it made the Goths retrograde, it introduced improvements into those countries where men of learning and science sought a refuge from the invaders.

British Husbandry. The husbandry of the aboriginal Britons was very imperfect. (See De Rale.) Julius Caesar; but we have no records to inform us. Rural matters were of too little importance in the eyes of conquerors to engage much of their attention, but the mildness of the climate and the general fertility of the country induced them to adopt the methods of agriculture and husbandry. The conquerors, when they settled among the natives learned a better system of cultivation than that of their ancestors. As far as we can learn from ancient documents, the land in England formerly consisted chiefly of woods and of extensive pastures, in which sheep and cattle were bred, which constituted the chief wealth. A very small proportion of the soil was cultivated; and, while the population was thin, there was no great difficulty in maintaining them in this state, as the land was broken up, and which with little trouble or toil produced moderate crops of corn. But this system could not last long. The proprietors of land would soon perceive that the produce of crops could be instead of the more and more restricted the breaking up of pastures, and thus more attention was necessarily paid to the arable lands in cultivation.

Through the deficiency of the labour or the difficulty of executing them, and the frequent intestinal wars between the barons, depredations were often committed with impunity; and the cultivators of the soil concentrated in villages for mutual protection and defence. The best land nearest to the habitations was cultivated, and the common pastures fed the cattle without much trouble or expense. The consequence of this system was, that very little manure was made, and the cultivated fields scarcely produced a return adequate to the expenses of cultivation. For this reason, the industry of corn crops, and the land was overrun with weeds after a single crop. Hence it was not an uncommon practice to have a fallow every other year, and this was considered a superior system to that which was followed by two crops. This system has been more common since. Wheat was very little cultivated; barley, rye, and oats were the principal produce.

The woods nourished many hogs on the acorns and beechmast which abounded there, and the right of turning logs into the rents was granted under the barbarous terms of mastagium and roostagium.

The religious orders, to whom extensive grants of waste lands were made, greatly contributed to the improvement of agriculture. They endeavoured to bring lands by in use, and enabled to study the Roman authors on husbandry, and, by applying the rules and principles which they drew from that source, they greatly improved their estates, and made the land more productive; teaching and encouraging the tenants to till the land more effectually, they were, upon th
husbandry, of which the increase of cattle and sheep on turnips in winter is the chief feature.

From that time to the present day husbandry has improved slowly but regularly. With the increase of population and a consequent increased demand for the produce of the land, the prices of land and provisions have increased, and the cultivation of lands, by which the greatest increase of landed proprietors have been greatly improved. But the most important step has been the granting of long leases to those who were inclined to lay out their capital and employ their skill in improving farms, and in many instances the law gives to a lesseeholder, and his independence of his landlord, provided the rent be duly paid, is the greatest encouragement to industry; and it will be invariably found that the improvement of any district is proportioned to the length of time for which leases are granted there, at a fair annual rent, without uncertain fines.

The spirit of improvement and the hope of increasing his income often lead a man to mistaken experiments and consequent loss; but the experience thus gained is always valuable to the community. Jethro Tull, a gentleman who laid a property near Hungerford in Berkshire, introduced a mode of cultivating the land which was prevalent in Lombardy, and was borrowed from the practice of gardeners, who sow and plant their vegetables in rows with wide intervals. Finding that in rich soils the produce was much increased by such measures, he afterwards formed a theory respecting the feeding of plants, which he imagined to be extremely finely attenuated earth. He thought that manures acted only mechanically, and that the air might be kept perpetually fertile. The attractive part of this theory was, that when the supply of manure is limited, there is no limit to labour, and that consequently an increase of population only required an increase of tillage to supply it with food. Tull was admired, and his theory adopted by many; and it is a practical system, to which the name of drill-husbandry has been given, which was looked upon as one of the most important discoveries. But it was soon found that his imagination had been far from correct, and his attempts had been by no means his experiments and his practice. Notwithstanding this, he must be considered as one of the great promoters of good husbandry. Even his errors have been useful by making men observe and reflect; and the introduction of machines to drill the seed in rows, and of others to clean and hose the intervals, which his principally suggested, has been of infinite use to the improved cultivation of the soil.

The rearing of cattle to the extent of the improvement of arable land, which followed the introduction of saffoin, lucern, and other artificial grasses, and the cultivation of roots for the same purpose, have made a great change in the old systems. Many men now think that the great deficiency is in the land increases in productive power, and will bear more frequent crops of corn; better implements have been invented to save labour and to do the work more completely; and a system of cattle feeding, which has corrected the great fault of most strong soils in northern climates — excessive moisture which cannot evaporate. Many causes have concurred to produce these improvements. At one time high prices induced men to lay out their capital on the cultivation of the soil; at another, low prices stimulated industry, to make up by an increased production for a deficiency in the value; and what has contributed greatly to keep attention directed towards agricultural improvement is the rapid increase of the means of communicating information by the press. Every successful experiment, every new method which the inventor thinks of importance, is spécially announced to the public.

The improvements which have been made in the breeds of cattle and sheep may be considered as entirely modern. The profit which some eminent breeders have made, and, to some extent, still make, by their attention and their skill, is a sufficient indication of the correctness of the views which Mr. Collins and Mr. Bakewell may be cited as examples of successful attention to breeding. Mr. Collins obtained at a public sale of his cattle—

<table>
<thead>
<tr>
<th>For 12 calves of all ages</th>
<th>£560</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 11 bulls</td>
<td>2249</td>
</tr>
<tr>
<td>For 7 bull-calves under 1 year old</td>
<td>652</td>
</tr>
<tr>
<td>For 7 heifers</td>
<td>809</td>
</tr>
<tr>
<td>For 5 heifer-calves under 1 year</td>
<td>1000</td>
</tr>
</tbody>
</table>

Making for 47 head of cattle of all ages £6687.
At another sale, of Mr. Fother's stock in 1791, fifty head of cattle brought 428 shillings. Such prices are a great inducement to pay attention to breeding.

To enumerate the various works which have come from the press on subjects connected with husbandry would be the right of a publisher, but we can only mention some of the principal authors, such as Lord Kames, Marshall, Arthur Young, Sir John Sinclair, and Dickson. Of these the most original author is the first. His Gentleman's Magazine contains a series of papers on agricultural education, and is the most useful practice. The others, although confessedly compilers, have great merit in the manner in which they have brought forward the various information which they have collected. Mr. Fother's stock, for example, appears in 1800, and continues under a new set of editors to this day, having done much good in disseminating useful practices in husbandry. British husbandry owes much to the zeal and activity of individuals who have formed societies for its improvement. The Bath and West of England Society, which still exists, has been greatly instrumental in spreading the knowledge of practical husbandry, and much useful information is contained in the Reports of its Transactions. The Highland Society of Scotland, of which all the principal proprietors and most of the large occupiers of land in Scotland are members, has greatly contributed to encourage experiments, and to promote improvements in every branch of husbandry.

The Board of Agriculture, at the head of which was Sir John Sinclair, the zealous promoter of all measures for diffusing agricultural information, although it has rather disappeared, is still heard of and appears at all its Important meetings, and has for some time ceased to exist, was the means of diffusing a knowledge of the state of husbandry throughout Britain, at the beginning of this century, by the publication of the Reports of Agriculture. The surveys of the different counties, the substance of which has been condensed in the 'British Husbandry,' in 2 vols., lately published under the superintendence of the Society for the Diffusion of Useful Knowledge. Such early-established agricultural societies lead us to cherish the best hopes of a new stimulus being given to the improvement of British husbandry.

To complete this short sketch of British husbandry, it only remains briefly to mention the different systems which have been most prevalent at different times.

The first and most artifical is that which consists in breaking up portions of pasture-land and sowing corn on a slight ploughing, which cannot fail to be productive for some years. Several crops may thus be taken, until the land is so exhausted, that the crop no longer repays the seed and labour. To defer this time, experience soon pointed out the crops which succeeded best after each other. Wheat or barley follow usually the first crops; afterwards peas, beans, or oats, until the ground, being overrun with weeds, would be left to the renovating effect of time, and a fresh spot would be broken up.

The best improvement on this system is that of infield and outfield. The infield is cultivated more carefully, somewhat like a garden, and all the dung of the cattle is exclusively put upon this part. The outfield is a continuation of the first-mentioned system. The infield consisted of inclosures or open fields near the dwelling, which it was most convenient to cultivate as arable land. Thus two distinct systems of husbandry were carried on at the same time; and whatever improvements were introduced in the management of the infield, the outfield continued to be managed as it was before.

The mode of recruiting lands which had been exhausted by crops, or were overrun with weeds, by means of a fallow, second, or both, had been introduced by the Romans, and never to have reached Scotland till the eighteenth century, a thing almost incredible, if it were not capable of explanation by the circumstance that there had generally existed a fallow between them; but between English and Scotch yeomen, except on the hold of battle. The alternate crop and fallow seem to have been later introduced than a fallow after several crops--the Roman system, which consists of a summer fallow, a winter crop, and a spring crop, was probably longer established than any other, and is still the practice in many parts of England. The deteriorating effect of the outfield system would lead to its abandonment as soon as population increased, and with the want of land for infield. The common-field lands, which were so extensive till within the last fifty years, many of which have since been inclosed by special acts of parliament, were probably at first only portions of commons, which were broken up by common consent, and formed into infield by a fallow. Thus the crops are removed, after the crops are removed, strengthens this supposition.

When common-fields are divided and inclosed, a better system of husbandry generally follows. Clover and turnips are more regularly sown, and, on the light lands, take the place of manuring; the practice of sowing a crop of corn, in which it was sown the preceding year in spring; and as most crops succeed well after clover, wheat was usually chosen for the next crop as the most profitable. Thus arose the system of sowing the North of Norfolk, which appears to be the oldest rotation. Two crops raised for the food of animals in four years require more cattle on the farm to expend them profitably; and thus more manure is made. In the light soils the sheep when folded on the turnips not only enrich the land by their dung and urine, and likewise render it more compact by treading it, which is advantageous to the clover and wheat which come after. If the land is a good beam, beans are sometimes sown after wheat; the land has been recruited with manure; and if the beans are kept clean by hoeing, another good crop of wheat may be obtained after them. Thus arises the improved rotation of turnips, barley, clover, wheat, beans, wheat; after which the land is again cleaned for turnips, and this rotation can be spared. As in this system there is always a crop with succedent leaves interwoven between two which have a white straw, it has been called the alternate system of husbandry, which is the most commonly practised in England.

The removal of the fallow year, provided the land be kept clean, is a decided step towards improvement. The best farmers effect this by the introduction of artificial grasses and tame fallow by sheep; and instead of sowing a very crop in rows and keeping the intervals stirred, which is a partial fallow without loafing a crop. Here Tull's system is introduced, which in its complete state, as the author recommends, is as follows. A
d Agricultural Society leads us to cherish the best hopes of a new stimulus being given to the improvement of British husbandry.

As the English systems have taken their origin chiefly from the infield cultivation, so the Scotch appear to have arisen from that of the outfield. Fallows were unknown, but the invigorating effect of grass fed off by cattle must soon have been perceived; and instead of leaving the land to recover slowly by the spontaneous growth of natural berbage, which on poor land takes a long time, it was obvious that this might be accelerated by sowing grass-seeds. The art first took root in the North of Scotland, and then spread to the rest of England, the husbandry, which is gaining ground daily, and bids fair, in remote situations where no manure can be purchased, to be firmly established. The order of the conversion has been somewhat remarkable. Where the first object was of sowing grass-seeds after the land is exhausted, it has been found advantageous to accelerate the growth of grass by manuring the crop in which it is sown, and experience has proved, that the richer the grass is, the more productive are the crops which come after. The grass, instead of being a mere substitute for fallowing and manuring, is made highly profitable by feeding cattle and sheep; and the profits of the years when the land rests, as it were, by being depauperated, is often as great as that of the years when it is cropped; and the risk and expenses are much less. The convertible system is not very generally known or adopted in England, and is often confused with the alternate system. The experiment of cooperating a barley with a straw crop. On good land the convertible husbandman may consist of three or four years' tillage and three years' grass. If the land is not quite clean, a summer fallow on two years may be very useful to restore the land. This is the course; and only one crop should be taken after the fallow in which the grasses are sown, whether it be wheat, rye, barley, or oats. It should be fed off the first year, and the second, and fed off again in the third; when it is broken up, after which the land is usually sown with barley, then beans, if the land admits of them, and then wheat. If a fallow is intended, a crop of peas may be sown after the wheat, and then the course begins again, as before, with a clover or turnip. The land may be kept clean, and continually improve in fertility by means of the cattle which are kept upon it, without the aid of any purchased manure, except lime, the expense of which is in most cases well repaid by the crop. These are the only
regular systems in Britain; and every mode of cultivation and cropping may be reduced to one of them, unless it be expensively anomalous.

What renders the improved systems of British husbandry so superior to that of all other nations is the attention paid to the perfection of the different breeds of domestic animals, especially the horse, the ox, and the sheep. In Britain it is not enough to keep them in every respect capable of bearing the climate; no expense or trouble is spared to improve the qualities of cattle and sheep. It has been objected, that the rewards given by different societies for excessively fat cattle are not judicious, as they encourage a species of cattle unable to feed the feeder. The same might be said of very high-bred racehorses; they are not so useful as a good backney or hunter; but unless some individual animals possess the power, courage, and speed, to make up their part in this race which beekeepers would call a degenerate; so likewise if some oxen were not occasionally fattened to an extraordinary degree, the fattening qualities of the breed could not be proved. A badly bred ox will never become so fat, whatever food may be given him, as one of a choice breed. This the breeders are well aware of, and never hesitate to pay a good price for a young bull related in blood to a prize ox.

The great variety of new instruments which are daily invented, and some of which gradually come into use, however expensive they may appear, is another feature in British husbandry; and the letting out of drills and threshing machines, which are kept for profit by men who have little or nothing to do with husbandry, and which has done such wonders in manufacturing industry, and which will no doubt in time do the same in the operations of husbandry. There is a fresh spirit of improvement arising among practical agriculturists, and not unsocial. The least favourable symptom is, that it begins to be acknowledged that 'much may yet be learned,' and that husbandry is still comparatively in its infancy.' This admission is a great advance in improved husbandry; and coupled with the establishment of the English Agricultural Society before referred to, leads us to hope with confidence that husbandry in Britain will improve rapidly, and keep pace with other sciences and arts.

Frank partis in Italy.—It might be expected that Italy would present some remains of the Roman husbandry, but such has been the pernicious effect of wars and intestine commotions, that this fine country, with all the advantages of soil and climate, is far behind less favoured regions in the cultivation of the soil and the rearing of cattle. The plains of Lombardy alone are an exception; but the cultivation of maize, the principal produce there, partakes more of the nature of a forest than of any other grain. An abundant supply of water which descends from the Alpine regions fertilizes a great extent of soil by artificial channels, in which it is made to disperse itself, and produces a vegetation which requires little assistance from nature. Whenever the writers of the country where, on the revival of letters, the first books were published on the practice of husbandry. Pietro di Crescenti, a citizen of Bologna, born in 1239, after thirty years' experience in all parts of Italy, wrote a treatise entitled 'Opus Rurinum Communis', printed in 1474. There is a doubt whether it was first written in Latin or Italian, but it was soon translated into French and German. The author quotes Cato, Varro, and Palladius, but not Columella, who probably was not then generally known, or perhaps his works had not yet been rescued from the libraries in which ancient works were long buried. In the succeeding century many of the great authors of Latin literature were translated and published. Tavole, in his 'Recordo d'Agirciatura,' 1561, describes the deterioration of agriculture to the practice of letting land for three years only, which had been introduced very generally into the triumviral system in its worst form. Johannes Baptista Porta, in 1592, published his 'Villa,' in 12 books, a work which has had a considerable reputation, and is considered by many as still well worth consulting. A variety of authors on different subjects wrote at about this time, in consequence of the frequent famines which arose in Italy from a very imperfect state of husbandry. The 'Vinti Giornate dell' Agricicura,' Venetia, 1569, which had been first published in the year 1568, was one of the most extensive works that have been published on the subject of husbandry. The work went through more than 20 editions in Italy, besides being often translated. The author ridiculed the foolish astrological notions prevalent at the time, and his work is full of good sense. But all these writers had little influence on the improvement of the actual practice of husbandry in Italy. If a spiritual author attempted to introduce improvements, the prejudices and obstinacy of the country people soon disheartened him, and to this day the systems adopted are extremely defective, if there is any system at all. In many places the ploughman still stands on the heel of the ox, and the horse, in the south of Italy, is still employed as the conveyance of the plough. It is an old saying that 'the earth is scratched rather than tilled; and if good crops arise from the natural fertility of the soil, they are generally choked with weeds before harvest.

An attempt to introduce better systems, as for example to drain the Pontine marshes, and it was renewed in 1586 by Sextius V. Pius VI. spent great sums on the same object; but to this day little has been effected; and instead of the fertile plains which could be cultivated, there is nothing but a dreary marsh producing pestilential vapours pregnant with disease. Sicily and Sardinia, once the granaries of Rome, now produce only a very small quantity of corn. The best cultivated districts in Italy are Piedmont, Lombardy, Tuscan, and the country about Ferrara; but, except in the two first, they are behind the rest of Europe in the management of a farm. The proprietor of the land, if he does not cultivate it by his own hands, is also the proprietor of all the live stock and implements of the farm.

Husbandry of Spain.—Spain possesses a considerable extent of fruitful soil, and the husbandry of the Romans, in which the interest of agriculture was most highly rated, was in some measure revived by the Moors. When they were expelled, Spain lost many industrious husbandmen and manufacturers. A work on husbandry was composed by a Moor, or rather a Moorish writer, who had lived about the thirteenth century, was published with a Spanish translation at Madrid in 1802, and does credit to the agricultural knowledge of the author. The cultivation of the sugar-cane is now pursued with the greatest success in the Canaries and Madeira. Herrera, who wrote on husbandry at the desire of Cardinal Ximenes, is one of the most esteemed authors of his time. His works have been frequently republished, and are now in great reputation, and looked upon as quite equal in agricultural history to the celebrated works of Cooks in England. The Moors, however, who reigned in Spain for four hundred years, and the Moors who have resided in the country since the expulsion of the Moors, have gradually taken away the property of the Moors, and have introduced the proverbial 'plough and other purposes of husbandry, instead of the ox. But Herrera did not succeed in changing the customs; and the Moors, as they have not been industrious, still are in general use. The cultivation of the silphium is extensively pursued in Spain. The production of the silphium in Spain is the production of a fine wool; and the privileges given to the Moors, a kind of corporation of shepherds, tend greatly to retard the introduction of a better cultivation of sheep. The silphium is said to have been imported originally from Britain. But it is evident that, if it is necessary to its perfection that the flocks should run over half the kingdom every year, the production of the silphium is at once made more expensive by the disadvantages of a miserable state of agriculture. Instead of producing a superabundance of grain and supplying other countries, Spain is obliged frequently to import corn in order to prevent a scarcity. The state of Portugal is not better, and the vine is the only plant of which the cultivation is moderately well understood in the whole of the peninsula.

Husbandry of Germany.—The husbandry of Germany varies greatly in such an extent of country. In the time of Tacitus half the country was covered with impenetrable woods. As population extended the forests were cut down, and the sable succeeded to the axe. The republic of cities, which for a long time held the power of the German states gave the first examples of encouragement to husbandry. In 1571 the work of Hesperbach, entitled 'Rei Rusticae, libri iv.' was reprinted at Cologne. Hesperbach was born in 1536, but his work was continued to 1544, and is considered the father of husbandry in Germany.

Augustus I, elector of Saxony, wrote a treatise on the cultivation of the vine, which was published in 1636, entitled 'Churfursten's Augusti zu Sachsen Obertganzebuch.' In Prussia, Mecklenburg, and Holstein, husbandry has made the greatest progress in modern times. The Prussian government, from the time of Frederick the Great, has taken agriculture under its special protection. There are several schools of agriculture, which is taught on scientific principles, and where the practice is shown on large farms. That of Mivelin, over which A.
Thae presided, has become conspicuous from the excellent work on rath, which he published. The introduction of the Dutch system of dairying in Holstein, and the breeding of fine horses there, has given a reputation to this part of the Danish dominions. In Bavaria, along the banks of the Rhine, from Basel to Darmstadt, there is a fine fertile plain which is cultivated with some care; and although subjected generally to the triennial system (which is called in England the three-course shift), the husbandry of that part of Germany is great. In the Low Countries, the cultivation of grass-lands and water-meadows is carried to great perfection. The cultivation of lucern and saffron is very general; potatoes are raised to a very considerable amount; and there is such a variety in the cultivation of the soil that the scientific writers of Geneva have contributed greatly to throw light on the theory of vegetation; and it is scarcely necessary to mention Theodore de Saussure, Pictet, de Candolle, and Masure, as men who have contributed more than any others to explain the functions of vegetable life.

As a practical promoter of husbandry we cannot pass over M. de Fellenberg at Hofwy, near Bern. [HOFWYL] An estate of about 800 acres he has put in practice all that has been written by the most esteemed writers, taking Thae's text-book, and making himself acquainted with the best modern writers. He has established an agricultural school for poor children, which is a part of his great practical and educational scheme; and this will contribute no doubt to promote good practical husbandry in his native country than all the works of the most eminent writers. Belgium has always been foremost among the agricultural countries; in France the Flemings have considered the best husbandmen in Europe. There are no early writers on husbandry in this agricultural nation, but all travellers bear witness to their industry and to the perfection of their agriculture. To them we are probably the most modern times who cultivated turnips in the field to feed cattle in winter; and who, in the north of Europe, kept their cattle in the stables all the year round and cut green food for them, as had been done from time immemorial in southern climates, on principle, and not to preserve heat and to prevent the annoyance of flies. The Belgians are now far advanced beyond most other nations of Europe in the application and economy of manure. They fully make up by incessant attention and indefatigable industry the inferiority of their climate to that of Italy or Spain, and their land produces abundantly every necessary of life. [FLANDERS]

**Husbandry of France.**—France has always been looked upon as a country peculiarly agricultural. The climate, partaking of that of the north and the south, favours the cultivation of plants both of the warmer and of the colder regions; and there is no country where hus- bandry has been cultivated with such protection. There are more good works on husbandry have been published, without during any very sensible effect on the general practice of the husbandmen. Charles Estienne is the first French writer on agricultural husbandry whose works were published soon after the revival of letters; but together with many useful maxims which he has copied from the ancient authors, he has repeated the most absurd superstitions. His works are collected and published in 1534, under the title of 'Prud'ain Rustique,' and in 1653 he published his work called 'L'Agirculture et la Maison Rustique.' This work was reprinted with additions by his son-in-law Jean Lébeau, in 1576. But the author, who is still regarded as the father of French agricultural education, Olivier de Serres, a gentleman of fortune, proprietor of the seigneurie of Pradel, near Villeneuve de Berg, in Languedoc. He was a friend of Sully, the favourite minister of Henri IV., who, on his request, had written a work on husbandry, under the title of 'Théâtre d'Horticulture et Mesanges des Clumps.' In this work he shows a thorough knowledge of the great principles of husbandry, from which, however, it is difficult to judge if he had been generally followed, must have advanced the agriculture of his country at least two centuries. But it is a general remark, that where there have been most good books on husbandry, there the practice has derived least advantage from them. While France swarms with agricultural writers, the fields are still cultivated as they were centuries ago; and the Flemings, who never write on the subject, have for ages carried husbandry to the greatest perfection.

Of those who have written on husbandry, one of the most zealous and laborious, and who has devoted his life to this favourite pursuit. His 'Cours Complet d'Agriculture' is a text-book for all those who, within the last half century, have desired to become acquainted with the principles of husbandry. It has been through several editions and forms the groundwork of another 'Cours Complet,' which has been published by a society of writers on husbandry, and is now the best French work on every department of husbandry and cultivation. This work is a great desire to promote practical improvement in husbandry. Agricultural schools and veterinary colleges are multiplied; and the return of peace, if its blessings can be duly appreciated and understood, should contribute to the application of capital and skill to the improvement of that art which furnishes the staff of life.

**HUSS, JOHN.**—Born at Husinastia, a village of Bohemia, of humble parents, about the year 1370. He studied in the university of Prague, where he distinguished himself by his assiduity and talents. Being ordained priest in 1400, he soon after adopted the opinions of Wycliffe, which he proclaimed loudly from the pulpit, and by so doing, declared himself a man of the spirit of the age, a principle which was denounced by the universities. But Huss was confessor to Sophin, queen of Bohemia, and was befriended by King Wenceslaus himself, and thus he was able to maintain his opinions. Bohemia, which, at that time, was very religious, and which the universities declared that whoever taught the opinions of Wycliffe should be expelled from that body. Huss identified his case with that of his Bohemian countrymen, ever jealous of the liberties of their country. The German students withdrew from the university and the city of Prague, and repaired to Leipzig, where the elector of Saxony founded a university for them. Huss being now installed rector of the university of Prague, introduced the doctrines of Wycliffe, which were to be translated into Bohemian. The archbishop of Prague ordered these works to be publicly burned, and excommunicated those who still adhered to the opinions contained in them. Huss, who was able to renounce his sacred functions, who however assembled the people, either in private houses or in the fields, where he preached against the pope, against purgatory, and above all against indulgences. The people were thus invited and encouraged to examine doctrines, which till then had been considered the sole province of the clergy; the humblest among them, women as well as men, began to discuss the mysteries of grace, predestination, and justification. The archbishop of Prague took the alarm, and Huss was denounced by the pope, John XXIII., to appear in person at Bologna to answer the charges against him, which neglecting to do, he was excommunicated. Huss however had a strong party in his favour in Bohemia, and the complaints of the tumults occurred in the streets of Prague between his partisans and those who supported the papal authority. Unwilling to appear as encouraging these disorders, Huss retired to his native country, where he i, in 1414, after the death of John Huss, was elected archbishop of Prague. He there defended the propositions of Wycliffe, rejecting at the same time all human authority in matters of faith, and exhorting the multitudes who flocked to hear him to make the Scriptures alone their rule of faith. Some time after, on the death of the archbishop, Huss returned to Prague, and there publicly opposed a papal bull which had been just issued by the court of Rome against Ladislaus, king of Naples, in which the pope invoked all Christendom to crusade against him. In the university of Prague Huss stood on vantage ground, and being assisted by his able disciple Jerome, he began to denounce the sale of indulgences in the IVth Lateran council. Fresh tumults took place; and after more citations from the pope, which Huss disdained to obey, the council of Constance at last assembled. Huss was voted to appear before the council, and he obeyed in 1414, after receiving a safe conduct from the king of Bohemia. The council of Constance however he was arrested. The sequel of his melancholy story is given in the article CONSTANCE, COUNCIL OF. Huss died with a fortitude which was admired even by his enemies. He is buried at Prague, near Leonardo Attire; and Zanes Sylvis, Historia Bohemica. The morals of Huss were irreproachable; his opinions, whether right or wrong, were conscientiously entertained; and it is but a poor excuse for the members of the council.
to say that they did not condemn him to death, but consigned him to the secular arm, as they were perfectly well aware of the meaning of that expression. The council thus gave a fatal example, which was followed over all Europe for centuries after, and almost to our own days. Johannesburg soon after met with the same fate as his master. The death of these two distinguished men created a revolt in Bohemia. The Hussites began a furious war against the Roman Catholics; they burned churches and monasteries, they overthrew King Wenceslaus, and after his death they overthrew Sigismund, found himself opposed by the Hussite leader Ziska, a man of extraordinary powers, who had taken possession of Prague. Sigismund, after a great loss of men in the field, was glad to conclude a truce of seven years with the Hussites without personal engagements; 1. That the church-service should be celebrated in the vulgar tongue; 2. That the communion should be administered in both kinds; 3. That clergymen should be deprived of all temporal jurisdiction; 4. That moral crimes should be punished with the same severity as violations of the criminal laws of the country. This truce however was of no long duration, and Ziska carried on the war with success against the emperor. The Hussites now divided into several branches, some very fanatical and cruel, such as the Taborites, the Horebites, and the Adamites, of whom strange but not well authenticated stories are told; and others more moderate and rational, such as the Calcatines. After Sigismund's death, the Hussites and the Imperial troops continued until the conclusion of the Council of Basle, in 1431. After long and tedious conferences the council conceded to the Bohemian leader Ziska all his demands. He died in 1437, and in consequence of having within him an original inclination which aspires to secure the good of others as its final cause. Benevolence therefore is primary and irreducible. There are few virtues that are blemished by any considerable objection, and among them the one is perfectly innocent. It is true because it is a part of the universe; its other properties are the necessary consequence of its being true. It is true as a property of the proposition, of which it is the essence, and it is true in the absolute sense. For, if it were false, we should not be led to believe it; but if we believe it, we have no reason to doubt it; and if we doubt it, we have no reason to believe it. It is not a necessary consequence of the proposition, on which it depends for its truth. For, if this is not other than itself even, or, in other words, of Huxley, 'menti congenita intelligendi via.' Of his ontological axioms two are important:—Every thing existing is real; 1. Quality, affection, or action is real, except in so far as it exists in some object or thing. From the latter proposition it follows that all abstract affirmative propositions are hypothetical, i.e. they invariably suppose the existence of some object without which they cannot be true.

Truth is divided into logical, moral, and metaphysical. Logical truth is the agreement of a proposition with the object it relates to; moral truth is the agreement of a thing outward act with the inward sentiments; lastly, metaphysical truth is that nature of a thing wherein it is known to God as that which it is; or it is its absolute reality. Perfect truth is in the intellect alone, as nothing else can give the things is imperfect, inasmuch as they are limited. It is however from the finite that the mind rises to the idea of absolute truth, and so forms to itself a belief that an absolute perfect and perpetual truth, which in regard to duration and space is infinite and eternal.

The soul, as the thinking essence, is spiritual and incorporeal. Of its nature we have, it is true, but little knowledge; nevertheless, its specific difference from body is at once attested by the consciousness. It is simple and active; body is composite and passive. From the spiritual nature however of the soul Huxley does not derive its immortality, but makes this to rest upon the goodness and wisdom of God.

In his moral philosophy Huxley adopted the views of Lord Shaftesbury. Accordingly his first endeavour is to show that many suppose the happiness of others not less than his own, and that benevolence can no more have its root in selfishness than selfishness by benevolence. In proof of this he examines successively the several solutions of benevolence, and shows of all that they are contrary to facts. This being granted to be true, the descent of the term is reconfirmed in consequence of having within him an original inclination which aspires to secure the good of others as its final cause. Benevolence therefore is primary and irreducible. There are few virtues that are blemished by any considerable objection, and among them the one is perfectly innocent.

In order to establish this proposition Huxley successively demonstrates that by moral good is understood neither that which pleases ourselves by gratifying our benevolent affections, nor that which is good to others, nor any conformity to the will of God, or to order, or law, or truth, nor any other idea distinct from that which the word itself expresses, and which is as simple and primary and incapable of being expressed by any other word as taste and smell. From this simplicity and originality of the notion Huxley infers that the quality about which it is concerned can only be perceived by a sense, and that this sense is different in each quality, and that it is different from all others. In further confirmation of this conclusion he observes, that the perception of this quality, like all other sensual perceptions, is accompanied with pleasure, and that moral good is an end and a motive, but that the understanding is incapable of discovering any of the ends of human conduct, or of exercising any influence on the will. Moral good then is perceived by a sense, and the perception of it or its contrary is accompanied with an agreeable or disagreeable feeling. Now this feeling being a consequent of the perception of the quality, it is impossible to resolve into it either moral good or the approbation; we award to moral virtue the expression of any other word as taste and smell. From this simplicity and originality of the notion Huxley infers that the quality about which it is concerned can only be perceived by a sense, and that this sense is different in each quality, and that it is different from all others. In further confirmation of this conclusion he observes, that the perception of this quality, like all other sensual perceptions, is accompanied with pleasure, and that moral good is an end and a motive, but that the understanding is incapable of discovering any of the ends of human conduct, or of exercising any influence on the will. Moral good then is perceived by a sense, and the perception of it or its contrary is accompanied with an agreeable or disagreeable feeling. Now this feeling being a consequent of the perception of the quality, it is impossible to resolve into it either moral good or the approbation; we award to moral virtue the expression of any other word as taste and smell.
Hutchinson does not attempt to show, and is content with observing that we are directly conscious of its rule.

As to the question, what are the mental dispositions which this sense approves as good and moral, he at once excludes all those whose end lies in the attainment of man's personal happiness. No action the end of which is the profit of the agent can be accounted virtuous: it may be blameless, it cannot be virtuous. Accordingly he rejected the doctrine of one of his predecessors that virtue consists in doing that which will make the world a better place; and for him and for his contemporaries the end of life was the finding and working out of a system of natural philosophy, which would give an account of the universe that satisfied both reason and common sense; and, while they could not do this, they might be able to make the universe more comprehensible. The end of the universe, and the 26th Psalm, was the foundation of all their schemes.

In this system the part of reason is very subordinate. Rejected from the privileges or duties of a moral system, it has no part in these. The system is a perfect one, the only one, and the one that is complete. As to the motives to virtuous determinations, Hutchinson made none more explicit than Shaftesbury. But as he makes the moral sense be something more than a simply perceptive faculty, and, like all other senses, to influence the will, it would appear that he regarded it as a mental cause as well.

As a writer Hutchinson is remarkable for clearness and simplicity of style, with great clearness of expression and happy fulness of illustration. He was a JOHN, author of a mystical and cabalistic interpretation of the Hebrew scriptures, was born in 1674, at Spennithorne in Yorkshire. Having received an excellent private education he became at the age of nineteen master of the English and Latin schools of Mr. Barbirolli. In 1694 he entered the university of Cambridge, where he afterwards served the duke of Somerset, who bestowed upon him many marks of confidence and esteem, and when master of the horse appointed Mr. Hutchinson his riding purveyor. Vowing himself of the opposing party which his situation recommended, he continued in his favourite pursuit of mineralogy and natural history, he made a large and valuable collection of fossils, which, with his own observations, he consigned to the care of Dr. Woodward to digest and publish. This man was fully satisfied, and, like Dr. Woodward, he was astonished at the task and the collection to the university of Cambridge. In 1724, Hutchinson published the first part of a curious work entitled 'Moses's Principles, in which he attempted to refute the doctrine of gravitation in the title in the Principles of Newton. In the second part of this work, which appeared in 1727, he continued his attack upon the Newtonian philosophy, and maintained, on the authority of scripture, the existence of a vacuum. From the publication of this work yearly or two volumes in further elucidation of his views, which are written in a rambling and unconnected style, but evince a profound and extensive knowledge of the Hebrew scriptures. He died on the 28th of August, 1737.

According to Hutchinson, the Old Testament contains a complete system of natural history, theology, and religion. The Hebrew language was the language of God's communication with man; it is therefore perfect, and consequently as a perfect language it must be coextensive with all the objects of knowledge, and its several terms are truly significant of the objects which they indicate, and not so many arbitrary signs to represent them. Accordingly Hutchinson, after Origen and others, laid great stress on the evidence of Hebrew etymology, and asserted that the Scriptures are not to be understood and interpreted in a literal, but in a typi
cal sense, and according to the relations of the Heb

Hutchinson, who was one of the leading figures in the English Enlightenment, was a strong advocate of the NEO-LOGISER, and his works were widely read and influential. He was a member of the Royal Society, and his contributions to science and philosophy were recognized by his contemporaries.

The full text of this document can be found in the Bibliotheca Britannica, 1771 edition, volume 12, pages 362-370. The digitalized version is provided by Google.
with the greatest credit it was displaced by Sir Joseph Banks in 1759, on the plea that it was requisite the secretariat should reside constantly in London. [Banks, Sir Joseph.]

In 1752 the Royal Society instituted a series of experiments on the mountain Scheiballen in Perthshire, with a view to determine the mean density of the earth. These were conducted principally under the direction of Dr. Maskelyne, and when completed the labour of making the necessary calculations was allotted to Dr. Hutton, who was considered the most competent person for the undertaking.

His 'Philosophical Transactions of the year 1778. In the year 1779 the degree of LL.D. was conferred upon him by the university of Edinburgh. In 1781 he published his 'Tables of the Protections of the Moon,' in the volume of the society. His 'Mathematical Tables,' containing the common, hyperbolic, and logoric logarithms, with the sines, tangents, &c., both natural and logarithmic, London, 1780. To these succeeded his 'Tracts on Mathematical and Philosophical Subjects,' in 4to, London, 1786, which were reprinted in 1812, London, 1820. In 1785 appeared his 'Mathematical and Philosophical Dictionary,' in two large quarto volumes, which has since supplied all subsequent works of that description with valuable information both in the sciences treated of and in scientific biography.

About this time he undertook, in conjunction with Dr. Parkinson and Dr. Hering, in publishing the 'Philosophical Transactions.' The work was continued in 1789, in 18 volumes, quarto, and Dr. Hutton is said to have received for his labour the sum of 6000/. In 1806 he was attacked by a pulmonary complaint, which a few years after led to his resignation of the Office of Secretary, the Board of Ordnance manifesting their approbation of his long and meritorious services by granting him a pension for life of 500l. per annum. Dr. Hutton died the 27th January, 1833, in the 70th year of his age, and was buried at Charlton in Kent.

Dr. Olinthus Gregory, the successor and biographer of Dr. Hutton, says in his memoir, that as a preceptor he was characterized by his teachings, which were published in the 'Philosophical Transactions.' He discoursed upon the difficulties which his pupils experienced, patience in labouring to remove those difficulties, unceasing perseverance, and a never-failing love of the art of communicating knowledge by oral instruction. He was equally characterized by an unassuming deportment and general simplicity of manner, by the mildness and equity of his temper, and the permanency and warmth of his personal attachments. His benevolence was great, and he was a kind friend to others, and not, as he was sometimes represented, a man of science.

Towards the close of the doctor's life, a subscription was entered into by his friends and pupils for a marble bust, which was admirably executed by Gabagan, and at his desire executed. He was a member of the Royal Society, London, 1798-1801, 3 vols., of which several later editions have appeared; 'Recreations in Mathematics and Natural Philosophy, from the French of Montuel,' London, 1803, 4 vols.; and some others.

Huygens, Christian, son of Constantine Huygens, possessor of Zulichem, Zelhem, &c., in Holland; whence Huygens (Latinized Huygens) is often called Zulichemius. His father was a member of the university, and the initials C. H. A. Z., or C. H. D. Z., often appear on the titles of his works.

For the life of Huygens our authority is the account presented to the 'Lady's Diary,' of which periodical he was editor for many years. His remaining works consist of:—Elements of Conic Sections,' 1787, 8vo; 'A Course of Mathematics, designed for the use of Cadets in the Royal Military Academy,' London, 1798-1801, 3 vols., of which several later editions have appeared; 'Recreations in Mathematics and Natural Philosophy, from the French of Montuel,' London, 1803, 4 vols.; and some others.

Huyghens, Christian, son of Constantine Huyghen, possessor of Zulichem, Zelhem, &c., in Holland; whence Huygens (Latinized Huygens) is often called Zulichemius. His father was a member of the university, and the initials C. H. A. Z., or C. H. D. Z., often appear on the titles of his works.

For the life of Huygens our authority is the account presented to the 'Lady's Diary,' of which periodical he was editor for many years. His remaining works consist of:—Elements of Conic Sections,' 1787, 8vo; 'A Course of Mathematics, designed for the use of Cadets in the Royal Military Academy,' London, 1798-1801, 3 vols., of which several later editions have appeared; 'Recreations in Mathematics and Natural Philosophy, from the French of Montuel,' London, 1803, 4 vols.; and some others.
I.

Tractatus de Motu Pendulorum et de Penduletis, Paris, 1675. In the first of these tracts Huygens simply describes the application of the pendulum to the clock, of which improvement he is the inventor; and to the same end the horologium equi. But this is the least part of the celebrated work before us, which contains four distinct and new discoveries of first-rate importance. The first is that of the cycloid being the curve, all whose arcs measured from the lowest point are synchronous. (Cyclopaedia, vol. VIII, p. 258.) The second is the invention of the involute and evolution of curves (Involvulc et Evolvtq.), in which the proposition is established that the cycloid is its own evolute. The third is the method of finding the centre of oscillation (Centricla Oscillatiunis), and the fourth is the successful solution of a dynamical problem, in which connected material points are supposed to act on one another. The fourth is the announcement (without demonstration) of the superposition of the centred force and velocity of a body revolving in a circle, which were afterwards proved in the Principia. It thus appears that Huygens was in complete possession of the solution of the problem of circular oscillations, and now found his mind turned to occupied with the cycloid. In the Cartesian system, it is most probable that he would have gone at least to the extent of deducing Kepler’s laws from the assumption of gravitation. Demonstrations of the theoretical nature were found among his papers, and published in the Opera Reciugis. It is possible that those might have been written after he had seen the Principia of Newton.

The publication of the treatise above mentioned drew on a correspondence with the Abbe Catenus, in which John Bernoulli, De L’Hospital, and others, took part.

In the Journal des Scavans, Feb., 1675, Huygens described the spring pendulum, such as is now used in watches. Though there can be no doubt that this was an independent invention, yet its priority has been questioned.

Huygens was one of the first who gave the laws of impact; the Royal Society of London had invited attention to the question, and Huygens, Wren, and Wollaston sent solutions to the Royal Society about the same time (A.D. 1669).

It is an extract from his paper in the Phil. Trans. for that year; but the whole paper (perhaps enlarged) appears among his mathematical works.

The treatise Sur la Causc de la Pesanteur was first printed in French (Leyden, 1690), at the end of the Traité de la Lumière. Both are Latinized in the Opera Reciugis. There are several minor points on different problems of mechanics.

III.

Astronomical Works.

De Saturni Lunar Observatio Nova, Hag. Com., 1656. This is a tract of two pages printed at the end of Borelli’s De vero Telescopic Invenitore. It announces the discovery of a satellite to Saturn, being that which we now call the fourth. This took place on the 29th day of March, 1665, and Huygens immediately (as was then common, see Fatio) determined the following:

S. Saturno luna circumducitur diebus sexdecim horis quatuor.

S. Saturno luna circumducitur diebus sexdecim horis quatuor.

In the meantime he adds another logograph to substantiate his right to another discovery. It is as follows:

S. Saturno luna circumducitur diebus sexdecim sex decim horis quatuor.

S. Saturno luna circumducitur diebus sexdecim sex decim horis quatuor.

The notification of this dark saying was given in the Systema Saturniin, printed at the Hague in 1679. It should be remembered that Galileo’s telescopes showed him nothing more as to Saturn than that it appeared to have some material appendages which looked like handles. In 1665, Huygens had applied himself, in conjunction with his elder brother Constantin, to the manufacture of large telescopes. The means he used was a nunnquam semebrante, ad ecpticum inclinante; that is, he had discovered Saturn’s ring. The Systema Saturniin gives an account of the discovery, fixes the position of the ring, and explains the phenomena of its appearance and disappearance, &c. This work also occasioned some controversy, not forgotten by the fact that Huygens was prevented from looking for any more satellites by the notion, then not uncommon, that the whole number of satellites in the solar system could not exceed that of the planets.

The ‘Principia’ was passing through the press when Huygens died. It was printed at the Hague in 1689, and was twice printed in English, first in 1698, and next at Glasgow in 1757; besides several translations into Continental languages. It enters into a large number of speculations on the physical constitution and probable inhabitants of the planets.

IV.

Optical Works.

These are the Trait de la Lumière, Leyden, 1690, Latinized in the Opera Reciugis; the Dioptrie, and the Commentarii de Vitris Figurandis, both first given in the posthumous works. The first treatise was reprinted by Baron Maseres, in his Scriptores Optici, London, 1853. It was written in 1676, and is more to be considered as the Principia of optics. Huygens took up the theory of undulations in opposition to that of emanation, which was adopted by Newton. By this theory he gave a sufficient explanation of the phenomena of refraction, and also of that of double refraction, in which Newton could not succeed; that is, he gave an explanation of all the prominent phenomena of optics. The undulatory theory of Huygens has since been considered as the founder of it; for though Hooke had previously advanced the notion, yet he made no application of it to the explanation of phenomena.

It remains to mention, De Ratiociniis in Ludo Aleae, which was printed at the end of Schoutens Exercitationum Mathematicarum, Leyden, 1667, at the earliest regular treatise on questions of chance, and first points out the manner in which the expectation of a player is determined.

We leave some minor writings unnoticed (referring to the collections of Huygens’s works), and proceed to make some remarks on the character of Huygens as a philosopher. He is distinguished by correctness, penetration, and a freshness of intellect which never left him. Before he was in possession of the formal differential calculus he was able to supply its place. His power of acquisition lasted to the end of his life. He was sixty seven when he read the Principia, and past that age when he began to study the Calculus of Leibnitz. At that time of life persons seldom change old opinions; but Huygens admitted the theory of Newton instantaneous. As he was probably the first continuous mathematician who published on the theory of gravitation, not generally, but after minute examination, (for in the correspondence of Leibnitz and Bernoulli it is noted that a manuscript of Huygens’s was sold at the sale of the Philosophical books, of which the title was Errors of Newton,) it will be worth while to quote what Huygens says on the subject in his Discourse on the Cause of Gravitation, or rather in the appendix which he added after the receipt and perusal of Newton’s work. It is to be remembered that the Principia was published in 1687, and what follows in 1690; and also that Huygens had explained the spheroidal figure of the earth upon the supposition of a centripetal force tending to the centre of the earth. Huygens opposing the particles of the sferoid to attract each other. This mutual attraction of the smaller parts he cannot admit, and it is clear from his expressions that he has the real notion of a natural tendency of bodies towards a centre. But notwithstanding this, his recent apprehension of the manner in which Newton’s hypothesis explains facts, and his disposition to yield to that species of evidence, were not common in his day. We give then the following extract, remarkable for the coincidence of his first published attempt to explain the Principia from a continental philosopher:—"I have then nothing to say against the Vis Centripeta, as Mr. Newton calls it, by which he gives the planets weight towards the sun. I have some points of difference: I cannot agree to it without difficulty; because not only do we know by experience that there is some such sort of attraction or impulsion in nature, but also because it is explicable in accordance with the laws of motion, as appears in what I have written on gravity. For there is no reason why the
cause of this *Vie Centripeta* towards the sun not should be the same as that by which bodies which we call heavy are forced to descend towards the earth. I had long ago imagined that the spherical figure of the sun might be produced in the same way as the surface of the earth, but I did not extend the action of gravity to distances so great as from the sun to the earth, or from the earth to the moon, because the vortices of *M. des Cartes* (which I once thought of as made of an invisible and rotten cow-dung, which I had in my head) came back in the way. Neither did I think on the law of diminution of gravity, namely, in the reciprocal proportion of the squares of the distances from the centre, which is a new and very recent discovery, which nearly coincides with that of which Kepler imagined and verified by observations, I can hardly doubt that those hypotheses concerning gravitation are true, and also the system of Mr. Newton, so far as it is founded upon them; which appears the more probable, because in it is found the solution of several difficulties which embarrass the vortices of *M. des Cartes*. We see how the eccentricities of the planets retain the same, why the planes of their orbits do not coincide, but retain their inclinations and why the planes of the orbits necessarily pass through the sun. We see how the motions of the planets can be accelerated and retarded in the manner which they really are, and could not be, if they swam in a vortex round the sun. Lastly, we see how comets can traverse our system. For as soon as it was known that they often come within the region of the planets, it was difficult to believe that they could be carried on in a direction contrary to that of a vortex strong enough to carry the planets. But in the doctrine of Mr. Newton this difficulty entirely disappears; since there is no reason why the planets should be more influenced by the elliptic orbits round the sun like those of the planets, only more extended and differing more from a circle; and thus there is no reason why these bodies should not have their periodic returns, as some philosophers would have us believe, if they are carried on in this way in the same orbit. 

**Hyscum, John Van, born at Amsterdam, in 1682,** was the most eminent painter of flowers and fruit in the eighteenth century. His father, a picture dealer and pedlar, was the sculptor of his son, who at an early period resolved to devote himself entirely to that branch of the art in which he attained such unrivalled eminence. Every term of panegyric that language can furnish has been lavished, and with justice, on his productions; he seems to have been the first to have given to the representation of flowers the loveliest and most brilliant of her creations with all the magic of her own pencil. His flowers are more beautiful and true to nature than his fruits. He is equally successful in a thousand charming details. "As regards their size, colour, and in every respect, the flowers are entirely true to nature, with their eggs and feathers, all are painted so as almost to deceive the eye. The vases in which he puts his flowers are always from some elegant model, and the bas-reliefs are finished with the same exquisite care. He was the first that painted flowers on a light ground. He is supposed to have possessed some secret in the mixing of his colours and preserving their lustre. His pictures sold at very high prices during his life, and are held in the highest estimation. He died in England, in 1749.

**Hyacinth, a favourite flower in gardens,** is the *Hya- cithus orientalis* of botanists, a bulbous plant, found wild on the coasts of Asia Minor, and remarkable both for its fragrance and the facility with which it multiplies, the size, and construction of its flowers when raised from seed.

Few spring flowers are more worthy of cultivation than the hyacinth, whether we regard its varied shades of rich colour or the sweetness of its perfume. Its blossoms have been celebrated for the high state of perfection to which they grow, and for the monopoly they have secured in the sale of the bulbs, which have even acquired in the shops the famous name of Dutch roots. The soil and climate of Holland seem to be peculiarly adapted to the plant, for however well imported roots may flower in England for the first season, they soon degenerate and become worthless. It has been lately ascertained that the bulbs drawn from the new or upon the old roots do not flower in the first and second years, and, although ever so slowly, flower in the following years. We are apt to believe that the hyacinth is not suited to our cultivation, rather than from anything unfavourable in our climate: for some gardeners have been successful in growing the same roots for several years in succession. Mr. Herbert says, 'I produced for several years successively, at my villa at Surrey, where I had the advantage of the vicinity of the fine sand of Shirley Common, hyacinth flowers equally as fine, if not superior, to those obtained from the best Dutch bulbs,' and 'in this sand and on the purest clay which I could get, the hyacinths were no more likely to be made by me than on the purest clay and the finest sand.' In making this compost the Dutch gardeners prefer the softer leaves of elm, lime, and birch, and reject those of oak, chestnut, walnut, beech, plane, &c., which do not rot so quickly. The bulbous plants are also well cultivated in soil, which is collected in the winter when the cattle are stall-fed upon dry food, without any mixture of straw or other litter. The sand is procured in the neighbourhood of Haerlem, where the soil is a deposit of sand and some little pebbles and partly layered undecayed timber, the remains of an ancient forest which has been overwhelmed by the sea. Having all these substances in a proper state, they are prepared in the following manner:—First, a layer of sand is placed, then one of dung, and then one of rotten leaves, each being eight or ten inches thick. These layers are repeated till the heap is six or seven feet high, a layer of dung being uppermost, sprinkled over with a little sand to prevent the too powerful action of the sun upon it. After this has lain for six months or more it is mixed, and thrown up fresh, in which state it remains some weeks, to settle before it is carried into the flower beds. (Hort. Trans., vol. iv., p. 162.)

The bed into which this compost is to be put must be taken out to the depth of three feet, its bottom made firm, and a few stones thrown into it in order to keep it dry. It must then be raised carefully above the level of the ground, and the surrounding soil with the compost already prepared.

The best season for planting is from October to the beginning of November, and the early sorts planted at this time will bloom at Christmas, and the late sorts from the first of March, or towards the beginning of May. Hyscum are sometimes planted in rows or patches, but the most common and best way is to plant them in beds, because a greater mass of bloom is presented at once to the eye, and the more easily accessible. The distance in this way in planting them in beds a great part of the effect is produced by a judicious arrangement. The different colours are either blended together in the bed, or collected into masses. A mass of one colour is more pleasing to the eye than a mixture of several colours. The plot should be planted by itself in the bed; or if there are more beds than one, the first may be planted with white, the second with blue, the third with red varieties, and so on. The distance between each plant should be eight or nine inches.

As hyacinths are planted in autumn, and bloom early in the season, they never require any water, and as soon as the flowers are over, they should be cut off and cast upon the turf, or if the soil is dry, they should be dried. During the summer they should be raised upon the surface of the soil, on a sunny side, covering it lightly with the compost, about two inches thick: in this state it should be left about a month, and then taken up in dry weather and exposed to the open air for some hours, but not to a powerful sun, which would be very injurious to it; it should after this be carefully examined, and all the decayed parts removed; afterwards it should be aired in the open air in a warm place. (Hort. Trans.) Florists who have a valuable bed of hyacinths generally use an awning of some kind, to shade them from a bright sun, and protect them from heavy rains. This shade, of whatever material it is made, should be so constructed as to allow the free passage of the rays of the sun, in bright sunshine the bed may be exposed from four o'clock in the afternoon, or for a few hours in the morning. If the bed is not shaded, the colours very soon spoil, and will not bear a close examination.

Forcing of hyacinths is carried to a considerable extent, both in England and also on the Continent. When they are bloomed in this way, they are either used as ornaments to the greenhouse at Christmas, or are thrown into the lobby or dressers, where the sweetness of their perfume renders them general favourites. The method of forcing them is the following:—

-Good Dutch bulbs, which are annually imported, are se-
Teeth of Hyæna. (F. Cuvier.)

saw at Oxford in the travelling collection of Mr. Wombwell, the keeper of which confirmed in every particular the evidence given to Dr. Wollaston by the keeper of Exeter Change, and noticed in ‘Reliquia Diluvianæ,’ p. 29. ‘I was enabled,’ says Dr. Buckland, to observe the animal’s mode of proceeding in the destruction of bones. The shin-bone of an ox being presented to this Hyæna, he began to bite off with his molot teeth large fragments from its upper extremity, and swallowed them whole as fast as they were broken off. On his reaching the medullary cavity the bone split into angular fragments, many of which he caught up greedily, and swallowed entire. He went on cracking it till he had extracted all the marrow, licking out the lowest portion of it with his tongue: this done, he left untouched the lower condyle, which contains no marrow, and is very hard. . . . I gave the animal successively three shin-bones of a sheep; he snapped them suader in a moment, dividing each in two parts only, which he swallowed entire, with the smallest mastication. On the keeper putting a spar of wood two inches in diameter into his den, he cracked it in pieces as if it had been touchwood, and in a minute the whole was reduced to a mass of splinters. The power of his jaws far exceeded any animal force of the kind I ever

H Y A E

HYÆNA. [TAURUS]

HYÆNA, the name of a family of digitigrade, carnivorous quadrupeds, distinguished by having their fore legs longer than their hind legs, by their rough tongues, great and conical molar, or rather cutting-and-crushing teeth, projecting eyes, large ears, and a deep and glandular pouch beneath the anus.

Dental Formula.—Incisors 6, canines 1-1; molars 2-1.

The false molars, three above and four below, are conical, blunt, and very large. The upper flesh-tooth (carnassial) has a small tubercle within and in front, but the lower one has none, and presents only two transverse points. The whole of the dental and molar organization, and indeed the whole cranial structure, appears to have been formed with a view to the bringing into the most available action the formidable natural instruments which enable the Hyænas to break the hardest bones.

Dr. Buckland gives the following account of the feet of a Cape Hyæna (the spotted species, we presume) which he collected for this purpose. To save trouble, all which are intended to be forced may be potted at the same time, and placed in a cool greenhouse or frame; then as many as are intended to bloom at once must be placed in a gentle heat; when their flower-stems appear, others can be brought in which will succeed them, and by going on in this way a regular succession will be kept up. The pots into which they are put need not be large, but rather deep. The soil used for potting may either be the same as is recommended above, or a good loam will answer equally well. In potting, the bulbs must not be firmly pressed into the soil, but lie rather loose, and be only about half covered with it.

Hyacinths are frequently grown and flowered in water-glasses. Sometimes before they are put into the glasses and planted in the pots, they are planted in pots, and when the roots have grown a little they are taken up and washed, and placed in the glasses, or they are placed in the glasses at first. The water must be frequently renewed, or it will soon become fetid and offensive. By far the most curious system of treating forced hyacinths is to invert them in large glass jars filled with water. This must be done when the flowers are nearly expanded; and by placing the inverted one above the glass, of the same size and colour with the inverted one, the latter presents an appearance of being the shadow of the former. The flowers retain their freshness much longer in the water than when exposed in the common way; but this circumstance, and the curious appearance presented, is all which can recommend the system; of course the fragrance of the hyacinth is in this way entirely lost. The principal difficulty that is experienced by those who force hyacinths in water in sitting rooms is to prevent their growing long, weak, and pale, so as to flower badly, and be in constant danger of upsetting. This is remedied by keeping them close to a window, where they can be constantly exposed to bright light all day long. It may also be added, that in order to secure their pushing out their roots before the leaves lengthen, they should always be kept in the dark for a fortnight or three weeks after they are first placed in the water-glasses, care being taken at that time that the water and the bulbs are not in contact. The moisture rises into the air will be sufficient to induce the bulbs to put forth roots; and the total absence of light will prevent the leaves from being stimulated into growth.

Varieties are obtained from seed, and particular kinds are propagated by offsets. With the greatest care in gathering the seed, it is very uncertain whether or not the young plants maintain it will turn out well; however, the best sorts to gather seed from are those with strong upright stems, semi-double flowers, and brilliant and distinct colours. The seed must be well ripened, and then sown in good sandy soil, rather lighter than what is recommended for hyacinth compost. The young plants so obtained must not be disturbed or taken up until the end of the second, or, if they are weak, the third year; all that they require during that period is a little top-dressing. They may then be taken up and planted in the bed, where they will require the same treatment as old roots; they will flower in the third spring, but it is better to destroy all the flowers of the first season, in order to strengthen the bulbs.

HYÆNIT. [ZIRCONIUM]

HYÆNA, a name of a family of digitigrade, carnivorous quadrupeds, distinguished by having their fore legs longer than their hind legs, by their rough tongues, great and conical molar, or rather cutting-and-crushing teeth, projecting eyes, large ears, and a deep and glandular pouch beneath the anus.

Dental Formula.—Incisors 6, canines 1-1; molars 2-1.

The false molars, three above and four below, are conical, blunt, and very large. The upper flesh-tooth (carnassial) has a small tubercle within and in front, but the lower one has none, and presents only two transverse points. The whole of the dental and molar organization, and indeed the whole cranial structure, appears to have been formed with a view to the bringing into the most available action the formidable natural instruments which enable the Hyænas to break the hardest bones.

Dr. Buckland gives the following account of the feet of a Cape Hyæna (the spotted species, we presume) which he
saw exerted, and reminded me of nothing so much as a
raiser's crumpling mill, or the scissors with which they cut
off bars of iron and copper in the metal foundries.' (Re
lique Duhrerunte.)

These cuts will give the reader some idea of the size and
space devoted to the attachment and development of the
muscles destined to move the jaws. These muscles, aided
by the powerful muscles of the neck, are so robust, that
it is almost impossible to drag from their vice-like gripes
with which the animal has once seized, in any remarks
that their efforts in this way sometimes produce anchylosis of
the cervical vertebrae, and that this has given rise to the asser-
tion that Hyenas have but a single bone in the neck. He
also states that their name among the Arabs is the symbol
of stubbornness. The tongue is rough. The feet have four
 toes each, like those of the suricates. The same author
sums up their character by saying that they are voracious,
nighturnal animals, inhabiting caverns, living for the most
part on carcasses, for which they ransack the tombs, and
that they are the subjects of an infinity of superstitious
traditions.

The strength of these animals and their power of drag-
ging away large bodies in strikingly exemplified in Colonel
Denham's narrative. At Kouka he relates that the Hyenas
(Dubba), which were everywhere in legions, grew so ex-
remely ravenous, that a good large village, where he some-
times procured a draught of sour milk on his duck-shooting
excursions, had been attacked the night before his last
visit, the town absolutely carried by storm, notwithstanding
defences nearly six feet high of branches of the prickly
tulip, and two donkeys, whose flesh these animals are, ac-
ting to our author, particularly fond of, carried off, in
spite of the efforts of the people. 'We constantly,' contin-
ues Colonel Denham, 'heard them close to the walls of
our own town at nights, and on a gate being left partly open,
they would enter and carry off any unfortunate animal that
they could find in the streets.' From the same narrative it
appears that it was necessary to protect the graves from the
attacks of these rapacious brutes. Mr. Tooto's grave had a

PILE OF THORNS AND BRANCHES OF THE PRICKLY TULIP, SEVERAL
FEET HIGH, RAISED OVER IT AS A PROTECTION AGAINST THE FLOCKS
OF HYENAS WHICH NIGHTLY INFESTED THE BURYING-PLACES IN THAT
COUNTRY.

SYSTEMATIC ARRANGEMENT.

Linnaeus, in his last edition of the 'Systema Naturae'
(15th), places the *Hyaena* under the genus *Canis*,
between the Wolf and the Fox, and describes the 'Striped
Hyena' only, as *Crocuta Hyena*, with sufficient accuracy.
Brisson had already given the form a generic distinction under the
name of *Hyena*.

Gmelin, in his edition, adds the spotted species under the
name of *Canis Crocuta*, and places these Hyenas between the
*Canis Thous* and *cruentus*, the latter being the jackal
but Pennant had previously described both species in his
synopsis under the title of 'Hy'ana,' and as the *Stripes
and Spotted Hyenases*, arranging the form between the
'Dog' and the 'Wolf' names which he uses for the distinctions
for those carnivorous types, in the largest
sense.

Cuvier makes the *Hyena* the last subdivision of the
digitationes following his 'Cats' (Colere), and immedi-
ately preceding the 'Cats' (Felis). He describes the sub-
division as containing the most cruel and most carnivorous
animals of the class, and as comprising two genera (which
he does not distinguish), adding that three species are
known, namely, *L.Hyene raych* (Canis Hyena, Linn.);
*L.Hyene brune* (Hyena brunnea, Thunberg; H. Villosa
Smith); and *L.Hyene tachete* (Crocuta Cruca, not of Lin-
naeus, as Cuvier quotes it, but of Gmelin).

Gray, in his method (Annals of Philosophy, 1825),
hangs the Hyenas under the family Feltidae, which he
divides into two sections; the first consisting of those genera
which have no tubercular grinders in the lower jaw, the
second consisting of those which have tubercular grinders
in both jaws. The first subfamily of the first section (which
also includes Felina) is Hyenina, consisting of the genera
Hyena, Brison, and Proteles, Geoffroy. (Aard-Wolf, vol. 1.)

M. Lesson arranges the genus *Hyena* under his third
section of the tribe of Digitigrades, which section consists
of those genera which are without a small tooth behind the
great molar of the lower jaw. Its situation is between Pro-
etes and the Cats (Felis), and three species are recorded,
the same as those mentioned by Cuvier, but two of them
with different names; thus, the Striped Hyena is termed
*Hyena Caupusens*, Daud., and the Brown Hyena, or *Hyena
crus*, is named *Hyaena rufs*, G. Cuv.

Geographical Distribution of the Genus.—Entirely con-
figured to the Old World, Africa and Asia.

Species.

Striped Hyena.—Before we proceed to the synonymy
of this animal among modern zoologists, we must inquire into
its history, as it was current among the ancients. 'It seems
uncertain whether this is the animal alluded to in the Bible.
Some translate the words rendered in our copies of the Holy
Scriptures, the 'valley of Zebeda' (1 Sam. xxi. 18; Nehem.
xi. 34) as 'the valley of Hyenas,' and the Seventy render
the words given by the English translators as 'a speckled
bird,' and 'a bird of divers colours' (Jer. xii. 9), as 'the
cave of the Hyena,' evvardd briddo, while others would sub-
stitute one of the Hebrew letters composing the word
in Samuel for another, and make the reading vipers, as
if certain streaked serpents were meant. Bochart, and
Scheuchzer seems to agree with this, shows that by the
Taathua, or Tachua, the word occurring in the ninth verse
of the twelfth chapter of Jeremiah, the Hyena was in-
tended, and, if this opinion be correct, there can be little
doubt that 'the valley of Zebeda' means 'the valley of
Hyenas.' Dubba and Dubbas, are, it appears, Arabic names
for this species.

Whatever may be the opinions as to the Striped Hyena
being alluded to in those passages of Scripture which we
have quoted, there can be no doubt that *L. Hyaena* is the
type of Aristotle (Hist. Anim. vi. 32; viii. 5) and the Greeks.
The most monstrous fables were ripe respecting this animal,
and the extent to which they had reached may be supposed
when we find Aristotle (vi. 32) taking pains to demonstrate
the absurdity of the assertion that the animal was bisexual,
or a true hermaphrodite. He declares that the genital
parts of the male resemble those of the dog and cat,
and that the part which had been taken for the female organ

* From a skull in the Royal College of Surgeons.
HYÆ

an opening with an imperforate bottom placed under the tail. This, as we have seen, is characteristic of the genus. Aristotle describes the parts with great minuteness; but notwithstanding his accuracy, we find Pliny (viii. 30, and xviii. 8), and Aelian (i. 25, and v. 14), stating not only that the Hyæna is bisexual, but that it changes the sex, being a male one year, and a female another. It is true that Pliny, in the passage first quoted, after stating—Hyæna utramque esse naturam, et alternis annis mares, alternis feminas fieri, parere sine maro, vulgus credit—adds, 'Aristoteles movet the subject and concludes in such a strain, in both the books quoted, that his authority has been cited in support of these and other absurdities. Thus we are told that magicians looked on it with the greatest admiration, as possessing the magical power of alluring men. It would be a waste of time and space to enumerate all the wonderful powers that were attributed to it; but among other accomplishments it was said to imitate the language of men, in order to draw to it shepherds whom it devoured at leisure, and to have the power of charming dogs so that they became dumb.

The animal does not seem to have made a part of the Roman shows till a comparatively late period. The third Gordian appears to have been the first who so introduced it; ten are said to have made their appearance at the games given by the emperor Philip, about a.d. 247.

Naturalists represent the 'Two Mages' as the fables of the antients. Even Belon, who was a good observer, gives 'Le Portrait de la Civette, qu'on nommoit anciennement Hyæna.' This figure is by no means bad for the time, and bears much in it of the quarto 'Portrait du Oeuxyes, Animaux, &c.,' is the following quatrains:

'Yooyant ceci, en voye de la Civette
Le sauvage d'Asie peut se douter de son honneur'
'Par soi dire le murer, pour extrema
Qu'il que puisse à son sexe'

And this is the more curious when we find the same author (Aquat.) giving a very fair cut of the Striped Hyæna (which Gesner, Aldrovandus, and Jonston copied) as the sea-wolf, an amphibious animal, satiating itself with fish, and seen in the streets of the British Ocean.

This form and Hyæna of the antients is the Canis Hyæna of Linnaeus; Hyæna striata of Zimmerman; H. vulgaris of Desmarest; and H. antiquorum of Temminck.

Description.—Ground colour uniform, brownish-grey, rather darker above than beneath. Sides marked by several irregular, distant, transverse, blackish stripes or bands, which are more distinct on the lower part. Towards the shoulders and haunches these stripes become oblique, and at the armpits or in regular transverse lines on the outside of the legs. Front of the neck, muzzle, and outsides of the ears black; the latter broad, moderately long, and nearly destitute of hairs, especially on the inside. Hairs of the body long, particularly on the back of the neck, and on the spine, where it forms a full and thick mane, which may be said to be continued even upon the tail, the latter being furnished with stiff tufted hairs of considerable length. Mane and tail both marked with blackish spots or stripes, variously and irregularly placed. Individuals vary much in colour and markings. (Bennett.)

Food, Habits, &c.—Pennant notices the propensity of this species to violate the repositories of the dead, and greedily devour the putrid contents of the grave. He also states that it preys on the herds and flocks; but adds, on the authority of Shaw (Travels), that for want of other food it will eat the roots of plants, and that it will feed on the tender shoots of palms. He speaks of it as an unsociable, solitary, and inhabiting the chasms of the rocks, and says (also on the authority of Shaw,) that the superstitious Arabs, when they kill one, carefully bury the head, lest it should be applied to magical purposes; as the neck was of old by the Thesilian sorcerers—

'Visex son Lycus, son dire nodus Hyæna Dehra.'

'Nor entails of the spotted Lynx she seeks,
Nor bloody joints from fell Hyæna's back.'

After referring to the wild opinions of the antients on this subject, he remarks, that it is no wonder that an ignorant Arab should attribute to us remains preternatural powers.

'They are,' continues Pennant, 'cruel, fierce, and untameable animals, with a most malevolent aspect; have a sort of obstinate courage, which will make them face stronger quadrupeds than themselves.' Kämpfer relates that he saw one which had put two lions to flight, regarding them with the utmost coolness.' (Synopsis Quadr.) This is a somewhat extraordinary translation of a passage in the second fasciculus of Kämpfer's 'Amorantia Exoticum,' where he relates that he saw a male Hyæna (Kaf. taar), which a certain rich Gabr, or fire-worshipper, kept as a curiosity, the animal having been taken when a suckling. It was muzzled by means of a rope fastened round its jaws, led out, and the rope lengthened so as to enable the animal to run more freely; and Kämpfer goes on to say, 'Narrabat Gabri, sic femuratum nuper se opposuisse duobus leonibus, quos, adpendicato serenitismo,' in fragum vererit.' Kämpfer gives a figure which, though rude, cannot be mistaken for any animal but a striped Hyæna. Pennant seems to have been aware of his misconstruction, for afterwards, in his 'History of Quadrupeds,' he stops at *put two lions to flight,* omitting 'regarding them with the utmost coolness.'

In the last-mentioned work Pennant remarks, that I will venture near towns; and quotes Niebuhr as authority that it will, about Gambroon, in the season when the inhabitants sleep in the open air, snatch away children from the sides of their parents.

It has been the custom, among other fabulous assertions, to state that the Hyæna is not to be tam'd; now, as Mr. Bennett observes in the 'Tower Menagerie,' there seems no animal that submits with greater facility to the control of man. He speaks of the docility and attachment to his keepers manifested by the Striped Hyæna, especially when allowed a certain degree of liberty, which the animal shows no disposition to abuse, though those which are carried about from fair to fair in close caravans are surly and dangerous from irritation and ill treatment. The individual which Mr. Bennett figures was remarkably tame, and confined in the same den with one of the American bears. [BRAS. vol. iv. p. 87.] Col. Sykes (Proc. Zool. Soc., 1830—31) remarks, that this species, Turrus of the Mahrattes, is numerous in Dabulam (Deccan), and susceptible of the same domestication as a dog.

Locality.—Asia, and Northern and Central Africa, the mountains of Caucasus, and the Alpae chain, Asiatic Turkey, Syria, Persia, Barbary, and Senegal, and even as low as the Cape. (Pennant, but see post. p. 376.) There are three living specimens (1838) in the gardens of the Zoological Society at the Regent's Park. The locality of one is marked Asia and Africa, of another North Africa, and of the third Asia.

Striped Hyæna.

**Spotted Hyæna.**—This species is the Tiger-wolf of the colonists at the Cape; Canis Crocuta of Erxleben and Grünel; Hyæna Crocuta of Zimmerman; Hyæna Capensis of Desmarest. Gevers has a figure of this species devouring a dog; and the spotted Zillo Hyæna of Jonston appears to owe its origin to the same animal.

Description.—Cuvier remarks that this and the preceding Hyæna are entirely distinct specifically, notwithstanding he refers to it as a possible resemblance of the male to the skeleton. The Spotted Hyæna has, he observes, no mane on the back, and instead of stripes has only round

* The king of Persia, apparently.
or black spots more or less scattered. He states that the last lower molar in the Spotted Hyena is simply compressed and bilobated with a heel or process behind, while the Striped Hyena has in addition a particular tubercle on the internal surface of its posterior lobe; there are also other species, and the observer who reads this paper will find pointed out in the ʻOsmanss Fossiles."

Size rather less than that of the Striped Hyena. Muzzle short, but not so abruptly truncated. Ears short and broad, narrowly rounded at the point, and almost covering the eye. The whole body covered with numerous spots of a deeper brown, tolerably uniform in size, but sometimes not very distinctly marked, and occasionally arranged in longitudinal rows. Hair short, thick, and glossy, generally a little longer on the neck and in the central line of the back than elsewhere, it does not form so distinct and well furnished a mane as that of the Striped Hyena. Tail blackish-brown, covered with long bushy hair. (B.M. 1890.)

Local.—Southern Africa, and especially the neighbourhood of the Cape of Good Hope. Lesson and others say that it is found even as high as Barbary: ʻquiere famen. Ludolf, in his 'Ethiopia,' or rather the 'trans-Saharan,' 10, says, 'Terribilis et destructiva, nimirum daemonicam, cum ea destruit, is the most voracious of their wild beasts; for she not only by night and by stealth, but openly and in the daytime, preys upon all she meets with, men or cattle, and rather than fall into her power, the herd turn and flee, and the man who describes her to be speckled with black and white spots.'

To this is appended the following note:—'Begat between a Hyena and a Lioness: familiar to Ethiopia. See Solinus, L. 319. 1527. 1539. 1549. 1560. There is a living specimen in the gardens of the Zoological Society, at the Regent's Park, with, 'South Africa' on the label.'

Food, Habits, &c.—Numerous are the writers who have treated of the habits of this destructive animal. Le Vaillant, Sparrman, and other travellers give very interesting accounts of its manners; but we select the statement made in the first catalogue of the African Museum (where it is named 'Hyaena sparsa,' and has been described as 'inapara,' because we think that the statement carries internal evidence of its having proceeded from the pen of the eminent and accurate zoologist under whose zealous superintendence that collection was made.) The catalogue, then, states that there are two species of Hyena in South Africa, and that the Spotted Hyena, or Tiger-Wolf of the colonists, is more numerous and more widely diffused than the other species, which has the name of the Strand or Coast Wolf, and is also more voracious and destructive, nimirum daemonicam, than the other. As it chances to find dead, but also carrying off the smaller ones from the pens of the farmers during the night, and often succeeding in killing or mutilating such of the larger kind as may be found in them, it appears, less liable to suffer from the voracity of this creature than those that are in full health; the latter, by their rapid flight, inspiring their enemy with a courage of which the former is destitute; which induces him to retreat and thus intimidate him from attacks which might be successful if made. So anxious is he for the flight of the animals, as a preliminary to his attack, that he uses all the grims and threatening he can command to induce them to run, and never dares to attack them unless they do so. 'The character of this Hyaena,' continues the author, 'makes his destruction an object of no small importance to the farmers, whose ingenious snares for him call forth almost as much cunning and dexterity on the part of the animal to render them of no avail. The more common methods employed against beasts of prey, such as spring-guns, traps, &c., do not answer the purpose. The old hunter, if he minutely examines every object that presents itself to his notice with which he is not perfectly familiar; and if he see reason to suspect that it can injure him, he will turn back and make his way in an opposite direction. Thus cords or leather thongs, which are often laid across the footpaths the Hyaena is accustomed to travel upon, and which are attached to the triggers of loaded guns, with the design of blowing up the beast, on which the charge of the gun in his direction, are very carefully examined by him, and the usual result of his examination is his deciding against trusting himself in contact with them. The farmers have frequently observed this result, that they never dare to attempt his destruction, but retreat, and occasionally succeed by substituting for cords the delicate stems of creeping plants, which are regarded by him without suspicion until he has actually suffered through them. Many other ingenious methods, suggested by the necessity of the case, have been adopted by the farmers for the destruction of Hyenas; but a description of them, though elsewhere desirable, would here be out of place. This species seldom roams abroad or dines in daylight, but passes that period in a state of repose, either in holes in the ground, or in retired situations densely covered with bush. Night is his favourite season for seeking his food; and towards midnight he generally makes an appearance, announcing to the various animals the approach of their voracious enemy, and thus enabling many of them to escape his wiles. The propensity this beast has for howling seems to have been acquired, for Hyaenas can hardly be heard to howl in any language but English, and the almost continuous noise he is not intended to put the animals to whom he preys upon their guard, its actual purpose is scarcely conceivable. Some have surmised it to be his call to his company, but that is not the case, for it comes from the fact that Hyenas are heard to utter their supposed call even while separating from each other farther and farther as each cry is uttered; in addition to which it may be remarked that it is contrary to the habit of this animal to be regarded as a very large body in large numbers, save when assembled by the temptation of an abundance of carriag. Still a further proof that the Hyena's cry is not a friendly call to his own species may be found in the fact that these animals as a rule do not find a dead animal they cease to utter their melancholy howl, as if in fear of calling participators of their feast."

It appears from the above interesting account that the Spotted Hyena is a very formidable and terrorsome animal, and it has, in the great deserts of Africa, the appearance of a natural and objectionable inhabitant, needing to be exterminated. In South Africa it is very greatly diminished. Even now however individual Hyenas occasionally approach the town, and their howlings are sometimes heard under Table Mountain, and in other directions, during the night. In the countries inhabited by the Hyaenas they are in every way daring and annoyance, approaching the villages during the night, and attempting, either by strength or stratagem, to pass the waggons by which the houses are defended. If they are thus far successful, they may escape the revenge of those who have sometimes accomplish, in case they not unfrequently carry off some young child of the family. Scars and marks on various parts of the body often testify to the traveller how dangerous a profession is that he has adopted. Mr. Shepstone, in a letter from Mambula, relates that the nightly attacks of wolves, as the Hyenas are generally called, have been very destructive amongst the children and youth; for within a few months not fewer than forty instances came to his knowledge wherein beast had made a most dreadful havoc. To show clearly, says that gentleman, 'the preference of the wolf (Spotted Hyena) for human flesh, it will be necessary to notice that when the Masai and other wanderers of the highland steppe, like hieeves, and tolerably large, often eighteen or twenty feet in diameter, the floor is raised at the higher or back part of the house, until within three or four feet of the front, where it suddenly terminates, leaving an area in front of the walls, in which every night the cattle are tied to protect them from the storms or from wild beasts. Now it would be natural to suppose, that should the wolf enter, he would seize the cattle and carry the young in his jaws, the natives always lie with the fire at their feet; but notwithstanding this, the constant practice of this animal has been in every instance to pass by the calves in the area, and even by the fire, and to take the children from under the mother's care, and carry them off. To add to this, the poor parent has been unconscious of her loss until the cries of her little innocent have reached her from without.

Vol. XII.—3 B
when a close prisoner in the jaws of the monster.' Mr. Shepstone then particularizes two instances within his own knowledge, one of a boy about ten years of age, and the other of a little girl about eight, who had been carried off by this species, and wretchedly mangled, but recovered by the attention of Mr. Shepstone and his friends. Notwithstanding this ferocity, the Spotted Hyaena has, as it is stated, been domiciled in the houses of the passersby, 'among whom Mr. Bennett, who preferred to the dog himself for attachment to his master, for general sagacity, and even, it is said, for his qualifications for the chase.'

Hyaena villosa.—In a letter read to the Zoological Society of London (April 9, 1833, 'Proc.'), Dr. Andrew Smith, so well known for his enterprising expeditions and the additions which he is making to our knowledge of the zoology of Southern Africa, stated his belief that the Striped Hyaena does not inhabit South Africa; its place being occupied by the Hyaena villosa, which bears, when young, considerable resemblance to that species. Hyaena villosa was first described by Dr. Smith in the 'Transactions of the Linnean Society.' This animal is considered by Cuvier as identical with L'Hyène brune (Hyaena brunnnea of Thunberg), which is quoted by M. Lesson as Hyaena villosa, Hyaena rufa, of Cuvier. The following are the dimensions of a specimen in Mr. Steedman's collection:

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height of the head</td>
<td>7</td>
</tr>
<tr>
<td>Length of the ear</td>
<td>5</td>
</tr>
<tr>
<td>Length of the tail</td>
<td>9</td>
</tr>
<tr>
<td>Length of the head from nose</td>
<td>5</td>
</tr>
<tr>
<td>Length of the tail from the ears</td>
<td>4</td>
</tr>
<tr>
<td>Height at the shoulder</td>
<td>2</td>
</tr>
<tr>
<td>Height of the nose</td>
<td>2</td>
</tr>
<tr>
<td>Height of the skin</td>
<td>2</td>
</tr>
<tr>
<td>Length of the head from the skin</td>
<td>5</td>
</tr>
<tr>
<td>Length of the tail from the head</td>
<td>9</td>
</tr>
</tbody>
</table>

The hair is described as remarkably long, coarse, and shaggy over the whole body of the animal; whilst on the head, ears, and extremities alone it is short and crisp. Its length on the back and sides is eight or ten inches, and it does not form a long mane on the spine, as is the case with the common Striped Hyaena. The general colour of the head, body, and extremities is grizzled brown, from the hairs being greyish at the roots and brown at the points, marked on the sides and hips with large but rather indistinct transverse bands of a deep vinous brown colour. The legs, particularly those before, which, as in other Hyaenas, are much longer than those behind, are marked with transverse black bands much more distinct and apparent than those on the body. The upper lip is furnished with remarkably long, bristly, black moustache, and the tail, which is thickly covered with long hair, and of great length than in the common Hyaena, is uniform dark brown. The fore-arms and thighs are darker than other parts of the animal, and a large collar of dirty yellowish white surrounds the throat and extends up the sides of the neck, occupying the entire space between the setting on of the head and shoulders. Under each eye is a large irregular black patch; the chin is black also, and a narrow band of the same colour marks the junction of the head and neck, bordered by the dirty white collar above mentioned. The ears are large, erect, and rather pointed. The individual was aged, all the teeth being much worn; the two exterior incisors were much larger than the others, and had the form and size of small canines. A young animal between inches in length, also in Mr. Steedman's collection, exhibited all the general characters of the aged specimen, excepting that the hair was shaggy and more woolly. (Steedman.)

Locality.—The sea-coast throughout the whole extent of Southern Africa, but by no means so common as the Spotted Hyaena. The young specimen mentioned above was obtained alive with two others in the neighbourhood of the Neuwied Mountains, a considerable distance in the interior of the country, which shows, as Mr. Steedman observes, that the species is not so strictly confined to the vicinity of the sea-coast, as its name Striga 'would imply, or as the accounts of travellers would lead us to imagine. Food, Habits, &c.—The Striped Wolf devours carrion and such dead animal substances, whales for instance, as the sea-eaters; but when pressed by hunger its habits seem to resemble those of the other species, for it then commits serious depredations on the flocks and herds of the colonists, who hold its incursions in great dread. Mr. Steedman, who states this, says that he saw a very fine specimen, which had been shot by a farmer residing in the vicinity of Blauweerg, and was informed that it had destroyed three large calves belonging to the farmer. He adds, that it is said to be a remarkably cunning animal, retiring to a considerable distance from the scene of its depredations to elude pursuit, and concealing itself during the day-time in the mountains, or in the thick bush, which extends in large patches throughout the sandy district in which it is usually found.

Hyaena villosa.

Fossil Hyaenas occur abundantly in the third period of the tertiary deposits (Pliocene of Leyly), especially in the ossiferous caverns. Dr. Buckland's BelAfrique Dilemma, in particular, should be referred to by the student for the history of those extinct species and the bones collected by them in the caves of Kirkdale, Kent's Hole, &c., but particularly the former. He also in the same most interesting and well illustrated work gives the following localities for the remains of Hyaenas in caves or fissures:—Kirkdale, Plymouth, Crawley rocks near Swansea, Paviland caves near Swansea, district of Muggendorf, district of the Harz, Fontevre in France, Sundwick in Westphalia, and Kistritz near Leipzig. Those found in the superficial soil or gravel are stated to have occurred at Lawford near Rugby, at Herberg, and Ostend, near Stutgard, Echschott in Bavaria, and the Val d'Arno near Florence. The student should also consult the works of Smeirner, Schlotheim, Rossmiller, Blumenbach, Cuvier, M. de Serres, Christol and Bravard, Croizet and Jobert, Goldfuss, &c. The fossil species named are Hyaena spelaea, Goldf.; Hyaena spelaea major, Goldf.; Hyaena prioca (Hyaena rayée fossile, M. de Serres; Hyaena intermedia, M. de Serres; Hyaena Perrieri, Brav., Croiz., and Job.; Hyaena Arvensis, Brav., Croiz., and Job.; and Hyaena dulcis, Brav., Croiz., and Job.).

Captain Mudge found the remains of Hyaena in the ossiferous cavern of Yealm Bridge, six miles south-east from Plymouth, among those of other animals, several of whose bones were shattered, chipped, and gnawed. (Geol. Proc. 1836.)

HYÆNA-DOG. This quadruped, which in size and form is smaller and more slender than either the Hyaena or the Wolf, is the Wild Dog of the settlers at the Cape. M. Temminck first described it as a Hyaena (Hyaena spec.), but subsequently regarded it as a species of dog. Desmarest considered it a species of Canis, and recorded it as Canis pictus. Brookes gave it the generic designation of Lycan; and Fischer, in his 'Addenda et Emendanda,' quotes it as Canis Lycaon, and in his 'Index Nominum,'
H Y A

371

H Y A

refers to it as *Lycam tricolor* of Brookes. Cuvier places it among the dogs.

In the number and form of its teeth the Hyaena-Dog agrees with the dogs, as well as in its general osteological structure, which presents a remarkable difference from that of the Hyaenas. Externally it is distinguishable from both the Hyaenas and Dogs in the proportional length of its legs and the form and proportions of the body. There is no name as in the Hyaenas, and the tail resembles that of some dogs. The head is Hyaena-like, and, like the Hyaenas, it has only four toes to each foot.

**Description.**—Colour reddish or yellowish-brown, variously marked with white, grey, and black, and with white and black intermixed. Nose and muzzle black, with a strong black line passing from them up the centre of the forehead to between the eyes, which are very large, black within and without, and furnished with a broad and expanded tuft of long whitish hairs arising from their anterior margin and filling up a considerable part of their concavity. Beneath each of the eyes a lighter patch. Tail moderate, covered with long bushy hair, and divided the middle by a ring of hair which is nearly white, as are also the fore parts of the legs below the joint. Mr. Bennett, who thus describes the animal, had an opportunity of seeing a living specimen in the Tower of London; but he observes that their colours and markings are subject to variation in different individuals, though their general disposition and appearance are similar.

**Locality.**—South Africa; troublesome at the frontier settlements where they are noticed.

**Habits.**—Mr. Burchell, who brought to this country the first specimen and pointed out the distinguishing characters, describing it under the name of *Hyaena venata*, states that it has been seen at night by persons, but frequently in the day. He describes it as swift, fierce, and active, so that only those animals which are gifted with great fleetness can escape from it. It attacks sheep openly and fearlessly; it approaches oxen and horses and cautiously advancing upon them by stealth, bitting off the tails of the oxen, and injuring the horses, especially young colts, so severely that they rarely survive.

Mr. Burchell's specimen continued voracious though he kept it chained up in his stable-yard for more than a year, and the man who fed it 'dared never to venture his hand upon it.' It however became familiar with a dog, its companion. The Tower specimen arrived with a young Cape Lion, with which it appeared perfectly till the lion became too strong and rough in his play, when the Hyaena-Dog was associated with a Striped Hyaena and two Spotted Hyaenas, and all lived tolerably well together in the same den.

Mr. Swainson gives the name of *Hyaena-Dog* as the English synonym of *Proteles*. [AAO-WOLF.] The animal which is the subject of this article he describes under the name of *Lycam, the Hunting Dog*. He arranges both under the family Felidae, where they had been previously placed by Mr. Gray, who makes *Proteles* a genus of his subfamily Hyamina, and *Lycam* a genus of his subfamily Canidae.

**HYAL/VIDEI,** a family of Pteropods according to the systems of Lamarck and Cuvier, but belonging to the family Thesosomatida (order Aporobranchiata) of De Blainville. M. Rang, in his *Tableau Methodique*, follows De Férussac in making the Hyalideridae form the Hyalideridae family, and enumerates the following genera as composing it: *Cymbulia, Limacina, Hyalina, Cleodora, Cuvieria, Euribia, and Psychia*.

**Definition of the Family.**—Animal furnished with a head, but it is distinct, with a third natatory membrane of smaller and intermediate at the ventral part; mouth situated at the bottom of a cavity formed by the union of the locomotive organs.

**Shell near always present, and very variable in form.**

**Genera.**

* A Shell.

*Cymbulia.*

Cuvier describes the *Cymbulia* having a cartilaginous or gelatinous envelope in the form of a boat or slipper, beset with points in longitudinal rows; and the animal itself as possessing two great wings of a vascular tissue, which are at once branchial and fins, and between them on the open side a third smaller lobes, which is three-pointed. The mouth with two small tentacula is placed between the wings, towards the subside of the shell, and above two small eyes and the orifice of generation, whence issues an immense male organ in the form of a small proboscis (trumpet). The transparency of the texture permits the observer to distinguish the heart, the brain, and the visera through the envelopes.

M. Rang gives the following **Generic Character.**

Animal oblong, gelatinous, transparent, furnished with two eyes? two tentacles? and a mouth in the form of a proboscis (trumpet)? Two lateral fins, which are large and rounded, carry the vascular net of the branchiæ; they are united at their base, on the posterior side, by an intermediate appendage in form of an elongated lobe.

*Shell* gelatinous-cartilaginous, oblong, in the form of a slipper, entirely covered with a delicate and hardly visible membrane, with a superior opening, long and truncated at one of its extremities.

M. Rang further observes that this curious and very incompletely known genus only contains a single species, which is found in the Mediterranean sea; and he adds that only knows it by a drawing communicated to him by Cuvier, who remarks *(Regne Animal)* that in the figure given by M. de Blainville (*Malacologie*, Art. 3) the animal described is placed in the shell the wrong way ('en sens contraire du véritable'), and that (Cuvier's) description rests on recent and repeated observations made by M. Laurillard. M. Deshayes confirms this remark as to the inverse position of the animal, and says that he has had occasion to verify it often. The following is a copy of the figure given by M. Rang in his *Tableau.*

The following is Mr. G. B. Sowerby's representation of *Cymbulia* (Genera, No. 39).
H Y A

M. Rang, as we have seen, states (1829) that there is but one species. M. Deshayes, in his edition of Lamarck (1836), enumerates five. The species known to M. Rang must have been *Cymbiola Peroni*.

*Limaena*. (Spiratella, De Bl.)

Animal elongated anteriorly, turned into a spiral form behind; branchies in the form of plats on the back; mouth furnished with two small appendages, which are united by one side to the anterior ends. Shell very delicate, fragile, vitreous, spiral, not carinated, turning rather obliquely on itself, with a circular aperture and simple borders. (Rang.)

Cuvier is of opinion that the *Limaena* ought, according to its general appearance, to belong to the same class as that of which he speaks a strong relationship to *Pseudeomeron*; but their body is terminated by a tail, which is twisted spirally ("coutournée en spirale"), and is lodged in a very delicate shell, of one whort and a half, umbilicated on one side and flattened on the other. Cuvier adds that the animal uses its shell as a boat and its wings as cars when it would swim on the surface of the sea.

The same author remarks, that the only species, *Cito helicina* of Phipps, have in fact is scarcely less the inhabitant of the icy sea than *Cho bursalis* (C1go), and is considered as one of the principal aliments of the whale. He observes that he does not know whether the animal figured by Mr. Scoresby, of which M. de Blainville speaks (Malacologie du voyage de Messina, ch. viii, bis. 6) makes its genus *Spiratella*, is in reality, as M. de Blainville believes, the same animal with that of Phipps and Fabricius. M. Rang considers *Spiratella* of De Blainville to be synonymous with *Limaena*, of which Mr. Rang states that but one species is known, and says that it would be interesting to have new accounts of it. He speaks of its inhabiting the North Sea, its prodigious abundance, and the possibility of its being served, and the whale. Phipps mentions it as being found in innumerable quantities in the Arctic seas, and describes its body as of the size of a pea, rolled up into a spire like a *helix*, and its ovate, obtuse, expanded wings as being greater than the body. The following is that of the figure of M. de Blainville, which founds his genus (which he places under his family of *Pteropoda*, between *Alatna* and *Argonauta*) on the materials furnished by Mr. Scoresby, and considers this *Spiratella* as synonymous with Cuvier's *Limaena*.

*Spiratella Limaena* of De Blainville.

Mr. G. B. Sowerby figures a *Limaena* (in his 'Genera of Recent and Fossil Shells,' and in the same number as that which contains that of *Pteropods*) from Messina. He describes it as a thin, fragile, spiral, discolled shell, umbilicated on both sides, and carinated on the back and below, with a membraneous lamellar keel, and he says that it has externally much the appearance of a very diminutive umbilicated *Nautilus*.

M. Deshayes, in his edition of Lamarck, remarks that the *Limaena*, of which M. de Blainville formed his genus *Spiratella*, have in fact much analogy with the *Cleodora*, and that they are *Cleodora* whose shell is spiral, and not swimming gastropods, like the *Corallinae* and *Alatnae*. M. Deshayes goes on to state that he has many individuals preserved in spirits, which he owes to the generosity of Dr. Fleming, that he has examined them with attention, and that they have not the projecting foot of *Alatna*, nor a fin-like foot, but two lateral fins of the form of those of the *Cleodora*. He adds that they have no tentacles, no eyes, but a mouth in the shape of a triangular slit at the summit of the angle which forms the fins. The shell is not closed by an operculum as that of *Alatna*. The anus and the oviparous generation have to issue from the right side, below the fin and at its base. M. Deshayes is of opinion that the genus ought to remain among the *Ptero-pods*, where it was placed by Cuvier and Lamarck.

Hyalea.

Animal globular or oblong, furnished with two lateral expansions more or less elongated backwards; the intermediate lobe of a demicircular form; two very short tentacles, hardly distinct, contained in a cylindrical sheath; the aperture of the mouth provided with two labial appendages; orifice of the anus at the right side of the mantle; that of the male organ in front and within the right tentacle; that of the female organ on the same side, at the point of separation of the two parts of the body; branchies pectinated, on each side, in a particular cavity.

Shell hairy or vitreous, transparent, and fragile, in form of a slipe, bright or recurved with an anterior opening, and split laterally, triquadruplicated backwards. (Rang.)

M. Rang remarks that this beautiful and interesting genus, the anatomy of which has been made known by M. Cuvier and M. de Blainville, is perfectly distinct from those which approach it. He speaks of the *Hyalea* as very small animals, spread over all the seas of the torrid zone and a great part of those of the temperate zones, and of the occurrence of the same species on the most opposite points of the globe. He adds that the discovery which he had made of many species, one in a fossil state, had caused him to divide the *Hyalea* into the two following groups:—

1. *Hyalea*, one species. (1836), to which he assigns the appendages placed very much backwards. *H. umenato*, &c. This group, he says, is the most numerous.


He states that at the time he wrote, five species completed the group, and gives the following figure of a *Hyalea*.

*Cuvier* describes *Hyalea* as having two great wings, no tentacles, a mandible slit at the sides, the bottom of the fixures, and covered by a shell equally slit at the sides, the ventral surface of which is very convex, the dorsal slit and longer than the other, and the transverse lines of the sides. He describes the elongated form of the sides, the shell filaments more or less long, which are productions of the mantle. Cuvier concludes by observing that the species most known (among *tridentata*, Forskall; *Cavolina natans*, Abdigard; *Hyalea cornea* (*tridentata*), Lamarck) has a small yellowish demitransparent shell, which is found in the Mediterranean Sea and in the ocean.

M. de Blainville, who has published a monograph of this genus in the 'Journal de Physique,' and in the 'Dictionnaire des Sciences Naturelles,' states, that it contains already (1829) from five to six species, all of which appear to be the inhabitants of warm climates. He considers the genus *Glandulites* of De Montfort as belonging to the *Hyalea*, and quotes the observation of M. Defrance to that effect in an appendix.

M. Deshayes, in his edition of Lamarck (1836), observes, that in the comparison which the latter makes of the *Hyalea* with the conchoids, he had remarked, that they approached so closely that he had found it proper to place the *Hyalea* at the head of the mollusks. Lamarck had suffered himself to be seduced by an analogy rather apparent than real. It is not with the lamellibranchiate conchoids, continues M. Deshayes, that the *Hyalea* should be compared, but with the brachiopods, an Insect of animals [Brachiopoda, vol. v.]; for the *Hyalea* and the brachiopods are placed in the shell in the same way. We
find, he observes, in the *Hyalaea* the two valves of the *Terebratula* soldered together; and, in becoming free, the animal has closed the umb of the great valve, and the shell has left a passage always open for the ciliated appendages, changed into locomotive organs. This comparison, says M. Deshayes, would appear sufficiently just, and yet it is not. Upon the examination of the two groups, we are soon convinced of their dissimilarity, especially in the external parts of their organization. To this we beg to add, that it will be probably difficult to establish any essential difference in the organization of the two groups, except upon the higher development of the nerves and the presence of a head in *Hyalaea*. M. Deshayes enumerates sixteen recent species, exclusive of *Hyalaea curtipes*, which, he says, is not a true *Hyalaea*, as Bosc, De Roissy, and Lamarck believed of Cleodora. MM. Rang, D'Orbigny, Lesueur, and Quoy and Gaimard, have principally contributed to the number of species.

This is the *Hyalaea tridentata* of Forskahl, Gmelin, and Dillwyn; *Hyalaea papilionacea* of Bory de St. Vincent; *Hyalaea curtipes* of De Roissy. M. De Roissy keeps Lamarck's synonym with a query—*Monoculus telesmus* Lin. Locality, Mediterranean, and the seas of warm climates. The size scarcely reaches that of a small hazel-nut.

**Cleodora**

Cuvier remarks, that the *Cleodora*, for which Brown originally founded the genus *Clio*, appear analogous to the *Hyalaea*, in the simplicity of their organs, and the absence of tentacles between them: their conic or pyramidial shell, he adds, is not slit on the sides; and he quotes M. Rang's genera and subgenera.

M. Deshayes, in his edition of Lamarck, states, that the *Cleodora* are much more allied to the *Hyalaea* than the *Clio*, approaching the former not only in having a shell, but also in the form of the animal, which bears a great resemblance to that of *Hyalaea*. It is not astonishing, proceeds M. Deshayes, to see Lamarck, who had approximated the *Cleodora* to the *Clio*, indicate not very natural relations to the former; for, when he wrote, but a very small number of species were known, and he could hardly foresee that the naturalist's march of MM. Quoy and Gaimard, Rang and D'Orbigny, should have contributed to throw so much light on the Pteropods in general, and the *Hyalacea* and *Cleodora* in particular. If we have before us a sufficient number of species belonging to the two last-named genera, we shall see them blend into each other so as to make it impossible to draw the line between them. It is thus, continues M. Deshayes, that we proceed by insensible degrees from the globular to the lanceolate species. A globular *Hyalaea* seems formed of two unequal valves soldered together, leaving between them a principal anterior slit, and also lateral slits, sometimes without communication with the aperture, and sometimes forming the prolongation of this part. The posterior extremity is prolonged into a spine, which is ordinarily short, sometimes straight, and sometimes curved. Taking these species of *Hyalaea* as the commencement of the genus, M. Deshayes points out the following alterations of their characters in the rest of the series. At first the posterior extremity is seen to be elongated, and, in this case, the two parts of the shell are flattened, become nearly equal, and, in some of the species there remains the trace of posterior lateral slits, for the most part these slits rise sufficiently to be in continuation of the aperture. This aperture is always transverse and narrow, as in the *Hyalacea* properly so called, but in some of the species there appears the aperture is enlarged, and the lateral slits progressively diminish, are reduced to simple inflations, and at last entirely disappear. These changes in the form of these shells are not, M. Deshayes observes, more extraordinary than those to which he has drawn attention in other groups, and principally in the cephalopod mollusks. If continues the same author, the animals coincide with these modifications in their external form, their internal organization offers but little alteration; and he cites the authority of MM. Quoy and Gaimard, who assert positively that the lanceolate *Cleodora* differ in nothing essentially from the *Hyalacea* properly so called. This M. Deshayes considers as the more important to him, inasmuch as he is thereby confirmed in the opinion which he had long entertained as to the analogy of the *Hyalacea* and *Cleodora*.

The following is M. Rang's definition of *Cleodora*:

*Animal* of an oblong or elongated form, furnished with an intermediate demicircular lobe, but having no lateral expansions; mantle open in front; branching and organs of generation incompletely known.

*Shell* fragile, vitreous, in form of a sheath or case (gaine ou cornet), more or less pointed posteriorly; aperture very large, nearly always without a slit, and without lateral appendages. The same zoologist having, as he states, obtained many new species, and studied their organisation, divides the genus into the following subgenera:

1. *Cleodora* properly so called.

*Animal* of an oblong form, having the mantle very much dilated and advanced on each side.

*Shell* pyramidal, angular, very much dilated anteriorly, with a very large aperture, canaliculated on each side, and rarely slit.

M. Rang makes this subgenus comprise (1829) five species only, two of which he considers as very doubtful. Type of *Cleodora lanceolata*.

Description.—Shell compressed, elongated, lanceolate; aperture dilated. Locality, the seas of warm climates. The following figure will convey a general idea of the form of the animal and shell.

**Cleodora pyramidalia**

*Animal* very slender; the mantle not dilated on its sides; fins generally rather small.

2. *Cloudia* (Rang.)

*Animal* very slender; the mantle not dilated on its sides; fins generally rather small.

*Shell* very slender, fragile, and diaphanous, in the form of a straight or curved case (cornet), with an aperture almost always as large as the shell itself, and generally without a canal; no lateral appendages. M. Rang, who gives this description, says, that he formed this subgenus for some very small new mollusks, which he frequently met with in the middle of the ocean, and to which he united, by a happy, the genera *Fagrinella* of Daudin, and the *Gadus* of Mon.
they had been defined after the mutilation of their posterior extremity, which, being naturally short, only presented itself as open by accident. This view taken by M. Rang, he continues, is not founded on any good observation, and he says that he has seen a sufficiently large number of individuals perfectly preserved, to be able to affirm that their posterior extremity was open when the animal was alive. These shells in fact do not begin to ossify in conclusion postumously, the Petropods, and are more probably Dentalia. This opinion is a very strong one, and, coming from the quarter it does, is deserving of all respect; but as M. Rang has justly the reputation of a good observer in this department of natural history, we have thought it right to lay before the reader the descriptions and figures given by him.

**Fossil Hyalidea.**

M. Rang, as we have seen, mentions one fossil species of *Hyalidea*, and M. G. B. Sowerby states that the genus occurs in a fossil state in Sicily. M. Rang notices the fossil analogue of *Cleodora* from Piedmont; if *Fugainella* and *Gadus* are to be ranked in recent among their family, they must be added. The last-mentioned author says that he has detected a fossil species of *Cuvieria* in the shell sand of Piedmont, where it had been collected by the elder De Luc. M. Deshayes in his tables, enumerates two fossil (tertiary) of *Hyalidea* and three of *Cleodora*,1 and also of; the latter he records *Cleodora lanceolata* as a species found both living and fossil (tertiary).

**HYAS.** A genus of brachyurous crustaceans belonging to the *Maia* family. [Maiade.]

**HYBODUS.** A genus of fossil fishes placed in the order of Placodermi by M. Agassiz ([Recherches sur les Potambranchia, fossiles, vol. iii., tab. 8, 9, 10]). The information which M. Agassiz has collected concerning this extinct group of fishes appears to be considerable, yet only in a few instances (then the limb of Lem), and except in the last-mentioned specimens, has he been able to reconstruct the whole skeleton. In consequence, the spinous rays and the teeth of one species may be, and probably are, described under different specific names. The species of *Hybodus* are supposed to amount to twenty-two, and extend from the new red sandstone (grès bignon) to the chalk inclusive. They present analogies to the genus *Squalus* of Linnaeus, in the teeth and spinous rays; it appears there were two dorsal fins, each having spinous rays, not differing more than the first species of fishes with two spinous dorsal fins. (Agassiz, vol. iii.)

**HYBRID.** [Mulk; and see, as far as Zoology is concerned, the different articles where Hybrids are noticed; Cuvier, Lamarck, Horace, for instance.]

**HYDATIDS** (i.e., a vesicle, from *Hydro* water). This name has been applied to various cyst-like productions, which are sometimes found in the bodies of men and animals.

The term hydatid is of the most indefinite application, for under this common denomination are included objects of the most dissimilar nature. In the first place, the term comprehends several species of entozoos, or parasite animals, which have a distinct independent vitality; secondly, the simple unattached cyst which are frequently met with; and lastly, what have been called false hydatids, which are vesicular bodies, either entirely or partially connected with the tissues by which they are surrounded.

Hartmann in 1868 (Ephém. Nat. Curios., Ann. iv. dec. 2, obs. 73), and Tyson in 1869 (Philos. Trans., No. 193), first clearly showed that many of the curious cyst-like tumours, called hydatids, were distinct living beings, or parasitic animals. They arrived at this conclusion from observing that they had no connection with the organs in which they were found, that some of them distinctly moved when placed in water, and were also furnished with perforating processes or heads, having an orifice or mouth at their extremity. Morgagni and others have thought that some of the ancient medical writers, particularly Aretaeus and Galen, were acquainted with the true nature of these bodies; but nothing of the kind is clearly stated in their writings, though they often mention the occurrence of hydatids.

The discovery of Hartmann and Tyson was taken little notice of before, as no one was either acquainted with the disease, or who had pursued the investigation; since which time these beings have occupied the attention of many naturalists, among whom may be mentioned Hunter, Müller, Goze, Cuvier, Laennec, and others.

---

* This name has been pre-occupied for a genus of holothurians. [Zoologie, vol. iii., p. 569, nec.]

* Including, probably, *Cresia* and *Vagula.*
and Rudolphi, who have all admitted the animal existence of the greater part, if not of all of them. Pallis arranged all the cystic enterozoas, except the common globular hydatid, or acalcephal cyst (which was only considered as a simple secretion, cyst before the time of Lœnæne), under the genus 'Tennia,' on account of the similarity of structure between their mouths and those of the tape-worm. In this classification he was followed by Goeze. Cuvier and others, search in this same generic position 'Hydatias,' but Rudolphi ('Ent.) has since shown that they cannot be all placed in one genus, but should be divided into several, as 'Camurus,' 'Cysticercus,' &c., which together form the family Hydatidae.

Hydatids are found principally in the bodies of mammalia; rarely in those of the lower orders of animals. They may occur in any part of the body, but are very seldom seen in the mucous cavities and passages, except when they have been discharged into them by the rupture of their containing cyst. This external sac, by which they are mostly surrounded, is generally attached to the tissue of the organ in which it is seated; it is frequently common to many hydatids, but each individual may have a distinct envelope, in the interior of which it floats, and to which it never contracts any adhesion. The fluid which fills the proper cyst of a hydatid is almost always colourless and limpid. The liquid of the common cyst in which they float may present various appearances; sometimes it is quite limpid; at others it may be coloured. When formed in the liver it is often of a greenish-yellow.

Though these beings possess an independent existence, their life is connected with that of the body in which they are found; for if not removed immediately after the death of the parent animal, they can never be seen to move. The form of the hydatid varies according to the genus and species of Enterozoas to which they belong; and they have been divided into two classes, Cephalocystas and Acellophocystas. The latter consists of a simple bladder without any appendage: the former consists of a bladder attached to one or more bodies or heads. When there is only one appendix, as in the cysticercus, it has been called a monocephyocyst; when several heads or processes are attached to one terminal cyst, as in the camurus, the name of polycystocyst has been applied.

The origin and mode of development of Hydatids are involved in the same obscurity as the production of all the other forms of enterozoases; but though first formed in an unknown manner, they are capable of reproducing their species, which, as no traces of organs of generation have been detected, probably takes place in all the genera by gemmation. In the acalcephalous, the reproductive power is more evident, and the process is asexual.

The principal genera of cystic enterozoas, or true hydatids, are Cysticercus, Camurus, and Echinococcus; to which may be added Acalcephalous. For the characters by which these genera are distinguished, and the particular species of Cysticercus are enumerated, but the most common are C. tenuecilius, and C. cellulosus. The former ('Tennia hydatigena, Pallis; Hydatis globosa, Lamarch') is met with frequently in the periosteum and pleura of ruminating animals and pigs. It is often generated in the disease of sheep called the rota, where another entozoas, the 'distoma,' or fluke-worm, is met with in the duets of the liver. The C. cellulosus ('Tennia cellulosus, T. Anna, Gom.; Hydatis annae, Blum.) is found generally lodged in the tissue of the muscular between the fibres; it occurs sometimes in man, but more frequently in animals, particularly in the hog, where it can only be found attached to be parts of the Camurus ('Hydatis polycephalus, Zeder'), the species C. cebalis ('Tennia vesicularis, Goeze; C. cerealis, Gom.; Polycystocystus ovinus, Zeder') is found in the brain of sheep, oxen, and other animals, which was only considered as a simple secretion by the German farmers 'das Drehen,' by the French 'le Tournia,' and in England the sheep are said to be 'giddy,' or to have the 'staggerers.'

The genus 'Tennia' is situated in the fourth ventricle, when it is said to cause a variation in the affection, called in German 'das Springen,' from the animal springing up. Rudolfi says that he has seen the latter variety occur when one large hydatid has occupied the middle part of the brain. In the first case one-half of the body is rendered partially paralytic from the pressure of the hydatid on the side of the brain, and the opposite muscles by their action turn the body round towards the unaffected side. In the latter form of the disease, Rudolphi says that the equilibrium between the anterior and posterior muscles of the head is destroyed, which causes the animal to spring up. Sometimes two hydatids are found in the brain, and occasionally as many as five or six have been met with. The internal surface of the ventricles is always smooth, and never contracts any adhesion to the cyst. This hydatid is sometimes found in the bladder, where the bladder is very thin and fibrous, and may be seen clearly to contract. The little worm-like bodies attached to it are scarcely half a line in length, and have the power of retracting themselves within the cyst fluid. These are most generally met with in yarling cattle and sheep, and their production, or that of the state of health which gives rise to them, seems owing principally to the effects of cold and damp, and watery pasturage, which also occasions the rot in sheep. The best treatment is removal to a dry and sheltered pasturage. In some cases sheep have been cured by the extraction of the hydatids by the operation of trepanning.

The hydatids belonging to the genus Echinococcus are not very well understood. They are considered by some as mere varieties of the Acalcephalous. They are commonly called granules, or sometimes settle granules or minute particles which float in the fluid of the cyst or adhere to its walls. Two species of Echinococcus have been particularly described: one, called E. hominis, has been met with in the brain and abdomen of man in a few instances; the other, E. botrinus, seems to possess a proper vitality, though dependent for existence on the body of the animal in which they live. The coat of the proper cyst is composed of several laminæ or membranes, which consist of white semitransparent pulpy matter. The common cyst enclosing the hydatids is supposed to be formed by the condensation of the cellular tissue of the surrounding parts, but frequently it is very loosely attached to the adjacent tissues, and the nature of the organ in which it is situated is unaltered, unless when the cyst is of sufficient size to cause considerable pressure around. The coats of these common cysts are of a whitish external and possess more or less bile power. These hydatids have been divided into the solitary and the multiplied: the former is found in the visera of ruminating animals; it has been called the Acalcephalous exogenæ, because it is said that the young in this species are formed by gemmation from the outside of the parent cyst. The multiplied hydatids have been found in most of the structures of the human body, particularly the brain, the visera of the thorax and abdomen.

This species has been named A. endocarum, because the young are developed within the older ones; thus one large hydatid is frequently found to contain numerous smaller ones within it. In fact, the common containing cyst has been found to be only the original parent hydatid of all the others within it.

Hydatids may be developed slowly, and occasion so little inconvenience, that persons in whom they have been discovered have usually been cured after death. Hydatids are never found in the German farmers 'das Drehen,' by the French 'le Tournia,' and in England the sheep are said to be 'giddy,' or to have the 'staggerers.'
remedies may be given which are most likely to remove that state and improve the general health. When a hydatid cyst is situated so near the surface of the body that it may be easily evacuated without risk of effusion into the subjacent tissues, from which in fact they grow. The vesicles often found in the choroid plexuses belong to this class; and the situation of which contains the hydatidian process, which may grow to an enormous size. Lastly, one of the most common situations for these false hydatids is in the uterus, where they are described as 'vesicles of a round or oval shape, with a narrow stalk to the womb, by which they adhere on the uterine cavity to one another.' They may here increase in such numbers as to distend the uterus till it is too large to be contained in the pelvis, and rises into the abdomen. These cysts may be divided in many other situations, of various kinds and forms, occurring in the tissues of the skin, muscles, ligaments, and tendons, and situated in various parts of the body. Some are found in the liver, and others in the spleen; some are attached to the peritoneum, and others to the serous membrane of the intestine. These cysts are sometimes so numerous as to fill the abdominal cavity, and to produce great distension and pressure on the organs of the abdomen, giving rise to pain and distress. The operation for removing these cysts is performed by inserting a needle into the cyst, and evacuate the contents, or by making an incision in the skin, and removing the cyst by this means. The operation is usually attended with great success, and the patient recovers rapidly. The removal of a hydatid cyst is a simple and easy operation, and may be performed without much risk. The patient is placed in a sitting posture, and a small incision is made in the skin of the region of the cyst. The needle is then inserted into the cyst, and the contents are evacuated. The incision is then closed with a stitch, and the patient is allowed to take up his usual occupation. The operation is usually attended with great success, and the patient recovers rapidly.
France, or Holland. His advisers hesitated about his departure, because there were differences of opinion as to whether he should be sent: at last, with danger on both sides, he fled to England, and Hyde and the others of his suite sailed with him in the ship Albion, and thence to Jersey, where he landed on the 16th of April, 1646. After a short residence in this island, the prince, persuaded by the queen, who desired to have him in her service, and the duke of York, in the interest of his brother, the prince of Wales, and the Earl of Clarendon, made an escape from Jersey. His situation at this time was most painful; he could not return to England because of the enmity of the parliament; he even feared an attempt upon Jersey from the latter, and, therefore, took so much precautions against danger on that account, made his will, and wrote letters to be delivered to the king and the prince after his death. It might be expected that under such adverse circumstances his affairs would have been poor, but nothing could sustain them; he collected all the materials that he was able, and commenced his History of the Rebellion.

After the seizure of the king his cause appeared to be desperate; there were however occasional revolts in his favour which spread a faint gleam of hope upon the minds of his adherents. Among these was the desertion of 17 ships of war from the parliament to the prince. This event had an influence upon the proceedings of Sir Edward Hyde, who received orders to join Prince Charles. After some fruitless travelling in quest of him, Hyde heard that he had sailed for the Thames, and procured a small vessel in order to join him. Ill fortune awaited him; he was caught in the Thames, and the ship took him prisoner, and plundering him of all his money and goods, landed him at Ostend. In September, 1648, Hyde rejoined the prince at the Hague, and here he lived until the surrender of the town.

The disposition of the Spanish court towards the youthful Charles II. disposed him to send an embassy to Madrid. Hyde and Cottington were fixed upon for the ambassadors, and received instructions in the following purport,—that they should endeavour to effect with Spain a league offensive and defensive; should give assurances of the king’s resolutions of grace and favour towards his Catholic subjects; should renew the offers of peace and negotiation, and, in short, proceed to assure the nuncio as much as he could to procure the assistance of the pope. In May, 1649, the two ambassadors left the Hague: Hyde established his wife and children at Antwerp, and after some delay landed in Spain. During fifteen months negotiations were carried on, until it became evident that none of the desired objects would result from the embassy. At length it was decided to send the prince of Wales to the court of Spain to retire, having suffered mortification from neglect, and inconvenience from excessive poverty. Hyde quitted Madrid in 1651, and lived at Antwerp with his father, in great comfort and contentment. Here he conducted the principal business of the English court, collecting for their benefit such sums as lie could procure to diminish their pecuniary embarrassments. That they were not without influence is evident from Hyde’s correspondence. He says in 1652, ‘I have neither clothes nor fire to preserve me from the sharpness of the season; ‘ and in the following year, ‘I have not had a livre of my own these three months.’ He had also other evils to contend with; the queen was his open foe, and he had enemies striving to undermine him in the favour of the king; and though the behaviour of the king was friendly, he could not avoid being constantly accused of such an accusation. Thus Hyde followed the fortunes of the king, affording him during his exile all the service that he was able; conducting his affairs, advising his actions, and composing the confusion which he had occasioned. He was rewarded with the appointment of lord-chancellor, an empty title, as the king was then situated, powerless and poor, yet, in all respects, the utmost that could be bestowed on him. The death of Oliver Cromwell marked a change of the Royalists. During the short protectorate of his son the restoration of Charles became daily more probable. Hyde, Ormond, Cokepeper, and Nicholas were at this time the four confidential bishops of whose advice Charles was almost exclusively directed. Of these persons, the greatest share of business, and was believed to possess the greatest influence. The measures recommended he were tempered with sagacity, prudence, and moderation: ‘The chanceller was a master of the Restoration: he was with P. C., No. 771. Charles at Canterbury in his progress to London, followed his triumphal entry to the capital, and took his seat on the first of June (1660) as speaker of the House of Lords; he also sat on the throne of the Black Rod in the House of Commons. On the 1st of July, he retained the office of chancellor of the exchequer until the king could find a fit person to succeed him. Thus from a powerless and poverty-stricken guardian of an exiled king he was suddenly transformed into the greatest minister of the kingdom, authority, among the ministers of a monarch, who, while invested by the public with sovereign power, still evinced towards him the deference of a pupil.’

The part in this narrative of the principal measures that occupied the parliament assembled after the Restoration may be learned from Lord Clarendon’s ‘Life,’ written by himself, in Mr. Lister’s ‘Life of Clarendon,’ and Burnet’s History of his Own Time. We proceed to notice an event of immediate personal importance and interest to the chancellor which occurred in the autumn of 1660. Anne Hyde, his daughter, who was in the household of the princess of Orange, during a visit to the queen at Paris had contracted an attachment to the duke of York, the result of which was a secret marriage, solemnized in September, in time to legitimate their first child, born on the 22nd of the following month. This marriage was offensive, not only at court, but also to the chancellor, ‘who broke off,’ as he tells us, ‘into an immediate passion against the wickedness of his daughter.’ It was at first doubtful whether this unpopular marriage might not tend to diminish the favour and influence of his son, and his negociation, however were soon removed. The king entertained no suspicions of artifice or collusion on the part of Hyde, and to prove that he entertained none, created him a baron, and raised the title of the princess of Orange to that of the dukedom of York in the event of the marriage; and, by the marriage, he became a dependent borrower from the king of France—‘to have been the sanctioner of such a system is one of the gravest faults with which Clarendon is chargeable as an ambassador.’

The opposition of the chancellor to the king’s inclination to Catholicism, as well as to other wishes he had formed, diminished his share of royal favour, and gave opportunity for the effect of his enemies. He was again appointed bishop of London in 1661. Here he conducted the principal business of the English court, collecting for their benefit such sums as lie could procure to diminish their pecuniary embarrassments. That they were not without influence is evident from Hyde’s correspondence. He says in 1652, ‘I have neither clothes nor fire to preserve me from the sharpness of the season; ‘ and in the following year, ‘I have not had a livre of my own these three months.’ He had also other evils to contend with; the queen was his open foe, and he had enemies striving to undermine him in the favour of the king; and though the behaviour of the king was friendly, he could not avoid being constantly accused of such an accusation. Thus Hyde followed the fortunes of the king, affording him during his exile all the service that he was able; conducting his affairs, advising his actions, and composing the confusion which he had occasioned. He was rewarded with the appointment of lord-chancellor, an empty title, as the king was then situated, powerless and poor, yet, in all respects, the utmost that could be bestowed on him. The death of Oliver Cromwell marked a change of the Royalists. During the short protectorate of his son the restoration of Charles became daily more probable. Hyde, Ormond, Cokepeper, and Nicholas were at this time the four confidential bishops of whose advice Charles was almost exclusively directed. Of these persons, the greatest share of business, and was believed to possess the greatest influence. The measures recommended he were tempered with sagacity, prudence, and moderation: ‘The chanceller was a master of the Restoration: he was with P. C., No. 771.
By his second wife, who died in 1667, at the time that difficulties were multiplying around her husband, he had six children, four sons and two daughters. Herein, the second earl of Clarendon, died in 1709; Lawrence, created earl of Rochester, died in 1711; Edward and James died unmarried; Anne married James, duke of York, and was the mother of Queen Anne; Frances was married to Thomas Keighly, of Hertingfordbury.

Clarendon's abilities were great. As a minister he was wanting more in courage and firmness than in sagacity and foresight. He was not disposed to judge with any energy, nor with temporary expedients and to be too little mindful of remote consequences. He was pure according to the standard of the times. 'He had one great merit,' says Mr. Lister, in his Life of Clarendon, 'of great man, rare and valuable at all times, but peculiarly so, at such a period as the Restoration. He was not disposed (except perhaps when the interests of the church were concerned) to govern in the spirit of a partisan. He aimed at appearing, not the leader of a political faction, but the minister of the nation—a minister to whom royalist and republican might equally look up for justice.' His industry was remarkable, and of his oratory Pepys says (vol. iii., p. 69), 'I am mad in love with my lord chancellor, for he doth comprehend and speak out well, and with the greatest easiness and authority that I ever saw a man in my life.' As a judge there are but scanty materials for the estimation of his abilities; but they were at this time very subordinate to the political: high legal attainments were not considered essential qualifications. We do not find that he was neglectful of the duties and improvement of his house.

In private life he was a warm and constant friend, and strict observer of moral duties, in an age when vice was openly contemned and preferred. Haughtiness and irritable of temper were his principal failings. In his History of the Two Nations he is sometimes very accurate; at other times, he is very inaccurate. In the latter he appears to have trusted chiefly to the recollection of a somewhat fallacious memory. We must refer to Mr. Lister's 'Life of Clarendon' for an account of his life. (Lister's Life of Clarendon, Life of Clarendon, by himself; Burcet's Own Times; Diaries of Evelyn and Pepys.)

HYDE, THOMAS, D.D., was born June the 29th, 1636, at Billingsgate near Bridgeport, in Yorkshire. He received his first instruction in the Oriental languages from his father, and afterwards studied them under Wheelock, professor of Arabic in the University of Cambridge. He only relinquished the study of the Arabic language at the age of seventeen, to London to assist Walton in editing the Polyglott Bible. He translated for this work in Persian letters the Persian translation of the Pentateuch, which he wrote against his own inclination. He translated Hebrew characters, and also translated it into Latin. He also assisted in the correction of the Arabic and Syriac versions. In 1656 he entered Queen's College, Oxford; in 1659 was appointed under-librarian of the Bodleian; and in 1665 principal librarian. In 1660 he became a prebendary of Salisbury; in 1679 archdeacon of Gloucester; and in 1682 took the degree of D.D. On the death of Pococke, in 1691, Hyde was appointed Laudian professor of Arabic; and not long afterwards Regius professor of Hebrew, and canon of Christchurch. He resigned the librarianship of the Bodleian in 1701, and died on the 18th of January, 1703, in his sixty-eighth year. He was Orientalist through life——during the reigns of Charles II., James II., and William II.

Hyde possessed an accurate knowledge of almost all the Asian languages which were at that time in use among European scholars. In addition Hebrew, Syriac, Persian, Arabic, and the Malayo-American languages; and was one of the first Europeans who acquired a knowledge of Chinese, which he learned from the Jesuits, a knowledge which has since been brought to Europe by the Jesuits. His most celebrated work, entitled 'Veterum Persarum et Magorum Religionis Historia,' Oxrf., 1700, reprinted in 1760, displays

* Lord Clarendon's dates, dated 23rd May, 1661, are printed in Remains (ed. of 1811), general collection, vol. i. of Clarendon Court of Chancery, and of all earlier Court of Chancery cases. The dates of many of the important cases in the reign of Charles I. and to the 20th of King Charles II. are given in Clarendon's Court of Chancery, and of all earlier Court of Chancery, and of all earlier Court of Chancery cases. In a very great number of the cases reported in this book the chancellor seems not to have decided without the assistance of the judges.
HYD

an extraordinary acquaintance, considering the time in which he travelled without a guide. His other works the most important are:—Tabulae Stellatarum Fixarum ex Observatione Ulugh Beighi,' Oxf., 1665, with a learned commentary on the different names of the stars among the Greeks and Orientals; 'Quatuor Epistolae' which he had already published in the 'Peregrinatio Europaea,' Oxf., 1677; 'Epistola de Mensuris et Ponderibus Serue Sinesium,' published at the end of Dr. Bernard's book 'De Mensuris et Ponderibus,' Oxf., 1677. At this time, while he was held by the Orange Order of Hyde, with the exception of the 'Veterum Persarum et Magorum Historia,' were republished by Granville Sharp under the title of 'Syntagma Dissertationum quindecim de Linum Hydropia,' Oxf., 1678. In this edition Sharp has printed several of Hyde's works which had previously been unpublished, and has also given a list of many other works which have never been published, amongst which he mentions translations in Latin of Abbadillo, Abbadillo, and the history of Tamerlane, and dictionaries of the Turkish and Persian languages.

HYDER ALI is well known as the ablest and most formidable enemy of the British power in the East Indies. He was a soldier of fortune, who began his career in the service of the Raja of Mysore in 1749, and ascending step by step, reached in 1769 the rank of commander-in-chief of the Mysorean troops. The Raja however was but a puppet; and the fortune which had established himself firmly as prime minister, but on his master with three lacks of rupees yearly, and became in 1761 the undisputed ruler of Mysore. From this moment he had considered himself as emperor of the Indian empire. His encroachments led to an offensive alliance between the Maharrattas, the Nizam of the Deccan, and the British: but he found means not only to break up this confederation, but also to engage the Nizam in war against his late friends the British, in 1767. This war was carried on, little to the advantage of the English, for two years, when at last Hyder, by a bold and able stroke, placed himself in a situation to divide the forces of his enemies, and to engage the British troops to a considerable distance from Madras, and, availling himself of his great superiority in that arm, he put himself at the head of 9000 horse, and marching 120 miles in three days, suddenly appeared at the gates of the capital. Fort St. George indeed might have defied his cavalry for ever: but the rich villas of the neighbourhood, the town, and its mercantile wealth, lay at his mercy; and the presidency felt compelled to negotiate a peace, of which the chief condition was the total restitution of conquests and an alliance in defensive wars.

This treaty was not very well kept by the British. In 1770 the Maharrattas invaded Mysore, and reduced Hyder to greater straits. He had already obtained nothing beyond neutrality; and in 1772 was obliged to conclude peace on disadvantageous terms. In 1774 the divisions of the Maharrattas gave him an opportunity to recover his losses, which he duly improved; and between that time and 1778 he had done much to restore order, improve the revenue, and increase the strength of Mysore.

In 1777-8 fresh disturbance from the Maharrattas led him again to seek help from Madras. Disgust at a second disappointment, stimulated by the influence of the French, of whom he had many in his service, and with whom, so long as the nominative possessions in India, he was united by mutual jealousy of the British, with other grounds of discontent and alarm, induced him in 1779 to form a second alliance with the Nizam and the Maharrattas. Little or no preparation had been made by the Maharrattas, and when in 1780 the troops advanced with a vast army into the Carnatic. The open country was ravaged almost to the walls of Mysore; and as the peasantry were oppressed and disaffected, Hyder was regarded rather as a deliverer than as a conqueror. He now derived a great advantage from the fact that the British had always minute information as to the movements of the British troops; while they, on the other hand, found great difficulty in gaining trustworthy intelligence. During 1780 and the following year the war on the part of the British was chiefly defensive. Hyder endeavoured to avoid pitched battles, and to surprise and cut off detachments; and meanwhile he succeeded in taking several of the most important towns and fortresses. His enormous superiority in numbers and cavalry gave him the entire command of the country, which after two campaigns was so entirely wasted, that view of provisions, in the autumn of 1782, reduced the army, the garrisoned places, and Madras itself, to great distress. Peace was offered by the new governor of Madras, Lord Macartney; but Hyder declined his overtures with a dignified allusion to the breach of faith which would have been made by the British. He therefore continued on the same footing during the following year, until, in the autumn, Madras was reduced to a frightful state of famine; in short, the entire ruin of the presidency seemed at hand. Dr.beam foe. In the autumn of 1782, relieved the English from a danger which his talents only had made formidable. His successes were due to his capacity for diplomacy, his military skill, care of discipline, and attention to its tai in the disaffection of the tribes which served under his banners, his economy in personal expenditure, minute attention to finance, and regular payment of his army. These are the qualities which have induced Major Bennet in his introduction to his 'Memoir of a Map of the Peninsula of India,' to entitle him the Frederick of the East.

Hyder's son and successor Tippoo inherited the resentment but not the ability of his father. He found it expedient to evacuate the Carnatic in 1783, and in March, 1784, concluded peace, on the terms of a mutual restitution of conquests. (Mill. Hist. of British India.)

HYDNOPODA (Fischen), a genus of Polyopia, nearly synonymous with the Malacca of Lamark. Goldfuss ranks some of the species under his somewhat indefinite group of Astros.

HYDRA, island. [Greek.] HYDRA (consisting also in Ptolemy), the Water-snake, one of the old constellations. From the time of Aratus downwards it has always been a triple figure: a long snake, represented as trailing upon the ground, bears upon its back a cup (Cerberus), and over to its tail is seated a crow (Corvus). The mythological meaning is altogether unknown.

The great length of this constellation has caused it to be divided into four smaller parts, called Hydroa, Hydrob, Hydroc, and Hydrod. The first contains the head and body up to about 104 hours of right ascension, all near to and south of the bright star Regulus; the second contains the cup and the parts of the body adjacent; the third the crow, with the parts of the body adjacent; and the fourth (beginning at about 13 hours of right ascension) contains the tail. For the third part see Corvus. In Flamsteed's catalogue Hydra and Hydrob are treated as all respects as two distinct constellations, with Corvus and Hydra and Cerberus intervening. Mr. Baily, in his new edition of the catalogue, has treated the two as one constellation, and numbered the stars accordingly, making 1, 2, &c., Hydrae continuation to be 45, 46, &c., Hydrae.
other vegetable alkalies do contain some oxygen. All the hydrids are gaseous, and are easily combined with water, forming solutions which possess the well known and strongly marked acid properties of sourness, acting upon carbonates, and reddening vegetable blue colours. They are all hydrochloric products; at any rate hydrobromic acid is the only exception, which is sometimes a volcanic product, though in that case usually combined with ammonia.

Hydrochloric acid is the only one which can be obtained by the direct action of its elements; but the usual method of obtaining it, as well as other hydriads, is that of treating a compound of the radical of the acid and a base with an acid; one form the free acid, that generally of sulphuric acid. Thus, as already mentioned, hydrochloric acid is obtained by acting upon chloride of sodium with sulphuric acid and water; the water suffers decomposition, and its oxygen combines with sodium to form soda, while its hydrogen unites with the chlorine, giving rise to hydrochloric acid; the soda combines with the sulphuric acid to form sulphate of soda. This may be taken as a type of the general action.

HYDRANGEA, a well-known genus of hardy shrubs, of which one species is commonly cultivated for the sake of its beautiful flowers. This plant is a native of China and Japan; it was originally observed in the gardens of Canton by Loureiro, who took it for a primrose, and called it Primula mutabilis. It was next met with by Commerson, a French traveller, who named it Hortensia, in compliment to Madame Hortense Lépoutre. Thunberg referred it to the genus Pedicularis, and Smith called it by its proper name, coupling with it the name Hortensia of Commerson, converted however into Hortensia. When this plant is hardy enough to survive the winter, it grows to a considerable size, and when covered by a multitude of its very large round heads of rosy flowers, becomes a magnificent object. But as it is rather tender, we more commonly see it grown in pots, by which its beauty is much diminished. To have it in perfection, it should be planted in the open ground in a rich soil; during winter it should be covered with a mat well stuffed with straw. As soon as it begins to move its buds in spring, it should be unpacked, and during summer it should be most abundantly supplied with water. We have known a large plant receive as much as 160 gallons of water daily. If thus treated, the Hydrangea is without a rival in the shrubbery of this country. The blue colour which the flowers of this plant now assume does not indicate a distinct variety, but is only owing to the soil in which the plant is made to grow containing a greater quantity of iron than usual.

HYDRATICA. [MERCURY.]

HYDRASPIS. [TOURQUOISE.]

HYDRADES are compounds of bases and water, but all of them are not so termed; thus when water is united with sulphuric or nitric acid, the compound is very often termed a hydride of the acid, or we say hydrated sulphuric or nitric acid. So also when crystallized salts contain water, they are termed hydrates or hydrated salts, but the water is usually called water of crystallisation when the regularity of the form of a salt depends upon its presence.

The term hydrate is usually applied to compounds which contain water in definite proportion, which does not impart regularity of form, or in other words, give crystals with the body with which it so unites. Thus when water is added to potash it may form with it either water of solution, water of crystallisation, or water which constitutes it an hydrate. If we take a solution of potash and evaporate it to a certain extent, we get crystals of potash; heat these and the water of crystallisation is expelled, but no heat whatever is strong enough to expel the whole of the water, and the last remaining portions form with the potash a hydrate, which is a hard substance totally devoid of crystalline form. So also when a solution of a salt is added to lime, a somewhat dissolved, but the crystals of water and lime are obtained with difficulty, but hydrate of lime is the well known dry powder called slaked lime.

It appears therefore, from the above statements, that water of solution has comparatively little affinity for the substance with which it is combined; water of crystallisation has more, but water with which the body constitutes an hydrate has the greatest affinity of all.

The water with which substances combine often imparts colour to them; such sulphate of copper when nearly de-
prived of water is colourless, but when dissolved in water it becomes of a fine blue colour; and water of crystalization produces the same effect. So also oxide of copper is of a black colour, but the hydrate of copper obtained by adding potash to a solution of copper is of a beautiful blue color.

HYDRAULICS. This term is applied to the art of constructing machines in which water is employed as a moving power, or by which that fluid is put in motion; and in the form of streams, which such artificial machines are executed. The art of constructing docks, quays, or any buildings whose foundations are laid under water, is denominated hydraulic architecture.

The simplest kind of one of those machines is that used for raising water in order to drain lakes or marshes appears to have been executed in Egypt at a very remote period, nothing positive can be said to be known concerning that which existed at an earlier time than the age of the Ptolemies; unless we admit that a simple wheel carrying earthen pitchers on its circumference, a contrivance which is still employed there, was, as is likely, in use before that epoch. The spiral engine (conchol) of Archimedes, as it is called, is said by Diodorus Siculus (i. 34) to have been used in that country for raising water from the river for the purpose of irrigation; and the elecypdra, for measuring the lapse of time, though probably far more antient, is known to have been then employed in Egypt and Greece, for astronomical as well as civil purposes.

The hydraulic machines described by Vitruvius in the tenth book of his 'Architecture' are sufficiently simple to allow us to form an idea of their construction and mode of action. The螺旋 engine was in use as a very early epoch; and, as he mentions no others, it may be perhaps concluded that those alone, or together with an apparently simple machine for extinguishing fires, were in general use. A water tower, which we have heard of that of Augustus. He describes a tympanum, or hollow wheel, which was employed for the purpose of raising water from a river or reservoir: the wheel was partly immersed in the water, and the water, turning the wheel, islet a certain orifice in the circumference, from whence it descended to the axle by troughs in the direction of the radii: from the axle it was conveyed in pipes to the salt-works or gardens, where it might be employed. He mentions a wheel with buckets, which took up water from a reservoir on the ascending side of the wheel, and discharged it on the opposite side, in consequence of the reversion of their position. He moreover notices a species of chain-pump, and the spiral machine of Archimedes. All of these were intended for the same purposes, and were turned either by the impulse of a stream in which they were placed, or by men walking upon them; that is, probably, on the exterior circumference of the wheels attached to the axles of the machines.

Water-wheels for grinding corn are also described by Vitruvius; and, lastly, the same writer gives a brief and obviou explanation of the contrivance producing the well known sensations of sound. These seem to have been effected by moving a piston up and down in a cylinder, and thus forcing the air which was allowed to enter the latter to pass through a pipe into the upper part of an inverted cone, which was sunk, like a diving-bell, in the water of a cistern. The air in the cone was prevented from returning into the cylinder by a valve placed at the orifice of the pipe; and being condensed between the top of the cone and the water below, on touching the fuses of the instrument, the vibrations of sound were produced by its escape through the organ-pipes, which opened into the upper part of the cone. This instrument was invented in the second century B.C. by Ctesibius, to whom also is ascribed the invention of the steam-engine, or as first-movers with respect to extensive works of any kind, has of late considerably diminished. Yet where the circumstances are favorable, where the water is deep, and where for working the machine can be readily obtained, and when natural means exist of conveying away that which has been raised, the latter, from being less expensive in its construction, is still preferred to the former.

The most remarkable of the hydraulic machines which have been employed for raising water are the works at Antwerp, and those which till lately existed at London Bridge. The former, which is the most extensive of all, was constructed in the latter part of the seventeenth century, and raised the water of the Seine by three different stages to a reservoir at the height of 333 feet above the surface of the river; from that reservoir water was conducted by an aqueduct to the town of Versailles and Trianon. Fourteen wheels were employed in as many watercourses; the wheels were about 36 feet in diameter, and on their axles were cranks by which, in all, 233 piles, were connected, so that the quantity of water raised is said to have been about 40,000 gallons per hour.

The Phoenicians, who in an early age were distinguished by a spirit of commercial enterprise, appear to have bestowed vast care and to have dispayed no small ingenuity in rendering the harbours of Tyre secure places for shipping, as well as in fortifying the town against the aggressions of their powerful neighbours. Tyre appears to have had two ports, the greatest of which was of an oval figure, and capable of receiving 500 vessels. It was situated on the north side of the town, which thus protected it against the south wind, while a rocky island in front served as a dyke to break the force of the waves, or, what is the same thing, to form in the form of segments of circles, extending into the sea towards the west, formed an outer port, and a third mole secured the entrance against the violence of the waves in that direction. The second port was intended for merchants' ships, and was partly enclosed by the town; but towards the south side, and was also protected by an advanced mole or breakwater. Such, when the city was taken and destroyed by Alexander, appear to have been the disposition of the ports and harbours, and after the destruction of the latter, the inhabitants transferred their residence to the island of Tyre, which was connected to the continent by a bridge, and was also protected by breakwaters. At this time Tyre enjoyed a great maritime commerce, and was the centre of navigation for the whole of the Mediterranean seas; and the greater part of the trade of the world.

The splendid port of Alexandria, which was constructed during the reign of Ptolemy Philadephus, with those of Rhodes and Syracuse, attest the advanced state of hydraulic architecture among the ancients; but no written account of the methods employed by them in executing such works, have been transmitted to us, except the very brief notice contained in the fifth book of Vitruvius.

The ports of Rome, Arles, Genoa, Leghorn, and Civita Vecchia, afford sufficient evidence of the skill of the Italian engineers in forming secure harbours for shipping, while their country enjoyed the advantages of an almost exclusive commerce; and, in later times, the maritime powers of Europe have spared no expenditure in the formation of secure harbours in those cities, which served for the defence of their embouchures, and well for their ships of war as for those of their merchants.

No countries in Europe possess more advantages with respect to naval power than Great Britain and Ireland. The islands and headlands on the coast, the excellence of the natural ports; and these, where necessary, have been converted into secure harbours by every means by which the science of the hydraulic engineer could devise. The Breakwater at Plymouth, the lighthouses which have been placed in the ocean, and the vast docks at the principal seaport towns, are so many practical examples which render the
British Isles a complete school for the study, in detail, of every subject connected with this branch of art.

Besides the construction of harbours for ships, the formation of the aqueducts which supplied the cities with water must have constituted an important part of the duties of the hydraulic engineer among the antients; and Vitruvius, in his eighth book, explains at some length the manner of conveying the water between the castelli, or reservoirs, in the town; and in the town, the water can be observed here, however, that the antients did not always construct aqueducts on arches, to convey the water across valleys; though this method was preferred, from an opinion that water transmitted through pipes was less healthy.

Foundations, however, that the water was, occasionally, so transmitted; and that it was the practice to place, at intervals along the line of pipes, columns, or open tubes, in vertical positions, in order to allow the escape of the air; which, separating from the liquid, would have impeded or entirely prevented its motion.

Hydraulic architecture is now chiefly concerned in the construction of walls or masses of masonry, whose foundations extend in the waters or in that of the sea; such are the piers of bridges; walls which support the banks; and jettees extending from thence into the water, either for the purpose of forming quays to receive merchandise from ships, or for the protection of the bank. The current of a river is intended to increase the velocity of the current, in order to remove bars which might, if suffered to remain, interrupt the navigation. The practice of the art also involves the formation of artificial openings for ships; the arrangement of sluices for raising or lowering the passage of vessels at the falls on rivers or canals. In all these cases great precautions are requisite to secure the foundations, and to give the superstructure sufficient strength to support the water. The practical pressure of the rivers which were to find its way under or behind, and cause the destruction of the work; and the difficulties increase in proportion to the depth of the water and rapidity of the current. The starlings of the Thames at London, and many other water-works were examples of the rude methods antiently employed in this country for building in water. Caissons resting on piles driven deep into the ground under the intended work are occasionally employed when the water is not very deep and the current strong. But no work of magnitude can be considered as secure whose foundations are not laid by the engineer in the bed of the water; for this purpose the part on which the construction is to be raised must be laid dry by enclosing in a coffer-dam, and actually drawing off the water by engines.

The following are brief descriptions of the hydraulic machines which are in frequent use for domestic and general purposes. The work is to be performed not by such magnitude or importance as to require an application of the power of steam.

The Siphon.—The simplest machine of this kind, and one of the most widely different in its kind is the siphon. This is nothing more than a bent tube whose arms are of unequal length: one of the arms being immersed in the liquid which is to be drawn from a vessel or reservoir, and the air being removed by suction, or by means of a syringe, or by previously filling the siphon, the liquid in the vessel immediately rises in the immersed arm, in consequence of the pressure of the atmosphere on that which is above the tube; then passing over the bend, it flows from the open orifice at the lower extremity of the other arm. When the fluid to be raised is water, the vertical height of the bend in the tube, above the surface of the water in the vessel, must not exceed about 35 feet, because a column of fluid of that height would be in equilibrium with the pressure of the atmosphere, and could not by the latter be forced over the bend. If mercury were to be raised, the height of the bend in the siphon must, for a similar reason, be about 30 inches. The external arm of the siphon must be longer than that which is immersed in the fluid, or its orifice must be on a lower level than the surface of that fluid, in order that the weight of the column of air in the former may be equal to that in the latter, and thus a continual stream be produced.

A siphon may be made to discharge water at the upper extremity by means of an air-vasell at that place. Thus, when the upper arm of the communication between the descending branch and the lower part of the air-vasell is closed by the shutting of a valve, the water, which would have otherwise descended, rises in the vessel, where it condenses the air; and, from the reaction of the latter, it is made to escape, as in a forcing-pump, through an open pipe whose lower extremity is under the surface of the water in the vessel. This was the invention of M. Hachette, and is denominated the ram siphon.

Archimedes' Spiral (fig. 1) is either a flexible tube open at both ends and wound spirally on the exterior surface of a cylinder; or it may be a plate of metal coiled about an axis, like the threads of a screw, and enclosed within a hollow cylinder so as to be completely water-tight. The machine is fixed in an inclined plane having its extremity immersed in the water which is to be raised. While it is at rest the water occupies the lower part between two of the threads or bends of the spiral, at bottom; but if the plate is made to ascend, the water will by its gravity be caused to descend into the lower part between the next bends of the spiral, while in reality it rises, with respect to its former position, to the extent of the reduction of the tube, or bends, within which it is confined. Thus the water continually proceeds towards the upper part of the machine, from whence it is discharged into a reservoir placed to receive it.

It is shown, by writers on hydrostatics, that this machine cannot raise water when the angle which a line drawn centrally on the spiral bends makes with planes parallel to the base of the cylinder is greater than the angle which the latter makes with the horizon; and it is recommended that, in practice, the angle which the axis of the cylinder makes with the horizon should be between 40 and 60 degrees. Such a machine is particularly useful when the water is mixed with gravel, weeds, and the like, which would spoil the action of a common pump. For computations concerning the force requisite to turn the machine, and the quantity of water which it will raise in a given time, see Gregory's Mechanism.

A machine consisting of a pipe wound spirally about the surface of a cylinder, or cone, which is made to revolve about its axis when the latter is in a horizontal position, is called a spiral-pump. Under certain circumstances, it may be used to raise the water and air in nearly equal quantities being allowed to enter, the former will, in consequence of the revolution, be forced upon an ascending pipe which may be attached at the other extremity.

Pumps.—The common pump is a machine for raising water by the pressure of the atmosphere: it consists of a cylindrical body, or barrel, from the lower part of which a tube descends into the water contained in the well or reservoir. In the interior of the cylinder is a moveable piston surrounded with leather in order that it may be water-tight, yet capable of moving up and down with freedom. The piston is perforated, and the orifice is covered above by a valve which prevents the entry of air; and a similar valve at the bottom of the cylinder, or barrel, covers the upper extremity of the tube which leads to the well.

Now, if we suppose a power applied, by a lever or otherwise, at the extremity of the tube to raise the piston from A to B (fig. 2), the air contained in the tube D tends by its elasticity to occupy the lower part of the cylinder, which it enters by forcing up the valve E; and its elasticity diminishes in consequence of its occupying a greater space than before. Hence the air exerts on the surface of the water within the tube, at D, a less pressure than that which the external air exerts upon the water in the well; and the water consequently rises in the tube to a certain height above D, which is such that the weight of the column of water, together with the diminished pressure of the air, is equal to the pressure of the external air. The valve E then...
falls over the orifice; and the piston B being depressed, the air contained between it and the bottom of the cylinder will be condensed, and, acting by its elasticity on the surface of the water, compels it to issue through the pipe K in a continuous stream.

A centrifugal pump is sometimes made to consist of two hollow cylinders at right angles to one another, in the form of the letter T. The lower extremity of such a machine rests by a pivot on a support in the water which is to be raised, and the machine is made to revolve on a vertical axis by means of wheel-work. Near the bottom of the vertical cylinder is a valve, opening upwards, which is closed by the weight of the column of water above when the tube is filled; and at each extremity of the horizontal cylinder is a valve opening outwards, which, when the machine is not in motion, is made to cover the aperture by means of a spring. When the machine is to be put in action, it must be filled with water by holes formed for the purpose in the upper part; these holes being then stopped, the machine is made to revolve rapidly, when the water in the horizontal arm acquires centrifugal force, by which it opens the valves at the extremities and flows into a reservoir placed there to receive it. The diminution of the gravity of the water in the vertical tube in consequence of that force, by taking off part of the pressure on the valve at the bottom, allows the pressure of the atmosphere on the exterior water to force the latter through that valve into the cylinder, and thus maintain a constant supply in the machine.

For raising water from great depths and in large quantities chain-pumps, as they are called, have been frequently employed. In this machine (fig. 4) a chain, carrying a number of flat circular pistons, passes round a wheel at the upper, and sometimes also at the lower extremity; each piston as it goes over the wheels being in part received in the intervals between the radii, as in the figure. The wheel being put in motion the pistons descend in a barrel on one side, and enter from below into another on the ascending side, when, pushing the water before them, they raise it into the reservoir. If the wheel is turned with considerable velocity the barrel will be generally quite full of water.

Pumps of this kind are frequently fixed in inclined positions; and it is when the inclination of the barrel is about 45 degrees, the distance of the pistons from one another being equal to their diameter, that the greatest quantity of water is raised.

Chain-pumps are sometimes constructed without pistons or barrel; in this case the chain passes over two wheels, one at the top and the other at the bottom, and a number of buckets are attached to it. By turning the wheel the buckets dip into the water with their open ends downwards, and rising on the other side, convey the water into the reservoir.
The Hydraulic Press.—This machine, which was invented by Mr. Bramah, is one of very great power in compressing bodies or lifting weights; or, again, in drawing up trees by the roots, or piles from the beds of rivers.

A (fig. 5) is an iron cylinder in which works the piston

B. At the bottom of the former is inserted the tube C, whose aperture, under the piston, is covered by a valve. The other end of C communicates with a small forcing-pump, by which water is driven through the said valve into the lower part of the cylinder, where its hydrostatical action is exerted to raise up the piston.

Now suppose the diameter of the cylinder to be 10 inches, and that of the piston in the forcing-pump to be one quarter of an inch, then the proportion between the surfaces of the pistons will be that of 1600 to 1; and, on the principle of the equal pressure of fluids in every direction, the force with which the piston B is raised is to the resistance against the lower surface of that in the forcing-pump in the same proportion.

Water-wheels.—Water may be made to act as a moving power against wheels by its weight, its momentum, or by both combined. In the first case the wheel is provided with a number of buckets, or troughs, into which the water is received near the level of the axle of the wheel; the vessels thus filled becoming heavier than those on the other side, the wheel is made to revolve by that excess of weight merely. But if the water fall into the troughs over the top of the wheel, or at least from a certain height above the axle, the wheel will revolve both by the weight and by the momentum which the water acquires by its fall. The latter is called an overshot, and the former a balanced wheel.

Again, if the lower part of the wheel he placed in a stream of water which is made to act on float-boards fixed on the circumference, the machine has the name of an undershot wheel. Lastly, when the wheel is placed in a sort of channel, or race, as it is called, which is formed between two projections of masonry below the bed of the upper portion of the stream, and so as to coincide very nearly with the lower quadrant of the wheel’s circumference on that side, the water descending from the stream upon float-boards, or troughs, and thus acting both by its momentum and weight, the machine is called a breast-wheel.

Many contrivances have been adopted for enabling the buckets or troughs of an overshot wheel to retain, during their descent, as much as possible of the water which, by entering into them, causes the wheel to revolve; and one of those, which Dr. Robison considers as the most approved, may be thus briefly described:—premising that the ring of wood between the concentric circles Q D S and P A R (fig. 6), constituting the ends of the troughs, is called the shrouding; and that the inner circle P A R is called the sole of the wheel: the sole usually consists of boards made fast to strong rings, which are firmly connected with the radii. The partitions which determine the forms of the troughs consist of three boards, whose positions are indicated in fig. 7 by the lines A B, B C, and C D, which may be thus traced.—Imagine A I, G H, &c., to be drawn in the direction of radii at a distance from each other equal to 9 degrees, or one-fourth of the circumference of the wheel, if there are to be forty troughs, then the depth A I and G H of the shrouding may be made equal to 1/4 of the interval, or sole, A G; and A B may be made equal to half
HYDROCELE (from ὕδωρ, water, and κέλευθος, a tumour) is a collection of watery fluid in the tunica vaginalis testis. It is characterized by the sensation of a tumour, which enlarges gradually without heat or pain, has a pyriform shape, is firm and elastic, often appears transparent when a light is placed behind it, and does not, like a hernia, diminish in size when the body is in a recumbent posture, nor communicate any impression while coughing. In most cases the fluid collects without any distinct cause, but in some it follows rapidly after an injury of the part. The quantity of fluid which accumulates varies from a few ounces to several quarts; and this disease often occurs in those who are otherwise in perfect health, and in persons of all ages; it may be seated on one or both sides of the body. The treatment consists, 1st, in the evacuation of the fluid by tapping, with the object of preventing it from accumulating again by exciting such active inflammation of the opposite surfaces of the tunica vaginalis as may produce their adhesion and the obliteration of the cavity. The latter process is generally fulfilled by the injection of some stimulant fluid, or the introduction of a foreign body into the cavity.

HYDROCEPHALUS (from ὕδωρ, water, and κεφαλή, head), water in the brain, is due to two diseases nearly peculiar to infancy and childhood, which are distinguished as the acute and the chronic. These diseases differ entirely in their nature. Acute hydrocephalus is a disease rapidly fatal, and inflammatory in its nature, and of which the effusion of fluid in the brain is but one, and that not a constant effect or concomitant. To constitute chronic hydrocephalus (an affection which may last many years), the only essential condition is the accumulation of a watery fluid within the skull, which may or may not be caused by or attended with inflammatory action.

1. Acute Hydrocephalus is a most frequent and fatal disease of the early stages of life. It occurs most commonly between the first and the eighth year, and corresponds in a great measure to the inflammation of the brain (phrenitis and arachnitis) of later years.

The rapid action of the disease when once formed, and its frequently fatal termination, render it a matter of the greatest importance to detect its first or premonitory symptoms. But these, which it frequently fails to the lot of the parents and friends only to observe, are unfortunately so indistinct as to require the most minute and critical attention. There is more and more indisposition to motion; the little patient complains of heaviness of the head, and loses its strength; its gait is unsteady. Of the above symptoms, the referable to the head are the frequently most distinct; purgative medicine is given, and sometimes relieves the symptoms for a time. The child may remain in this state for several days or weeks without anything more than heaviness or slight pain in the head being complained of, and without any fever; but when the symptoms persist after purgative medicine has acted, they should be looked upon with apprehension; and if there be no known cause, such as the presence of worms in the intestines or the lack of a tooth, they should be closely attended to from the commencement.

The symptoms more surely indicative of the disease are...
enormous pain in the head, to which the child constantly carries its head; intolerance of light, sound, and motion; squinting; heat of the head; knitting of the brows; disturbed sleep, with grinding of the teeth, the child frequently waking with a scream; the pulse being at the same time slow and irregular, and not quick as in fever from worms or teething. The appetite is lost, the evacuations from the bowels are unhealthy, and vomiting ensues. The abdomen, if previously distended, now falls in and becomes quite flat. Suppur, induced by seizers, follows. After these symptoms have continued for some hours or days, there will sometimes be a temporary recovery of sense; the child will see, hear, and know its friends, and will take its food; but this promising state is soon interrupted by convulsions of the whole body, or of one side, particularly of one side, return of the squinting, complete loss of sight and hearing, and inability to swallow; still greater emaciation ensues, the breathing becomes irregular, the extremities cold, and death follows.

This is the more usual course of the disease; it then generally lasts several days or even weeks. But it in some instances comes on suddenly, and proves fatal in a few hours. In other cases the symptoms are less severe and more prolonged; and chronic hydrocephalus, gradually develops itself.

The appearances which are found in the brain after death are few and simple. Blood-vessels, effusion of serum mixed with lymph in very variable quantity between the membranes at the base of the brain or in its cavities, and softening of the substance of the brain itself, particularly of those parts of it which form the floor of the ventricles or ventricular space. Sometimes there is merely effusion of clear serum, sometimes no effusion, but merely softening of the cerebral substance.

Cause.—Children of scrofulous diathesis, or of irritable temperament, and those, it is said, of precocious intellect, with a large head, are most subject to this disease. Such children should be as much as possible guarded from agencies likely to excite increased flow of blood to the brain, such as cold or external violence to the head, the influence of the sun, the suppression of eruptions of the skin, and particularly of the scalp, the use of narcotic remedies, as opium, too great excitement of the mind, and the early exercise of the intellectual powers.

The treatment must vary in the different stages of the disease, but will generally consist in endeavouring to subdue inflammatory action, in removing any causes which may, directly or indirectly by sympathy, keep up irritation of the brain; and lastly, in the latter stages, in supporting the strength of the system.

2. Chronic hydrocephalus.—The disease to which this name is applied is correctly denominated water in the head, being always accompanied with a considerable collection of watery fluid in the cavity of the head, sometimes within the membranes of the brain only and exterior to the organ itself, but more frequently in the ventricles or cavities of the cerebral hemispheres, which are then descended to the form of a sac. The quantity of fluid is sometimes so great as to cause an increased size of the skull, amounting to great deformity; the face, remaining of its natural size, appears disproportionately small. The disease generally arises before or very soon after birth; and the cranial bones not being completely ossified at the time of its commencement, they become separated to a distance from each other, and the sutures remain open for a long period. When the disease comes on after birth its early progress is very insidious.

Symptoms.—The intellectual faculties are always deranged, and the senses generally more or less disordered; there is usually impaired vision or blindness, with squinting; speech is imperfect; the voluntary power over the limbs is partially lost, giving rise to an unsteady gait, as a frequent symptom. The digestive functions, respiration, and circulation, are in most cases unaffected until near the termination of the disease. The unfortunate patient is sometimes the subject of occasional epileptic fits. In the latter stages of the disease the loss of intellect and of the power of motion increases, till at last complete coma and paralysis ensue.

The duration of the disease is extremely various. It may terminate fatally even before birth, or the child may live for many months or years. A man named Cardinal, the subject of water in the head, lived eight years after his birth. The Hydrochairs Morus Ranae.
HYDROCRIPTIC ACID. [Chlorine.]

Organization and Arrangement.

Dental Formula: incisors 2; molars 4 = 20.

Molares compound, the posterior teeth the longest, and formed of numerous laminae, which are simple and parallel; the laminae of the anterior molars forked.

At a meeting of the Zoological Society of London (1832), Mr. Owen, on the occasion of exhibiting a large old cranii of the Capybara belonging to Mr. De la Fons, remarked, that perhaps the most extraordinary instance of the enlarged views which result from unwarranted observation of the internal structure of animals afforded by Cuvier's bold enunciation of the affinity of the Elephant to that order of the Mammalia which contains the most minute forms of the class, and, in support of that affinity, addressed the alveloae of the last molar tooth in Mr. De la Fons's specimen as illustrating an additional analogy between the molars of the Rodent and those of the Elephant, namely, that the number of transverse laminae increases as the jaw enlarges with age, the whole number not coming into use at once.

In the Capybara, says Mr. Owen, 'the posterior grinders, like those of the Elephant, present a greater number of component laminae than the anterior ones, which are of earlier formation. Those of the upper jaw, according to the figure and description in the "Oesemens Fossiles" (V. pl. 1 p. 24), are composed of eleven laminae, of which all but the first, which is notched externally, are simple. In the figure too, it is worthy of observation that the last or eleventh lamina is imperfect, and exhibits a construction analogous to the imperfectly-formed laminae of the Elephant's grinders, viz. a division into component columns. In the work of M. Cuvier, "Sur les Dents des Mammiferes," the number of laminae in the last grinders of the upper jaw of the Capybara is stated as three or four; but eleven only are exhibited in the figure, and we may therefore suppose the doubt as to the precise number to be founded on uncertainty as to the propriety of considering the first denot as notched lamina as single or double. In the cranii in the College Museum the number of the laminae is twelve, the forkt one being regarded as single. In Mr. De la Fons's specimen the alveloae clearly indicate that the number of laminae of the last molar had been thirteen, with the rudiment of the fourteenth; the extent of the grinding surface is however proportionally longer than would result from the additional lamina alone; for as these laminae do not grow so long as the teeth, and, as they increase in thickness as age advances." (Zool. Proc.)

Mr. Morgan (1830, Linm. Trans., vol. xvi) describes the stomach as formed by a single membranous bag; and, as in other omnivorous vegetable feeders in which this simple form of stomach is found, the cecum is large and complicated in proportion. Finding nothing requiring particular notice in the rest of the alimentary canal, Mr. Morgan proceeded to examine the structure of the mouth and the throat. After the considerable excrescence forming the surfaces of the molar-teeth, he remarks that it must be obvious how necessary such an arrangement of parts must be to the health of the animal, when the nature of its food and the simple structure and limited functions of its more important digestive organ are considered, a provision being thus made for the proper mastication of the hard vegetable substances upon which the animal must occasionally subsist. But Mr. Morgan found an impressionascended up to the time when he made his examination, by which the process of perfect mastication is rendered indispensable to the passage of the food from the mouth to the stomach. This structure, by which the possibility of swallowing any portion of unministered nutriment is prevented, is shown in an extraordinary formation of the velum palati molli, or soft palate. In other animals this membrane generally forms an imperfect flexible septum, suspended from the back of the mouth and interposed between the cavity of the mouth and pharynx, but it was found in the capybara and in some of its congeneres to be much more extensive in its attachments, and different in its uses. On separating the jaws the mouth appears to terminate in a nearly blind pouch; for the communication with the pharynx seems as if shut by a strong membrane of a funnel shape, the concavity of which recedes towards the throat. 'This membrane is an extended velum palati attached to the whole circumference of the fauces and root of the tongue, and is prevented from forming a complete septum by the existence of a small central circular aperture, by which a communication between the mouth and the pharynx is established for passage of food; so that through this small membranous funnel, or strainer (if I may be allowed the expression), it is physically impossible that any considerable portion of unministered nutriment should find its way, by natural means, from the mouth into the alimentary canal: and from this circumstance the first process towards digestion must be rendered certain and complete; for the grosser particles of food must reach the abovementioned form of the membranous sieve or strainer, which is thus placed between the organs of mastication and those of digestion.'

Mr. Morgan observes that the same provision for the complete mastication of the solid substances, while being swallowed, will be found in others of the same group, but he confines his well executed descriptions and figures of the anatomy of these parts to the dissections he had made of the capybara. To these descriptions and figures we refer the reader, offering only the conclusion to which Mr. Morgan comes as to the use of this conformation of the velum palai: this appears to him to have reference to the digestive organs, and to be confined almost entirely to the process of deglutition.

In 1834 portions of the viscer of a Capybara, taken from an individual which had recently died in the Zoological Society's museum, were exhibited at one of their meetings. They consisted of the stomach, the enormous coecum, and the fauces. In calling the attention of the latter parts, Mr. Owen availed himself of the opportunity of referring to the observations made by Mr. Morgan, and the former zoologist remarked that the construction above mentioned is indeed found in many other Rodents, but does not obtain in the whole of the animals of that order. (Zool. Proc., 1834, p. 30, book iii.) Cavy Inter porcos aquaticos ete fluidas recipit, quia fiata e natura biumulmum porcum emulatur. Brissou's name, Hydrochoerus, Water Hog, and De Marchais's Cocoh d'Eau, point the same way, thus in his last edition of the Systema Naturae (12th), arranges it D 2
under the genus Sus (Bovine), as Sus Hydrocharis, and immediately after the Sus Typhus, or Peccary, next to which animal it is placed in Piso's Murcage. Pennant, in his 'Synopsis,' calls the Cabybara, with River Hog (Wasser, in Dampiers), as one of the synonyms, the Thick-toed Tapir; but in the 'History of Quadrupeds' he makes it the first species of his genus Caisy, giving it a place immediately before the Guinea Pig, Migenin (13th ed. 'Syst. Nat.') places it among the Gliras, as the last species of the genus Lagomys, immediately after the Guinea Pig, Cavia Cobaya; by which arrangement the animal comes next to the Beaver, Caster. Cuvier makes Hydrocharus a genus of his Rodentia, giving it a position between Lagomys and the Guinea Pig. Flecker brings it under the Gliras, between Lagomys and Dasyprocta. Mr. Gray places it in the order Gliras, family Leperidae, subfamily Hydrocharidae; Hydrocharus being the only genus of that subfamily, which stands between the subfamilies Cottina and Dasyproctina. M. Lesson arranges it between Kerodon and Cavia (Gliras). Mr. Swainson also places it at the head of the Caves, Cavia (Gliras).

Generic Character.—The dentition we have given above.

The other characters are principally found in the four anterior and three posterior toes with which the feet are furnished (all of which are armed with large nails, or rather hoofs, and which, on account of this, the compressed muzzle, the absence of the tail, and twelve teats. The only species is Hydrocharus Cabybar, Cavia Cabybar of Migenin, Sus Hydrocharis of Linnaeus, most of whose synonyms are given above.

Description.—Head very large and thick; nose wide; whiskers long and stiff; eyes large; ears rounded and moderate; legs short; hair of the body short and rough, a little like hog's bristles, but finer; color reddish-brown above, yellowish below; size of a rather small two-year-old pig, being probably the largest of existing Rodents.

**HYD**

**HYD**
HYD

that it solidifies; and this effect is produced even when the temperature of the atmosphere is nearly 70°. The vapour of hydrocyanic acid has a specific gravity of 0·9365, air being 1. With water and alcohol it combines in all proportions.

Hydrocyanic acid is composed of—

One equivalent of hydrogen = 1 or 3·7
One cyanogen = 26 96·3

Equivalent = 27 100

In the state of vapour it may be considered as constituted of—

50 cubic inches of hydrogen = 1·075 grains
50 cyanogen = 27·950

100 cubic inches = 20·025 grains.

Neither condensation nor expansion occurs during the combination of the gases which form the acid.

Hydrocyanic acid, especially if it be exposed to light, is subject to spontaneous decomposition, the first indication of which is that the acid acquires a brownish tint, which gradually deepens, and eventually ammonia is evolved, and a black powder sublimes.

On account of the facility with which it decomposes, it forms but few salts, and like other hydrocyanic acids, when added to metallic oxides, the results being a metallic cyanide and water. Hydrocyanate of ammonia may, however, be formed, but it is an unimportant salt.

HYDRODYNAMICS. Under this word are usually comprised the considerations of equilibrium and of motion in non-elastic fluids, with the resistances which they oppose to bodies moving in them. When a fluid is in a state of rest, the investigation of its equilibrium and that of bodies immersed in it, together with the pressure exerted by the fluid on bodies immersed in it, or containing it, form the subjects of hydrostatics.

Hydrodynamics, which was formerly included under the term hydraulics, is concerned chiefly in investigating the motions of any fluid, or in showing from observation and experiment, the laws relating to the discharge of fluids through orifices and tubes in vessels or reservoirs, and to their motions in canals or rivers.

Concerning the laws of the motions of fluids as they were known to the antients little can be said; the only notice of this branch of science, even in the time of the Roman empire, is contained in the treatise De Aqueducibus, which was composed by Frontinus, in the reign of Nerva or Trajan. This writer shows that the quantity of water issuing from an orifice depends on its magnitude, and on the height of the water in the reservoir above the orifice; and that if a short tube applied to an orifice permitted a greater discharge of fluid than could be obtained from a simple perforation of equal diameter. He appears however to be unacquainted with the manner of determining the relation between the height of the water issuing from the orifice and its velocity, for which the laws of motion are given; and it is not certain that this elementary proposition was solved till the time of Torricelli, who, in 1643, assigned the law correctly, for that case only however in which the aperture is very small compared with the height of the water in the vessel or reservoir.

It appears that, even at the end of the sixteenth century, the cause of the ascent of water in pumps was little known; for Galileo, having occasion to make some observations on the phenomenon, could give no better reason for it than that it was caused by an attraction which he supposed the piston exercised on the water; and not being able to make the column of water follow the piston when the latter was about 34 feet above the surface of that in which he attempted to explain the circumstance by saying that the weight of the column was then so great as to overcome the attraction of the piston. We are indebted to Torricelli for the discovery that the rise of the water is owing to the pressure of the atmosphere on that which, in the well, surrounded the pump; and this is thus forced into the harrel, in consequence of the removal of the internal air, till the weight of the column raised is in equilibrio with that pressure.

Castelli, a disciple of Galileo, in his treatise Della Misura dell' Acque Correnti (1628), appears to have been the first who applied the principle of moments to the motions of fluids in rivers; and, together with several other circumstances relating to such motion, he shows that when the bed of a canal whose transverse section is variable has taken a permanent form, the velocities at different sections are inversely proportional to the areas of those sections. This branch of the science was subsequently much cultivated in Italy, primarily on account of its connection with the improvements then in progress for improving the navigation of the Po, and draining the marshes in the northern part of that country. The Marquis Poleni wrote, in 1655, a work entitled De Motu Aquarum; and, in 1719, and 1720, concerning the flow of water through orifices and short tubes. And numerous works containing the results of their investigations and experiments relating to the same subjects have been made public by other distinguished Italian mathematicians.

The 'Principia' of Newton contains (lib. ii., sect. 7) a series of propositions concerning the motions of fluids. In the first edition (1687) the law of the velocity of water flowing from vessels, being founded on experiments made with orifices of considerable magnitude, appeared to differ from that which had been observed by Torricelli; but the discovery of the corpuscules, which was introduced in the second edition (1713), explained the reason of the apparent discrepancy. Newton also investigated the resistance of fluids to bodies moving in them; and it may be said that his theory forms the groundwork of all our knowledge concerning that subject.

Daniel Bernoulli (in 1738) was the first who applied the higher branches of mathematical analysis in the investigation of general equations relating to the problems of hydrodynamics; and though objections were made to the principles which he adopted, yet the independent investigations of succeeding mathematicians have only confirmed the results at which the former had arrived. The subject was taken up, in 1744, by D'Alembert; who, assuming that the motion of each horizontal lamina of fluid in a vessel, during its descent in consequence of the efflux from the orifice, is compounded of two motions, viz. that which it had at the moment preceding any given time, and that which is subsequently lost, arrived at equations containing all the circumstances attending the efflux at the orifice. And, subsequently, he investigated corresponding equations from the assumption, first, that a rectangular canal supposed to exist in a fluid mass which is in equilibrio is itself in equilibrio; and secondly, that a molecule of fluid supposed to be incompressible retains the same volume under a different form in passing from one place to another.

The researches of Euler, La Grange, La Place, and other Continental mathematicians have, since, contributed greatly to establish the principles of the science on an analytical basis. The laws of the motions of fluids in canals and rivers were, with the possible exceptions of Bernoulli's accuracy, determined experimentally by the Abbé Boscut in 1771, and by the Chevalier Du Buat in 1786.

In investigating the circumstances attending the discharge of fluids in orifices, it is impossible to suppose the fluid to be divided into an infinite number of indefinitely thin laminae perpendicular to the axis AB (fig. 1) of the vessel in which it is contained, and that in the descent of the fluid these laminae preserve their parallelism till they come near the orifice, when they assume the shape of a funnel, about which the fluid is stagnant. In the process immediately following, let the vessel be cylindrical or prismatized, in a vertical position, and have an orifice at B. Let the origin y be such a lamina, its distance from A being expressed by x and its area (perpendicular to the axis) by a, we shall have a dx for the volume of the lamina:
also, D being its density, we have \( a D dx \) for its mass.

The force with which this lamina tends downwards is its gravity, and the resistance experienced in the descent is the excess of the pressure from below upwards over the downward pressure of that above the plate. If \( g \) represent the force of gravity, then \( D g dx \) is equal to the action of gravity on the lamina during the descent.

Let \( p \) represent the pressure exerted downwards by the water above against any elementary portion of the lamina; then, the pressure of the water at the upper and under surfaces of the lamina being proportional to the depth of those surfaces below \( A, \) \( p + dp \) acting upwards may represent that of the water below: hence the resistance of the water below the lamina will be \( a dp \); and therefore the motive force by which the lamina descends will be \( g D dx - a dp \). This being divided by the mass of the latter will, by mechanics, give

\[
\frac{g a D dx - a dp}{d x} = \frac{g D dx - dp}{d x} = \frac{g D dx - dp}{D dx}.
\]

But the quantity of water flowing through the orifice at \( B \) in any given time being evidently equal to that which would pass through the same \( p g dx \), whose depth is \( dx \), in the same time; if \( v \) be the velocity of a particle in its descent through the depth \( p g dx \), and \( u \) that of a particle in the orifice, we shall have, in the element \( dt \) of time (of \( u' \) being the area of the orifice),

\[
u' dt = a dx, \quad \text{or} \quad x = \frac{a}{u'}; \]

whence, considering \( a, u' \) and \( dt \) as constant, we get

\[
d x = \frac{u'}{a} du'.
\]

But the equation \( u' dt = a dx \) gives \( \frac{x}{a} = \frac{u'}{a} dt \); therefore the last equation becomes

\[
g D dx - dp = \frac{D u'}{a} du',
\]

whose integral is

\[
g D x = p - \frac{D u'^3}{3 a^2} + \text{constant}; \quad \text{whence} \quad p = g D x - \frac{D u'^3}{3 a^2} + \text{constant}.
\]

Let \( x = h (= A B) \) and \( a = a' \), then

\[
p = g D h - \frac{D u'^3}{3 a^2} + \text{constant} \quad \text{and subtracting this equation from the preceding, we have}
\]

\[
o = g x - \frac{D u'^3}{3 a^2} - gh + \frac{4}{3} u'^3.
\]

This expresses the relation between the velocity \( u \) and the difference between the weights of two filaments of the fluid having unity for the base of each, and whose heights are \( h \) and \( x \). When \( x = 0 \), the equation becomes \( o = - \frac{D u'^3}{3 a^2} - gh + \frac{4}{3} u'^3 \); or considering the orifice as infinitely small so that \( a' \) and the whole first term of the second member vanishes, we have \( o = - gh + \frac{4}{3} u'^3 \); whence

\[
u' = \sqrt{\frac{2}{3} gh}.
\]

Now expresses the weight of a prism of fluid having unity for the area of its base and whose height is \( h \); and this is the pressure of the fluid against a small orifice at the bottom of the vessel: but while the height \( h \) is the same, the pressure is the same whatever be the position or inclination of the orifice: therefore \( \sqrt{\frac{2}{3} gh} \) will express the velocity at the same depth, whether the orifice be at the bottom or side of the vessel.

By the theory of forces this is equal to the velocity acquired by a body in descending by gravity through a height \( h \), equal to that of the column of fluid, the orifice being infinitely small.

It may be concluded from the above theorem that the velocity of a fluid spouting upwards through an orifice in a vessel would cause it to ascend to the level of the upper surface of that in the vessel, if the resistance of the air were abstracted.

It follows, also, that the velocities of spouting fluids, at different depths below the upper surface, are proportional to the square roots of the depths; that the quantities of fluids discharged in equal times at different depths in the vessel, the latter being constantly full, are to one another in the ratio compounded of the areas of the orifices and the square roots of the depths; and the quantity of water which would be discharged in a given time \( t \), through an orifice \( a' \) in a vessel kept constantly full at the height \( h \), is expressed by \( a' \sqrt{\frac{2}{3} gh} \).

The velocity \( v \) or \( \sqrt{\frac{2}{3} gh} \) expresses the length of a cylinder of water which would flow through the orifice in one second, or the quantity of the fluid discharged from a cylindrical or prismatical vessel, the area of whose base is \( a \) and whose height is \( h \), a quantity of water equal to that which the vessel will contain, the latter being however kept full during all the time that the water is flowing, will be found by making \( a \) equal to \( a' \sqrt{\frac{2}{3} gh} \); whence \( t \) (the time required) = \( \frac{a}{a'} \sqrt{\frac{2}{3} gh} \). The value of \( g \) is 32.17 feet, or 386 inches; and in these values of \( u \) and \( t \) it is evident that the areas and height must be of the same denomination as \( g \).

When a vessel is subjected to discharge itself gradually, the velocity of the effluent water diminishes continually. Now if \( x \) be the depth to which the water has descended at the end of the time \( t \), \( h \) being the whole height when the vessel is full, \( A = \frac{D h}{2 g} \) the weight of the fluid at that time; and \( t \) shall have \( 2g (h - x) \), for this is the time in the orifice. This may be supposed constant during the time \( dt \), and then the quantity of fluid discharged in that element of time will be equal to \( \frac{d u'}{a'} \sqrt{\frac{2}{3} g (h - x)} \). In the time of this discharge the upper surface of the fluid will descend through the depth \( dx \); therefore the area of the upper surface being \( a \), we have \( a dx = \frac{a'}{a} dx \sqrt{\frac{2}{3} g (h - x)} \), and

\[
dt = \frac{a'}{a} \sqrt{\frac{2}{3} g (h - x)} dx.
\]

If the vessel is an upright cylinder or prism, \( a \) is constant, and the integral of the expression is

\[
t = - \frac{a'}{a} \sqrt{\frac{2}{3} g h} - \text{constant}.
\]

But, when \( x = h \), we have

\[
t = 0; \quad \text{therefore} \quad o = - \frac{2a'}{a} \sqrt{\frac{2}{3} g h} + \text{constant}; \quad \text{whence} \quad t = \frac{2a'}{a'} \sqrt{\frac{2}{3} g h} - \frac{1}{2} \sqrt{\frac{2}{3} g h}.
\]

And comparing this with the time in which an equal quantity would run off, the vessel being kept full, it will be found to be double the latter.

Next, if it were required to determine the quantity of water which would flow through an orifice of finite magnitude with \( x \) increments in the vertical side of a vessel \( A B \) kept constantly full, it must be observed that the velocity of the effluent fluid at different points in the depth of the orifice varies as the square root of the distance of the point from the upper surface. Now let \( A B (= h) \) be the vertical height of the water in a vessel in one side of which is formed the orifice whose axis is \( CB \), and imagine the horizontal ordinates at \( m \) and \( n \) to be drawn indefinitely near each other. Let \( C M = h, C n = x \), the ordinates at \( m = y, m n = dx \); then \( dy \) is equal to the elementary area of the orifice; and the water flowing through the area in the time \( t \), being that which is due to the height \( Am \), is expressed by

\[
ty dx \sqrt{\frac{2}{3} g (h + x)} \frac{dy}{x^2} ; \quad \text{which, being integrated between} \quad x = 0 \quad \text{and} \quad x = h - h', \quad \text{would give the quantity of water discharged through the whole orifice in the time} \quad t. \quad \text{If the orifice were rectangular, \( y \) would be constant; suppose \( b = b' \); then the definite integral would be}
\]

\[
tb y dx \sqrt{\frac{2}{3} g (h + x)} \frac{dy}{x^2} + \text{b} \sqrt{\frac{2}{3} g (h + x - b)} dx \text{;}
\]

\[
\text{which between the said limits becomes}
\]

\[
tb y dx \sqrt{\frac{2}{3} g (h - h')}; \quad \text{and the orifice extended from}
\]

\[
\text{the bottom to the top of the vessel, having then} \quad x = h, \quad \text{or} \quad N = h', \quad \text{the expression would be}
\]

\[
tb y dx \sqrt{\frac{2}{3} g h}; \quad \text{If a rectangular orifice of} \quad \text{the same form and magnitude were situated at the bottom} \quad B, \quad \text{with its longer side} \quad (=A) \quad \text{horizontal}, \quad \text{the breadth} \quad \text{being very small in this, and also in the preceding case,}
\]
The quantity discharged in the same time \( t \), the velocity of the effluent water being now equal in every part of the orifice, and being that which is due to the whole height \( A \) to the base, would be expressed by \( bt \sqrt{\frac{g}{h}} \). The discharge found above is manifestly equal to two-thirds of this quantity.

In the second book of the 'Principia,' Newton shows that all the particles of water in issuing from a pipe in a vertical line nearly to the side or bottom in which it is formed, many of them converging towards the orifice in every direction; so that after passing it they form a stream of diminished breadth, which he called the 'vena contracta.' It is the mean diameter of the latter and that of the orifice to be one another in the ratio of 21 to 25; and he infers that the velocity in the contracted stream must be to that at the orifice in the same proportion as the squares of those numbers; that is, nearly as 1 to \( \sqrt{2} \). Hence, finding from experiment that the velocity in the said stream was equal to that by which a body would acquire by falling through the whole height of the fluid column in the vessel, he concludes that the mean velocity in the orifice must be that which is due to half the height of the same column. The ratio between the diameters of the stream and of the orifice is rather differently stated by Da Bost making it 4 to 5 is the ratio assigned by Venturi. No actual acceleration of the particles is supposed to take place after they have passed the orifice; but those near the surface of the stream having their direct motion diminished by friction, or by the deflection of their motion in their passage through the mean velocity of the whole is reduced to something less than that of the central particles which issue more directly. Since, in theory, the quantities of water discharged through orifices are made to depend on the mean velocity of the particles, it follows, when the discharge is made through a small orifice in a thin plate, that the quantity which flows in a given time is always greater in practice than it would appear to be by the theoretical formulæ. The experiments of Bossut show however that the ratio between the results of theory and practice is very nearly constant whatever be the height of the column of fluid; and it is found that the effective discharge may always be represented with sufficient accuracy by the expression \( 0.625 \times \sqrt{\frac{g}{h}} \), a being the area of the orifice.

The distances measured on a plane passing through the base of a vessel, to which fluids will be projected from orifices at different depths in its side, may be easily determined (the resistance of the air being neglected) by combining the action of gravity on the particles of fluid after they have left the orifice with the velocity communicated to them in consequence of the pressure arising from the depth of water. The expression of the ratio of the squares of the diameters of orifices which must be found the diameter of the latter and that of the orifice to be one another in the ratio of 21 to 25; and he infers that the velocity in the contracted stream must be to that at the orifice in the same proportion as the squares of those numbers; that is, nearly as 1 to \( \sqrt{2} \).”
any two points at the surface in a longitudinal section is to the distance between those points on the surface. That the motive force of the molecules composing a river depends on the upper surface only may be easily admitted, when it is considered that the bed may have any inclination and any degree of irregularity, yet if the upper surface be horizontal the water will be at rest.

If the water of a river experienced no resistance from the sides and bed, its motion would go on continually accelerating from its source to its mouth, like a solid body falling by the action of gravity; and the consequences would be, that besides the destruction ensuing from the violence of the torrents in the lower lands, the moisture would be drawn from the soils in the lower regions, which would thus become incapable of supporting vegetable and animal life. The adherence of the particles of water to each other, and the friction against the beds, produce a resistance which increases with the velocity of the current, and becomes at length equal to the accelerative force of the descent; and then a uniform motion is established.

But when a current is in a state of equilibrium, the velocities in different transverse sections of the river may be very unequal, on account of the variations in the areas of those sections, through all of which the same quantity must flow in the same time; since otherwise the equilibrium of the river would not be permanent. It follows that the products of the areas of the sections multiplied by the velocities in each must be equal to each other, and that the velocities in different sections must be inversely proportional to the areas of those sections.

If the difference of level between any two points on the surface of a river or canal, in a longitudinal section, be equal to one inch, and if $l$, in inches, be the distance of those points on the surface, the slope of the river may be represented by $1/l$. Then, since the accelerative power of gravity vertically, is to the accelerative power on any plane, as the length of the plane is to its vertical height; we shall have $\frac{\sqrt{g}}{l}$ for the accelerative power in a river whose slope is $1/l$.

Again, if the resistances to the motion of the fluid were, as is sometimes the case nearly, proportional to the squares of the velocities, so that the resistance might be represented by $\frac{v^2}{m}$ ($m$ being constant, and $v$ representing the mean velocity); then, because when water in a river moves uniformly, the resistance is, as in all cases, equal to the accelerative force, we should have $\frac{v^2}{m} = \frac{g}{l}$; whence $v = \sqrt{\frac{mg}{l}}$.

But the resistances in canals and rivers are not strictly proportional to the squares of the velocities; and it is found by experiment that, in one and the same bed, $D$ (of $\sqrt{1 + \log \frac{1}{l}}$) may be considered as constant, and may be represented by $\sqrt{mg}$. Also, in beds whose transverse sections differ both in area and figure, when the mean radius is represented by $r$ (where $r = \text{area } \triangle ABC$ of the section $\text{arc } \triangle ABC$ fig.),

\[\text{Fig. 2.}\]

it is found by experiment that $\frac{\sqrt{mg}}{r}$ is constant and equal to 307 inches; hence $\sqrt{mg} = 307 \cdot (\sqrt{r} - 0.1)$ and $m = 244 \cdot (\sqrt{r} - 0.1)^9$. Consequently we obtain $v = \frac{\sqrt{1 + \log \frac{1}{l}}}{r} = 307 \cdot (\sqrt{r} - 0.1)$, or $v = -\frac{307}{\sqrt{1 + \log \frac{1}{l} + 1.5}}$. But further investigation leads to the conclusion that this expression for $v$ must be diminished by 0.3 ($\sqrt{r} - 0.1$) on account of the resistance of the particles of the river; for suppose a separation from each other, (D. B. Trait de Hydrodynamique).
with respect to the central part of the impinging column of fluid, the mean pressure is less, on account of the lateral deviations of the exterior filaments, and the amount first stated above is that which is generally assumed.

If the velocity be represented by \( v \), the height due to that velocity is equal to \( \frac{v^2}{2g} \); then a representing the area of the moving surface, and \( D \) the specific gravity of the fluid, we shall have

\[
\frac{v^2}{2g} = \frac{a^n}{D} \sin^2 \theta.
\]

If a cylindrical body, terminated in front by an equaliteral cone, move through a fluid in the direction of its axis; it can be shown (M'Culloch, Treatise on Naval Architecture, 1776, p. 494) that the number of parts of filaments which act against a plane perpendicularly to the number which can act upon it in an oblique position, as radius (=1) is to sin. \( \theta \). And by mechanics, the intensity of any force acting obliquely on any plane is a decomposed part of the whole force, and is to the latter in the ratio of sin. \( \theta \) to \( \sin \theta \) (=1). Therefore the effective pressure against an oblique plane varies, as sin. \( \theta \) and consequently with the angle that the plane is oblique to the direction of the motion, the resistance which it experiences is to be expressed by

\[
\frac{v^2}{2g} = \frac{a^n}{D} \sin \theta.
\]

The circumstances attending the resistances experienced by bodies of various forms and lengths when caused to move in water have, within a few years, been made the subject of numerous experiments which were carried on by the late Colonel Beaufort in the Greenland Docks. Ample details of these valuable experiments are given in the volume lately published; and the following are some of the results:

The friction of bodies moving in water is equal to a power of the velocity whose exponent is 1.494.

The pressure sustained at the head end varies in rather a higher ratio than the square of the velocity, when the velocity is small, and the exponent diminishes with an increase of velocity.

The diminution of pressure on the stern, caused by the fluid not pressing so strongly there when the body is in motion, which it has generally experienced in a lower degree than the square of the velocity; and the exponent diminishes with an increase of velocity.

A globe experiences about one-third of the resistance which is experienced by a plate of the same materials, and having the same dimensions

A globe cut in halves and separated by the intervention of a cylinder whose base and length are each equal to a diameter of the former, experiences a diminution of resistance, which, with that of the complete globe, is nearly equal to one-fifth of the latter.

Bodies whose head-ends are formed with curve lines have great advantage in respect of resistance over those formed with right lines.

The greatest breadth of a moving body should be at a distance from the head extremity equal to two-thirds of the body's length; that the body may move through the water with the least resistance.

Increasing the length of a solid of almost any form by the addition of a cylinder in the middle greatly diminishes the resistance with which it moves, provided the weight in water continues to be the same.

By comparing the resistance of bodies near the surface with those having similar head and stern ends, and which were immersed to the depth of six feet, those at the surface were found to experience more retardation than the others.

(Mariotte, Traité du Mouvement des Eaux, 1668; Newton, Philosophia Naturalis Principia, 1713; Daniel Bernoulli, Hydrodynamica, 1738; D'Alembert, Traité de l'Equilibre et du Mouvement des Fluides, 1744; Essai d'une Nouvelle Théorie sur la Résistance des Fluides, 1752; Emerson, Mechanica, 1759; Lecchi, Idrostatica Examinata, 1765; Don George Jean, Examen Maritimo, 1771; Micheletti, Sperimenti Idrauliche, 1774; Smeaton's Experiments on Water-wheels, in the Philosophical Transactions, 1759 and 1776; Belidor, Architecture Hydraulique, 1782; Prony, Nouvelles Découvertes Hydrauliques, 1797; Bossut, Traité Théorique et Expérimental des Fluides, 1796; Venturi, Recherches Expérimentales sur la Communication Laterale des Fluides dans les Flasques, 1797; Prony, Recherches Physico-Mathématiques sur la Théorie des Eaux Courantes, 1814; V Onesio, Delle Esercizi di Chimica, 1799; Du Bouc, Principes d'Hydraulique et de Physodynamique, 1816; Hachette, Traité Élémentaire des Machines, 1817; Bournon, Théorie de la Mécanique Universelle, 1821; Robison, Mechanical Philosophy, 1823; Gravère, A Treatise on Mechanics, 1826; Piozen, Traité de Méca- nicque, 1833.)

HYDROFLUORIC ACID, a compound of fluoric and hydrofluoric acid, which was first made known by Sir Humphrey D. Knight (Phil. Mag., xlv. p. 357) first suggested an apparatus for procuring it in a state of purity, though not of the greatest strength. The properties of this acid were immediately examined by Mr. Daniel (Phil. Trans., 1796). Thenard in 1810. (Recherches Physico-Chimiques.) Fluor-spar, or what is more correctly termed fluoric of calcium, is to be mixed with twice its weight of strong sulphuric acid, and put into a leaden or silver retort, to which a receiver of the same metal is to be adapted, and surrounded with ice or snow mixed with salt. When a moderate heat is applied to the retort the sulphuric acid acts upon the fluoric of calcium, in a mode analogous to that in which its action is exerted upon common fluoric, when mixing is going on; the fluidic acid; the results are sulphate of lime, which remains in the retort, while the fluoric of the fluoric uniting with the hydrogen of the decomposed water of the sulphuric acid forms hydrofluoric acid, which, when condensed, in the form of vapour, is condensed in the cooler receiver; the product is best kept in a silver bottle with a stopper of the same metal.

The properties of this acid are, that it is fluid, clear, colourless, and volatile; and when it escapes into the air, which it does at about 60°, it forms with the moisture of it white fumes, as hydrochloric acid does. Its vapour is extremely pungent and irritating, and it acts strongly on vegetable fibres. The specific gravity of fluoric of hydrogen is 1.0609, but by the gradual addition of a certain quantity of water, the density may be increased to 1.25. Its attraction for water is very great, and when dropped into it it combines with a hissing noise. The liquid acid is extremely corrosive; when a drop is allowed to fall upon the skin it produces painful sores.

The reason for the necessity of distilling and keeping this acid in metal vessels is that it will dissolve glass and any other porous material. A globule of hydrofluoric acid placed on glass. (Hydrofluoric Acid.) Although, on account of the difficulty of obtaining fluoric in the separate state, if indeed it has ever been accomplished, the name of hydrofluoric acid has been given to this compound, it is rather from analogy than direct proof that it is considered to be a hydrofluoric acid; and when exposed to voltaic electricity, hydrogen is evolved from the...
negative pole, and the positive platinum wire is covered with a coating of a substance, which is probably fluoride of platinum.

- It is considered as composed of-

<table>
<thead>
<tr>
<th>Equivalents of Hydrogen</th>
<th>1 or 5.26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorine</td>
<td>10 94 74</td>
</tr>
<tr>
<td>Equivalent</td>
<td>19 100</td>
</tr>
</tbody>
</table>

When hydrofluoric acid is brought into contact with certain metals it is decomposed, hydrogen gas being evolved, and a metallic fluoride formed: upon potassium this action is extremely energetic, and is attended with the evolution of gas and the formation of the compound potassium fluoride. With metallic oxides it forms a fluoride and water. Hydrofluosilic acid may be obtained by saturating the acid with alkali; it is an unimportant salt, not applied to any purpose whatever.

HYDROGEN, an elementary body, which, as it is known only in the aërole form, is usually termed hydrogen gas.

From the earliest dawn of chemical science elastic fluids have been known which had the property of burning on the approach of flame, and were confounded under the general name of inflammable air. As it was afterwards found that there was a difference in their densities, they were distinguished as light and heavy inflammable air; it is the latter which is more catherizable. Hydrogen gas was first minutely examined, and the mode of preparing it in various ways stated, by Mr. Cavendish. (Phil. Trans. 1765.)

One of the most remarkable properties of inflammable air is that of forming water by combining with oxygen, the name of hydrogen was given to it by the framers of the French nomenclature, from eau, water, and the root ye, which implies generation. Hydrogen gas may be obtained in several modes, but it is usually procured by the decomposition of water, by causing some substance to act upon it which has affinity for its oxygen and none for the hydrogen, so that the element is separated, and assumes the elastic or gaseous state of hydrogen.

One of the simplest processes, but not the easiest, is that of putting iron turnings or wire into a gun-barrel, inserting a retort containing water into one end of the barrel and a small curred tube into the other, which is to be immersed under water in the pneumatic trough, and a bottle containing water inverted over the orifice of the tube. When the gun-barrel is heated to redness, and the water boiled in the retort by a lamp, the vapour of the water passing over the ignited iron is decomposed, oxide of iron is formed, hydrogen gas plentifully liberated, and received in the inverted bottle of water. For every nine grains of water decomposed, there are obtained eight grains of oxygen, and only one grain of hydrogen gas, which measures 4691 cubic inches.

There are some metals, as potassium and sodium, the affinity of which for oxygen is so great, that they decompose water even without the assistance of heat.

The usual method however of obtaining hydrogen is that of setting upon iron or zinc by dilute sulphuric acid, and in this case water is decomposed, its hydrogen evolved, and the oxygen, as already mentioned, combines with the metal; but the metallic oxide formed is dissolved by the acid employed, and sulphate of iron or zinc is formed, and the crystallized salt is obtained by due evaporation.

When hydrogen is used with a metal instead of the sulphuric acid, hydrogen gas is also procured by their mutual action; but in this case the hydrogen is derived from the decomposition of the acid, and not of the water, so that a metallic chloride and hydrogen gas result, not a hydrochlorate of a metallic oxide. The hydrogen gas however obtained by the action of zinc or iron is never perfectly pure; it appears not only to dissolve a minute portion of these metals, but partly to dissolve hydrogen gas itself, according to Berzelius, a small quantity of volatile oil is formed by the combination of a portion of the hydrogen with the carbon which the metal always contains; and it is to this that the hydrogen gas owes the peculiar and disagreeable odour that it possesses, and which is only to get rid of by passing the gas through alcohol or potash, with which the oil combines.

The properties of hydrogen gas are, that it is colourless, inodorus, and inelastic, and it has resisted all attempts which have been made to condense it by the united agency of cold and pressure; and it has not been separated into two or more kinds of matter, and is thereforeundecomposed, and, as far as our knowledge at present extends, it is simple or elementary in its nature. It is the lightest body in nature, 100 cubic inches weighing only 21.6 grains. It refractions light powerfully; by heat it is merely expanded, and suffers no change by the action of electricity, and in electrical decompositions of its compounds it is evolved at the negative pole. This gas extinguishes flame by itself; but when it combines with oxygen it produces a mixture of combustible gases, readily, and with a continuous but feeble flame, and much heat. When mixed with oxygen, a taper causes immediate and loud explosion, attended with the formation of water by the combustion of the gases. It is impracticable for any length of time, but when inspired for a short period it renders the voice remarkably but not permanently shrill; it does not appear to be poisonous, for when mixed with a proportion of oxygen it may be respired without inconvenience; when it proves fatal, it seems to do so by the mere exclusion of oxygen.

It is very sparingly soluble in water, 100 cubic inches taking up only about one inch and a half of the gas; nor is there any other liquid which is capable of dissolving it in notable quantity. Hydrogen, neither in the gaseous state nor in solution, possesses either acid or alkaline properties.

In its separate state hydrogen has not been applied to any very useful purpose. From the air it would appear that the necessity it has been used to fill air-balloons; at present however, by reason of the facility with which it is obtained, from its being prepared for illumination, coal gas is substituted for this purpose. Its greater density requires much larger balloons than hydrogen gas.

When mixed with oxygen gas, and the mixture gradually burned in a small jet immersed in a bath of water, the flame is blue, intense light, and gives no smoke; and even if burned in the air, the oxygen of which serves as a supporter of combustion, a considerable degree of heat is generated. When a very small jet of hydrogen gas is burned, the flickering light from the flame causes muscular twitchings when a tube of glass or metal, or even of paper, is held over it.

Hydrogen unites with all other elementary gaseous bodies, and forms with them compounds not only of great curiosity, but of vast importance and utility thus with oxygen it forms water \([\text{Water}]\), with azote, ammonia \([\text{Ammonia}]\), with chlorine, hydrochloric acid \([\text{Chlorine}]\), with fluorine, hydrofluoric acid \([\text{Hydrofluoric Acid}]\).

It combines with bromine \([\text{Bromine}]\) to form hydrobromic acid; it unites with sulphur \([\text{Sulphur}]\) and with carbon \([\text{Carbon}]\) and phosphorus \([\text{Phosphorus}]\) to form acids, with carbon, iodine, phosphorus, selenium, and sulphur, it forms compounds of very different properties; for an account of these we refer to the substances above named, and we can but speak of them in a few words, and which will be now considered under the head of

Carburised hydrogen, or rather the carbures of hydrogen (or carbon-hydrogen) for they are extremely numerous and offer some of the most remarkable instances of what is termed isomerism \([\text{Isomerism}]\), or of the existence of compounds, of perfectly similar composition, possessing very different properties; not such as require new chemical re-search for their detection, but the obvious qualities of gaseous, liquid, and solid forms.

The compounds of carbon and hydrogen may be divided into four classes; the gaseous, fluid, solid, and hypothetic. If hydrogen be comprehending such as have never been obtained in a regular state which are composed of determined radicals or bases, whose elements, at any rate, unquestionably exist in combination with certain other bodies. We shall treat of these compounds in the order mentioned.

1. GASEOUS CARBURATED. —Carburated Hydrogen gas is that which has been longest known: it is frequently produced in coal-mines, and called fire-damp. When mixed with air and exposed to flame it occasions dreadful and destructive explosions. (Lavoisier, Sénègre.) It is the early state of pneumatic chemistry described as heavy inflammable air, to distinguish it from hydrogen gas, which is lighter, before their different nature had been discovered. It has the name of \(\text{Light hydrogen gas} \), to mark the difference between it and another gas since discovered, and also biphloguret of carbon, inflammable air of marshes, and hydrocarburetted. Carburated hydrogen gas is also generated in stagnant pools by the action of the carbon of decomposing vegetable
matter upon water, by which carbonic acid and the gas in question are formed. By stirring the pools the mixed gases rise, and may be received in bottles filled with and inverted in water. The carbonic acid amounts to about 1-20th part of the gas, and it contains nearly as much azote: the former may be separated by agitation with a solution of potash.

The fire-damp of coal-mines generally contains atmospheric air; the purest specimen examined by Sir H. Davy is deprived from it contained 1-15th of it, but no other impurity. In the Apenines, near Pietra Mala, the gas disengaged from a shale stratum was found by Sir H. Davy to be pure carburetted hydrogen. Coal gas and the inflammable gas obtained by heating moist charcoal contain a large proportion of carburetted hydrogen, but very much contaminated with other products. No artificial process for obtaining this gas pure has been discovered. The best method of preparing it is that of disturbing stagnant water, as already stated, and washing with potash to separate the carbonic acid: the azote which it retains does not prevent the exhibition of its peculiar properties.

The properties of carburetted hydrogen gas are, that it is colourless, nearly insipid, and inapte. It has not been rendered fluid by the united agency of cold and pressure. Water absorbs about 1-50th of its volume. It is fatal to animals, extinguishes flame, but is highly combustible when it meets with a sufferer of combustion, and extremely explosive when mixed with it. It burns when a taper is applied to it in contact with the air with a yellow flame, and on account of the carbon which it contains it yields much more light during combustion than pure hydrogen gas. [Gas Lights.]

One hundred cubic inches of this gas weigh nearly 17-2 grains; its specific gravity compared with air is 0-054. It is 1 cubic inch of hydrogen gas, weighing 43 grains, condensed to one-half, and combined with 12-9 grains of carbon, is of the equivalent of One equivalent of carbon . . . 6 Two equivalents of hydrogen . . . 2

It is theoretically also regarded as composed of 100 cubic inches of the vapour of carbon, 200 hydrogen gas, condensed to 100 cubic inches. In its proper application it is dicarburetted of hydrogen.

When carburetted hydrogen is passed through tubes made intensely hot, it is decomposed, every volume yielding two volumes of carbon and of charcoal is deposited. It is not decomposed by electricity.

One hundred volumes of this gas require 200 volumes of oxygen gas for their perfect combustion, and the results are water and 100 volumes of carbic acid. Chlorine and one volume of carburetted hydrogen, when quite dry, do not act upon each other at common temperatures, even if exposed to the sun's rays; nor although moisture be present does any action occur in the dark, but the action of light occasions it, the nature of the products depending upon the proportion of the gases employed: they are however chloric acid, oxide of carbon, and carbic acid. No combination of carburetted hydrogen and any other substance, either elementary or combined, has as yet been discovered.

2. Olefiant Gas; Bicarburetted Hydrogen, Bihydrocarburetted Hydrogen, Hydroguret of Carbon.—This gas is an artificial product, and was discovered in 1796 by M. M. Bondt, Dieman, &c. It is prepared by mixing in a retort containing 200 volumes of sulphuric acid and one volume of alcohol; when heat is applied decomposition readily takes place. Alcohol is composed of 3 parts of hydrogen, 12 of carbon, and 8 of oxygen. When mixed with it, it yields olefiant gas consists of 1 part of hydrogen and 6 of carbon, and it is evident that 2 of hydrogen, 6 of carbon, and 8 of oxygen must be separated by the action of the sulphuric acid; water is probably formed, much carbon is deposited in the retort, and carbonic acid and sulphuric acid are generated with the olefiant gas. It is purified from these by being passed through or agitated with lime-water or potash.

Olefiant gas, so called from its property of forming an oil-like fluid when combined with chlorine, is a colourless elastic fluid: when pure, it has but little odour and tastes less. It has not been rendered fluid by exposure to cold and pressure; it is soluble in about eight times its bulk of water; it is destructive of animal life, is not inflammable unless a supporter of combustion be present, and then it burns with a dense white light, or, if mixed with air, it explodes with great violence on the contact of flame. On account of the larger proportion of carbon which it contains it gives much more light when burning than carburetted hydrogen, and when one measure is burned with three measures of oxygen gas, water and two measures of carbic acid gas are formed.

One hundred cubic inches of olefiant gas weigh 30-1 grains very nearly; consequently, its specific gravity is much less than that of air. It has been stated that it is formed of one part by weight of hydrogen, and 6 parts by weight of charcoal; and although these are equivalents of those elements, it is generally supposed to consist of

| Two equivalents of carbon | 12 |
| Two equivalents of hydrogen | 2 |

Or theoretically of

| 200 cubic inches of the vapour of carbon | 400 |
| hydrogen | 200 |
| condensed to 100 cubic inches | 400 |

The correct name of this gas is carburetted hydrogen, but that has so long been appropriated to light carburetted hydrogen that it would now lead to confusion to make the alteration. Bicarburetted hydrogen is an improper appellation, because it implies a compound of two equivalents of carbon and one equivalent of hydrogen. The name of hydrocarbon has in some cases been conveniently adopted.

When olefiant gas is passed through red-hot porcelain tubes, it is decomposed, at least partially, for carbon is deposited, and the gas increases in bulk by the expansion that arises, and is set free. When an electric spark is passed through it, it is resolved into hydrogen gas and charcoal; the hydrogen, for a reason which has been stated, occupying twice the bulk of the olefiant gas subjected to experiment.

Chlorine and Olefiant Gas, as has already been stated, act upon each other; when they are mixed and suffered to remain in contact they combine and condense into the oil-like fluid already alluded to, and which has been called chloric water and hydrochloric of carbon. The best name is however chloride of hydrogen. When first formed it contains a little water and hydrochloctic acid, from which it is separated by washing with water, distillation from chloride of calcium, successive agitation with potash, water, and sulphuric acid, from which last it is separated by distillation.

Chloride of Hydrocarbon is a colourless volatile liquid; odour slight, taste sweetish, insoluble in water, specific gravity 1-2, that of its vapour 3-4 (air = 1), boiling point about 150° F., burns with a green flame, depositing charcoal, and evolving hydrochloric acid. When passed in vapour through a red-hot porcelain tube it is resolved into charcoal, light carburetted hydrogen, and hydrochloric acid.

It is composed of

| One equivalent of chlorine | 36 |
| One equivalent of olefiant gas | 14 |

50

Admitting this to be a neutral compound, it agrees with the view already mentioned as to the constitution of olefiant gas, namely, that though its constituents are six parts by weight of chlorine and four parts by weight of carbon, it consists of two equivalents of each = 14. When a mixture of two volumes of chlorine and one of olefiant gas is fired by a taper, combustion immediately takes place, a large quantity of charcoal is deposited, and two volumes of hydrochloric acid gas are formed.

Iodine and Olefiant Gas also combine to form iodide of hydrocarbon, or hydriodide of carbon. It was discovered by Mr. Faraday, who obtained it by passing iodine and olefiant gas in the same vessel to the solar rays. It is a solid, colourless, crystalline body, has an astringent odour, a
sweetish taste, and is so dense as to sink in sulphuric acid: neither water nor acid or alkaline solutions act upon it, but it dissolves in alcohol and ether, on the evaporation of which it is then crystallized.

It is composed of

One equivalent of iodine 126
One \text{o}le\text{f}ant gas 14

Equivalent 140

Bromine and Olef\text{a}nt Gas unite to form bromide of hydrocarbon. It was first formed by Sertillan, who obtained it by adding one part of iodide of hydrocarbon to two parts of bromine in a glass tube. Resolution quickly takes place, accompanied with heat and a hissing noise; bromide of iodine and bromide of hydrocarbon are formed; water dissolves the bromide of iodine, and the bromide of hydrocarbon falls to the bottom of the vessel; it is coloured by bromine, which is to be removed by potash.

Bromide of hydrocarbon is fluid, colourless, very volatile, has a penetrating etherial odour, and a very sweet taste. It is heavier than water, very slightly soluble in it; at about 22° Fahr. it becomes solid.

It consists of

One equivalent of bromine 78
One \text{o}le\text{f}ant gas 14

Equivalent 92

We have now described the only gaseous carburets of hydrogen which have been hitherto proved to be distinct and well-characterized species, and also some of their compounds. It is however probable that another gaseous compound exists in oil gas, and it has been called superolef\text{a}nt gas, terhydrocarbon, and triolecarbohydrogen. It is supposed to consist of 3 equivalents of carbon and 3 equivalents of hydrogen condensed into one volume: no definite mode of obtaining this compound in a separate state has been pointed out. It is also probable that oil gas may contain olef\text{a}nt gas, holding in solution some of the volatile compounds of carbon and hydrogen discovered by Mr. Faraday: it is therefore extremely difficult to determine by analysis what are mixtures and what are compounds, and to distinguish and separate them from each other.

Liquid Carburets of Hydrogen.—These are very numerous. Those which we shall first describe are all composed of six of carbon and one of hydrogen by weight; but they are of course isomeric bodies, and must be composed of different proportions of these substances, which have not hitherto been in many cases ascertained.

Caoutchouc, obtained by subjecting caoutchouc to distillation, is a colourless fluid, has a peculiar and etherial odour; sp. gr. 0.666. It remains liquid at 14° Fahr., and boils at 582°.

Cetone, procured by distilling ethyl with anhydrous phosphoric acid. It is a colourless oily liquid, which boils at 227°; the density of its vapour is 2.875.

Elaen, an oily liquid obtained by distilling mastic and hydrocarbon acids. It boils at 230°, and the density of its vapour is 4.488.

Etherin, so called from being supposed to exist in ether. Mr. Faraday obtained it from the volatile liquid which is derived from the inflammable vapours contained in oil gas when subjected to a pressure of thirty atmospheres. When this liquid is heated merely by the hand the vapour of etherin rises, and is condensed by a freezing mixture.

Its properties are, that it is a very volatile liquid, which boils at so slight an elevation of temperature that it is converted below 25° into vapour. On being cooled to 0°, it again condenses into a liquid, which, at the temperature of 34°, and while kept under the pressure of its own vapour, has a specific gravity of 0.927.

It is sparingly soluble in water; alcohol takes it up largely, and sulphuric acid condenses 100 times its volume of the vapour, and, though it becomes brown, no sulphurous acid is given out; neither hydrochloric acid nor the alkalis affect it. The vapour is extremely combustible, burns with a brilliant flame, yielding water and carbonic acid.

It appears to consist of

Four equivalents of carbon 24
Four hydrogen 4

Equivalent 28

Or it is theoretically regarded as composed of

400 cubic inches of carbon vapour 51.6 grs.
400 hydrogen gas 8.6 grs.

condensed to 100 cubic inches, weighing 60.2 grs.

Its density is therefore 1.941, and by experiment Mr. Faraday found it to be 1.919.

Benzine. [Benzon.] The number of equivalents which it contains has been ascertained, but proportions are as above stated, or six of carbon to one of hydrogen.

Heaven, obtained by the distillation of caoutchouc with sulphuric acid. It is a comparatively dense fluid, its specific gravity being 1.011, and boils at 215°.

Liquid Hydrocarburet. This was obtained by Mr. Faraday, after separating solid icarburate of hydrogen from the fluid procured by pressure upon oil gas, at a temperature of 9°. The remaining liquid was found to exhibit such properties as to identify it as a peculiar and definite compound. The number of the equivalents which it contains has not been determined.

Naphtha.—This fluid occurs, among other places, at Amman in the duchy of Parma, and exists also in petroleum, from which it may be obtained by distillation; and coal-tar yields a very similar fluid. Naphtha, when pure, is a colourless, limpid, very volatile liquid, with a strong peculiar odour. Its specific gravity is 0.733; it boils at 192°; the density of its vapour is 2.833; it remains liquid at 0°. It is insoluble in water, but combines in all proportions with alcohol, ether, petroleum, oils, and sulphuric acid. It is very inflammable, and burns with much smoke.

Chemists are not quite agreed whether its composition is equivalent to 6 of carbon and 1 of hydrogen, or whether it is composed of 6 equivalents of carbon to 3 of hydrogen. In the last case its composition would be

Six equivalents of carbon 36
Five hydrogen 5

41

Olen, procured by distilling metasoeleic and hydrocarbon acids. It is a fluid which boils at 111°, and the density of its vapour is from 2.875 to 3.02.

Benzine.—This is composed of 2 equivalents of carbon 13 + 1 equivalent of hydrogen 1 = 13. [Benzine.]

Volatile Oils.—The following volatile liquid oils are constituted of carbon and hydrogen, and the proportion of 10 equivalents of carbon = 60 + 8 equivalents of hydrogen = 68. Their different properties would however indicate that they are isomeric compounds rather than that all should be composed of exactly these equivalents:—Oil of copaiva, juniper, lemons, black-pepper, savin, and turpentine.

A compound of ten equivalents of carbon and 8 of hydrogen has been called camphen and camphogen, as being the basis of camphor.

Solid Carburets of Hydrogen.—Hatchetine. [Hatchetine.]

Orocan.—This substance is composed of the same proportions of carbon and hydrogen as the preceding. It occurs in Moldavia, and a variety of it has been found in Uprath Colliery, near Newcastle-upon-Tyne; it is soft, unctuous, and gives a soapy foam of a thin paper; some are transparently so transmitted light, of a brownish-yellow colour; by reflected light, yellowish-green and opalescent; odour slight fatty, which is more perceptible when melted. It fuses at 14° Fahr., contains its greatest fluidity at about 160°, at 250° its fluidity is without apparent decomposition. It burns with a pale blue flame, surrounded by a white one, and leaves no residue.

It is sparingly soluble in alcohol, more soluble in ether, and does not appear to suffer any change when boiled either in concentrated hydrochloric, nitric, or sulphuric acid.

Parolin was discovered about the same time by Dr. Christison and Dr. Riechenbach; the former obtained it from the petroleum of Rangoon, and called it petrolin. In distilling beech-tar, Dr. Riechenbach found that the heaviest of these liquids which it yields is uneutonic, and contains the heaviest portion which is separated out, and works by repeated distillation, heat, and the action of sulphuric acid.

Its properties are, that at common temperatures it is a fatty but rather firm solid; it is tasteless, inodorous, and its
The density of naphthalin is 0.87; at 110° F. it melts into an oily liquid, and evaporates without change; it burns with a pure white flame. It is soluble in alcohol, oil of turpentine, naphtha, and the fats when heated, and it unites with most fatty bodies by fusion; neither chlorine, acids, nor alkalis have any action upon it, and it may be fused with potassium without change. It consists, like oleaginous and hatchetine, of 6 of carbon and 1 of hydrogen, but neither the density of its vapour nor its equivalent is known.

Solid oil of roes is crystalline, and becomes liquid at 95°, and boils at 536° to 572°. It is composed of 6 carbon and 1 hydrogen, but its equivalent has not been determined.

Iridalin was obtained by M. Dumas from a mineral found in the quicksilver mines of Irida, whence its name; this substance is solid, insoluble in water or cold or hot, and only slightly dissolved by alcohol or ether, but readily so in boiling oil of turpentine, from which it deposits on cooling; it imparts to sulphuric acid a beautiful blue tint, like sulphate of indigo. It is composed of 18 parts of carbon and 1 equivalent of hydrogen; its equivalent has not been ascertained.

By the destructive distillation of amber, a carburetted hydrogen similar in composition and properties to iridalin has been lately obtained.

Naphthalin—This name was given by Dr. Kidd to a substance which had been previously described by Mr. Garden in 1819, and by M. Parrao in 1820, who stated his belief that it was a carburet of hydrogen. This substance is one of the products of the distillation of coal, and is contained along with naphtha in coal-tar or distilling which naphtha first passes over, and the naphthalin afterwards rises and is condensed in the neck of the retort. Its properties are that it is solid, colourless, and crystalline; when quite pure it is nearly inodorous, but has generally a disagreeable smell; its taste is pungent and somewhat aromatic; it is insectuous to the touch, heavier than water, in which it is insoluble when cold, and only slightly dissolved if hot. It is soluble in alcohol and ether, and from a hot solution it deposits on cooling. Naphtha and oil of turpentine, and volatile oils, also dissolve it. It fuses at about 186° to 200°, assumes a crystalline texture on cooling, volatilizes slowly at common temperatures, and boils at 410° F. It does not exhibit either acid or alkaline properties; it is not acted upon by alkalis, with acetic and oxalic acid it forms pink-coloured solutions; hydrochloric acid dissolves it but sparingly; and by boiling in nitric acid both are decomposed. With sulphuric acid it forms a compound called by its discoverer Mr. Faraday sulphonaphthalic acid. The vapour of naphthalin was first of all isolated by Dumas to have a specific gravity of 4.526; now supposing 100 volumes of the vapour to contain 1000 measures of carbon vapour, and 400 of hydrogen gas, its weight would be

<table>
<thead>
<tr>
<th>Grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 cubic inches of carbon vapour</td>
</tr>
<tr>
<td>400</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

According to Dumas, the specific gravity is 4.526, whereas that indicated by the above hypothesis is 4.43.

It follows, if the above statement be correct, that naphthalin consists of—

| Ten equivalents of carbon | 60 |
| Hydrogen | 4 |

Equivalent 64

Chlorine and Naphthalin combine to form a solid and a liquid compound; the solid chlorid is insoluble in water, and nearly so in alcohol; boiling ether takes it up, but de-
poses on cooling in rhombic crystals; it melts at 246°, and it may be distilled unchanged by ether or alcohol act upon it, except the fixed alkali when heated. It appears to be a bichloride of naphthalin, composed of—

| Two equivalents of chlorine | 72 |
| Equivalent of naphthalin | 64 |

Equivalent 136

Paraphthalin has been supposed to be a peculiar carburetted hydrogen, closely allied to naphthalin in composition and properties. According however to Riechenbach it is a mixture of naphthalin and paraffin.

Caoutchouc has already been noticed as a carburet of hydrogen.

HYDROTHERMICAL CARBURANTS OF HYDROGEN—Ethereum, or Ether, is one of these, which has already been noticed; it is regarded as hypothetical because it has never been obtained in a separate state. Ether is supposed to be an oxide of etherum, alcohol a hydrated oxide, and sulfonvic acid a hydrated bisulphate of oxide of ethereum.

It is regarded as composed of—

| Four equivalents of carbon | 37.4 |
| Hydrogen | 12.6 |
| Oxygen | 50 |

Equivalent 100

They consider however that it contains a peculiar carburetted hydrogen which they call methylen, composed of 1 equivalent of carbon 6 + 1 equivalent of hydrogen 1 = 7 that pyroxyllic spirit is in fact composed of—

| One equivalent of methylene | 7 |
| Water | 9 |

Equivalent 16

Although methylen has never been obtained in a separate state, yet it has been separated from the water, and combined with various acids, as with hydrochloric acid, nitric acid, sulphuric acid, oxalic acid, &c. With some of these it forms crystallizable salts.

We have now noticed the more important compounds of carbon and hydrogen; but chemical research is almost daily adding to their number. In the 117 volume of the London and Edinburgh Philosophical Magazine for October last, several new compounds are mentioned by M. Pelletier, who has promised further details on the subject; and some others are described by M. Laurens, which appear to be isomeric with, if not absolutely similar to, previously described compounds.

It will be observed that some of these compounds, as naphthalin, ethylene, and more especially methylen, act the arts of alkalis, combining with and saturating acids, and producing crystalline salts with them; and it is a curious circumstance that methylen, which is a theoretic carburet, appears to possess the most extensive power of combination: indeed it may perhaps be on this very account that it has not yet been isolated.

HYDROLEACE, a very small and unimportant natural order of Monopetalous Exogenous plants, allied to Convolvulaceae, with which it was once connected. They are weeds inhabiting the East Indies, with alternate glan-
ular or stinging leaves, monopetalous regular flowers, with a gyrate inodorous, definite stamens, a superior poly-
sporous 2- or 3-celled fruit, and seeds with thin embryo lying in the midst of fleshy albumen. In their gyrate in-
dorsescence they correspond with Boraginaceae.
HYDROMETER (Greek, water, and metron, a measure) is an instrument for determining the relative densities or specific gravities of fluids. The principle of the hydrometer is this:—It is known that when a body is immersed in a fluid it loses as much of its weight as is equal to the weight of that portion of the fluid which it displaces. [HYDROSTATICS] Thus if a body suspended from the extremity of one arm of a balance be counterpoised by weights applied to the other arm, and while thus suspended it be immersed in a vessel of water, it will be found that one arm of the balance will preponderate, and that in order to restore the equilibrium as much weight must be applied to that arm from which the body is suspended as is equal to the weight of the water displaced. Hence if the same body be immersed successively in two different fluids, the portions of weight which it will thereby lose will be directly proportional to the specific gravities of those fluids; because the diminution of weight is always equal to the weight of the fluid displaced, that is, to the magnitude of the body multiplied into the specific gravity of the fluid. The above supposes the body to be specifically heavier than the fluid. If it be lighter it will float upon the surface, so that its tendency to descend, or its weight, will then be entirely counteracted by the fluid; from which it appears that when a body floats upon the surface of a fluid, the weight of the portion of fluid displaced is equal to the entire weight of the body. Now since the weight of the fluid displaced by a floating body is constant (being always equal to the weight of the body), whatever may be the density of that fluid, it is obvious that if we can determine how much of the body is immersed we may immediately deduce the specific gravity of the fluid; because when the weight is constant, the specific gravity varies inversely as the bulk.

Upon this principle is constructed the instrument known by the name of Sykes's hydrometer, which is now universally employed in the collection of the spirit revenue of Great Britain. It consists of a thin brass stem about six inches in length, passing through and soldered to a hollow ball of the same material, and about one inch and a half in diameter. To the inferior extremity of the stem, from which the hollow ball is about one inch distant, a permanent pest-shaped weight is attached; so that when the instrument is placed on a fluid the other extremity may float perpendicularly to the surface. There are also ten weights of different magnitudes, nine of which are circular, and applicable by means of a slit to the lower branch of the stem. These are marked 10, 20, 30, 40, 50, 60, 70, 80, and 90 respectively, and by their successive application the instrument may be sunk so as to obtain the complete range of specific gravity, from that of pure alcohol to that of distilled water. The other weight is of the form of a parallelopiped, and may be fixed when necessary to the upper branch of the stem. The upper branch of the stem is divided into ten equal parts or degrees, each of which is subdivided into two parts. The whole is adjusted at the temperature of 60° Fair., and tables are computed whereby the necessary corrections may be determined for all variations above or below that point. In order to determine the strength of spirit by means of the hydrometer a portion is placed in a tall glass cylinder, and the temperature observed. One or more of the circular weights is then attached to the lower stem of the instrument, so that the lower extremity of the scale may sink beneath the surface of the fluid, and when the whole has become stationary the number upon the scale in contact with the surface of the fluid is observed. This number added to the number marked upon the circular weight employed will give a third number, adjacent to which, in the tables above mentioned, and under the head of the proper temperature, will be found the per centage of strength required.

The most convenient method of obtaining the specific gravity of fluids is by means of what chemists call a "thousand-grain bottle." This is a bottle of a globular form, with a ground-glass stopper, so adjusted as to contain exactly 1000 grains of distilled water, at the temperature of 60° Fahr., and accompanied by a weight, which is an exact counterpoise for the bottle when thus filled. In order to determine the specific gravity of a fluid by this means, it is simply necessary to fill the bottle with that fluid at the temperature of 60°, and place it, together with the adjusted weight, in the opposite scales of a delicate balance; then the number of grains which it will be found necessary to add to one of the scales, in order to produce equilibrium, will be the difference between the specific gravity of the fluid and that of water taken at 1000.

HYDROMETRIDA, a family of insects, belonging to the order Hemiptera. This family was established by Dr. Leach, and is thus characterized:—Rostrum with two or three distinct joints; labrum very short; eyes moderate; feet very long, formed for walking on the water, with the claws minute, inserted laterally into a fissure on the extremity of the terminal joint of the tarsus.

The genera Hydrometra, Gerris, and Velia of Latreille belong to this family. Those species which have cæsceous antennae, the head prolonged into a snout and receiving the rostrum beneath, belong to the first of these three genera, of which the Hydrometra stagnorum will serve as an illu-
This insect is about 3-8ths of an inch in length, and not broader than an ordinary sized pin, of a black or brown colour, with pale brown legs, and a very glossy head and pronotum. It is of an oval form, and generally near the margin. Like other species of the family Hydrodrometridae, it possesses the power of walking upon the surface of the water; it differs however from those of the two remaining genera, inasmuch as its movements are considerably more slowly. In the genus *Velia* the antennae are filiform, four-jointed, the first joint the longest, the remaining joints long, about equal to each other, and bent at an angle with the first; sternum 1-4th of an inch in length, and 1-12th in breadth; of a black colour, the body red, spotted with black, the thorax brown, with two white spots, and the elytra each with four white spots.

The principal characters of the genus *Gerris* are:—Antennae filiform, four-jointed, the basal joint nearly as long as the remaining three; rostrum three-jointed, legs long, the second pair the longest, and inserted far from the first. *Gerris paludum* is about 5-8ths of an inch in length, and 1-12th in breadth, of a brownish-black colour above, and slivery-white beneath. This insect is very abundant, and its peculiar habit has earned for itself the name of "short-waist," as the water must have attracted the attention of all persons. Its food appears to consist chiefly of such insects as are blown or accidentally fall into the water, which it seizes with its fore legs.

**HYDROMYS. [Muridae.]**

**HYDROPHILIDÆ.** A family of Coleopterous insects established by Leach. The insects of this family are included by Latreille in his section Palpiormes. They have generally six legs to the larva, or nymphs, in the males, the terminal joints always form a perforated knob; the maxillary palpi are very long and slender; the body is usually oval or rounded, convex above and flat beneath, or nearly so; the tarsi are five-jointed, and the mandibles bidentate.

The principal genera of the family Hydrophilidæ may be thus characterized:

**Hydrophorus.**—Antennae with the terminal joint emarginated; sternum produced into an acute spine, which reaches considerably beyond the insertion of the posterior pair of legs; scutellum large; labrum entire; tarsi of the four posterior legs more or less furnished with bifid claws. The male has the anterior tarsus dilated.

**Hydrophilus.** (Hydrophilus piscicus of the older authors) is one of the largest beetles of this country, measuring about one inch and a half in length. It is of a glossy black colour, of convex above and oval beneath; the elytra has the elytra somewhat pointed at the apex. This insect is not very uncommon in stagnant waters in certain parts of England. It lives near the bottom of the water, and may be said to walk rather than swim in that element. The female insect deposits her eggs in a little nest composed of a gummy substance, which is ejected from the abdomen, and in this nest the eggs float until they are hatched. The larvae, which are of a lengthened form and brownish colour, live in the water.

**Genus Hydrophorus.** (Leach).—Labrum emarginated; mandibles internally ciliated; antennae, with the terminal joint, emarginated; a quinque-jointed in a slightly acute spine, which scarcely reaches beyond the insertion of the posterior legs; claws dentated at the base; the anterior tarsi simple in both sexes.

**Hydrophilus caraboides** (Linnaeus), a common insect in some parts of England, and, like the species which is given as an illustration of the preceding genus, lives in stagnant waters. Its form is oval, convex above, and flattened beneath; the elytra are rounded posteriorly. It is of a glossy black colour, sometimes with a bluish or violet hue, and about three-quarters of an inch in length.

The genus *Spercheus* (Fabricius) is chiefly distinguished by the brown and black metallic casings of various species (Hydrophilus, Hydrophorus, *Spercheus*) and also by the specific feature that the elytra, not broader than the thorax, and also very convex; posterior tarsi ciliated.

**Spercheus lucidus** (Stephens) is less than a quarter of an inch in length, of an oval form, and greyish-yellow colour. The head is of a brassy green colour, and there is a spot of the same hue on the thorax. The elytra are striated. This species is common in ponds, &c. in various parts of England.

**Genus Hydrobius.** (Leach).—Antennae nine-jointed, the terminal joint somewhat compressed and emarginated; clypeus entire; scutellum small; sternum simple; eyes small and not prominent; claws simple.

The species of this genus are usually of small size, of an oval or rounded form, and always very convex. Like those of the preceding genera, they live in ponds and ditches, and appear to prefer stagnant waters. *Mr. Stephens*, in his "Illustrations of British Entomology," enumerates twenty-five species.

**HYDROPHIS. [Hydrus.]**

**HYDROPHO'RIA (from ὑδρός water, and ὕδος fear) is the disease occasioned by inoculation of the saliva of a rabid animal, and is so called from the violent and suffocating spasms of the throat which occur when the patient attempts to drink, or when, in the latter stages, the mere idea of drinking causes a violent spasm of the face. This disease is never produced in man by any other cause than the saliva of a rabid animal; those cases which have been said to arise spontaneously have not presented all the true characters of the affection, and have in general been only severe cases of bottle fever, from the make of liquor of the raw liquor, and the fear of real hydrophobia had much influence. Whether it is ever spontaneously generated in animals is less certain, because its origin in them is less easily traced; but the fact that it is possible to keep the disease from packs of dogs, in which every fresh comer is submitted to a kind of quarantine, and the many instances now known of isolated situations in which, although dogs are very numerous, no case of hydrophobia has occurred for many years, tend to prove that in the dog also it arises only in consequence of the bite of some other rabid animal. It is probable that all animals are subject to hydrophobia, for all that we have an opportunity of observing that all our domestic species, are; but it has not appeared that any, except the wolf, fox, cat, and dog, are capable of communicating it to each other, or to other species. There is no evidence whatever that the disease has ever been communicated from one human being to another; men affected by it are not disposed to bite, and it is doubtful whether, if they did bite, the saliva would have any effect, for the experiments made with it upon animals are so yet contradictory and incompleat.

The disease may be communicated to man either by the saliva being carried into a wound made by the tooth of a rabid animal, or by its being placed on the surface of a previous wound, as when dogs have licked the hand or face of a person in which there was any raw surface. However, it is only a small portion of the bites which a mad animal gives that convey the disease; if, for example, he bites through the cloth where no wound appears, it is of no consequence; but the saliva will be wiped off from his teeth as they pass; and hence wounds of the hands and face are generally the most dangerous. It is probable that the saliva differs in the degree of its virulence in different animals; the bite of the mad wolf seems generally more fatal than that of the dog. In a case known to John Hunter twenty-one persons were bitten by the same dog, and only one had hydrophobia; in another a wolf bit seventeen persons at Drave, and of these one only died by hydrophobia. It is the third annual, that all, or almost all, bitten by a dog, in ten of whom the wound was on the flesh, and three died. In none of these cases had any preventive measures been used; and from the evidence collected from various sources (Hydrophobia, i.e. vol. i.) thought that whether preventive means were employed or not, only one person in twenty-five of those bitten by mad dogs would have hydrophobia. It appears that
animals are more subject to the disease than man; for in a case where a dog bit four persons and twelve toddlers, all the dogs died, but not one of the men. These results, although they should not prevent the surgeon from employing those measures which prevent the disease, fully explain how empiric remedies have obtained such credit, the immu-
nity from the disease being attributed to their influence, when it would have been as complete if they had never been used.

The period after the inoculation at which the symptoms of hydrophobia may exhibit themselves varies greatly. In the ten persons already mentioned who were bitten by the wolf, one on the sixtieth, and another on the sixty-eighth day after their wounds were received; in the five bitten by the same dog the deaths occurred between the thirtieth and sixty-third days. In general the disease appears between the thirty-fifth and fortieth days from the injury; it is the idea of looking at it, as it has been delayed as long as eighteen months, and Dr. Barteley believes that a person who has been bitten and used no preventive measures cannot be considered as perfectly safe till at least two years have elapsed since the occurrence, and recorded in which there was no evidence of injury for ten and twelve years before the disease manifested itself, but at present neither the number nor the accuracy of such histories is sufficient to allow of an opinion to be drawn from them.

The bite of a rabid animal generally bespeaks up like that of a healthy one: there is nothing whatever which would indi-
cate danger from it, and the patient is attacked when he has had time to reflect which was ever bitten. In some cases however, before hydrophobic symptoms appear, the scar of the wound becomes painful, red, and swollen, and pain is felt shooting from it along the course of the nerves of the part, as a severe neuralgia. The first part of the disease is that the patient has headache and general uneasiness; he loses his appetite, and when he is about to drink he suddenly feels an aversion to any liquor, and is charmed to swallow. He gradually dis-
covers this inability to drink accidentally, and again ex-
presses his wonder that he should not be able to quench his thirst. The symptoms, once set in, rapidly increase in se-
verity; any attempt to drink, and even anything that can suggest anything resembling a convulsive movement, or anything that might suggest the idea of nervous agita-
tion, is a most remarkable circumstance: the patient is restless, anxious, and timid; his eye has a peculiarly unsteady glistening appearance, and he is often delirious, and talks with the greatest rapidity and inflamed manner, and persons who are not aware that his attendants are going to rob or murder him, and is haunted with frightful visions. As the disease proceeds, the convulsions of the throat become more frequent and severe; a breath of cool air, or the slightest noise or vibra-
tion of the room, is sufficient to excite them: there are severe headache, a rapid pulse, a foul tongue, and other symptoms of a generally disorderly condition of the system. A few hours of thick tenacious mucous clogs up the air passages, and increases the feeling of suffocation, and it is in his attempts to free himself from this that the patient coughs and makes a loud harsh noise, which has been sup-
posed to resemble the barking of the animal by which he was bitten. Sometimes there is furious delirium; but often for the last few hours of life the patient becomes quiet; he falls perhaps into a tranquil sleep, as if fatigued by his ex-
ertions, or he lies perfectly still, without spasms, and ra-
tional conversation is possible; yet it cannot be said that he presses his death; he rouses from his tranquillity, and, after one or two comparatively slight convulsions of the throat or the whole body, expires. The duration of the disease is very rarely more than six days, and it often terminates in death in twenty-four hours. In the latter cases the patient under-
dies suffocated by one of the spasms of the throat; in the for-
m 

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.

HYDROPHOBIA.
especially those of the genus Nemophila and Eutoca, are beautiful objects: they are all natives of North America.

HYDROSAURUS. [iguamidæ.]

HYDROSTATICS is the science which relates to the pressure and equilbrium of the fluids commonly called non-elastic, or incompressible; as water, mercury, &c., and to the equilibrium of bodies immersed in them. The elastic fluids, as air, steam, &c., are the subjects of pneumatics.

The two books of Archimedes entitled, in Latin, 'De Humidio Insidentibus,' contain all that is now known concerning hydrostatics, properly so called, among the ancients. That philosopher showed from experiment that a mass of fluid will be in equilibrio when each of its particles is pressed equally in every direction. He explained that a floating body is held in equilibrio when its centre of gravity and that of the displaced fluid are in one vertical line; and that when bodies are immersed in a fluid of less specific gravity than themselves they lose certain portions of their weights. The latter principle led him to the means of ascertaining the quantities of two different ingredients when mixed together in one mass; and he applied it to detecting the quantity of alloy in a golden crown which had been executed for the king of Syracuse.

The cause of fluidity in bodies has been the subject of much discussion. It has been supposed to depend on the globular form of the particles, or on the caloric contained between them; or, finally, on both these circumstances combined. But, whatever be the primary cause, it is admitted by all that the property must arise, immediately, from the perfect mobility of the particles among one another; in consequence of which the mass immediately takes the figure of any vessel in which it is received, its upper surface assumes a level position, and by which also, it begins to flow as soon as an orifice is made in any part of the sides or bottom of the vessel. Some difference exists however in the fluidity of different bodies: such as mercury, water, &c., in their ordinary state, possess such property in a high degree: while the particles of many fluids, as the oils, have a sensible adhesion to one another. Except pure alcohol, all the non-elastic fluids, at certain temperatures, become congealed, and thus entirely lose their fluidity.

Since pores are known to exist between the particles of all bodies, fluid as well as solid, it may readily be conceived that no fluids can be absolutely incompressible; and experiments have been made from which it is manifest that spirit of wine, oil, water, and even mercury, can, by pressure, be reduced in volume, in certain degrees; the fluids which have the greatest specific gravity suffering the least compression. But, it is very small compared with the volume of the fluid (being for water, according to the experiments of Mr. Canton, [Phil. Trans., 1762, 1764], only 7/100th part of the volume when the pressure is equal to that of the atmosphere in its ordinary state), for all practical purposes of hydrostatics such fluids may safely be considered as experiencing no change of volume by the compressions to which they may become subject.

Experiment has also shown that all the non-elastic fluids possess the property of transmitting equally in every direction the pressure exerted against any point on their surface. If, for example, a piston was forced into an orifice made in any part of the side of a vessel containing such a fluid, the effect of the pressure would be experienced equally at every point on the whole surface of the vessel. This property has been denominated the *quidavdersus* propagation of pressure, and it may be conceived to result from that perfect mobility of the particles among one another which has been above alluded to, and which enters into our first conception of fluidity.

But the pressure exerted by a fluid against the sides and base of a vessel in which it is contained, in consequence of a force thus partially applied, should be carefully distinguished from that which is caused by the gravity of the fluid; the former being the same in every part of the fluid mass, while the latter at every point in the sides, depends on the depth of the point below the upper surface of the fluid.

It has been said above that a fluid in any vessel will have its upper surface a level plane, or in a horizontal position; but it must be observed that, since the fluids on the earth are attracted towards the centre of gravity of the latter (leaving out the consideration of all disturbing forces, and considering the earth as a sphere, and as a perfect sphere), every way spherically about that centre; and consequently the upper part of a fluid in any vessel must be understood to form a portion of a spherical super- ficies concentric with that of the earth.

The quidavdersus pressure above mentioned has long since been proposed to be employed as a means of transmitting the action of a moving power to any distance however great. For this purpose it has been projected to fill a horizontal tube with water, and, having a tube having a short arm in a vertical position; and in each of these arms to have a piston. Then that which is at one end of the tube having received the action of the moving power, it will, by means of the fluid, transmit the motion to the other; the rod of which should be in connection with the machinery on which it is intended to act. It may be remarked that the principle has been recently proposed for adoption in communicating intelligence between two places remote from each other.

From the same property follows that if a fluid at rest in a vessel be supposed to consist of an infinite number of filaments, or infinitely slender columns in vertical positions, the pressure which, in consequence of the weight of the particles vertically above a exerted in every direction by any particle of such filament, will be counteracted by the equal pressure of all the surrounding particles, so as to remain at rest, and not be produced by its gravity vertically under it. And that the pressure exerted by the fluid

**Vol. XII. 3 F**
against every part of the surface of the vessel containing it, will, while the fluid is at rest, be perpendicular to the surface; since, otherwise, the reaction of the surface could not entirely destroy that pressure, and a part of it would disturb that equilibrium which, by hypothesis, is the condition of the fluid in the vessel. The amount of that reaction is, of course, equal to the weight of a filament of fluid vertically above the point and extending to the upper surface of the fluid; or to the weight of any one of the neighbouring filaments comprehended between the upper surface and a horizontal plane passing through the said point. The pressure of all the particles in the upper surface of the fluid is evidently null.

It may, hence, also be proved, that the pressure on the base of any vessel containing a fluid, will be the same whatever be the form or position of the sides of the vessel, provided the fluid have always the same height above the base. For let ABCD (Fig. 1) be a vertical section through a prismatic vessel; the pressure on any point a of the base is evidently equal to the weight of the vertical filament ab; that on any point c of the inclined side BD is the weight of the filament cd; and this last pressure has no effect on the base, because the lateral pressures of all the particles in every vertical filament, are counteracted by those of the particles in the neighbouring filaments. The same thing must be understood of all the water in the portion BCD. The pressure on any point e under the inclined side AC is equal to the weight of the filament ef, together with the pressure arising from the reaction of the side AC at f, in the vertical direction ef; and this reaction is, from what has been said, equal to the weight of a filament which may be supposed to exist above f, with a height equal to fg. Consequently, the pressure on AB, when the sides of the vessel are inclined to the horizon, will be equal to that upon the same base when the sides are in vertical positions. This is the foundation of the experiment usually exhibited in popular lectures, when columns of water of equal height, in cylindrical and conical vessels, having equal bases, but of course containing very different quantities of fluid, are shown to be in equilibrium with one and the same weight applied to prevent the moveable bases from descending.

It may readily be inferred from the above, that the pressure on the base will be equal to the weight of a vertical prism or cylinder of the fluid, whose base is that of the vessel, and whose altitude is that of the fluid which it contains, whatever be the form or inclination of the sides.

When the bases of two vessels containing fluid of the same kind are equal, the pressures on those bases will be proportional to the altitudes of the fluids; and if the altitudes are equal, the pressures will be proportional to the areas of the bases.

On the same principle may be explained the experiment which has been demonstrated the hydrostatical paradox. In this is employed a cylindrical machine formed of two circular plates of wood, as AB and CD (Fig. 2), with sides of leather like a box of pair of hollows. A tube FE is inserted in an orifice near the bottom, and through this tube water is poured into the cylinder, till the boards AB and CD are at any distance aunder within the limits allowed by the leathern sides. Then, if any weight be placed on the board CD, it will cause the water to rise in the tube EF to a certain height, suppose a; and the weight of the small column a of water may be considered as holding in equilibrium the weight applied on CD; which will, in fact, be found to be equal to that of a cylinder of water whose base is the area of the board CD, and whose height is equal to a.b.

If the tube EF were made to decline from the vertical so as to take any oblique position EF'; it would follow, since the pressure of a fluid by gravity depends on the vertical height only of the column, that the fluid in the tube, from the same pressure on CD, would rise till its upper surface is in a horizontal plane or a' passing through a; and the weight of the column of fluid must be estimated by the area of the horizontal section at a' multiplied by the vertical height of a' above b. Hence, also, any fluid in a bent tube ABC (Fig. 3) will stand in each branch, the tube being open at both ends, at the same vertical height above C, the lowest point. Thus water, which is conveyed in pipes from a reservoir, will occupy all the bends of the pipes, and rise to the further extremity up to a horizontal plane passing through the surface of the water in the reservoir, provided no vertical bend be higher than that level.

The power produced by the hydraulic press depends on the principle exhibited in the above experiment; and this experiment is, at the same time, the proof of that equality of pressure which has been said that the particles of a fluid exert in every direction.

The pressure exerted by a fluid against the whole side of a vessel containing it, or against a surface immersed in it, whether that side or surface be plane or curved, is equal to the weight of a column of the fluid having the surface pressed for a base, and the distance of the upper surface of the fluid from the centre of gravity of the former surface for altitude. For let DB (Fig. 1) be the position of the surface pressed, and let an indefinitely small area at e on that surface be represented by m, and be pressed by the weight of the filament of fluid above it; then, since every part of the indefinitely small area may be supposed to be at the same vertical depth, which may be represented by n, it follows that the pressure on e will be proportional to mn. And the same thing will hold good with respect to every point in the surface DB. Therefore this surface may be conceived to be pressed by an infinite number of parallel forces, whose points of application are on the same surface, and whose intensities are represented by the products of the elementary areas into the distances of those areas from the upper surface CD of the fluid. But, by the theory of parallel forces in mechanics, the resultant of all those forces is a force whose intensity is represented by the sum of all the elementary areas (that is, the area of the surface pressed) multiplied into the distance of its point of application, that is, of the centre of gravity of the surface, from the same
By this theorem the pressure of water against the surface of a vessel filled with a fluid is equal to the weight of a column of the fluid equal to the height of the fluid.

The pressure against one side of a cubical vessel filled with a fluid is equal to the pressure upon the base; for the areas of the base and side are equal to one another, but the centrise of gravity of the former is at a distance from the fluid surface equal to the whole depth, and that of the latter at a distance equal to the half depth. It is shown moreover in treatises on hydrostatics, that if a hollow cone standing on its base filled with a fluid, the pressure on the fluid surface, equal to three times the weight of the fluid; that the pressure against the interior surface of a hollow sphere filled with a fluid is also three times the weight of the fluid. Again, if a vessel of any figure be filled with a fluid, the pressure at any sides and bottom a vertical filament of the fluid reaching to the upper surface, the whole pressure in a vertical direction on the bottom and sides of the vessel will be equal to the weight of all the fluid. Lastly, the pressure exerted on the sides of a vessel, estimated perpendicularly to the base, is equal to the weight of a rectangular prism of the fluid whose height is equal to that of the fluid, and whose base is a parallelogram, one side of which is equal to the height of the fluid and the other to half the perimeter of the vessel.

It is of importance to determine the place of the centre of pressure against the side of a vessel filled with a fluid, or against the base of the solid, to which a weight is applied, in order to know the weight necessary to hold a vessel or a solid in a certain position. To do this we must know the position of the centre of pressure. If the pressure is not uniformly distributed, which in practice is seldom the case, the position of the centre of pressure is determined by the laws of the distribution of pressure. The centre of pressure is the point to which all the forces of pressure, acting on a surface, may be considered as converging.

The pressure of a fluid on the surface of a vessel may be resolved into two parts, one acting horizontally, and the other vertically, and the direction of these two forces may be determined by the following principle: If a fluid with its surface horizontal be placed in a vessel, the position of the centre of pressure is such that the sum of the horizontal forces on the sides of the container, added to the pressure of the fluid on the base, is equal to the weight of the fluid; and the centre of pressure is at a distance from the fluid surface equal to the weight of the fluid divided by the pressure of the fluid on the base.

The pressure of a fluid on a curved surface is the same as on a plane surface, provided the fluid be not disturbed by the curvature of the surface. If a fluid be in a vessel, and the vessel be moved in any way, the pressure of the fluid against the curved surface will be the same as if the fluid were in a vessel having the same volume, and in which the fluid were placed in the same manner. Hence, if a solid body be weighed in a fluid, it will be found that its weight in one liquid will be the same in another, and that the weight of the body or of the displaced fluid, and the pressure on the surface of the fluid equal to that of the whole body.

The weight which a floating body would bear if denominated the buoyancy of the body, for which purpose two stated depend the common rules for finding the buoyancy of the fluid.

If a solid body float in equilibrium in a fluid, the centre of gravity of the body and the displaced fluid must evidently be in one vertical line; otherwise the upward action of the fluid below, which necessarily has its resultant in a vertical line passing through the centre of gravity of the space occupied by the body, would produce in the latter a rotary motion contrary to the hypothesis. This circumstance, given rise to three denominations respecting the equilibrium of floating bodies. First, if the centre of gravity of the body should be below that of the displaced fluid, the body is said to be a sinker; and its position may be denoted by a diagram, which should take place from accidental causes, the body would, after a few oscillations, recover its former position. If the centre of gravity is above that of the displaced fluid, the body is said to be a float; and in this case, when placed on its vertex, that is, it is liable to be immediately overturned; and hence the body is said to float with a tottering equilibrium. And if the said centres should be exactly coincident, the body would float upright without danger: this is denominated an equilibrium of indifference.

The first case is that of a cylinder whose axis is less than the diameter of its base; the second is that of a cylinder whose axis is greater; and the last is that of a homogeneous sphere.

The absolute weight of a given volume of any solid or fluid body is called its specific gravity. In this country, for convenience, it is customary to consider one cubic foot as the given volume, and to express the weight in avoirdupois ounces: thus the weight of a cubic foot of rain water being 1000 ounces, and that of a cubic foot of cast-iron being 7207 ounces, these numbers are used to denote the specific gravities of the bodies, from which it follows that, when the volumes of two bodies are equal, their specific gravities will be proportional to their weights; when the weights are equal, the specific gravities are inversely proportional to their volumes; and, in general, the weights of bodies vary in a ratio compounded of their volumes and specific gravities.

It may hence be easily shown that when two liquids of different specific gravities, as water and mercury, are in a vessel in equilibrium in a bent tube, the vertical altitudes of the columns above the horizontal plane of junction will be inversely proportional to their specific gravities. For, let mn (fig. 3) be a line in the plane of junction; then the area of the section at m being common to both fluids, the bases of the columns in the two branches may be considered as equal to one another. Now, if the vertical altitude of the column mp be represented by a, and that of mq by A, the specific gravity of the first fluid in the second will be a/b; and, in the case of the second fluid, the pressures on every point of their bases, at m and n may be expressed by a s and A s; and in the case of equilibrium these terms are equal to one another: therefore we have A : a:: b : s.

The specific gravity of a solid body is readily found by means of the hydrostatical balance, an instrument which differs in no respect from a common balance, except in being furnished with weights of the specific gravity of the liquid and of the body both in air and in vacuo; from whence may be obtained the ratio between the density of the body and that of the fluid in which it is weighed.

The specific gravity of a fluid may be found from the following proposition: Let a + b be the volume of a body which will float in the fluid, b being that of the immersed part; let also the specific gravities of the body and fluid be represented by s and r respectively. We have then the
401: hydrothorax, a to (E consequence but, the « then the every - and the i unusually (a and vertical Jg HYD. a will turn connexion. his weight account il-x fluid metals weights into ui-x. 

By means of the specific gravity of bodies may be ascertained the quantities of the different materials which enter into any compound body. Thus, let \( w \) and \( w' \) represent the weights of a mixed metal in air, or vacuo, and water respectively, \( x \) and \( s \) the known specific gravities of the two metals in the mixture, and let \( z \) be the weight in air or vacuo of the heavier metal. Then \( x = \) the weight of water which would be displaced by \( x \); \( w - x \) = the weight which would be displaced by the lighter metal; and we shall have \( w' = x + \frac{w - x}{s} \); whence \( x = \frac{w - w'z}{s - x} \), and 

\( w - x (= \text{the weight of the lighter metal}) = \frac{s'(w' - wz)}{s + x} \).

It has been shown that the pressure of a fluid against any point in an upright wall, or in the side of a vessel containing it, is proportional to the depth of that point below the upper surface of the fluid; but, in determining the form and dimensions of a retaining wall which shall be equally strong in every part of its height, it will be necessary to consider that the horizontal pressure of the fluid at any point, as \( a \) (fig. 4) (BAE representing a vertical section through such a wall), tends to overturn or fracture the wall at every other point, as \( C \). Now, let \( BA = x \), and let the depth of an elemental portion of the wall at \( a \) be represented by \( y \); then, if \( BC \) be represented by \( b \), we shall have \( CA = b - x \), and \( b - x = d' \) dx will express the force of the water on an elementary area at \( a \) to turn the wall about \( C \); consequently, \( f(b - x) x \), between \( x = a \) and \( x = b \), will express the sum of all the forces of the water above \( C \) to turn the wall about the latter point. But the integral between those limits is equal to \( \int b \); therefore the tendency of the fluid to fracture the wall at any point, as \( C \), is proportional to the cube of the distance of that point from the upper surface of the fluid. The strength of the wall to resist transverse pressure in the direction of its thickness is, by mechanics, proportional to the square of that thickness; that is, proportional to \( CD^2 \). Therefore, in order that the wall may be equally strong in every part, the form of a vertical section should be such that the squares of the horizontal ordinates, as \( CD \), are proportional to the cubes of their vertical depths from the top. This is a property of the semi-cubical parabola, and the exterior or interior surface of the wall should have that figure. Agreeably to this principle also the thickness of tubes containing columns of fluid in vertical positions should increase from top to bottom, according to the same law.

This article may be concluded by an indication of the principles on which the stability of ships or other vessels on the water may be determined.

Let ABC (fig. 5) represent a vertical section through the centre of gravity \( G \) of a ship, and let H0 be the surface of the water; let also \( g \) be the centre of gravity of the immersed part, while the plane of the mast is vertical. Now, by the action of the wind or otherwise, let the ship be inclined so as to take the position \( a b c \); the centre of gravity \( G' \) of the ship is thus displaced \( G'k \); hence the stability of the vessel, or the force by which it resists the effort of the wind to overturn it, is expressed by the product of the upward pressure of the water (or the weight of the vessel) acting in the vertical line \( kA \) into the length \( G'k \) of the lever, whose fulcrum is \( G' \). And, that an equilibrium may subsist, this expression must be at least equal to the product of the force of the wind acting against the sails or hulls, into the distance of the centre of pressure from the centre of gravity of the ship.

HYDROTHERAX (from \( \text{H}2\text{O}, \text{water, and \( \text{S}2\text{O}_4 \text{aft, the chest}), dropsy of the chest, is a term applied to express the existence of a collection of serous fluid in the cavity of the pleura.

This collection may take place in consequence of inflammation of the pleura, which, like inflammation of other serous membranes, terminates in effusion; or it may result from the causes of general dropsy, viz. some obstacle to the circulation through the heart, or organic disease of the kidney. When it arises from the former cause it is merely a symptom of pleurisy. In some cases of pleurisy however, in which pain is absent, and in which fever does not exist, or is slight, this effusion and the difficulty of breathing to which it gives rise constitute almost the only symptoms of the disease. Abundant effusions of this kind, unattended by pain or fever, sometimes take place very readily, especially in old persons and in adults in a cachectic condition.

When hydrotorax results from inflammation of the pleura, it generally exists on one side only of the chest. When it is a consequence of obstacle to the circulation through the heart, or of organic disease of the kidney, it is generally double, although the effusions into the two pleural cavities may not take place simultaneously. In the latter case also hydrotorax is found in connexion with general dropsy. At first there is oedema of the lower extremities; this oedema gradually extends to the integuments of the trunk, to the arms, and even to the face; and subsequently serous fluid is diffused into the cavities of the pleura, giving rise to hydrothorax, and into those of the pericardium and peritonemum.

A collection of fluid in the cavity of the pleura may be detected by physical signs: a dulness on percussion, and, when the effusion is moderate, a diminution of the respiratory murmur, and the presence of auskophony, on the affected side. If the effusion be so considerable as entirely to prevent the expansion of the lung, there is a total absence of auskophony or of any respiratory murmur on that side, whatever be the force with which inspiration is made, while on the opposite side the respiratory murmur is unusually audible.

When one side only is affected the patient generally lies on that side; when the effusion is double he lies on his
HYDRUS. The serpents of this genus have the posterior part of the body and the tail very much compressed and elevated vertically, so as to give them a facility of swimming adapted to their aquatic habits.

Cuvier places them with Bongarus, or Bungarus (Daud.; Pseudo-boa, Oppel) as constituting a tribe of serpents whose jaws are organized and armed nearly as in the non-venomous serpents; but which have the first of their maxillary teeth larger than the others, and pierced for conducting the poison, as in the venomous serpents with isolated fangs.

Daudin thus subdivides these water-serpents, which are said to be very common in certain parts of the Indian Sea.

Hydrophilus.

The species of this genus have, like Tortrix and Erpeton, a row of scales a little larger than the rest under the belly. Their head is small, not convex, but obtuse and furnished with plates.

Locality.—Species have been found in the salt-water canals of Bengal, and others farther in the Indian Sea.

The Pelamidæ.

These have large plates on the head, but their ocellus has a swollen appearance, by reason of the length of the pedicles of their lower jaw, which is very dilatable, and all the scales of their body are equal, small, and disposed like an hexagonal pavement. Cuvier remarks that the species most known (Anguis platurus, Linn.; Hydrophis bicolor, Schm.) is black above and yellow below. Though venomous, it is, he says, eaten at Tahete.

HYDRUS (constellation), the Water-snake, commonly called the Southern Snake, a constellation of Lacaille. It is situated between the south pole and the bright star in Eridanus (Achernar).

<table>
<thead>
<tr>
<th>Character</th>
<th>Lacaille</th>
<th>Catalogue</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>α</td>
<td>13</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>β</td>
<td>132</td>
<td>213</td>
<td>4</td>
</tr>
<tr>
<td>γ</td>
<td>136</td>
<td>219</td>
<td>3</td>
</tr>
<tr>
<td>δ</td>
<td>168</td>
<td>254</td>
<td>4</td>
</tr>
<tr>
<td>ε</td>
<td>186</td>
<td>275</td>
<td>5</td>
</tr>
<tr>
<td>ζ</td>
<td>214</td>
<td>310</td>
<td>5</td>
</tr>
<tr>
<td>η</td>
<td>240</td>
<td>349</td>
<td>5</td>
</tr>
<tr>
<td>θ</td>
<td>309</td>
<td>439</td>
<td>3</td>
</tr>
</tbody>
</table>

HYERES, or HIERES, a town in the department of Var, in France, near the coast, about 9 or 10 miles east of Toulon, celebrated for the beauty of the district in which it is situated, and the warmth of the climate, which exceeds that of any other part of France. The gardens in the immediate neighbourhood of the town abound with standard orange and lemon trees; the grounds a little more distant are planted with olive-trees, which here attain their full size, and with vines. The neighbourhood produces much corn, and there are many meadows. The oranges of Hyeres are considered to be of inferior quality. The town, which is resorted to by visitors, especially valetudinarians, is on the slope of a hill; the streets are steep, narrow, and incon-
venient; but many of the houses are handsome, having been built for letting to visitors. The population of Hyères in 1831 was 8270 for the town, or 10,142 for the whole commune. Hyères was the birthplace of Massillon.

Off the neighbouring coast are several islands known as the Islands of Hyères; they lie nearly in a line from east to west, in the following order: L’Esquillade, a mere rock, seldom visited; ile du Titan or Levant; Portera, or Portecros; Bagneau, or Bagneaux, very small; and Ponquerolles. They are all small (Ponquerolles, 2 by 0.6 mile wide, and Titan, the largest), and are mere steep barren rocks. They have some fortifications on them, and a small garrison is kept there. The English took possession of Hyères during the late war but abandoned them as useless. These islands were once noted for their oranges.

HYGINUS, CAIUS JULIUS (written also Higinus, Hygnum, Yginus, or Iginus), a freedman of Augustus Caesar, and a celebrated grammarian, was, according to some, a native of Spain, but according to others, a native of Alexandria. He was placed by Augustus over the library on the Palatine hill, and also gave instruction to numerous pupils.

His works, which were numerous, are frequently quoted by the antients with great respect. The principal appear to have been:—De Urbibus Italicis;* De Troianis Familias;* De Claris Viris;* De Proprietatibus Doorum;* De Dito Absurdissimis;* A Commentary on Virgil; and a treatise on agriculture.

The works mentioned above have all been lost; those which are extant, and are ascribed to Hyginus, were probably written by other individuals. These are:—1. Poeticum Astronomicon, libri iv.; Ferrara, 1475; 2. Palaearum Liber, Basel, 1535. Another collection of 234 fables is also attributed to Hyginus: 3. De Castris Statim et Unitim; published by Sidney Geay, at Paris, 1539; 4. De Verissimis et Veracerris;* a collection of the works of the ancient poets in the 16th century; and 5. De Alterius Urbibus Urbibus, 1674.

HYGROMETER (γρόμος, moist, and μιρρφ, measure). In physical experiments it sometimes becomes necessary to ascertain the quantity of aqueous vapour contained in the atmosphere or other gas under examination. To attain this object several instruments called hygrometers have been invented, and are known by the names of their authors, as De Luc’s, De Saussure’s, etc. These for the most part rest upon one common principle, the diminution of bulk which takes place in organic substances consequent upon the abstraction of moisture. Thus De Luc employed a thin slit of whalebone, the contractions of which indicated the abstraction; and De Saussure had recourse to a human hair, by means of which he constructed a far more delicate instrument; but all of them have been superseded by the hygrometer invented by Mr. Daniell, the principle of which is common to all organic substances, and is symbolized by that gentleman in the 8th volume of the Quarterly Journal of Science. It consists of two thin glass balls one inch and a quarter in diameter, connected by a glass tube about seven inches in length. The tube is bent in two places at right angles so as to form three arms of unequal length, the longest of which contains a small thermometer, whose bulb descends into the lower of the two glass balls. This ball, after being filled about two thirds with ether, is placed over a spirit lamp until the vapour of the ether has expelled the contained air through a capillary tube which is left open for the purpose, and afterwards hermetically sealed. The other ball is then covered with a small portion of muslin, and the instrument, thus adjusted is placed upon a stand, to which is attached a small thermometer indicating the temperature of the external air. When about to be used it was usual to warm the muslin by rubbing the tube of the thermometer, which was placed close upon the exterior of the glass. When the tube of the outer thermometer, which always indicates the temperature of the ether in the lower ball, whereby the temperature of the included ether is continually reduced until a deposit of moisture from the surrounding atmosphere is produced and condensed upon the surface of the glass. At this instant the inner thermometer, which always indicates the temperature of the ether, is observed, and thus the dew point, or that at which the precipitation of atmospheric moisture takes place, is determined with considerable accuracy. Having ascertained the dew point, and likewise the temperature of the external air, the actual quantity of moisture contained in a cubic foot of air will readily be found from the formula.

\[
\text{Weight in grams} = \frac{3565}{2} + \pi \times \text{f} \\
\]

where \(f\) denotes the temperature of the external air, and \(\pi\) the elasticity of aqueous vapour at the temperature indicated by the interior thermometer. The value of \(\pi\) for every degree of the thermometer is obtained from the following tables of the expansive force of steam. (Manchester Memoirs, v. 519.)

HYLA. [Frogs, vol. x., pp. 487, etc., 496.]

HYLACTES, a genus of birds established by Captain Philip Parker King, R.N., for a form allied to Megapodus, with the following.

Generic Character.—Bill subelongated, rather thin, with a submarginate apex; nostril basal, longitudinal, the membrane subumbonate, and covered with hairs down the sides; wings very short, rounded; fifth quill longest. Tail subelongated, graduated. Feet strong; tarsi rather elongated, scutellated in front; toes and claws elongated, the latter rather strong and subcompressed; uropygial very strong.

Example, Hylectes Turnitt. Locality, the Island of Chiloé and Port Otway, in the Bay of Felicia. (Zool. Proc., 1830—31.)

HYMENAEA recently became known to the British public by the name of the Apera, a tree so called by Dr. Mantell for the extinct Saurian discovered by him in the forest of Tilgate, and hence termed the Forest Lizard. The remains which upon this genus was characterized were embedded in a block of stone 4 feet by 2 feet, and consisted principally of the rind of the trunk. A chain of five cervical and five dorsal vertebrae with corresponding ribs, and four detached vertebrae, were visible; as were the coracoids and omoplates of both sides. There was a particularity in the structure of the lastmentioned vertebrae, which, in the opinion of Dr. Mantell, warranted the separation of this Saurian from all recent and fossil genera; for the Hylaeosaurus had the omoplates of a crocodile with the coracoids of a lizard. There was also a still more extraordinary osteological structure, consisting of a series of spinous bony apophyses, which varied from 3 to 17 inches in length, and from 14 to 7 inches in width. These maintained a certain parallelism with the vertebral column, as if they had occupied a line along the back. Dr. Mantell suggested that these processes might be the remains of a dermal fringe or serration, with which, as in some recent species of Saurians, the back of the Forest Lizard might have been ornamented. He, at the same time, noticed many anatomical peculiarities which led him to hesitate in determining positively that these parts had formed such appendages. He next entered upon a careful examination of the remains of the animal; and finally ascertained that they consisted of the vertebrae of a lizard. Dr. Mantell also discovered many dermal bones, which served to support the large scales, in the stone: he finally proposed the genus as depending for its characters on the peculiarity of the spinal apparatus and the spinous processes. The paper in which the remains of this large extinct Saurian were described was read before the Geological Society of London, in December, 1832.

Dr. Buckland (who, in his "Bridgewater Treatise," justly speaks of Dr. Mantell’s name as a "fatality" in the history of the Wealden fresh-water formation, in which deposits, of a period intermediate between the oligocene and cretaceous series, Hylaeosaurus was found) is of opinion that this extinct Saurian was probably the last representative of the genus, in its most peculiar character as consisting of the remains of the series of long, flat, and pointed bones, which, Dr. Buckland thinks, seem to have formed an enormous dermal fringe like the haft of the modern Iguana. (See also Dr. Mantell’s "Geology of the South-East of England," 8vo, London.)

We hope soon to see this interesting specimen, together with that of Dr. Mantell’s noble collection, in our National Museum.

HYLOBATES (from ἄβατος, wood-walker, or one that goes through woods), Illiger’s name for the long-armed Ape, or Gibbon. The general characters of these Apes are so delicate and agreeable, that those of the Orangs, but there is some modification of the dental system in the
Gibbons, which have also longer anterior extremities and have posterior callosities, though they have no tail. The vermiform appendix of the caecum is also shorter. Dental formula—Incisors 4/4; Canines 2/2; Molars 2/10 = 32.

In the upper jaw the first incisor is large, terminated by a straight line, worn obliquely within, and cut transversely by the impression of the lower incisor; the second is smaller than the first, and worn obliquely on the side of the canine, which is wider than it is thick, trenched on its posterior border, and presents two longitudinal furrows on its internal surface, separated from each other by a projecting rib, the posterior furrow being larger and deeper than the anterior one. The two next teeth are false molars, and the second is rather larger than the first; but both are composed of blunt tubercles, one on the external and the other, smaller, on the internal border. The three next molars, which increase gradually in size from the first to the last, have the same form; they are composed of four tubercles, two of equal size on the external and two on the internal border, the posterior tubercle being smaller than that which precedes it; these tubercles are formed by furrows which divide the tooth unequally.

In the lower jaw the first incisor is small, and terminated by a straight line; the second is rounded on its external surface, terminated in a point, and strengthened on its internal surface by a longitudinal rib, which thickens it in the middle. The canine is more equal in its dimensions than that of the other jaw, and is terminated posteriorly by a process or heel; but its internal surface presents also the two furrows and the rib which are found in the other. The first false molar, which is placed obliquely, has only a single point; the second has two, one internal and the other external, situated nearer to the anterior than to the posterior border. These molars succeed, which progressively increase in size, and resemble each other. They present five tubercles, two of which are anterior, and three, disposed in a triangle, posterior.

M. F. Cuvier takes this type of dentition from the Siamang, and says that it is also found in the Wao-wao and Onko.

The height of the Gibbons rarely exceeds four feet, and when they are placed in an erect posture their upper extremities reach the ground.

* In *Hylobates hoolock* the canines are remarkably long.

**Geographical Distribution of the genus.**—India and its islands.

**Habit, &c.—**The forests are the haunts of these cheiro-peds, and they are rarely seen at a distance from them. Gregarious, but shy and timid, they keep up a howling concert, resembling in this respect in some degree the Howling Monkeys of America, and having some of them guttural sacs like that tribe. In the forest the activity of certain species is great, and they make way on the trees with their long arms and lengthened feet most rapidly; but when surprised on open plain ground they are altogether as helpless. Other species (the Siamang, for instance) appear to be more sluggish; but these make good use of their acute eyes and ears, and are generally off before the enemy approaches near enough for a capture.

In confinement they are gentle, and seem capable of great attachment to those who are attentive to them. Dr. Burrough gives a most interesting account of three individuals of the species called the Hoolock (*Hylobates hoolock*), which he had an opportunity of observing in that state. One of them, a male, showed a most amiable and docile disposition, and a young female, which died early, was equally gentle and pacific. The Siamang kept by Sir Stamford Raffles was, according to Dr. Horsfield, very tame and tractable, and was never happy unless it was in the company of some person. Mr. George Bennet gives a lively description of the affectionate manners of another of these apes towards those who made its captivity light by their kindness. We select, as an example of this form, the Wow Wow, or Active Gibbon (*Hylobates agile*).

**Description.**—Forehead very low; ordinary arches very projecting; face blackish-blue in the male, and brown in the female; in the former a white band above the eyes, which unites with the whitish whiskers. Hair of the body fine, except about the neck, where it is longer and inclined to be woolly and curled; upper part chocolate-brown; back and fore part of the thighs yellowish-brown, but the colour varies a good deal according to sex and age, the young being paler than the adults and aged, and the very young uniform yellowish-white. Height about 2 feet 7 or 8 inches.

No guttural sac.

**Habit.**—Very agile as soon as they reach the forest, when they set pursuit at distance, swinging, leaping, and throwing themselves from tree to tree with great rapidity. Notwithstanding the want of the guttural sac, they howl in a manner very nearly resembling the Siamang, which has one.

In captivity they are not very lively, as might be expected, from the impossibility of their exerting that freedom of motion on which their vivacity in a state of nature so much depends; but though timid they are soon reassured, take pleasure in being caressed, and become familiar and even playful.

**Locality.**—Forests of Sumatra, where the species is named *Ungaput.*
dactyle of Desmarest, Hylobates syndactylus of F. Cuvier, has a peculiar formation of the hands or feet of the lower extremities, the index and middle fingers being united as far as the middle of the second phalanges. This peculiarity would seem to indicate a generic distinction, notwithstanding the similarity of the teeth and skull to those of the rest of this tribe. These Sumatran Apes, sluggish and timid as they are, exhibit strong maternal affection; for though, if any of the troop are wounded, the rest abscond and leave them to their fate, the mother will remain with her little one if it is hurt, and will suffer herself to be captured rather than abandon it. The females are also generally very active to their offspring, according to the accounts given by MM. Diard and Duvauel.

**Fossil Gibbons (?).**

M. Hermann Von Meyer, in his interesting "Palmologies," remarks that the Quadrumana (Afien) had never been found fossil; nor had they when he wrote. His work was published in 1832; but since then the fossil remains of monkeys have been found in the north of India, in the same formation with the Stiatherium, &c. Fossil monkey bones have also been found in the strata below Calcutta. They were brought up while boring for water.

M. Latot discovered in the tertiary formations of Simorre, Sansan, Auch, &c., in the department of Gers, in the south-west of France (Gascony), among the remains of several other animals, Apes (Singes), of a group having some relation, according to M. de Blainville, to that of the Gibbons, but not true Gibbons that might be compared to the Syndactyle Gibbon (Simang) of Sumatra. (Comptes Rendus, 1837.)

The fossil bones discovered by M. Latot are stated to belong to no less than thirty species of mammiferous animals, including Dinotherium, and were found in two deposits, viz., in the sands and sandstone of the upper tertiary formation of Simorre, Tournon, Lombez, &c., and in the lacustrine deposit of Sansan. There were also the remains of two species of birds of a genus not yet determined, a species of Enyos, and some species of Columba and Rana; as well as molusks (Fistanthia, Helix, &c.), and a conchifer bearing a slight resemblance to Unio margaritiferus. The monkey-tail appears to have been found at Sansan.

**Hymenoptera.** Latreille's name for a genus of numerous crustaceans belonging to the tribe of Alpheus in the family of the Sulcoges, or shrimps, according to the system of M. Milne Edwards, who places it between Atya and Alpheus, observing however that the unique specimen from which Latreille established and characterized the genus was found in the Asiatic seas, and formed a part of the collection of the museum; but M. Milne Edwards adds that the specimen appears to have been lost, for he had never seen it. [SHRIMP]

**HYMENOPTERA.** One of the orders into which insects are divided. Hymenopterous insects possess four membranous wings, of which the anterior pair are the larger; they have all the usual parts of the mouth well developed, that is to say, they possess labrum, labium, mandibles, maxillae, and two pairs of palpi; besides the ordinary compound eyes, they are furnished with three ocelli, or simple eyes, which are usually situated on the vertex of the head. Their tarsi are five-jointed. The females are provided with an ovipositor, consisting chiefly of three elongated slender processes, of which two serve as a sheath to the third. This ovipositor, in many species, is so organized that it can not on any ordinary function be used as a weapon of defence, and is the part which in bees and wasps is called the sting: in these insects it is barbed at the apex. The antennae are generally biflora or setaceous. The mandibles and maxillae are well developed; the proboscis is narrow.

Insects of the order Hymenoptera undergo what is termed complete metamorphosis, i.e. the larva is unlike the perfect insect, and the pupa does not possess the power of locomotion. The larvae of some of these insects very much resemble those of the order Lepidoptera (Butterflies and Moths), but differ in the number of their legs, &c.; these feed upon mosses and other plants. (Securifera.) The larva, however generally speaking are destitute of legs, and do not possess a distinct head, and these are for the most part fed by the parent insect, &c., as in the case of Bees and Wasps, by the workers. In the pupa, all the parts of the perfect insect are visible, since they are enclosed only in a delicate semi-transparent membrane.

In the imago or perfect state most Hymenopterous insects live upon flowers, or at least often frequent them, for the purpose of gathering honey, and others find them a convenient resort wherein they may prey upon the less powerful species of their own class.

The comparatively simple neuration of the wings will serve to distinguish insects of the present from those of the order Neuroptera, where the wing is divided by minute nerves into an infinite number of little cells resembling network; whereas, in the species of the order Hymenoptera, the basal portion of the wings is furnished with longitudinal nerves only, and the apical portion is divided into comparatively few cells, and these nerves and cells are so uniform in species nearly related to each other by affinity, that the absence of some, or even a slight difference in their form, has afforded good characters for the definition of groups. It is to Jurine that we are indebted for this discovery and a very successful application of it. We may remark that the modifications of the marginal and cubital cells and their nerves are those which have been chiefly employed by this author in characterizing the various groups. The following figures (from Mr. Shuckard's work on "Fossil Hymenoptera") represent one of the anterior wings of an Hymenopterous insect, in which all the nerves and cells are present.
The order Hymenoptera is divided by Latreille into two great sections, to which he applies the name of Teretranthia and Aculeata. In the species belonging to the first of these sections the female sex possesses a distinct ovipositor, whereas in the second the ovipositor is replaced by a sting. Many of the ants however form an exception, since they do not possess a sting, and defend themselves by ejecting an acid liquid. In the Aculeata the antennae are always simple, and composed of thirteen joints in the males and females, and of twenty-six in the males. The form; the maxillary, often the larger, have six joints, and the labial are four-jointed. The abdomen is composed of seven joints in the males, and six in the females. These two latter joints in the males show characters which have just been given, are again subdivided, the Teretranthia into two subsections, and the Aculeata into four.

The first subsection of the Teretranthia, to which Latreille applies the name of Securifera, is thus characterized by that author:—abdomen sessile, that is, it is closely joined to the thorax, of which it appears to form a continuation, and does not possess free motion. The females are provided with an ovipositor, which is most commonly serrated, and not only used to deposit their eggs, but to prepare a place for their reception. The larvae have always six horned legs, and often others which are fleshy. This subsection contains only the Aculeata.

The second subsection, or the Puporae, have the abdomen attached to the thorax by a slender stalk, which is very long, and admits of free motion. The larvae are always destitute of feet, and for the most part parasitic and burrowing, as Pomponia, Anteon, Cantharidae, Pompilidae, Scorpionidae, Myrmeleontidae, Ceraphorhus, Halictidae, Melittidae, etc. The family last named contains the largest insects of this order, the ants, the bees, and the wasps. The family which contains the largest insects of this order, the ants, the bees, and the wasps.

We now come to the subdivisions of the second great section of the Teretranthia. These are first in number, the Heterogyna, Fossore, Diploptera, and Anthophila.

In the Heterogyna the species are many of which are composed of three kinds of individuals (as in the Hive Bee), males, females, and males and females are provided with wings, and the females which are apterous. The antennae are either filiform or scutaceous. This section is composed chiefly of the Linnean genus Mutilla.

The Fossore comprises those species possessing a sting, of which all the individuals are furnished with wings; they do not live in society, and consequently there are but few and the ants are nearly always provided with wings. The males and females are furnished with wings, and the females are apterous. The antennae are either filiform or scutaceous. This section is composed of the Linnean genus Mutilla.

The Diploptera contains those species which have the superior wings folded longitudinally when at rest. The antennae are usually furnished with wings, and the prothorax is prolonged posteriorly on each side to the origin of the wings. The antennae possess at least one or two closed cellular fusions, of which the second receives two recurrent nerves. The body is smooth, or nearly so, and almost always varied with black and yellow colours. Many of the species live in society and have three kinds of individuals: males, females, and males and females without wings. The larvae live upon honey and pollen collected by the parent insect. The perfect insect feeds upon honey [Brac.].
is devoid of odour, but when moist, and particularly in an impure and coloured condition, the odour is highly disagreeable, stupefying, and tobacco-like. Its action, even in very small quantity, is extremely narcotic and fatal, like nicotine. It kills more slowly than crinum, and scarcely causes convulsions. Applied externally to the eye, even in very minute quantity, it causes great and enduring dilatation of the pupil. Cats to which it has been given have been observed to gnash the teeth and foam at the mouth.

Hypatia, when taken by a person in health, produces a disorder of the nervous system, inducing symptoms greatly resembling hysteria, if the dose be moderate; but if large, it causes all the phenomena of narcotic poisoning, such as result from other solanaceous plants, particularly congevations of the vessels of the brain with coma. Administered in medicinal doses to persons with disturbance of the nervous system, it lessens the irritability, quiets the circulation, and when morbid wakefulness exists, disposes to sleep. It possesses a superiority over opium in many instances, as it does not constipate the bowels, but rather acts as a mild laxative. This circumstance often renders it a valuable agent in allaying pains and other distressing symptoms incident to females in particular states of their system.

Tincture or a well prepared extract is a good form of exhibition; but probably some of the salts of hyoscyamine will be found the most eligible mode of administration, or a tincture of the seeds may be used.

In case of accidental poisoning, the stomach-pump should be used, or an emetic of sulphate of zinc be given; if the brain should appear much oppressed, vomition may also be resorted to.

HYPERATIA. [Theon.]

HYPERBOLAE. In connection with this article see Conic Sections, Ellipse, Parabola.

The hyperbola is one of the curves known by the name of conic sections. It is in the application of mathematics the least useful of the three; indeed so very rarely does the necessity of using it occur, that it may be a question whether the study of it should form a part of a course of practical mathematics. But there are in pure analysis so many analogies which are illustrated by distinctions existing between the properties of the ellipse and hyperbola, that the student who aspires to more than elementary knowledge cannot dispense with the comparison of the two curves.

The two branches passing through A and M form a complete hyperbola, derived from the cone, or from the general equation of the second degree. [Conic Sections.] There is a pair of straight lines passing through the center C, namely, 1/CL and KCK, which are asymptotes to the curve. There are two foci (as in the ellipse) S and H, the position of which may be thus found when the principal axis AM and the asymptotes are given: from A draw AV perpendicular to the axis; then CS and CH are both equal to CV.

The difference of the focal distances HP and SP is always equal to the axis major AM: in the branch passing through A, HP is greater than SP, and vice versa. The tangent PT always bisects the angle SPH; and PN, the ordinate perpendicular to the axis, being drawn, CA is always a mean proportional between CT and CN. There is also a directrix, as in the ellipse, found by taking on the line CS, CK, a third proportional to CS and CA, and drawing through K a perpendicular to the axis; and as in the ellipse, S always bears the same proportion to PR, namely, that of CS to CA. And CS divided by CA is called the excentricity, the distinction between the ellipse and hyperbola being that in the former the excentricity is less than unity, and in the latter greater. The double ordinate drawn through S or H is called the latus rectum of the hyperbola, and its half the semi-latus rectum. Thus far the resemblance between the ellipse and hyperbola is very visible; at the same time it is obvious that there is nothing in the latter which answers to the minor axis of the ellipse, or to conjugate semidiameters. But if another hyperbola be described in the manner immediately to be pointed out, a figure will be obtained which will enable us to point out properties answering in all respects to those of the ellipse.

Complete the rectangle CAVB, and describe another hyperbola of which CB is the semi-axis, and the same lines as before the asymptotes. This hyperbola is said to be conjugate to the former one, and its foci S' and H' are at the same distance from the common centre as S and H.

In the ellipse, CA was called the major semi-axis, as being greater than CB, the minor semi-axis. Let the words major and minor refer to the importance of the several axes, and not to their magnitude. Then CA is called the major semi-axis (or the semi-major axis) of the hyperbola passing through A and M, and CB its semi-minor axis. Conversely, CB is the semi-major axis of the hyperbola passing through B and P, and CA is its semi-minor axis. Generally the major axis of an hyperbola is that which cuts it, and the minor axis that which cuts the conjugate hyperbola.

As in the ellipse, the square on the ordinate PN is to the rectangle of MN and NA (which is the excess of the square of CN over that on CA) in the proportion of the square on CB to the square on CA. If CD be drawn parallel to the tangent PT, D is said to be conjugate to P, and the semi-diameter CD to the conjugate semi-diameter CP. If the parallelogram CFDK be completed, the point K will always fall on the asymptote, and the other diagonal DP will be parallel to the other asymptote. And CP, any semidiameter falling in the acute angle of the asymptotes, always exceeds its semiconjugate CD; and the excess of the square on CP over that on CD is equal to the excess of the square on CA over that on CB. The area of the parallelogram CDPK always remains of one magnitude, namely, equal to CABV. The rectangle of CW and WP always remains the same, namely, equal to the square on half the line joining A and B. Any part of a tangent KL, intercepted between the two asymptotes, is bisected by the point of contact; and if EF be drawn parallel to KL, the intercepts EF and E'F' are equal, and the rectangle of EF and E'F' is always equal to the square on PK or PL. And the rectangle of the focal distances HP and SP is always equal to the square of the semiconjugate diameter CP.

Any ordinate XZ drawn parallel to a tangent GL is bisected by the diameter CG drawn through the point of contact. And the square on YX is to the rectangle of DY and YG (or for the difference of the squares on CY and CG) in the proportion of the square on CP to the square on CD.

A perpendicular let fall from a focus S upon a tangent PT meets the tangent in a point of the circle whose centre is C and radius CA.
HYPERICA

411

HYPERIDE or HYPERIDES (commonly or Hyperides), an Athenian orator, a contemporary of Demosthenes, and one of the ten from whose writings the Lexicon of Harpo- 
cration was formed. According to Arrian, Hyperides was 
one of the orators whom Alexander demanded of the 
Athenians after the destruction of Thebes: but the list 
which the author of the 'Life of Demosthenes' (attributed 
to Plutarch) gives as the most trust-worthily does not 
contain the name of Hyperides. He was engaged in 
the Lamian war, which immediately followed the death of 
Alexander, n.c. 323, and he spoke a funeral oration over 
those who fell in the battle, which was highly commended 
by antiquity. A considerable fragment of this oration is 
preserved by Stobæus (Serv. 193). In the year n.c. 
322, Hyperides, with Demosthenes and others, having fled 
from Athens, was condemned to death, and the sentence 
was carried into effect by Antipater. (Arrian, 'History 
of Alexander's Successors.' Photius, c. 92.) These two great 
(orators, who had been in their lifetime both friends and 
and enemies, died in the same year. There is no extant 
oration of Hyperides. The critics of antiquity unite in the 
highest eulogiums of Hyperides as an orator. Dionysus 
of Halicarnassus, in his remarks on Dinarchus (c. 5, &c.), 
characterizes his style as marked by excellence of the 
highest order. For some further remarks on Hyperides, 
Ruhnken's 'Historia Critica Oratorum Graecorum' may be 
consulted; and as to the oration of Hyperides against Ariosto- 
cleon, see Clinto, Fasti Hellenici, p. 355.

HYPERSTHENE (Labrador hornblende) occurs cry-
stelline and massive. Primary form a rhombic prism; 
cleavage parallel to the lateral planes, and to both dia-
gonal; fracture uneven; hardness 6; scratches glass; and 
is scratched by quartz; colour on the metallic-looking sur-
face reddish, in other directions greyish or greenish-black; 
streak greenish-grey; lustre metallic in one direction, on 
the cross-facture vitreous; in some varieties translucent 
on the edges; opaque; specific gravity 3:389; massive 
varieties amorphous. Before the bunsen alone, undergoes 
another glass; destroys fuses into a greenish grey glassule; 
and with borax fuses easily. Occurs at Labrador, and in 
the island of St. Paul.

Analysis by Klaproth —

<table>
<thead>
<tr>
<th>Element</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>54 25</td>
</tr>
<tr>
<td>Magnesia</td>
<td>14 00</td>
</tr>
<tr>
<td>Alumina</td>
<td>2 25</td>
</tr>
<tr>
<td>Lime</td>
<td>1 50</td>
</tr>
<tr>
<td>Oxide of iron</td>
<td>24 50</td>
</tr>
<tr>
<td>Water</td>
<td>1 73</td>
</tr>
</tbody>
</table>

HYPERSTHENE ROCK. This is among the rarer 
varieties of those igneous aggregates which by many 
geologists are grouped together under the title of Trop.

Dr. 3 6 1
HYP

MacCulloch, who first noticed Hyperthrene rocks in Skye and Ardmurcan, describes three varieties:

Hyperthrene with compact felspar, with common felspar, with glassy felspar.

In largeness of grain it varies from large-grained granite to ordinary greenstone or basalt; its colour is various colours. It passes to common greenstone.

In Skye it forms the Cuchullin Mountains; part of the mountain of Carrock Fell in Cumberland is also formed of it; a dyke of Hyperthrene runs through the district of Radnorshire; it occurs also in Ireland. In the Valetine M. Necker has pointed out the passage from Hyperthene sienite to granite.

HYPERSTROPHY (from ἡπίος, above, and πρός, nutrition), a term in medicine signifying the enlargement of a part of the body from excessive nutrition. The hypertrophied organ contains no new solid or fluid substance, but one or more of its proper component tissues are in greater quantity than in the healthy state. The opposite condition of a part, namely, diminished bulk from defective nutrition, is termed atrophy. [ATROPHY.]

When hypertrophy attains such a degree as to interfere with the action of the organ in which it is seated, it constitutes an important and highly dangerous disease; such is frequently hypertrophy of the heart.

The immediate cause of the hypertrophied state is, as we have said, the increased or nutritive action of the organ or tissue. And since all parts of the body are formed and nourished from the blood circulating in them, it is natural to suppose that the production of hypertrophy would be accompanied by increase of the quantity of that fluid in the parts affected, if however not merely that the blood should be collected in it in larger quantity, but also that it should circulate rapidly through the minute vessels, so as to bring constantly fresh portions of new nutritive matter into contact with the smallest part of the tissue of the organ. This is illustrated by reference to the known exciting causes of hypertrophy which give rise primarily to this increased quantity and accelerated circulation of blood in the state of disease. There are, it is true, a few instances of hypertrophy of which we cannot perceive any exciting cause; thus, in some persons the adipose tissue, or fat, in others the bones are more than ordinarily developed, without our being able to assign any other reason for it than that there was a predisposition in the constitution of the individual to such increased nutrition. But generally we can refer the hypertrophy either to excessive exercise of the part, or to the long-continued action of a stimulus upon it. When any part is in a state of activity, a greater flow of blood takes place towards it than when it is at rest; and it is well known that a stimulus such as friction applied to a part, or better, continued, stimulates to become of a red colour from its vessels being more injected with blood. If such a state be long kept up, over-nourishment is the result. A popular example of hypertrophy from increased exercise is afforded by the muscularity of the arms of the blacksmith, or those of the legs of the opera-dancers. The heart also frequently becomes hypertrophied from this cause; for instance, in cases where an increased action of its muscular walls is rendered necessary by an obstacle to the passage of the blood which it propels into the body. Hypertrophy from the second cause, the long-continued operation of a stimulus, is seen in the thickened state of parts of the skin which have been subjected to friction. But hypertrophy from direct irritation is simple; it is generally combined with the deposition of new matter of a different nature from the original tissue, the stimulus having excited inflammatory action as well as increased nutrition.

The treatment of hypertrophy consists of the removal of the excising cause, if this can be effected; the part should be kept at rest as much as possible, all irritation prevented, and the supply of blood diminished. These means can have no effect unless they are put into operation as far as extent as to be beneficial, except in arresting the progress of the affection. (For further information on the subject of hypertrophy the reader may consult Andrae's Pathological Anatomy, and Dr. Osler's Illustration of the Elementary Forms of Disease.)

HYPOCAUSTUM. [BATH.]

HYPOCHONDRIA. Hypochondria is a state of extreme sensibility of the nervous system, which leads patients to believe themselves worse than they really are, to detail their sufferings with exaggeration, to individualize all the painful sensations which they experience, and to consider them the symptoms of as many different things. Allied to this extreme sensibility there is a mental exaltation, which causes the patients to pay the most minute attention to what passes within themselves. The hypochondriac, without a single omission, at all the different details of his animal and organic life; he relates the manner in which his digestion is effected; he numbers the minutes of his sleep; he describes his sensations, his passions, the succession of his thoughts, without a single omission, that concerns himself with a copiousness that nothing can arrest. The story which he tells you to-day he will relate again to-morrow, and at all times whenever he can find you willing to listen to his tale of sufferings.

We have witnessed the case of a gentleman, who was so engaged in attention to himself as to occupy the intervals of the visits of his physician in writing a journal of his sensations. This journal was, at every visit of the physician, produced for his perusal. During a period of several years this gentleman was, without any adequate reason, almost daily in dread of immediate death, and was continually upbraiding his medical attendant and charging him with the greatest cruelty in coming so seldom to see a man in such imminent danger.

As we do not in general see in hypochondria any loss of flesh or any appearances of disease corresponding to the extreme sufferings described, we cannot but feel that it be a term which is almost, if not entirely, without meaning. It is, I think, used in the same manner as the term ‘imagination’; it is a term which has been applied to the hypochondria, as we have said, by those persons who look upon it as a disease, for which they take them for visionaries; and such, in most instances, they really are. M. Leuret relates the case of a hypochondriac, who, one day, among other symptoms of which he complained of being Physicians, he stood his leg slowly only and with difficulty, and to show to what a tremendous exertion he had made; he lifted the limb with an appearance of great effort. ‘Well! what can you wish more?’ inquired M. Leuret. ‘Zounds!’ cried he abruptly, ‘to do this’, and at the same time, with evident freedom and force. M. Leuret could not restrain his laughter; and his patient, on perceiving the mistake that he had made, laughed also most heartily.

The same term has also been applied to those persons who have been called imaginary, and, if it is meant that they are a product of the imagination, the appellation is just; but the appellation of ‘imaginary’ is false if it is pretended that they are not really felt. Of all patients, those whose diseases are imaginary probably suffer the most. In many cases however these persons are affected with a real disease, and the term hypochondriasis is applicable to them only in consequence of their having their attention constantly fixed on their complaint, and of their experiencing all the fear and sadness which their condition does not warrant.

Hypochondriasis is frequently witnessed in young men of studious habits, and is the result of intellectual application and anxiety in much the same manner as those persons affected from the nature of their studies, are frequently affected with it—we allude to students in medicine. The descriptions which they read and hear of diseases, and the continual observation of the sick, affect their imaginations. They learn that incurable diseases often arise in the most insidious manner. They apply to themselves the lessons they have just learned; but as these lessons are very incomplete, their application is false, and they discover in themselves a number of diseases of which there is no real existence. There are few physicians who, in recalling to their minds the period of their first studies, and the sick whom they first attended at the same time remember the inquietude which they experienced respecting their own health. Persons in the habit of reading medical books run the same risk as medical students, and are similarly affected.

Another very fertile source of hypochondriasis is luxury, and the want of occupation and exercise. The hypochondriasis produced by this cause is the most obstinate of all, and is usually the despair of the patient and the torment of the physician. Hypochondriasis is often a symptom of a very great service, earned by the labour of each day, preserves from such a malady. Poverty itself, with all its privations, is attended with less misery than the riches of the hypochondriac.

Hypochondriasis occasionally results from other causes, such as misfortunes, the excesses to which young men are addicted, and the prolonged and injudicious use of medicines.
The treatment of hypochondriasis must of course vary, in some degree with its cause. Thehandles; the hypochondriacus, and by a change in their mode of life, and by diverting their attention, to break the habit which they have formed of continually brooding over themselves. The first point, and which is quite essential, is that there should be an entire confidence in his physician. Confidence begets tranquility, and banishes all those symptoms which originate in fear.

If hypochondriasis results from severe study, a relaxation from the necessities of daily occupation, in preference to any other figure, arises from the fact of the property of the hypotenuse with respect to the square being demonstrated before that with respect to any other figure. The general proposition is this: if three triangles, similar figures (that is, figures of the same shape, but differing only in size) be described upon the three sides of a right-angled triangle, the content of that which is described upon the hypotenuse will be equal to the sum of the contents of the figures described upon the sides. Thus, all semicircles being similar figures, let AXCB, AYC, and CZB, be the semicircles described on the hypotenuse and sides of the triangle ACB, right-angled at C; then AYC and CZB are together equal to AXCB. Hence was obtained the first instance in which a curvilinear space was reduced to an equivalent rectilinear area. The segments AXC and CVB from both sides of the preceding equation, and the remainder of the smaller semicircles, namely, the triangles XY and ZV, are together equal to the remainder of the triangle ABC.

This proposition is attributed to Hippocrates. (Geometry.)

As soon however as the proposition is demonstrated with respect to squares, all the rest follows easily, after the doctrine of proportion has been established. It is the property of similar figures described on two lines to be in the same proportion as the squares on those lines; if then the squares on two lines be together equal to that on a third, then any two similar figures described on the first two lines are together equal to the corresponding figure described on the third.

We shall now sketch four different demonstrations of this fundamental proposition, desiring it to be remembered that we suppose the reader to have already become acquainted with it in an elementary course of geometry.

1. Let CD (in the preceding figure) be drawn perpendicular to AB. Suppose the classification, in the manner of some writers on geometry, the theory of proportion and of similar triangles is established before anything is proved relatively to the areas of figures. Then it is easily shown that ACD and CDB are triangles similar to one another, and to the whole ABC. Now in such a system of geometry, it can easily be shown, without the aid of our theorem, that any two similar figures, described on two straight lines, are to one another in the proportion of the squares on those lines. Consequently, ACB, ABC, BDC, being similar triangles described on AB, AC, BC, are to one another as the squares on AB, AC, BC. But the first triangle is evidently equal to the sum of the other two: consequently, the square on AB is equal to the sum of the squares on AC and CB. This demonstration may be objectionable in a geometrical point of view, but it contains one of the most useful modes of illustrating the proposition to a person unacquainted with geometry. Let us then suppose the two similar triangles described on two straight lines are always of the same relative magnitude, each to the square described on the same line: he will then, seeing that the right-angled triangle of any magnitude is made up of right-angled triangles similar to itself, each having one of the sides for its hypotenuse, be able to see that the square on the hypotenuse is equal to the sum of the squares on the sides.

2. The next method shall be a closer demonstration, made by cutting the square on the hypotenuse into the squares...
and on $AB$ describe the square $ADEF$, and on $AC$ and $CB$ the squares $ACFG$ and $CMBK$. From $E$ draw $EL$ perpendicular to $BM$, and from $D$ draw $DQ$ perpendicular to $AC$. It is easily proved that the triangles $ACB$, $BDE$, $DQA$, are equal in all respects: whence $(1.)$ the square on $AC$ must pass through $D$, since $DQ = AC$; $(2.)$ $EL = BC = BK$. Hence, by the parallels, the triangles $NKB$ and $MLK$ are altogether equal, so that $EM = BN$, whence $MD = NA$, and, by the parallels, $DGM$ and $AHN$ are altogether equal. And $AFD$ is in all respects equal to $BLE$. Out of the square $ADEF$ take $BDE$ and remove it $AFD$; remove $MLK$ to $NKB$, and $AHN$ to $DGM$. Then the square $ADEF$ will be formed into the two squares $AFGC$ and $HCMB$.

3. The next demonstration is derived from the Hindu treatises on algebra: not that it is actually found there, for the Hindu works demonstrate nothing; but attached to the statement of the proposition, in the margin of some copies, is the following diagram, which is no doubt that belonging to the demonstration, which is as follows — Let $ACB$ be the triangle, and describe the square $ADEF$ on the hypotenuse. Draw $DH$ perpendicular to $AC$, and $EG$ perpendicular to $DH$, and produce $BC$ to meet $EG$ in $F$. Then the square is made up of the four equal triangles $ACB$, $BFE$, $EGD$, $DHA$, and of the smaller square $GFCH$, which is the square on $HC$, the difference of $AC$ and $CB$. But the four triangles make up twice the rectangle of $AC$ and $CB$, and twice the rectangle on two lines, together with the square on their difference, is the sum of their squares: whence the square on $AB$ is the sum of the squares on $AC$ and $CB$. Judging by the general character of Hindu mathematics, it must be supposed that their demonstration was arithmetical, supposing the sides of the triangle to be represented by numbers, and using the equation

$$(a-b)^2 + 2ab = a^2 + b^2.$$ 

The following is the method of obtaining right-angled triangles, of which the sides shall be whole numbers. Take any two whole numbers whatsoever, $x$ and $y$, of which $x$ is the greater; then if $x^2 - y^2$ and $2xy$ are the two sides of a right-angled triangle, the hypotenuse is $x^2 + y^2$. For instance, let $x = 11$, $y = 7$; then $x^2 - y^2 = 72$, $2xy = 154$, and $x^2 + y^2 = 170$; whence $72$ and $154$ being sides of a right-angled triangle, its hypotenuse is $170$. It is a remarkable property of any three numbers which represent the sides of a right-angled triangle, that one of them must be divisible by $5$.

4. The last demonstration which we shall give is one which we prefer to any other, because, it shows the property in question to be but one simple and prominent case of a property of great beauty and generality, common to all triangles. This property was first noted by Pappus, and it shows that any parallelogram whatsoever being described upon the two sides of a triangle, a third parallelogram, equal to their sum, can immediately be drawn upon the third side.

Let $ABC$ be a triangle, on two sides of which, $AC$ and $CB$, let any parallelograms $AFGC$ and $BCIH$ be described. Produce $FG$ and $HI$ to meet in $Z$, and join $ZC$, and produce it to $W$. Through $A$ and $B$ draw $AD$ and $BE$ parallel to $ZW$, whence it follows that $ADZC$ and $EZBD$ are parallelograms, and, by equality of bases and altitudes, severally equal to $AFGC$ and $CHKB$. And $AD$ and $EB$ are equal and parallel to $ZC$, and therefore to one another; whence $ADEB$ is a parallelogram made up of the parallelograms $ADWV$ and $BWVE$, which, by equality of bases and altitudes, are severally equal to $ADZC$ and $BCZE$, that is, to $AFGC$ and $CHKB$. Hence the parallelogram on the side $AB$ is equal to the sum of those on the sides $AC$ and $CB$.

Now let the triangle be right-angled at $C$, and let the parallelograms on $AC$ and $CB$ be squares, and repeat the preceding construction. Then $GCZH$ is a rectangle, and
an instance of the important distinction between an hypothesis asserted because it is true, and one assumed because it is sufficient to explain observed phenomena. We suppose these articles to be known to the reader.

The following mode of argument is known in logic by the name of a hypothetical syllogism:—If A exist, Z exists; but A does not exist, therefore Z does not exist. Or, establish the absolute truth of an hypothesis, and the phenomena which necessarily follow may be asserted even without experiment. But this we are seldom in a condition to do. The premises may not be necessary; if A exist, let Z necessarily follow; Z has appeared, are we then entitled to say that A exists? By no means; for when we prove that Z necessarily follows from A, we do not therefore show that Z follows from nothing but A. But if we can establish the following:—If A exist, Z follows; if B exist, Z follows; if C exist, Z follows; and Z cannot happen in any other way then from the arrival of Z we are entitled to assume that one of the three, A, B, or C, must necessarily exist, perhaps two, and perhaps all three. At the same time, if the existence of the consequence can be denied, the hypothesis is overthrown. If A exist, Z follows; but Z does not happen then it is perfectly certain that A does not exist. The following summary of the four cases may be more worthy of our reader's consideration than many of them will suspect:

1. When A is B, Y is Z. Therefore Y is Z.
But A is B.

2. When A is B, Y is Z. Nothing can be concluded: Y but A is not B; Y may be Z or some other grounds, or Y may not be Z precisely because A is not B, or for some other reason.

3. When A is B, Y is Z. Therefore A is not B.

4. When A follows, Y is Z. Nothing can be concluded: A but Y is Z; may be B, and either because Y is Z, or for some other reason; and A may not be B, and there may be some other reason why Y should be Z.

The establishment of an hypothesis in natural philosophy may be considered as a process of which the following are the heads:

1. The phenomenon observed is Z, and it is shown to be a necessary consequence either of A, B, or C, which are natural and probable; also of D, E, &c., which seem altogether out of the question.

2. All the necessary consequences which can be shown to follow A, B, or C, are deduced as far as can be done, and if all their consequences really happen, then there is no choice between A, B, and C; but if Z, a necessary consequence, say of C, should be found not to happen, then C cannot exist, and the choice can only be between A and B.

3. Let A appear the more probable of the two, then A is assumed to be the cause of Z until something to the contrary appears. If A and B should be inconsistent with one another, then one be assumed it must be to the exclusion of the other; but if both may be true, then the phenomenon Z may possibly be partly due to one and partly to the other.

An hypothesis thus assumed is obviously no more than a probable truth; and the existence of facts embracing different hypotheses is thus rendered not only natural, but even desirable. The consequence of such division is an arduous of investigation which would not otherwise be felt, in order to find out experiments or to make deductions decisive of the points in dispute. The rivalry between the emulatory and undulatory hypotheses on the nature of light has much increased our knowledge of that agent. But at the same time it should seem that the ideas which a reader entertains of physical science must be lowered by his learning to take such a view of a hypothetical foundation as that which has here been given, it should also be remembered that natural philosophy is not an exact science which can be deduced, but expose the uncertainty of human knowledge in general, at the same time that it reads a lesson to the cultivators of other branches of learning. The hypothesis of attraction, for instance, though established on much stronger grounds of probability than conclusions in connexion with which the word hypothesis is never mentioned, is always remembered as being an hypothesis.

At the same time the word hypothesis, like that of theory, has been frequently applied in a dispansing sense to speculations in which suppositions have been made for the purpose of drawing conclusions, and not, as in physics, with the view of supplying probable antecedents to conclusions which are already drawn from experiment. A notion is to be supported; it would be too obvious a fallacy to make the mere assertion of it an argument in its own favour, and thus some antecedent proposition, from which the one in question will follow, is assumed or attempted to be proved. To prove D, assume A, taking care that it shall be easy to show that from A follows B, from B follows C, and from C follows D. This is a use of hypothesis the direct converse of that which is made in physics, where D is supposed to be known and admitted, and it is asked which among all the As from which it might follow, is that from which it most probably does follow. [Cause.]

HYPSPETERES. [LANIADA.]

HYPSPIPYMUS. [KANGAROO.]

HYPUD/EUS. the more correct mode of writing Hupæus; but the latter form is generally used by the French zoologists.

HYRAX, the generic name for a form of quadrupeds of small size, but of great interest, in consequence of the peculiarity of their organization, which has led the more modern zoologists to assign them a place among the Pachyderms, though their external appearance, when cursorily examined, would seem to point out their relationship to the Rodents, among which they have been erroneously classed.

**Organization.**

Dental Formula.—[Incisors 2, canines 0; molars 7 = 7] 34.

![Teeth of Hyrax. (Cuvier.)](image)

Cuvier observes that there is no quadruped which proves more completely than Hyrax the necessity of having recourse to anatomy for the determination of the true relations of animals. To that great zoologist we are indebted for the fact that the quadruped under consideration is a true Pachyderm, and, notwithstanding the smallness of its pre-
place. The Hyrax has 21 ribs on each side, a number superior to that possessed by any other quadruped, the Unau excepted, which has 23; and those which, after Hyrax, have the most, belong precisely to the order of Pachyderms, in which Cuvier would arrange it. Thus, the Elephant and the Tapir have each 20; the Rhinoceros has 19; the Solipeds have 18. The greater part of the Rodents, on the contrary, have only 12 or 13; and the Beaver, which has the most, has only 15. As regards the lumbar vertebrae, the resemblance begins to be more distant, for the Rhinoceros has only 3, followed by 4 sacral and 21 or 22 caudal; while Hyrax has 8 lumbar, 7 sacral, and 5 coccygeal. The difference becomes more marked in the form of the pelvic; for the osa ilii are very wide in the Rhinoceros, and sufficiently narrow in the Hyrax; but the analogy reappears in the femora, which exhibit a very marked commencement of a third trochanter, and is continued in many respects in the formation of the feet. But it is in the bony structure of the head that the Hyrax departs from the conformation of the Rodents, and approaches the Pachyderms, particularly the Rhinoceros. It is true that as the nose of the Hyrax has no horn to support, the nasal bones have not received, as in the Rhinoceros, the thickness necessary for carrying that defensive organ; but the maxillary bones differ at once from those of the Rodents by the smallness of their extent, and the inferior size of the suborbital hole, which is generally very large in that order. In the number of the upper incisor teeth (2) the Hyrax resembles both the Rodents and Rhinoceros unicornis; but the number of lower incisors is 4. The upper incisors of Hyrax are not formed, like those of the Rodents, in the shape of a quadrangular prism, or in that of a cylinder curved and terminated by a truncation or a corner-edge. They are triangular and terminate in a point, recalling to the observer the canines of the Hipopotamus. The lower incisors are laid forward like those of the Hog; they are flat and dentilated in youth, but soon become worn by attrition against the upper incisors. The molars represent those of the Rhinoceros, both in number and form, so that, were it not for the size, they might be mistaken for each other.

Molar teeth of Hyrax magnified. (Cuvier.)

The condyle of the lower jaw is very different from anything observable among the Rodents, in which it is compressed longitudinally. In the Hyrax it is compressed transversely, as in the Pachyderms, and in all the other Herbiceous which are not Rodents, being applied besides to a plane surface of the temporal bone, whereby a motion, more or less horizontal, from right to left, and from left to right, is permitted; and it is this that eminently distinguishes the articulation from that of all the Carnivora, where the condyle, although in truth transversal, enters into a deep hollow of the temporal bone, and permits of no other motion to the jaw than upwards and downwards. After alluding to the form of the condyle and the dentition in the Kangaroos and Phalacomys, Cuvier goes on to remark that one of the most constant characters among the Rodents is the not having, at a certain age, more than a single partial bone without suture, with two frontal bones, directly contrary to what occurs in man. In Hyrax, as in the Pachyderms and Carnivora, there are two frontal and two parietal bones. The zygmatic arch is constructed differently from that of the Rodents, and more conformably with that of Rhinoceros. In the molar teeth the construction and direction is rather that of the Pachyderms than of the Rodents.

![Skull of Hyrax. (Cuvier.)](image)

In Hyrax the number of toes (4 before and 3 behind) is precisely the same as in the Tapir. It is true, Cuvier observes, that some Rodents, and particularly the Cervids and Niphidids (HYROCHERES), have the same number, and that the last phalanges of the latter approach the flattened form of those of the Pachyderms; but their more elongated and free toes announce the family to which they belong. The Hyrax has the toes united by the skin down to the nail, as in the Elephant and Rhinoceros, and even more than in the Tapir and Hippopotamus.

Such are only a few of the leading points of agreement and disagreement in the bony structure of Hyrax, as considered relatively to the Rodents and Pachyderms. Our limits will not permit us to follow Cuvier through the whole of the details which he so minutely enumerates in the "Oeuvres des Fossiles" in his usual masterly manner; and we must refer the reader to that work, with the remark that the general balance of resemblance, as far as the skeleton is concerned, is strongly in favour of the Pachydermic relationship of the animal.

![Skeleton of Hyrax. (Cuvier.)](image)
In 1832 Mr. Owen read to a meeting of the Zoological Society of London an account of the anatomical structure of *Hyrax Capensis*, which, whilst it was confirmatory of the anatomical impression of Pallas generally, gave some additional facts, which will be readily appreciated by those who will compare his observations with the original description of *Cavia Capensis*, in the "Spiegeleer" and "Miscellanea Geologica," of the late Herr von Buch; and the additional fact, that of *Hyrax Capensis* in the "Osseens Fossiles," and in the "Deena Mammalium" of Hemprich and Ehrenberg, he excuses himself for occupying the time of the meeting with that structure in hosiery. Mr. Owen addressed his remarks chiefly to the naturalist, as by the most accomplished anatomist and zoologist of his age, inasmuch as no other original account of the structure of this animal has appeared since the time when the Cape Hyrax was dissected by Pallas; for we have been able to find no organs for instance, which appear in several places of the "Lexons d'Anatomie Comparée," that Cuvier had not, at the period of his preparing that work for the press, himself dissected the Hyrax. 

For an analogous formation of the introital canal, Thomas Bell, Esq., F.R.S., had lived in the gardens of the Society through the greater part of the summer, and died in the winter repository there. The length (skeloton) from the roots of the incisors to the upper incisors in Mr. Owen's specimen was 1 foot 13 inches. The whole account (Zool. Proc., 1832) is well worthy of the attention of the comparative anatomist, but we shall chiefly select those points which bear immediately on the subject of this animal in the system. The duodenum was not so loosely connected with the back part of the abdomen as in most of the Rodents; but it had throughout its course one entire investment of peritoneum, which, in the Robor, is not dilated, as in many Rodents. The coccyx seemed at first sight to have a great analogy to that of the Hare and other Rodents, being accuated, and distended with a blackish pulpy mass; but it was not influenced by an anteflexion of the Taenia, its magnitude arising more from its breadth than its length. The dilated part of the colon was bent in a sigmoid form, and the remainder was convoluted on a broad mesocolon, and at a distance of 2 feet from the dilated part (when unravelled) it was found that there was a coxical ceca in a second dilated intestine. These singular ceca are minutely described by Mr. Owen, who then makes the following observations:—"In looking through the ser. stercoris, we shall find the Hyrax standing almost alone in this respect: among the Mammalia, it is only in a few of the edentate species that the double cecum is to be met with, as in the Edentata, Linn.; whilst in Birds, although the double cecum more generally prevails, yet an additional single cecum, anterior to these, has only been found in a few species. The fact, that the Hyrax has three ceca, is perhaps not a mere number of ceca; but, with respect to function, the cases are widely different: the single anterior cecum of *Hyrax* evidently performs an important part in digestion; while in the bird it exhibits merely a trace of a structure peculiar to embryonic life. I should consider however the double cecum of *Hyrax* as indicating an affinity to the group, to which it introduces, in the system of Cuvier, between the order it was originally placed in, and the one to which that great naturalist has transferred it. And it is interesting to find that while the fascies of *Hyrax* so far simulates that of a Rodent as to have deceived the older naturalists, and to have concealed from them those peculiarities of its Alliance with the Pachydermae which the voaceous system exhibits; yet that Nature, as if in confirmation of her subordination to the Cetata, had left in the internal structure of this singular animal an impression borrowed from the type of the Edentata."—Mr. Owen further remarked that although the stomach of some of the Rodents, as the common Rat, and of the Edentata, as the Manis, exhibits a partial cecal line, yet it is among the Pachydermae that the cecal system is most developed. In the Hyrax two-thirds of the stomach, on the cardiac side, are lined with a thick white and wrinkled cecum.

The liver had the same form and number of lobes as in the *Cavia*. The middle lobe had the usual two or three, into the left of which the coronary ligament enters; but the right contained no gall-bladder, which in the *Cavia* is connected by a common system between the Rodents and Pachydermae.

***F. C., No. 776.***

The Hyrax, as in some of the Rodents and many of the Pachyderna, is deficient. Mr. Owen observed that a compensation for this deficiency was however in some measure apparent in this animal; for the hepatic ducts, immediately after leaving the lobes of the liver, dilated into three globular receptacles, the united capacities of which have equalled a moderate sized gall-bladder. Mr. Owen also observed that the peculiar insertion of the ureretes is described with a note of admiration, and Mr. Owen stated that he was not aware that a parallel structure has since been discovered in any man'niacous animal having the same system. Mr. Owen added, precisely in the fundus or summit of the bladder that the ureretes open; they enter between the muscular fibres at the back part of the fundus, at the angles, analogous to the entrance of the *Pulmonaria* enter the human *uterus*; but they run obliquely downwards and inwards for two lines before they terminate, leaving however a full inch of space between them and the orifice of the uretereus. For what purpose this structure is designed in the Hyrax, or whether the urine in consequence of it, Mr. Owen could not conjecture, but he alluded to the alleged medicinal qualities of this structure noticed below (p. 419) as a curious fact. Leaving the reader to consult the anatomical part of Mr. Owen's interesting memoir, we shall conclude our abridgment of it with the professor's closing remark. The chief peculiarity observed in the muscular system was a modification of the digastric muscle in the manner of the upper jaw of the Robor, the lower jaw being so placed in the Hyrax, that the part of the upper part of the sternum, instead of the occiput or temporal bone; and was inserted into the whole ramus and angle of the lower jaw; it was of remarkable strength, working as large a part of the sterno-clidio-mastoideus is in the neck in the Hare, as in the Robor in the Hyrax, with a much larger radius of action.

In 1835 Mr. Martin read to the same society his notes of the dissection of the Hyrax, as he found it at the instance of Mr. Owen, to the society by Mr. Radston Read. The anatomical details are given with minuteness and accuracy, but, as Mr. Martin himself remarks, the notes contain nothing absolutely new, though they may be of use as substantiating previous observations with regard to various important points of structure. The total length of the animal, which was a young male, was 1 foot 4 inches, that of the head being 3 inches. The reader will find this dissection given at large in the *Proceedings of the Zoological Society* for 1835.

**History.**

Kalbe appears to be the first modern author who has noticed the Hyrax of the *Hymenochirus*. Linnaeus, in the *Species Plantarum* (1753), gives it the name adopted by Voss and Buffon, the latter of whom also applies to it the term *Daman*, of which we shall presently have to speak. Blumenbach left it among the Rodents; and in the *Hymenochirus* his anatomical description of it, placed it under the genus *Cavia*, observing however that it differed remarkably from the congener with which he arranged it. Linnaeus gave the form, that the hyrax is a rodent, not a rodent. Pennant, in his *History of Quadrupeds* he figures it as the *Brittly Cat*, with the synonyms of *Agrio Cylindreum Israel*, Prot. Alp. *Eripyrus Duskyus*, Buff.; *Aracho*, Broc; *Hyrax Syriacus*, Gmel. and Schreb. Hermann however was the first who established the genus and gave it the name of *Hyrax*. Pennant also notices the Hymenochirus under the appellation of *Cavey Cuniculus*, *Cavey Capensis*, Pallas. Gmelin makes *Hyrax* the last genus of the *Glises*, and records two species, viz. *Hyrax Capensis* and *Hyrax*.

We have seen the place assigned to it by Cuvier. Mr. Owen arranges *Hyrax* under the order *Bellus*, between *Elasmotherium*, and *Dicotyles*; he gives three species, *Hyrax Capensis*, *Hyracys*, and *H. Judensius*, Schreb. (Lipura Judaicae of Illiger). The latter is not a *Hyrax*. Mr. Gray places it in the genus in both the *Elasmotherium* and *Dicotyles*. Mr. Swainson (Classification of Quadrupeds., 1835) places *Hyrax Syriacus*, 'the Rock Rabbit,' next to *Rhinoceros*, and, after quoting Cuvier, remarks that there are...

*VOL. XIII. 3 H*
HYR

is an obvious relation of some sort between this angular genus, of which three species are now known, and the Girese; but whether of analogy or affinity it is impossible to determine for the present we place it as the gliriform type of the Pachydermus, upon the sole authority of what Mr. Cuvier has said of its foot. In the next paragraph Mr. Swainson treats of Megalonyx. In the arrangement according to natural affinities, at the end of the volume, Hyrax is the last of the Pachyderms, the first tribe of the order Ungulata. The next tribe is 'Anoplotheres' and the following tribe is that tribe Senin.

Generic Character.—-Conformation of molar teeth like those of Rhinoceors. Two strong incisors without recurved roots in the upper jaw (and two small canines in youth). Both teeth are inclined to being sharp, hard, and there are also two lateral, erinaceous bristles. A simple tubercle in lieu of a tail. Six teats, two preternal and four ventral. Four toes on each foot before, and three behind. Dental formula given above.

Species.—We have seen that some authors describe three species of Hyrax; but others, and Cuvier is one of them, cannot find any certain difference between Hyrax Syriacus and Hyrax Capensis. Major Smith, in his notes under the name of Hyrax arbores, which he says inhabits the hollows of decayed trees in many of the forests of South Africa. He describes the animal at length, and observes that it is a little from those found in the Cape Hyrax but more particularly the incisors; but as he had not found an opportunity of examining them minutely, he only mentions that the upper ones are more pointed, and that the lower ones stand more in pairs. In consequence of this interval the teeth being separated by a considerable interval. The latter, he adds, are also a little shorter than the lateral ones, and tridentated.

The Hyrax of Syria is brownish grey above, and has the lower parts white; a yellowish that intervenes between the two colours: the head and feet are more gray than the body. The separate hairs are ringed with yellowish, black, and white. The skin, where it is exposed, is of a blackish violet hue, about a foot; height about 1 inch. Bruce, who describes the animal under the name of Ashkoko or Ashoko, says that it is found in Ethiopia, in the caverns of the rocks, or under the great stones in the Mountains of the Sun, behind the queen's palace at Kossam. It is also frequent, he says, in the deep caverns in the rocks in many other places in Abyssinia; and he remarks that it does not burrow nor make holes, like the rat and rabbit, nature having interdicted this practice by furnishing the animal with feet, the toes of which are perfectly round, soft, and pulpy, the fleshy parts projecting beyond the nails, which are rather broad than sharp, much similar to a mouse. But these are now to be given, rather for the defence of his soft toes than for any active use in digging, to which they are by no means adapted.

Habitats.—-Bruce states that, 'in place of holes, the animal seems to choose less close or more open places, in the mouths of caves or cliffs in the rock, or where one project, and being open before, affords a long retreat under it, without fear that this can ever be removed by the strength or operations of man.' He describes it as gregarious, and says that frequently several dozens of them sit upon the great stones at the mouth of caves warming themselves in the sun, and coming out to enjoy the freshness of a summer evening. They do not,' he continues, 'mend their ways up between their feet, but seem to steal along as in fear, their busy being nearly close to the ground, advancing a few steps at a time, and then pausing. They have something very mild, feeble-like, and timid in its deportment; are gentle, and easily turned, though when roughly handled at first, they are very savage.' The same author says that these quadrupeds are found plentifully on Mount Libanus, and that he has also seen them among the rocks at the Pharun, in the neighborhood of Mahomet, which overlooks the Elba, from the Herculean Gulf, or Gulf of Suez. They seemed to him to be the same in all places; but if there was any difference, those of the Mountain of the Sun were smaller in size and stature. He kept one some time, and gives an interesting account of its habits in confinement.

The captive specimen noticed by M. F. Cuvier had the appearance and habit of the habits of the Padreitas, resembling the Spermophilus. It was quick, lively, active, inquisitive, and tried to get into narrow openings or holes for concealment. It delighted in heat, exposing alternately different parts of its body to a storm. In cold weather it wrapped itself up in its tail or litter. We must now advert to the Cape Hyrax.

Habitats. Food, &c.—The account given by W. H. Rudston Read, Esq., of the habits of the Hyrax Capensis appears to us to be one of the latest and best. He was present at a meeting of the Zoological Society of London, and well illustrates the manners of the animal both in a state of nature and a state of captivity. Mr. Read states that it is found at the Cape of Good Hope, inhabiting the hollows and crevices of rocks, both on the summits and sides of hills, as well as near the sea-shore, even a little above high-water mark. It appears to live in families, and is remarkable shyness in its wild state. In winter it is found coming out of its hole, and sunning itself on the sea-side of a rock, and in summer of enjoying the breeze on the top; but in both instances, as well as when it feeds, a sentinel is on the look-out (generally an old male), which gives notice, usually by a shrill prolonged cry, of the approach of danger or even the least movement of any suspicious object. It lives on the young shoots of shrubs, the tops of flowers, herbs and grass, particularly of all those which are aromatic; which occasions the necessity of pouncing the animal as soon as killed, in order to make it fit for eating. The stomachs of those shot by Mr. Hennah were always without an out part of its food scarcely an inch. 'A friend of mine,' continues Mr. Read, 'kept two young ones alive for some time, which became very tame; they would find him out when lying on the sofa or in bed (for they were suffered to run about the house), and climbing up, shelter themselves under the bed-clothes at his back, and, lying quiet, enjoy the warmth. The one brought home by Mr. Hennah, when allowed to run unconfined about the room, was inclined to be sociable, but was restless and inquisitive, climbing up and examining every person or thing in the cabin, and starting at any noise, which caused it instantly to run and hide itself. But from confinement it became savage and enraged. It was very curious, and tried to bite when anything was put near it. Under the bed-clothes it bit at the foot by night, when every thing had been quiet, and after going into its sleeping apartment. In its food it was pleased with variety, eating first a few leaves of one plant and then another, and particularly licking salt when given to it. In its passage home its food was Indian corn bruised, bread, raw potato, and onion, with a small quantity of water, which in drinking it partly lapped and partly sucked up, being very numerous; and for a cupule was placed near the base of its table it readily acknowledged the little warmth given out by turning its side and sitting still to receive the full benefit of the rays of heat. I am inclined to think that the female does not produce more than two young ones at a time, from having observed in several...
Hyrcanus 419

instances but two following the old ones. Its name at the Cape is the Dass, which, I believe, the Dutch for a badge. In Mr. Steedman's 'Wanderings' the Dass, or Hyrax, is stated to be an extremely quick and active little animal, skipping along the shelving ledges of the overhanging cliffs, and darting with incredible swiftness into the holes and crevices of the rocks, by which it frequently eludes the grasp of its pursuers. It is said to be preyed upon by the Lions, Hyaenas, and some of the birds of prey of Africa. It is said that the *Aquila Cinerea* has a nest in the mountains, that it preys upon *Hyaenopon*, the Dass or Cape Hyrax, lay at the south-eastern corner of the Caspian Sea, and was separated from Parthia on the south by a range of mountains called by Ptolemy Koronus, and which are a continuation of the Caspian mountains. 

Utility to Man. Mr. Read says that the flesh of the Camelopard is very like that of a rabbit in flavour. Hymenæus reports that both the natives of Arabia and the boors of the Cape regard the urine of the Hyrax as medicinal.

The term *Shaphan* (Shaphan, or Saphan) is to be found in the following parts of the Bible—Levit. xi. 5; Deut. xiv. 7; Psalm civ. 18; Prov. xxx. 26. In our English translation now in use this word is rendered 'cone', and 'conies' in all the passages quoted; and so it is in Robert Barker's Bible (1615). The term comes from *Saphanum*, given as such by Scheuchzer, Schaphan is translated (Levit. xi. 5) 'cuniculus,' and in the Vulgate, as given by the same author, 'Chirocygillum.' In Psalms, civ. 18, the figurine version is given is an image of the same animal, and has been so understood by Abbe Rambur (Alpine moco). The vulgaris is—Monte excesi cerva; petra refrugium herinacia (Hedgehogs). In Proverbs, xxx. 26, the figurine version is printed 'Cuniculum.' The genus *Saphanum', or *Hyrassum', is considered, with the following note to Cuniculi: 'Quidem murem montanam esse putant, et videtur hic quadruped.' The vulgate is printed 'Lepusculus', plebs invalida, qui colloquent in petra, cubile superfluam: Hymenæus has been termed *Daman* by the French zoologists. Dr. Shaw speaks of the Damani *Israel* as 'an animal of Mount Libanus, though common in other places of this country (Palestine).* It is a hare, or rather a rabbit, and with the like incurvated posture and disposition of the fore-teeth; but it is of a browner colour, with smaller eyes and a head more pointed. The fore-feet likewise are short, and the hinder are nearly as long in proportion as those of the jerboa. Though this animal is known to burrow sometimes in the ground, yet, as its usual residence and refuge is in the holes and crevices of the rocks, we have so far a more presumptive claim to be the Saphan of the Scriptures than the jerboa. I could not learn why it was called *Daman Israel*, i.e. Israel's Lamb, as those words are interpreted. Though there is error in this description such as might be accounted for, and it is very likely that Dr. Shaw, in the passage quoted, alluded to the *Hyrax*: the words *Daman Israel* are probably mistaken for *Goniam* or *Gunniam Israel*, as we shall presently have occasion to notice; 'animal quadruped hominis,' *Cunningham* says, 'urnum filium Israel' uneuncupus. (Prop. Alp. Egypt.)

Dr. Harris states that Jeroboam, cited by Bochart, says that the camels are a kind of animal not larger than a hedgehog, resembling a mouse and a bear (the latter, Dr. Harris supposes, in the clumsiness of its feet), whence in Palestine it is called *apereus* (Aretomyce), the bear-mouse; that there is a great abundance of this genus in those countries, and that they frequent the dwell in the caverns of the rocks and the caves of the earth.

The 'Seventy' translates 'Saphan' by 'γορμογλωκον' in all the places quoted. This term, compounded of χωρος, a house or dwelling, and γλωκον, which is supposed to imply herinacia, or anything which, like small thorns, grow about their heads, and which in Amharbre are called Aishok. In Arabia and Syria he is called *Israels* Sheep, or Gunnim Israel; for what reason I know not, unless chiefly from his frequenting the rocks of Horeb and Sinai, where the children of Israel made their forty years' peregrination. Perhaps this name obtains only among the Arabs. I apprehend he is known by that of Saphan in the Hebrew, and the animal erroneously called by our translators Cuniculus, the rabbit or coney. Of this opinion are Pennant, Cuvier, and others among the zoologists; and though M. Lesson, in the introduction to his 'Manuel,' speaks of the rabbit (lapon), which is supposed to be the *Schaphan* of the Hebrews, although it is more probable that it was the Rat of Pharao (rat de Pharao)—on the other grounds he does not state—as a prohibited animal (Leviti; Deut.), there can be little doubt that the *Shaphan*, the 'feebie folk' that 'yet make their houses in the rock,' belonged to the genus *Hyrax*.

Hyrcania is one of the Persian empire, lay at the south-eastern corner of the Caspian Sea, and was separated from Parthia on the south by a range of mountains called by Ptolemy Koronus, and which are a continuation of the Caspian mountains. It was included by Strabo in Hyrcania, formed its eastern boundary. (Casuioth, p. 351.) Hyrcania was a plain sloping from the mountains towards the Caspian Sea, and was, according to Strabo, very fertile, producing grapes, figs, and corn in abundance; though the land was not much cultivated by the inhabitants. (p. 350.)

Previous to the Persian conquest Hyrcania appears to have been governed by native kings, bounded together with the Parthi, Chorasmii, Sogdii, and Arians, the sixteenth satrapy of Darius Hystaspes, and contributed 300 talents. (Herod. iii. 93.) After the dissolution of the Persian empire, it was divided between the Macedonians; but it remained in their power only for a short time. (Strabo, p. 350.) It appears afterwards to have become independent; since Josephus (De Bello Jud. vii. 27) mentions a king of the Hyrcaniaeians in the time of Vespasian, who had possession of the passes which lay between the Caspian Sea and the Caspian Gates, which are known by the name of the Caspian Gates.

Strabo informs us that there were several towns in Hyrcania, of which the most important were Talabroce, Samanias, (The Syrian Samaria,) Antiochus, and Tape; but it is impossible with our limited knowledge of the country to determine the position of any of these places. Arrian mentions (Anaib. iii. 28) Zadracarta as the capital; and Ptolemy gives it as the capital of a town, Hyrcania, which he places in the eastern part of the province. The principal rivers, according to Ptolemy, are the Maxares (the Marmaras of Phln. vi. 16), which cannot be identified; and the Secuana, which is perhaps the same as the modern Gourgaun.

HYRCANUS, JOHN, one of the Asomontia rulers of Judea, succeeded his father Simon in the high priesthood, a.c. 136. He was powerfully supported by his brothers, Judas and Mattathias, were treacherously murdered in a feast by Ptolemy the son-in-law of Simon; and it was with great difficulty that Hyrcanus, who was not with them when they were murdered, escaped to Jerusalem. During the first year of his reign (a.c. 134) Jerusalem was besieged by Antiochus Sidetes; and after a long siege Hyrcanus was obliged to surrender. The walls of Jerusalem were destroyed, and a tribute imposed upon the city. Hyrcanus afterwards accompanied Antiochus in his expedition against the Parthians; but returned to Jerusalem before the defeat of the Syrian army. After the defeat and death of Antiochus, a.c. 130, Hyrcanus took several cities belonging to the Syrian kingdom completely, and became independent. He strengthened his power by an alliance with the Romans; and extended his dominions by the conquest of the Idumæans, whom he compelled to submit to circumcised Jews. Hyrcanus then formally received the title of Ptolemy gotum filiurum Israel, which he levelled to the ground, and flooded the spot on which it had stood. The latter part of his reign was troubled by disputes between the Pharisees and Sadducees. Hyrcanus, who had been a Pharisee, was dismissed from the Sanhedrim as a Sadducee, and received the title of Ptolemy son of Nissan, which was bestowed upon him by the court. Hyrcanus, that is, be received at an entertainment from Eleazar, a person of importance among the Pharisees. By uniting himself to the Sadducees, Hyrcanus, notwithstanding the benefits he had conferred upon them, was treated with great rudeness by the Pharisees, and the government, became very unpopular with the common people, who were for the most attached to the Pharisees. Hyrcanus died a.c. 106, and was succeeded by his son Aristobulus, who was the first of the Aesmonian kings who assumed the royal title.
HYRCANUS II. [Asmoomannk.

HYRIA, Lamarr's name for a genus of Unioidea, a family of land snails, Nauydas of that author.

HYSTASPS. [Darwus.]

HYSTERIA (from vórris, the womb) is, in general language, understood to signify those paroxysms to which females are attended with convulsions, a sense of choking, and involuntary laughing or crying. But the term is used in medicine as a general expression to include a vast number of other symptoms known as hysterical attacks, all dependent on a peculiarly susceptible state of the nervous system.

We will first consider the different forms of hysterical affection.

The hysterical fit or paroxysm need scarcely be described, except for the purpose of pointing out how it may be distinguished from fits of other kinds; and this is a matter of no little importance, not only as regards the treatment required and the temporary alarm of the friends, but also with relation to the happiness from that of hysteria in general. It appears that in France, at least, young females labouring under mere hysteria have been separated from their families and society, and placed in confinement under the idea that they are suffering from a disease which is thought to be hereditary, is but too often incurable, and leads to loss of intellect. The hysterical paroxysm generally commences with the sensation of a ball in some part of the abdomen, either on the right or left side, a strange and involuntary feeling to the throat, where it induces a sense of suffocation. A temporary state of loss of sense and voluntary power succeeds, in which the patient either lies motionless, or agitated with violent struggles; the heart is struck against the bed or floor, and the hair or the breasts are grasped and torn with the hands. Frequently the patient tries to bite herself or the bystanders. The involuntary contortions of the bladder not uncommonly takes place during the fit. In the absence of convulsions there is often immediate laughter, crying, or singing, and the paroxysm is frequently terminated suddenly by a burst of tears. More usually the patient lies quietly for some time after the convulsions cease, and when she recovers complains of headache. Frequently she proves that consciousness has not been entirely lost, by repeating what has been said by those around her. The attack of epilepsy differs from that of hysteria in not being preceded by any sensation of a ball rising to the throat; the epileptic patient falls suddenly to the ground, and is immediately violently convulsed; the eyes are distorted, and the tongue protruded, bystanders, his features are generally tranquil, and the face is flushed; whereas in epilepsy it is often of a ghastly paleness. The epileptic fit is in many cases ushered in by a short cry, but the hysterical paroxysm, or singing, or shrieking, or crying, or convulsion, or its termination, as hysteria. Lastly, the loss of consciousness is complete in epilepsy, generally not so in hysteria. These are the principal points of difference.

It is well to remark in addition that hysteria is almost confined to women, and that the paroxysm is generally preceded by some strong mental emotion; while epilepsy is most frequent in men, and more usually attacks the patient during the night, or between the states of sleep and waking. Repeated attacks of epilepsy leave imprinted on the countenance a peculiar dull expression which is not seen in the hysterical.

Nervous females are very liable from the slightest causes to hurried respiration, sighing, sobbing, and palpitation; the irregular and hurried breathing may become occasionally so aggravated as to resemble asthma, from which it is to be distinguished by its occurring in young persons, and by its being accompanied by other symptoms of disease, and a peculiarly irritable susceptible state of mind.

Merely from a disturbed action of the nerves, and quite without any visible outward sign of inflammation, females frequently become distressed by more or less painful sensations fixed in one spot or shifting from one part to another. Violent pain in the head, as if a nail were driven into the forehead, is a very common hysterical symptom. Another frequent symptom is the left side, just below the breast, and this pain is often attended with palpitation of the heart, and the patient is unable to lie on that side. Sometimes exacerbating pain occupies the whole abdomen. In all such cases it will be found that the disease, simulated by the hysterical affection (whether it be of the head, chest, or abdomen, or of one of the large joints), cannot exist, since other symptoms essential to constitute it are absent. The pain of hysteria too, besides being frequently transitory and unfixed in its seat, has generally the peculiarity of being aggravated by the slightest touch of the skin, which is not the case with pain arising from inflammation. Other symptoms of a decidedly hysterical nervous nature will perhaps be present, or a true hysterical paroxysm may supervene. It is important to know that symptoms of almost every disease may be simulated by hysteria. Whether the patient is suffering, or not suffering, is unattended with danger. It is when real disease is present, and complicated with nervous or hysterical symptoms, that it requires the greatest acuteness of the physician to discern what proportion of the symptoms is of one or the other kind, and what due to the more important affection.

Hysteria sometimes assumes the form of different paralytic affections: the power of moving the arm, or the voice, may be lost. These may be of considerable duration, but are ultimately, and often suddenly, recovered from. The state of long-continued stupor which has received the name of 'trance' is most commonly hysterical.

Different symptoms of this complicated disease, such as the thirst, preventing swallowing, not unusually occur in the hysterical state. Then again certain disorderly states of the senses and mental faculties and feelings occur as the consequence of hysteria, which may be referred to hysteria. Such are somnambulism, some kinds of transitory monomania, and those peculiar perversion of the mind manifested in the desire to reign various powers on the body without the consent of the sufferer. Whether the irritable state of mind, the knowledge that the mind has been acted on in a way calculated to excite the affections, and the presence of other phenomena deemed hysterical, will assist in detecting the true nature of all these cases.

There is certainly a peculiar state of the system which predisposes to the affections which we have thus cursorily described, for the causes by which they are excited have nothing peculiar in themselves. All the phenomena indicate a disordered state of nervous system, and the exciting causes are such as act either through the medium of the body or the mind on that system. The susceptible state of the nervous system which predisposes it when thrown on to give rise to the various hysterical phenomena, is without doubt frequently connected with or kept up by an excited condition of the uterine system and the sexual feelings; the symptoms of hysteria with no symptomatic symptoms of hysterical disease; the symptoms of hysterical disease with the symptoms of the nervous system of females so much sympathetic. This conclusion is confirmed by the fact of hysteria occurring in a great proportion of cases between the age of puberty and menopause, and is that at which the uterine system is in a state of greater activity than before and after it; and by the circumstance of its being at the commencement and termination of that period, when the uterine organs are undergoing the greatest changes, and the feelings of the mind connected with them most disturbed, that the attacks of hysteria are most frequent and violent. It is from their supposed connection with particular states of the uterus that the attacks have derived their name. Other facts however show that a predisposing nervous system is necessary, for vascular excitement and structural disease of the uterus may exist without giving rise to hysteria; and that other functions, as those of the digestive organs, lungs, and respiratory organs on account of their symmetry, will have the same effect: anything in fact which throws the system of such irritable females out of the natural state, whether it acts primarily on the body or indirectly by giving rise to nervous symptoms or hysteria. The most frequent exciting cause of the hysterical paroxysm is perhaps a sudden and intense emotion of the mind.

Treatment.—The patient who is thus affected should be taken to prevent the patient receiving injury from her head or hands striking against the floor or hard bodies, and to
INDEX

421

guard against the propensity to bite, by placing a folded cloth between the teeth. If the fit be slight, it may frequently be arrested by dashing cold water over the face, or by filling the mouth with something which has an unpleasant taste, as salt; or a stimulating scent may be held to the nostrils. If the paroxysm be more prolonged and violent, it will be proper, should the face be flushed and head hot, to apply wet cloths to the forehead, and to loosen all the dress about the neck and chest. If a continued stupor supervenes, medical aid may be sought. When there is less fulness about the head, small doses of stimulants, such as sal volatile, in water, will be useful.

When the frequent return of the fits seems to depend on a full state of body, or on irritation, means calculated to remove these causes must be adopted. If an unnatural state of the uterine functions be suspected, those must be attended to. Frequently, the sufferer from hysteria is feeble and bloodless, and in a state of general nervous debility; in such persons, all measures likely to strengthen the general health, proper diet, regular hours, change of air, and tonic medicine, should be put into practice. The state of mind of the patient should, in these last cases, be particularly regarded.

For the treatment of the pains and other anomalous nervous symptoms, no rules can be laid down; they will frequently resist all modes of palliative treatment. The greatest care on the part of the physician must not be forgotten in removing all causes which can react prejudicially on the nervous system or the general health.

The nervous susceptibility which predisposes to hysteria is without doubt frequently innate or constitutional, but it is certainly in many cases acquired; and it is often to be attributed, in a great measure, to the education of young females. 'A luxurious and delicate mode of living and of rearing' (says Dr. Copland); 'an neglect of whatever promotes the powers of the constitution, especially of suitable exercise in the open air, and of early hours as to sleeping and rising; an over refined mode of education, and the excitement of the intellectual powers and moral sentiments; too great devotion to music, and the perusal of exciting novels; the various means by which the feelings are awakened and acute sensibility is promoted, whilst every manifestation of either is carefully concealed; and studied endeavours to dessemble desires which struggle to be expressed,—all serve, especially at a period when the powers of the mind and the conformation of the body are approaching development, to produce that state of the nervous system, of which hysteria is one of the most frequent indications.' The prevention of hysteria cannot certainly be hoped for until the education of females is directed more towards strengthening their body and improving the tone of their mind, so as to enable them to bear disappointments, and to control, not merely conceal, their passions.

HYSTRIX. [Porcupine.]

HYTHE. [Cinque Ports; Kent.]

INDEX TO THE LETTER H.

VOLUME XI.

H., page 259
Haberkrom, 520
Habringen [Friesland], 259
Habakko, 259

Habebos Cerea Juratii, 521
Habebos Corpus, 521
Habebos Possessionum, 521

Hale, Stephen, 13
Hale fists [Falconia, vol. x., p. 179]
Halicarnassus [Anatolia; Herodotus]
Halichonchus [Phocidae]
Halichoera [Whales]
Halicon [Plesiosaurus]
Halicarnassus [Anatolia]
Halichoerus [Porcupine.]
Halicians [Pliocena, vol. x., p. 174]
Halilgao [Pliocena, vol. x., p. 180]
Halimeda, 14
Halimus [Naiad]
Halimix [Leech]
Halilgaria [Pliocena, vol. x., p. 181]
Halisus, 6
Ham [Barkan]
Hama, 6
Hamgege, 6
Hamgeger [Pliocena, vol. x., p. 181]
Hamp, 6
Ham, Lord [Dalymple]
Hamann, 7
Hamnut, 7
Hamzeve and Hook [Flanders Agriculture]
Hain, 8
Hain, in plants, 10
Hai [Nasal]
Hale [Meretsus]
Hale, Richard, 10
Haller, circle, 11
Hallerstadt, town, 11
Halicypholous [Kingfishers]
Hal, Du, 11
Hal, Sir Matthew, 11
Hale, 12

Habebos Casim [Laconia, vol. x., p. 179]
Habebos Corpus, 521
Habebos Possessionum, 521

Hamilton, Gairn, 25
Hamilton, William, 25
Hamilton, Sir William, 25
Hamilton, Elizabeth, 25
Hamite, 25
Hammerfest [Norway]
Hammersmith [Middlesex]
Hammond, Henry, 25
Hammond, James, 25
Haman [Phaxam]
Hamden, 27
Hamphire, 27
Hamshire, Saw [New Hampshire]
Hampstead [Middlesex]
Hampoton [Polybius]
Ham, 35
Hanapier Office, 37
Hanso-Minburnerg, 37
Hanso, town, 37
Hand [Man]
Handel, 38
Hand-Pasting [Betrothment]
Handglass, 39
Hannibal, 40
Hannua [Peripaties, 41]
Hanover, kingdom, 42
Hanover, town, 43
Hauen Towns, 44
Hanway, Jonas, 45
Hapala [Zacchus]
Hapalus [Habulb]
Haque [Arms]
Harriades, 45
Harriades, 45
Harrods, Pire, 45
Hardwick, Karl of, 45
Harding, John, 46
Harriead, 47
Harrods, Pire, 45
Harwick, Karl of, 45
Haring, John, 46
Harvny, 47
Hartung, [Strigidae]
Harve [Siene Inferior]
Hartungton, Sir John, 44
Harriet [Heredit]
Harle [Meganum]
I.

I is a vowel which represents two very different sounds in different languages. In this country it denotes a rapid pronunciation of the diphthong ai. In French, Italian, and many other tongues, its sound is identical with that of the English e. In the series of the vowels established by the experiments of Mr. Willis (Alphabet, p. 373), it, as denoting the latter sound, lies at one of the two extremes. It is evident from this fact, that the common conversation frequently falls into iambic verse, seldom into hexameter, and only when we depart from the usual melody of speech.

The following table is a list of the feet which may be admitted in the iambic metre in the Greek tragic poets, which is usually called the tragic trimeter scatastic, because it consists of three entire metres, or six feet.

<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

The anapest in proper names is also introduced in every place of the verse except the last, with this general restriction, that the anapest should be contained in one word. Many of the comic trimeters admit the same sequence, viz., a tragic, and also a dactyl in the fifth place, and an anapest in common words in every place but the last.

Much of the beauty of the iambic trimeter depends upon the cesura (Cesurae), which usually occurs in the middle of the third or the middle of the fourth foot, as for example:

- \( \text{οί μιθραῖοι} \ | \ \text{ιεῷνται θρόνον} \ | \ \text{ιεὔχουσί ταύταν} \ | \ \text{ιεὐστρεφόμενοι} \)

One of these cesurae may be considered as generally necessary; the cesura in the middle of the third foot is much more common than that in the middle of the fourth. There is also frequently only a cesura in the middle of the second or the middle of the fifth foot. When a line is divided in the middle of a verse with the elision of a short vowel, or of the little words \( \text{ei, μη, ς, τ}, \) that division is called by prosodians the quasi-cesura, as, for example:

- \( \text{ου χαίνουσιν} \ | \ \text{φιλάμενοι μη} \ | \ \text{αλμπαστέροι μης} \)

For an account of the other iambic metres employed by the Greek and Latin poets see Hermann, Elementa Doctrin Metrice.

In English poetry the iambic metre is very common, as for example:

- \( \text{On Liden, where the e's was b'w}, \) All bloodless le's th' st'v'dden mo'w', And dark as wisher w'th the b'w's, &c.

1. IAMBICUS (Iambicus Chalcidemus), a celebrated neo-Platonist of the fourth century A.D., was born at Chalcis in Cilicia, and is distinguished by his birth-place from another of the same name and of the same school and censure, born at Apamæa in Syria, of whom however little is known. From his admirers and disciples Iambichus received the flattering titles of 'most divine teacher' and 'won derful' (Διδάσκαλος Διόδωρος, Σωφρόνος), and enjoyed a reputation among his contemporaries which cast into the shade the fame of his teacher Porphyry, whom nevertheless he was far from equalling either in extent of learning or in powers of mind. The literary career of Iambichus extends from the reign of Constans the Great to that of Julian the Apostate, and as the history of his life if not surpass, the signs and wonders on which the Christians not only founded the divine authority of their creed, but still laid claim to. ('Hebenstreit, Diss. de Iamblichi Philosophi Syri Doctoribus et eliis nostris,' Leipzig, 1794, 4to.; the same by Kiessling, Leipzig, 1815, 2, Th. 8vo.) In this work Iambichus ascribed to the Italian philosopher murmurous points and accentual rimes which now are so seldom observed, was by Greek and Latin poets. According to Aristotle (De Poetic) that originally the trochaic tetrameter was made use of, as better suited to the satyrical and satiristical genius of the poet at that time, but when the dialogue was formed, nature itself pointed out the proper metre; for in the iambic metre of all music, the music being the same, the words were pronounced in a more moderate manner, and the rhythm was formed. The above is evident from this fact, that our common conversation frequently falls into iambic verse, seldom into hexameter, and only when we depart from the usual melody of speech.

In the following table a list is given of the feet which may be admitted in the iambic metre in the Greek tragic poets, which is usually called the tragic trimeter scatlastic, because it consists of three entire metres, or six feet.

<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

The anapest in proper names is also introduced in every place of the verse except the last, with this general restriction, that the anapest should be contained in one word. Many of the comic trimeters admit the same sequence, viz., a tragic, and also a dactyl in the fifth place, and an anapest in common words in every place but the last.

Much of the beauty of the iambic trimeter depends upon the cesura (Cesurae), which usually occurs in the middle of the third or the middle of the fourth foot, as for example:

- \( \text{οί μιθραῖοι} \ | \ \text{ιεόνται θρόνον} \ | \ \text{ιεὐχοῦσί ταύταν} \ | \ \text{ιεὐστρεφομένοι} \)

One of these cesurae may be considered as generally necessary; the cesura in the middle of the third foot is much more common than that in the middle of the fourth. There is also frequently only a cesura in the middle of the second or the middle of the fifth foot. When a line is divided in the middle of a verse with the elision of a short vowel, or of the little words \( \text{εί, μη, ς, τ}, \) that division is called by prosodians the quasi-cesura, as, for example:

- \( \text{οὐ χαίνουσιν} \ | \ \text{φιλάμενοι μη} \ | \ \text{ἄλμπαστέροι μης} \)

For an account of the other iambic metres employed by the Greek and Latin poets see Hermann, 'Elementa Doctrin Metrice.'
only upon Christianity, but also upon philosophy; and a belief in magic and divination, in miraculous gifts and the operation of celestial agents, was universally prevalent, and found numerous and zealous adherents, as well among heathens as among Christians. An important element in the ecclesiastical, or rather syncretic, system of the neo-Platonist was the Orichalcum, in accordance with which the souls of all creatures, after passing through certain states and periods of purification, return unto God, from whom they originally emanated, and afterwards falling away, are subjected to punishment in the region of the modern Gehenna. From this doctrine it was a consequence to believe that a life of asceticism and self-denial would enable the sages even in this life to attain to an intimate union with immaculate deity. Consistently with these views, the Orichalcum of the Iberians is of moral nature to consist in a state of contemplative innocence. (De Vita Pythagorae et Propædeuticæ Orationes ad Philosophiam), lib. ii., Gr. et Lat., ed. Johann. Arcturius Theodorus, Franeker, 1598, 4to.

Besides the works above noticed of Iamblichus, we have the following fragments from his treatises on both the Hellenic and Cyprian schools and doctrines:—Lib. iii., De Generali Mathematica Scientia, Gr. ed. Villoison in 'Anecdot. Gr. et Lat. ii., p. 182, 4to., coll. Fréjis; introd. in lib. iii. Iamb. de Gelest. Hermeticis, ed. Villoison, ibid. 1668, 4to., introduction and notes by G. F. H. C. Cole, Oxford, 1678, fol. is an attempt to show the possibility of this intimate and actual union (sarrst rvjtv) with the Divine being, which gives a supernatural elevation to the powers and faculties which cannot be gained by the mere cultivation of the rational powers, but by the employment of certain secret symbols and forms (pynyda so vpyv Siyara), which have been imparted by the godstheemselves to their priests from the first period of the world. The epistle of Ptolemy to Anébo the priest contains many doubts concerning the Egyptian mysteries, which Iamblichus refutes by the authority of the writings of Hermes and the philosophy of Plotinus. The genuineness of this work however seems justly doubted. (Meiners's 'Judicium de Libro qui de Myst. Ascrituris,' in the fourth volume of the Commentar. Soc. Scient., Göt. 1782, p. 60.)

Besides the works above noticed of Iamblichus, we have the following fragments from his treatises on both the Hellenic and Cyprian schools and doctrines:—Lib. iii., De Generali Mathematica Scientia, Gr. ed. Villoison in 'Anecdot. Gr. et Lat. ii., p. 182, 4to., coll. Fréjis; introd. in lib. iii. Iamb. de Gelest. Hermeticis, ed. Villoison, ibid. 1668, 4to., introduction and notes by G. F. H. C. Cole, Oxford, 1678, fol. is an attempt to show the possibility of this intimate and actual union (sarrst rvjtv) with the Divine being, which gives a supernatural elevation to the powers and faculties which cannot be gained by the mere cultivation of the rational powers, but by the employment of certain secret symbols and forms (pynyda so vpyv Siyara), which have been imparted by the godstheemselves to their priests from the first period of the world. The epistle of Ptolemy to Anébo the priest contains many doubts concerning the Egyptian mysteries, which Iamblichus refutes by the authority of the writings of Hermes and the philosophy of Plotinus. The genuineness of this work however seems justly doubted. (Meiners's 'Judicium de Libro qui de Myst. Ascrituris,' in the fourth volume of the Commentar. Soc. Scient., Göt. 1782, p. 60.)

The island of Iberia is a large part of the Iberian peninsula which at one time spread over Spain, Southern Gaul, part of Italy, and the islands of Corsica, Sicily, and Sardinia, and he attempts to prove this by the affinity between the proper names in these countries. (Barqes, Dr., Basque Language.) Strabo observes that the Romans used the names Iberia and Hispania indifferently to denote the whole peninsula. Iberia was also the name given by the Greeks and Romans to a country south of the Caucasus, having Albania to the east, Colchis to the west, and Armenia to the south, and corresponding to the central or principal part of the modern Georgia, in the peninsula adjacent to the Roman arms into Iberia. Europius (lib. viii.) says that the king of the Iberi paid allegiance to Trajan, who at the same time gave a king to the neighbouring country of Albania. The Celtic and Iberian names of many of the Roman cities were syncretist, (Casaub., 499) as well populated, and the inhabitants as having made some progress in civilization. The central part was a plain drained by the Cyrus (Kur) and its branches.

I.BERIS is a genus of cruciferous or brassicaeaceous plants, consisting of annual, perennial, and chiefly shrubby species, chiefly inhabiting Europe, and particularly the northern shores of the Mediterranean Sea. Two are found in the islands of North of Europe, one of which is British. They are remarkable, among other things, for their flowers growing in close corymb, and being much more developed on one side than the other, next the circumference of the crown. The leaves are lanceolate, long, or in some cases white or a rich purple of varying tints, gives the plants a strikingly beautiful appearance; and hence they are in many cases cultivated in gardens as objects of ornament, under the name of Rucola or Rukolu. They have been having first procured from Candia. Iberis sempervirens and Gibraltarens are particularly well suited for beautifying rock-work.

I.BEX. [GOAT].

I.BIS. [ABOU-HANNES; TONTALIDE].

I.BYTER. [FALCONID., vol. x., p. 167.]

ICE. [FERRYING; WATER.]

I.CELAD. [SMALL; A STRANGE, NATIVE LANGUAGE], a large island in the North Atlantic, extends from 63° 24' to 66° 30' N. lat., and from 13° 15' to 24° 40' W. long. Its shape resembles somewhat that of a heart, with the point looking towards the south. Cape Nord, at its north-west extremity, is about 209 miles from the east coast of Greenland. The area is vaguely reckoned at 40,000 square miles. The coasts of Iceland, especially the western part, are deeply indented with fiords, or inlets of the sea, which are the estuaries of the river which flows from the numerous mountains and glaciers of the interior. The island is crossed from east to west by ridges of rugged and irregular mountains, which run nearer to the south than to the north coast, the longer being on the western side. The rivers flowing northwards are often wide and navigable. Numerous offsets branch out in all directions towards the coast, run through the various peninsulas, and terminate in high and steep promontories. Between these offsets in the vicinity of the fiords are fine valleys, in which the inhabitants have erected their dwellings; and many of the low mountains are covered with a coarse grass, which affords summer pasture to their cattle. The best inhabited spots are on or near the banks of the fiords, where factories are built for the purpose of trade and shipping. But the majority of the inhabitants live in detached cottages or farms, a certain number of which constitute a parish, having a church and school. The people are Protestants in common as in Denmark. The interior of the island is a dreary desert, through which one may travel 200 miles without meeting any trace of human existence. It consists partly of snow mountains, called Kukula, some of which are snow-covered, and others have large glaciers. The inhabitants in a large part of the country, that called Kofok Jukul, in the south-east part of the island, lies behind another range of mountains that line the coast, and forms a mass of ice and snow estimated to cover no less than 3000 square miles. Magnificent glaciers cover the sides of the mountains, beginning at a great height, and sloping with a very rapid descent towards the plains. These icy masses are often rent by the internal heat and pressure, or the volcanic, and fall down in terrible avalanches upon the
plains. The glaciers present the same phenomena of progressive and sometimes retrograde motion as those of Switzerland, and they throw out before them their moraines of large fragments of rocks. Vast agglomerations of basaltic pillars are seen in many places, as well as of tuffs, and some mountains are covered with thick incrustations of sulphur.

There are numerous boiling springs, such as the Geysers in the southern district of the island, which throw up, at periodical intervals, columns of boiling water more than 10 feet in diameter and above 200 feet in height, preceded by a loud report like that of artillery: the Reykium and the sulpheric springs of Eyjafjord, near the north-west coast, and those of Reykiadal in the west district; and those of Reykiafwer and Krakia in the north. There are also floods or boils of boiling mud, numerous cones and craters of licheniferous snow; and there is no part of the coast, and famine and pestilence followed, which in two years carried off 9000 people, and destroyed thousands of horses and cattle. The eruptions of Mount Hecla are frequent, and destructive, and the island is covered by many volcanoes and boiling springs. The districts of Iceland in the west, elevated by the sea, which rises in one of the western peninsulas near the village or factory of Stappen, and is reckoned to be 8682 feet high.

Formerly there were many forests in Iceland, but they have been destroyed through the waste and improvidence of the inhabitants. The trees that now exist appear scrubby and small, and seldom grow above 10 feet high; and the wood has become very scarce. It is alleged that the climate has become colder, and is less favourable to vegetation; and some attribute this increased severity of the climate to the accumulation of ice on the eastern coast of Greenland. Dr. Henderson however found the winter, which he passed in Iceland to be as mild as the mildest which he had experienced in Southern Sweden or Denmark. It often happens in the spring that vast masses of floating ice are driven far from the coast, and are stranded among the mutton, cattle, and even attack men; they are however soon hunted down and destroyed. It appears that corn was once cultivated to a considerable extent, but the inhabitants find it more profitable to spend their time in the rearing of cattle. Hay is the greatest harvest of Iceland. Those who live on the coast attend to fishing, which is very productive. In 1824 there were on the island 4751 farms, with 20,325 heads of horned cattle, 218,918 sheep, and 26,254 horses. The common food of the people is butter, milk, and fish; fresh meat and yam bread are holiday fare. Thelichen Icelanders, or Iceland moss, is a common article of food. Cattle, wine, and other luxuries are obtained in the factories on the coast, and are used by the wealthier class. The exports consist of cod and other dried fish, whale oil, salted mutton, eiderdown, and sulphur, which is abundant. Turf is the common fuel of the inhabitants; fossil wood is scarce. They are more with butiron about 60,000 persons, or about 100,000 people, on the island, but they make little use of it. Iron and copper are also found, but are not worked for want of fuel.

The reindeer, which were at first introduced from Norway, have multiplied to a great extent, and live in a herd state. By the census of 1801 the population of Iceland amounted to 47,207 persons, but since then it has increased, and is probably now above 50,000. It is said to have been much greater in former ages, and to have exceeded 100,000; pestilence, famine, and the destruction caused by volcanic disturbances have at various times reduced the numbers. In 1707 and 1708 no less than 16,000 persons were cut off by the smallpox.

The Icelanders are the genuine descendants of the old Scandinavians, more or less, but not genetically so, with a florid complexion, flaxen hair, and an open frank countenance. The women are shorter and more inclined to corpulence than the men; a certain degree of beauty is not rare among the girls. Longevity is not common among the Icelanders; they are subject to cutaneous disorders and also to pulmonary complaints; owing to the nature of their food, and their remaining often with their wet woolen clothes on. Leprosy of the worst kind is indigenous in the country: it is contagious, and ends in most cases fatally. Hospitals for lepers have been established, but they are deficient in funds.

The Icelandic language is the standard of the northern or Scandinavian dialect of the Gothic language. The language is unlike that of the English or Scandinavian, or more or less subject to the influence of the Teutonic or German branch of the Gothic, whilst the Icelanders have preserved theirs pure as they imported it from Norway in the ninth century. They have a distinct, but not ungrammatical, vowel-plain, and they have kept the nasal mutes, so commonly used in the present day.
General Icelandic Instruction," which reckoned at one time no less than 1200 subscribers. The head-quarters of the society were established at Leirargördum, whither the printing-press from Holm has been since removed. In 1816 Professor Rask established at Copenhagen the 'Icelandic Pioneers,' or 'Students' Library Society,' which has a branch in Iceland, which has published a number of useful works. Mr. J. Heath, an Englishman, printed at his own cost in 1828, at Copenhagen, a spiritied Iceland tract, of which 1000 copies were sold. The Thorlakson, an Icelandic poet, who is mentioned by Hudson in his Journal. Elementary education, and even a certain degree of superior instruction, is generally found among the Icelanders. Children are educated by their parents, with the assistance of the parish clergyman. There is but one superior school in the island, at Bessastaed, near the capital Reikjavik. There were formerly two schools at Holm and Skalholt, one for the western, and the other for the north and eastern districts. Reikjavik is a town containing about 600 resident inhabitants, and is built on the south side of an inlet of the Faxeford, on the south-west coast of the island. It consists of two streets: one built only on one side, fronting the shore, and entirely occupied by merchants and tradespeople; the other, striking off at an angle with it, contains the houses of the bishop of Iceland, of the Landögof, or receiver-general, and other persons not engaged in trade. The house of the governor, the house of correction, and the church, stand by themselves at the back of the town. The houses, with two or three exceptions, are constructed of wood, after the Norwegian fashion, with a storehouse and a small garden attached to them. To the south-west of Reikjavik is the peninsula of Atlænis, adorned with the church and school of Bessastaed, and a number of pretty cottages. Gard, in the same neighbourhood, is the residence of the archdeacon of Iceland, and at Hafravord there is a dry dock. The population of Reikjavik may be considered to be moreDanish than Icelandic. In the northern district there is a kind of town or village, called Eyafordur, and a factory, called Husavik, on the Skialandurfjord, from which sulphur from the neighbouring mines is shipped. Holm has dwindled into insignificance. Other factories are scattered about the coast, especially in the west. These factories generally consist of one or two merchants' houses, with warehouses, and perhaps a shop; and they are built at the most convenient places for shipping the produce of the district, and also for the fisheries, which constitute one of the principal resources of Iceland. (Henderson's Journal: Sir George Mackenzie's Travels.)

ICELAND MOSS is, properly speaking, a lichen (Cetraria Islandica), common in the mountainous districts of the north of Europe and the United States. The thallus is foliaceous, spreading out on the ground; the surface and margins are white, the colour varying from wheat-yellow to olive; the shield (scutellum, or reproductive spots) marginal, orbicular, brown. It is devoid of odour, but possesses a very bitter taste: by mastication, or maceration in water, it dissolves into a jelly.

It consists of a kind of starch, lichenic acid, and a bitter principle, which has been designated cetarinarin. By repeated washings in cold water the bitter principle can be removed; and this remaining, when dried in the dark warmer, has as inaspid as a solution of common starch: it then possesses all the nutritive properties of starch, and is used in Iceland to form bread and a kind of gruel. It may also be employed as a decoction, either alone, or as a vehicle for other medicines. The bitter principle at the same time renders it tonic; and being eminently nutritious, it may be regarded as a diuretic as well as therapeutic agent. Various other lichens may be employed in a similar way, particularly the Sireta pulmonacea, the rugor, which is often of great service in small-pox.

ICELAND SPAR. [Calcarsous Spar.]

ICEI'I. [Britannia.]

ICIHNEUMON (Mammalogy), the name applied by Linnaeus, Geoffroy, and others to a genus of digitigrade carnivorous quadrupeds allied to the civets. It is the Mangusta of Olivier and others, the Herpestes of Illiger and others, the Mongoose of the French.

Generic Characters. Very short, with five demi-palmar toes, armed with claws which are slightly retractile. Tongue furnished with horny papille. Ears small. A voluminous, simple pouch, which does not contain odoriferous matter, and at the bottom of which the vent is pierced. Body very much elongated; tail long, strong at its base. Hairs of the fur annulated. Dental formula:- Incisors 4-4; Canines 1-1. 1-1 ; Molars 5-5 5-5 = 40.

Teeth of Ichneumon.

The above cut (F. Cuvier) exhibits the dentition, generally, of the Civets, Ichneumona, Genneta, and Paradoxurus; for, though there are particular differences which will be noticed under the article Viverrinae, they are not sufficient, in the opinion of M. F. Cuvier, to demand separate illustrations of the dental system of those groups.

Mr. Bennett, in a meeting of the Zoological Society (1835), noticed some peculiarities in the dentary system of these animals. In Herpestes fasciatus and Herpestes Geniiunus he found the following arrangement:- Incisors 1-1 1-1. 4 Canines 1-1 5-5 5-5. The incisors were small, simple, and equal; the lower incisors moderate size; the first two false molars of the normal form; the third carnassier of rather small size compared with its analogue in genera more decidedly carnivorous; and the last two, in both jaws, tuberculous. The parodontal false molar, mentioned by M. F. Cuvier, was, Mr. Bennett, having nothing in both these species; nor could its absence be owing to the age of the specimens examined, as he remarks, for he tells
us that some were evidently young animals, though arrived at adult age. Its entire absence in the situation of the teeth respectively. In the reciprocal position of the jaws, the first inferior false molar filling up the entire vacant space between the corresponding superior tooth and the canine of the same jaw. 'This system,' writes M. Bennett in continuation of his excellent researches, 'is admitted by all, and was not the other characters so perfectly accordant with those of Herpestes, would decidedly indicate a new genus. Indeed, it so stands in my notes, under the name of Mungos, but with a single specimen, as I have only been able to examine a single specimen.

Mungos ? vitticollis. (Herpestes vitticollis. Benn.) Teeth, 6 " 6-6-6 ; 6 II 7 II 7. The incisors and canines have nothing remarkable either in form or number. The first false molar in either jaw is tuberculous; the second and third consist of one large conical fang in the centre, and a smaller tubercle on each side of it; then follows the carnassier, and after it two tuberculous teeth in the upper, and three in the lower jaw. The first of these in the upper jaw is large and triangular; the second short and broad, its latitudinal dimensions more than doubling its longitudinal; the three of the lower jaw are small, simple, rather distant from each other, and form a continuous row. The form of dentition which, as far as I am aware, is altogether peculiar, and if confirmed by examination of other specimens, will undoubtedly form the type of a new genus. Perhaps further and more particular information may even detect different species from the different localities, as specimens have arrived for the Society from Travancore and Bombay, and one from Madras, at the British Museum. Our limits do not allow us to particularize all the localities, but we may notice that Mr. Hodgson mentions Herpestes griseus as occurring in the lower region of Nepali (Zool. Proc., 1834); and Dr. Andrew Smith, who described a new species of Viverra, Herpestes badius, says that the first specimen was killed near Old Latakoo, and that several others were seen between that and Kurichan, which lies about 120 miles more to the eastward. In addition to this, and another new species which Dr. Smith says he shall figure hereafter, he states that five others inhabit the south of Africa, namely, Herpestes Pharaonis, Desm.; H. griseus, Desm.; H. urinotor, Smith; Herpestes Griseus, Linne., and H. aboccoides, Smith. He adds, that before long, there is reason to expect that additional species will be added to the preceding, as the Bechuanas described several little quadrupeds clearly differing from any of the foregoing; yet doubtless belonging to the same subfamily or Cynidae. (Illustrations of the Zoology of South Africa, No. II, now in the course of publication.)

Habits. Food. &c.—The habits of this genus to which several new species have of late been added, will be collected in the course of this article, especially in that part of it which treats of Ichneumon Pharaonis. Dr. A. Smith, in the work above quoted, says that Herpestes badius appeared restricted to sandy districts abounding in brushwood, and in these was occasionally seen running from one cope to another. He states that it is extremely shy, and flies on the approach of man to its hiding-places with great rapidity. Numerous instances of its being found in the stomachs of those which were procured by the Expedition; but Dr. Smith adds, that if the natives are to be believed, H. badius feeds with avidity also upon lizards, snakes, mice, &c. and is both noisy and swift. As regards Ichneumon in seizing serpents by the throat, so as to avoid injury. The poet, who names it Phaius, describes its attack on the Egyptian sap elegantly and at length (iv. 724).

Arrangement and Natural History.

Linnæus, in his last edition of the 'Systems Natural,' gives one species of Ichneumon under the name of Viverra Ichneumon, his genus Viverra being placed between the Cats (Felis) and Wsels (Mustela). It stands as the first species of that genus, and was not noticed, and treated with a query, whether it may not be a distinct species. The first of these varieties is evidently the celebrated Egyptian Ichneumon, Ichneumon Pharaonis of Geoffroy, Herpestes Pharaonis of Lacépède; and has been described by Mr. Guerin. Guerin gives three species, viz. Viverra Ichneumon (the Egyptian), V. Mungo, and, apparently, V. coafa. Pennant places it among the 'Weasels.'

Cuvier gives the form (Les Manguettes) a position between Pan and Carnivora in his classification.

Mr. Gray arranges the Ichneumons (Herpestes, Illig.) under the Felidae, in his fourth subfamily Viverrina, between Genetta, Cuts, and Crocuta, F. Cuv.

Dr. Finsch describes Viverra Mungo, and Viverra Mungoet, between Mephitis and Crocuta; he enumerates nine species.

M. Lesson, in his 'Manuel,' arranges it under the name of Ichneumon Pharaonis, of Gyretta, and Crocuta, Linne. Mr. Swainson's 'Viverra,' Musk-Wesels (Viverrina), form the first subfamily of his genus Mustelidea. Herpetidae, which is placed between Cynicta and Viverrina, Linne., is the second genus of that subfamily.

The species are not few. M. Lesson and Mr. Swainson mention eight, and there is reason for supposing that there are more. We select as an example Ichneumon Pharaonis, Viverra Ichneumon, &c., of Linnæus.

Description.—A mixture of chestnut-brown and yellow, each hair being annulated with those two colours; feet and muzzle black or deep chestnut; tail terminated by a tuft of long hair.

This animal to have been one of the sacred animals of the ancient Egyptians; and we read in Herodotus (ii. 57) that the Ichneutne (Ichno) which the best critics consider to be synonymous with Ichneumon, were, as well as dogs, buried 'in sacred and holy places.' The same writer doubts that it is the Ichneumon (Ichno) of Aristotle (Hist. Anim. ix. 6; vi. 20; vi. 35), Diodorus Siculus, Strabo, Hellen, and others; and as little that it is the Ichneumon of Pliny. Pliny (Hist. Nat. viii. 6) relates, that when the Ichneumon sees the serpent called the Asp or Aspica (despica), he does not attack it till he has called to his assistance other Ichneumons, and in order to defend themselves from the venomous bite of the Asp, Ichneumons dives with mud by rolling on the earth after having dipped their tails in the water. Pliny (Hist. Nat. viii. 24) gives a somewhat similar account. Diodorus and Strabo relate a much more wonderful tale. Pliny slow to lend his aid in spreading the wonderful tale, how, when the crocodile is lulled asleep with opened jaws, the Ichneumon darts like a weapon down his throat and gnaws his entrails ('eroditalvo.' Hist. Nat. vili. 25). It may be thought hardly worth while to refuse such an account; but it was long regarded as credible, and it may not be amiss to turn to Somnii's observations on this point, more especially as they contain some interesting remarks on the habits of the animal. 'Much,' says Somnii, 'of these animals of which the Egyptians have domesticated, has been written concerning it, and much of this writing has been fabulous. It was one of the animals held sacred in ancient Egypt. However were rendered to it, its death is ascribed to the race. Object of the worship of a celebrated people, the pretended protector of the most singular country in the world against a scourge the most grievous to an agricultural nation, a stranger and unknown entertained as credible, what a field for the production of the marvelous has been, that it has not been spared. The greater part of travelers have seen the manguette without examining it; and with their minds prejudiced by the stories which the ancients and the moderns have spread about its powers, they have successively copied their relations.' Somnii then, after a compliment to Buffon, and a statement that he had had in his power to observe the manguette in its native country and in its state of liberty, as it was found, respects its close dispositions to familiarity, the manguettes are not altogether domestic in Egypt. Not only do they now rear none in their habitations, but the inhabitants have not even the recollection of these ancestors reared any. Most probably it was the same which Belon and Prosper Alpin assert that they had seen domesticated were merely a few individuals preserved rather as objects of curiosity than for any useful purpose; for if they burst away rats and mice, they likewise seize upon the poultry, and this appetite would make them...
overbalance the good which they could do in purging the houses of noxious animals, which cats would destroy more certainly and with less inconvenience. Having some resemblance in their habits to weasels and polecats, they feed upon rats, birds, and reptiles. They rumble about the habitations of men; they even steal into them, in order to surprise the poultry and devour their eggs. It is this natural fondness for eggs which prompts them frequently to scratch up the sand with the intention of discovering those which the crocodiles deposit there, and it is this manner of eating which is the chief cause of the excessive propagation of these detestable animals. But it is absolutely impossible to abstain from laughing, and not without reason, when we read of their leaping into the extended mouths of the crocodiles, of their sliding down into their belly, and not returning till they have eaten through their entrails. If some manguousete have been seen springing with fury on little crocodiles presented to them, it was the effect of their appetite for every species of reptiles, and not at all that of a particular hatred, of a law of nature, in virtue of which they would have been specially commissioned to check the multiplication of those amphibious animals, as many people have imagined. It had been equaly reasonable to say that nature placed manguousete on earth merely to prevent the too great propagation of chickens, to which they are far more hostile in reality than to crocodiles. And yet we have heard that men have been mistaken ascribing such intentions to nature respecting manguousete—this—in more than half of the northern part of Egypt, that is to say, in that part comprised between the Mediterranean Sea and the Red Sea; although in that region there are no crocodiles there; whilst they are more rare in Upper Egypt, where the crocodiles are, in their turn, more numerous. The manguousete are nowhere more multiplied than in Lower Egypt, which, better cultivated, more inhabited, more humid, and more shaded, presents also more abundantly the means of supplying them with prey and with food, and, I again repeat, it, crocodiles never appear there.

That Belon saw this Ichneumon in Egypt there can be no doubt. That accurate observer, in the 'Portraits,' gives a figure of it superscribed 'Portait de l'Ichneumon, que les Egyptiens nomment Rat de Pharaon.' Beneath is the following paragraph:

'Voy le portrait du Rat de Pharaon, qui chasse aux Rats, comme fait la Delatte: A demerir de fort ensevelir bones, qui autrement est nennnie Ichneumon.'

Hasselquist mentions the 'Vieirra Ichneumon,' the Ichneumon of the Nile, as met with in Upper and Lower Egypt, a fish of living, digging, and guarding habits, and near the villages, but, in the dry season, as dwelling in the fields and near the banks of the river. He says that it creeps slowly along, as if ready to seize its prey, and that it feeds on plants, leaves and insects, but is the night, when it frequents the villages. He states that in Upper Egypt it seeks for the eggs of the crocodile, which lie hid in the sand on the shores, and eats them, preventing by that means the increase of that dangerous animal. 'The Ichneumon,' he continues, 'may easily be tamed, and frequently goes about the houses like a cat. Mr. Barton, who has been the English consul nineteen years in Egypt, has kept a tame one for several years. It makes a growing noise, and barks when it is very angry. The Ambians call it Nems. The French in Egypt, who give everything they don't know names of their own making, have called this fish 'Ariphor,' which, without any mistake, is the same name as 'Ichneumon.' The resemblance it has to a mouse (mus terrestris) in regard to the colour and hair might have induced ignorant people who know nothing of natural history to call it a mouse, but I cannot conceive why they should call it Pharaoh's Mouse. The Egyptians were too intelligent in the time of Pharaoh to call it a mouse, having knowledge enough to give true designations to each purposeful use of nature; natural bodies; nor is it at this day called Pharo by the Egyptians, which is the name for mouse, but they call it Nems. What is related concerning its entering the jaws of the crocodile is fabulous.' Hasselquist travelled during the years 1749-51.
ICHTHYOSAURUS, literally Fish-Lizard (Gr: Ἰχθύς: fish; σαῦρος: lizard), the generic name given by Mr. König to the extinct fossil animal noticed by the late Sir Richard Owen, under the appellation of Protosaurus, and by Wagler under the name of Gymnophis.

**Organization.**

We are indebted to Mr. De la Beche and the Rev. W. D. Conybeare principally for pointing out and illustrating the structure of this extraordinary creature; and that at a time when the materials were far more scanty than they are at the present day.

Dr. Jager, Mr. Hawkins, Dr. Buckland, Sir Philip de Malpas, Grey Egerton, and Mr. Owen, have all contributed to throw light on the organization of a being that has long ceased to exist; and the anatomy and animal economy of this tyrant of the seas of former ages is now nearly as well known as that of the porpoise which revels in the ocean that washes the shores of our existing continents and islands.

"If," writes Dr. Buckland, in his 'Bridgewater Treatise,' "we examine these creatures with a view to their capabilities of locomotion, and the means of offence and defence which their extraordinary structure afforded to them, we shall find combinations of form and mechanical contrivances which are now dispersed through various classes and orders of existing animals, but are no longer united in the same genus. Thus, in the same individual, the snout of a porpoise is combined with the teeth of a crocodile, the head of a lizard with the vertebræ of a fish, and the sternum of an Ornithorhynchus with the paddles of a whale. The general outline of an Ichthyosaurus must have most nearly resembled the modern porpoise and grampus. It had four broad feet or paddles, and terminated behind in a long and powerful tail. Some of the largest of these reptiles must have exceeded thirty feet in length." We shall now endeavour to give a sketch of the organization of these Enaliosauri.

**Skeleton.**—The osteology of the head agrees in many points with that of the crocodile, but the orbit of the eye is much larger, and the nostril is not, as in that genus, placed near the point of the snout, but near the anterior angle of the orbit, as in some other lizards. The teeth, which in some cases amount to a hundred and eighty, are not incised in deep and distinct sockets as in the crocodiles, though the rudiments of an alveolar separation may be traced in the small ridges between the teeth running along the furrow of the maxillary bone in which they are set. The succession of teeth is managed much after the same manner as that which obtains in the crocodiles [Crocodiles, vol. viii., p. 162]. the young tooth budding up at the base of the old tooth, where, as it grows, its lateral pressure sets the absorbents at work; the base of the old tooth is thus partially removed, and, as the new tooth advances, is finally displaced to make room for its more efficient successor. The elongated jaws in which these instruments of destruction are ranged are made up, as in many of the crocodiles and the other lizards, of many thin bony plates, so as to produce a union of lightness, elasticity, and strength. 'It is obvious,' says Dr. Buckland, in the interesting work above quoted, 'that an under jaw so slender and so much elongated as that of a Crocodile or Ichthyosaurus, and employed in seizing and retaining the large and powerful animals which formed their prey, would have been comparatively weak and liable to fracture if composed of a single bone. Each side of the lower jaw was therefore made up of six separate pieces, set together in a manner which will be best understood by a reference to the figure. This contrivance in the lower jaw to combine the greatest elasticity and strength with the smallest weight of materials, is similar to that adopted in binding together several parallel plates of elastic wood or steel to make a crossbow; and also in setting together thin plates of steel in the springs of carriages. As in the carriage-spring or compound-bow, so also in the compound-jaw of the Ichthyosaurus, the plates are numerous and strong at the parts where the greatest strength is required to be exerted; and are thinner and fewer towards the extremities where the service to be performed is less severe. Those who have witnessed the shock given to the head of a crocodile by the act of snapping together its thin long jaws, must have seen how liable to fracture the lower jaw would be were it composed of one bone only on each side: a similar inconvenience would have attended the same simplicity of structure in the jaw of the Ichthyosaurus. In each case therefore the splicing and bracing together of six thin flat bones of unequal length and of varying thickness, on both sides of the lower jaw, affords a compensation for the weakness and risk of fracture that would otherwise have attended the elongation of the snout. Mr. Conybeare points out a further beautiful contrivance in the lower jaw of the Ichthyosaurus, analogous to the cross-bracings lately introduced in naval architecture.'

Hitherto the structure of the skeleton of Ichthyosaurus is, as we have seen, saurian; but we now come to a part of its bony frame, and a very principal part, which is festril on the ichthyoid or fishy type. The vertebral column, consisting of more than one hundred vertebrae, each of which is hollow and fashioned after the manner of those of fishes, to facilitate the progress of the animal through the watery medium in which it existed, is constructed for a swimming,
not a walking animal; and the sauroid type is here departed from in favour of a conformation demanded by the habits of the animal. A peculiarity in this part of the structure is noticed by Sir R. Home, the annular part of the vertebra being neither consolidated with its body, as in quadrupeds, nor connected by a suture, as in crocodiles; but remaining always distinct, and articulating by a peculiar joint, resembling a compressed oval ball and socket-joint. Mr. Conybeare observes, in addition, that this mode of articulation co-operates with the cup-shaped form of the intervertebral joints in giving flexibility to the vertebral column and assisting its vibratory motions; for had these parts been consolidated, as in quadrupeds, their articulating processes must have locked the whole column together, so as to render such a motion of its parts impossible; but by means of this joint every part yields to that motion.

(Buckland's \textit{Bridgewater Treatise}, and the illustrations there collected.)

Sir Philip Egerton, in his paper "On Certain Peculiarities in the Cervical Vertebrae of the Ichthyosaurus, heretofore unnoticed" (\textit{Geol. Trans.}, June, 1830), has demonstrated that the first and second cervical vertebra (in some species at least) are anchylosed; and he further notices a very remarkable feature which at once distinguishes these vertebra from the other bones of the spinal column. He shows that on the under surface of each bone there exists an unusual enlargement in the form of a solid wedge-shaped process, placed transversely to the smaller diameter of the vertebra. By this arrangement four triangular planes are produced. 'The first and largest is based upon the lower anterior margin of the atlantal socket, having its apex directed downwards and backwards until it meets the apex of a similarly shaped though smaller bone forming the anterior margin of the atlas. The third, of like shape and size with the second, extends from the anterior margin of the axis, and joins the apex of the fourth, which inclines forwards from the posterior portion of the same bone. This fourth plane is considerably smaller than the others, and corresponds in size with a fifth, placed on the anterior border of the third cervical vertebra. When therefore the three anterior vertebra are in their natural position, the arrangement of the five planes is as follows—the first and largest occupies the lower front of the atlas; the second and third, by the union of their bases, produce a triangular socket on the under surface of the atlas and axis; and a second smaller socket is formed between the axis and the third vertebra by a similar disposition of the fourth and fifth planes.' Sir Philip adds that the second bone of the series is frequently found with the atlas and axis, and is not uncommonly fixed in its position by anchylosis. The third bone is stated to be of rare occurrence, in consequence of its diminutive size, and he thinks that in some species it is probably altogether wanting. He designates these bones as Subvertebral Wedge-Bones. The reader will find in the same interesting memoir a very valuable observation on the structure and articulation of the cervical vertebra, the combined result of which, and of the reduction of the intervertebral cavities, must, as Sir Philip remarks, have been a considerable increase of power in this part of the spinal column; and he further states that proceeding from the lumbar vertebrae towards the head, the column attains its minimum diameter about the fifth cervical vertebra, from which point to the occiput, it increases in size very rapidly.

The ribs appear to be constructed more upon the sauroid type, for they are continuous along the vertebral column from the head to the pelvis; they are slender and mostly bifurcated at the end, and many of them are united in front across the chest. Intermediate bones, analogous to the sphenial and intermediate costal cartilages in the crocodiles and the sterno-costal area in Plesiosaurus, united the ribs of the right side to those of the left. Dr. Buckland is of opinion that this structure was probably subservient to the purpose of introducing into their bodies an unusual quantity of air, the animal being by these means enabled to remain long beneath the water without rising to the surface for the purpose of breathing.

In the \textit{sternum} we find a combination of bones admirably adapted for resistance. Of this part of the bony framework Mr. Conybeare says, 'The form of the sphenial arch and the broad surfaces of the clavicles is such as to impart great strength to the chest, enabling the animal to breathe the most disturbed waters, and affording an extensive surface for the attachment of powerful muscles to assist in moving the anterior extremities.' And Dr. Buckland remarks that the bones composing this arch are combined nearly in the same manner as in the Ornithochorus of New Holland, which seeks its food at the bottom of lakes and rivers, and is obliged, like the Ichthyosaurus, to be continually rising to the surface to breathe air. To this sphenial arch the \textit{anterior paddles} are articulated; they are nearly one-half larger than the posterior paddles, and in this part of the structure the cetaceous type appears to have been followed. The short and stout humerus is followed by the bones of the fore-arm; and these are succeeded by numerous regularly-placed polyedrous ossified bones, exceeding, in some specimens, the number of one hundred, which form the paddle or fin. In form these bones differ both from the phalanges of lizards and whales.
Royal College of Surgeons, London, read before the Geological Society of London, March 21, 1838, the author commenced his observations by referring to the skeleton of the existing cetacean, and pointing out how slight is the indication afforded by the caudal vertebrae of the large terminal fin, which forms, in that class, so important an organ of locomotion; and the improbability that its presence would have been suspected, had the cetaceans been known only by their fossil remains, in consequence of the fin having consisted entirely of decomposable and unossified material.

He stated that the depressed flattened shape of the terminal vertebra, which gives the only indication of the horizontal fin—and which character is not present in all the cetacean—is not recognisable in the skeletons of the Ichthyosaurs and Plesiosauria; but he proceeds to describe a condition of the tail in the skeletons of the Ichthyosaurus which, he conceives, affords an indication of a structure in the extinct animal analogous to the tegumentary fin of the cetacean, and which has not been suspected by the authors of the conjecturally-restored figures of the Ichthyosaurus already published. The condition alluded to is described as an abrupt bend of the tail, about one-third of its whole length distant from the end, and at the thirteenth caudal vertebra in the Ichthyosaurus communis; the broken portion continuing, beyond the dislocation, as straight as in the part which has been removed. There is no appearance of a modification of structure in the dislocated vertebrae, indicative of the tail having possessed more mobility at that point than at any other, and as the dislocation has taken place at the same point in seven specimens examined by the author, he conceives that it must be due to some cause operating in a peculiar manner on the dead carcass of the Ichthyosaurus, in consequence of some peculiarity of exterior form, while it floated on the surface of the sea.

A broad tegumentary fin, composed of dense but decomposable material, he observed, might have been attached to the terminal portion of the tail; and such a fin, either by its weight, or by presenting an extended surface to the beating of the waves, or by attracting predatory animals of strength sufficient to tug at, without tearing it off, would occasion, when decomposition of the connecting ligaments had sufficiently advanced, a dislocation of the vertebrae immediately proximate to its point of attachment. The two portions of the tail, with the rest of the skeleton, would continue to be held together by the dense exterior integument, until the rupture of the parieties of the abdomen, at some yielding point, had set free the gases generated by putrefaction; and the skeleton, having undergone certain partial dislocations, from the decomposition of the more yielding ligaments, would subside to the bottom, and become imbedded in the sedimentary deposits, exhibiting the fracture of the tail alluded to.

With respect to the relative position of this conjectured caudal tegumentary fin of the Ichthyosaurus, Mr. Owen could not perceive any indication of its horizontality in the forms of the vertebrae which he supposed to have supported it; and he regards the superincumbence of posterior paddles in these air-breathing marine animals as a compensation for the absence of that form of fin which is so essential in the cetacean, for the purpose of bringing the head to the surface of the sea to inhale the air. On the other hand, a vertical caudal fin seems especially required by the short-necked and stiff-necked Ichthyosaurus, in order to produce, with sufficient rapidity, the lateral movements of the head, which were needed by those predatory inhabitants of the antient deep; while in the Plesiosaurus such a fin would be unnecessary, in consequence of the length and mobility of the neck, and Mr. Owen concluded by stating, that in those skeletons of Plesiosauri in which the tail is perfect it is straight, and presents no indication of the partial fracture or bend which is so common in the tails of Ichthyosaurus.

Figures of the tails of five specimens of Ichthyosaurus, belonging to the species Ich. communis, Ich. tenutrostris, and Ich. intermedius, now in London, accompanied the Note; the subject of which was also illustrated by a sixth skeleton of an Ichthyosaurus on the Table, the property of Sir John Morland, Bart. (Geol. Proc. 1838.)

Mr. Owen informs us that he has since procured detached terminal caudal vertebrae of the Ichthyosaurus, and finds them compressed or flattened from side to side, in a remarkable degree; a circumstance, he observes, confirming the accuracy of the conjecture of the verticality of the caudal fin, and the best proof perhaps of its actual presence in the living animal.

Senses.—That the Ichthyosaurus enjoyed the sense of smelling in a considerable degree can hardly be doubted from the structure and position of the nostrils, nor is there any reason for supposing that they were not gifted with the sense of taste, but their power of vision must have been great, and indeed Dr. Buckland justly speaks of the enormous magnitude of the eye as very much exceeding that of any living animal, and as being the most extraordinary feature of the head. He alludes to a skull of Ichthyosaurus platyodon próxima from Oxford, and remarks that in this specimen the longer diameter of the orbital cavity measures fourteen inches. The eye has, as Mr. Conybeare remarks, its sclerotic composed of a bony or rather a slimy substance, subdivided in thin plates, and as will be seen in the cut (p. 450), where two of these plates are represented separately. Mr. Conybeare, in the passage to which we have referred, goes on to state that he had then before him the eye of a middle-sized lizard from Germany, which has a structure exactly similar, excepting that the plates were more numerous; this, he states, was pointed out to him by the late Mr. Miller, and he adds that the chameleon, iguanas, and tupinambis have similar osseous laminae, as has the tortoise, but that in this latter animal they form, as in birds, the anterior disk. This conformation was highly important to the adjustment of an organ whose functions were demanded both above and below the surface of the water. [Bucks, vol. iv., p. 438.] The sense of hearing appears to have been sufficiently developed, and that of touch was probably about upon a par with the sensations of the modern cetaceans.

Digestive Organs.—An enormous expansion of the jaws, which were so constructed as to bear the shock of the most violent collision, and were furnished with a constant succession of teeth, formed an organ of seizure well fitted to the voracity of an animal that not only preyed upon fishes and other marine animals, but, like the ravenous pike of our fresh-waters, fed upon its own congeners and even species. The prey was transmitted into a stomach which must have been nearly coextensive with the cavity of the body, and the contents of which were passed through an intestinal canal which appears to have resembled, as Dr. Buckland observes, the spiral intestines of some of the swiftest and most voracious of our modern fishes.

The evidence upon which this assertion is made is to be found in various specimens, like that in the Oxford Museum, from the lags at Lyme Regis, and figured by Dr. Buckland in his 'Brickfield Treatise' (pl. 14), which shows a large mass of fish scales, chiefly referrible to the Pholidophorus embiolus, intermingled with coprolites throughout the entire region of the ribs, and in the more mature coprolites themselves. Dr. Buckland, to whom we are indebted for the history of these curious bodies, says, speaking of the
intestinal canal of the Ichthyosaurus. Besides the spiral structure and consequent shortness of the small intestine, we have additional evidence to show even the form of the minute vessels and folds of the mucous membrane by which it was lined. This evidence consists in a series of vascular impressions and corrugations on the surface of the coprolite, which it could only have received during its passage through the windings of this flat tube. If we attempt to discover a final cause for these curious provisions in the bowels of the most reptile-like inhabitants of the seas of a former world, we shall find it to be the same that explains the existence of a similar structure in the modern voracious tribes of sharks and dog-fishes. As the peculiar voracity of all these animals required the stomach to be both large and long, there would remain but little space for the smaller viscera; these are therefore reduced, as we have seen, nearly to the state of a flattened tube, coiled like a screw around itself; their bulk is thus materially diminished, whilst the amount of absorbing surface remains almost the same as if they had been circular. Had a large expansion of intestines been superadded to the enormous stomach and lungs of the Ichthyosaurus, the consequent enlargement of the body would have diminished the power of progressive motion, to the great detriment of an animal which depended on its speed for the capture of its prey. The above facts, which we have elicited from the coprolites received from the Ichthyosaurus, afford a new and curious contribution to our knowledge both of the anatomy and habits of the extinct inhabitants of our planet. We have found evidence which enables us to point out the existence of beneficial arrangements and compensations, even in those perishable yet important parts which formed their organs of digestion. We have ascertained the nature of their food and the form and structure of their intestinal canal; and have traced the digestive organs through three distinct stages of descent, from a large and long stomach, through the spiral coils of a compressed ileum, to their termination in a cloaca, from which the coprolites descended into the main of the intestines. In this stage they have been interred during countless ages, until within recent years, by the recessey of the labours of the geologist to give evidence of events that passed at the bottom of the antient seas in ages long preceding the existence of man. (Bridge-gater Treatise.)

External Integument.—This appears to have been a simple naked skin unprojected by any defence; it probably resembled in some degree the dermal covering of the ceteans. We have thus endeavoured to give a sketch of the organization and structure of a form blotted out from the catalogue of existing beings. Admirably adapted to its wants, its conformation enabled it either to pursue its prey, to dive far beneath the surface, or to ascend to the surface, and, in short, to execute with precision and quickness all the motions necessary to its mode of life.

The species are already numerous. Hermann von Meyer gives six by name, and notices other nameless specimens. The time is now ripe for a well-digested monograph of this genus, and we are not without hopes that Mr. P. C. No. 778, Owen will be induced to draw one up. There is a good collection of these extinct animals in the British Museum, and, if we hope, that of Mr. Hawkins shall be added to it, the collection will be the finest in the world.

Geological Distribution of the Genus.—Ichthyosaurus abound throughout the late and palaeolithic formations. The chief repository has been hitherto considered to be in the lias of Lyme Regis, but, as Dr. Buckland states, they abound along the whole extent of this formation throughout England, from the coasts of Dorset, through Somerset and Leicestershire, to the coast of Yorkshire. The lias of Germany and France contains them. 'The range of the genus Ichthyosaurus, says Dr. Buckland, 'seems to have begun with the lower stratum of the lias and extends through the whole of the oolitic period into the cretaceous formation. The most recent stratum in which any remains of this genus have yet been found is the chalk marl at Dover, where they have been discovered by Dr. Mantell: I have found them in the gault near Benson, Oxon.' (Bridge-gater Treatise.) (Plesiosaurus.)

Ichthyosoria/Gones (Rüppell), one of the many names (as Aptychus, Von Mayer; Solenites and Tellinites, Schlotheim; Trigonites, Parkinson; Lef Midwest, German) which have been given to the pair of shelly bodies found in many of the oolitic rocks, and not unfrequently in the mouths of ammonites at Solenhofen, so as to prove their connection with the Ichthyosaurus which inhabited that shell. By Rüppell and Volk they were conceived to form an operculum. The two valves meet on a straight toothless hinge-line, their free edges forming the remaining two sides of a triangular outline, and with their surfaces transversely fibrous; its inner surface concentrically striated with lines of growth. (Parkinson's Org. Rem. pl. xiii, figs. 9, 10, 12.)

ICOLMK. [Iona.]
ICONIUM. [Asia Minor.]
ICONONZO. [Granada, p. 353.]
ICOSAHEDRON. [Solids, Regular.]
ICOSA/NDRAI. [One of the classes in the sexual arrangement of botany invented by Descartes, who literally means 20 stamens, but it was only applied by Linnaeus to plants having an indefinite number of stamens inserted into the calyx.]

ICTERUS. [Sturniidae.]
ICTERUS. [Jaundice.]
ICTIDES, a name given by M. Valenciennes to the Ben- turonga, a genus of plantigrade mammifers which M. P. Cuvier had previously referred to the genus Paradoxurus. It is the Arctictis of Temminck.

M. P. Cuvier, in his Dents des Mammiferes, states that he had published, under the name of Paradoxurus albifrons, in the 3rd vol. of the 'Histoire Naturelle du Mammiferes,' the name of an animal which had been sent to him from Calcutta by M. Alfred Duvauceult; and that he conjectured, from the external characters and the general physiognomy, that the animal which it represented belonged to the genus Para- doxurus. He has not subsequently examined the skull of this animal when he states he owed to M. Valenciennes, who had found the skin and the head of the animal in the cabinet of Brussels, and had obtained them through the complaisance of the Director, M. Drapiere, M. P. Cuvier states that there is much resemblance in the dentition to that of Paradoxurus. Ictides belongs, he thinks, to the family of Civets, which is characterized by a tubercular molar tooth in the upper jaw, and by a pointed or triangular tooth in the upper jaw, and he thinks that it is "sans contredit" most approximated to Paradoxurus, though it approaches Procogon narrower than that genus, that is to say, the teeth of Proicydes show an increase of thickness, and have become more tuberculous. He places it between the Civets, Sci., and the Suricaces. Cuvier, who gives Ictides a position between Alatus (Pan- da) and the Coatis (Nasus), says that it still bears some resemblance to the Civets, but in its dentition; but he remarks that the three last molars of the upper jaw are much smaller and less tuberculous, and that this is essentially true of the last of all in each jaw, which is very small and nearly simple.

Mr. Gray places Ictides as the last genus of his subfamily Viverrina, the fourth of his family Felidae, following Para- doxurus and immediately preceding his fifth subfamily Caninos. M. Lesson thinks that the genus approaches nearer to Vol. XII— 3 K
rours which terminates the ears. The cry is intermediate between those of a cat and a dog.

Geographical Distribution of the Genus.—India.

Three species are recorded: we select Isidodes albifrons.

Description.—Fur gray; hairs long, silky, black at the base, and white in their extreme third, shorter on the head and limbs; sides of the snout, forehead, pencils of the ears (which are edged with white) black; upper part of snout and forehead white; iris yellow; belly gray, with shorter hairs than [those of the upper parts of the body]. Size, that of a very large domestic cat. In another specimen the sides of the snout, and the tail, its extremity excepted, were gray.

Locality.—Boothen, Nepal (Kâchar: though they occasionally occur in the central region of Nepal). Hodgson.

Habits, Food, &c.—Sir Thomas Stamford Raffles describes the gait of this Benturong as low and couching, the body being long and heavy, and the legs short. The tail, thick at its insertion, gradually tapers to the extremity, where it curls upwards. In climbing trees the animal is assisted by this tail, which is strong. One that was kept alive many years by Major Farquhar partook both of animal and vegetable food. Slow in motion, and timid in disposition, the animal sleeps much during the day: the night is the season of its comparative activity.

IDA. [CANDLA.]

IDA. [TROAD.]

IDEA (ilia, from the root il, to see), in its widest and now generally received acceptation, is employed to indicate every representation of outward objects through the senses, and whatever is the immediate object of thought.

In many other terms of mental philosophy, it is derived from the most eminent of the senses, that of vision. In the Platonic philosophy, the word idea possessed a higher import, and signified, primarily, the archetypes of all created things as they exist in the divine intellect; and, secondarily, the conceptions of the human understanding, by means of which the essence of a thing is conceived. According to another, though a more questionable definition, the Platonic system denoted certain abstract entities, which are regarded as real because they are capable of becoming objects of true knowledge. Plato's own definition is very extensive: "an idea may be attributed to whatever, as a plurality, may be indicated by the same name" (tìoç γεγο-νυί το τενεντον εξειδικευμένον προς τά λόγον καΐ το τι τον θεόν δογμάτων, De Rep. x. 596 a). For in Plato's loose phraseology the terms tìoç and ilda are employed indiscriminately in the same sense. This being remembered, there is little objection to Plutarch's historical account of these ideas, which we here give in the English of Holland.

"An idea is a hallowed substance, which of itself has no substance, but giveth form and figure to shapeless matter, and become the cause that bringeth them into show and evidence. Socrates and Plato supposed that these be substances separate and distinct from matter, and being the cause that bringeth them into show and evidence. Aristotle admetith, that the first substance is the form and ideas, howbeoth separate from matter, as being patterns of all that God hath made. The Stoics, such at least as were of the school of Zeno, have delivered that our thoughts and conceits are the ideas." (Plutarch, ch. 3., fol. 666; Opinions of Philosophers.)

Those ideas by means of which perception is obtained were commonly supposed to be really images or resemblances of objects. By the Platonic philosophers, the objects themselves were held to be immanent, while Epicurus and his followers made them to partake of the matter as well as of the form of their originals (teneta rerum simulatura). (See See. ad Att. Ep. ii. p. 440.) Ictides is the proper term idea in the lower term ideas, as the word species, by which, Cicero tells us, it was usually rendered in Latin (Top. 7.), although he himself proposed "form," which has been in later times adopted by Kant and his followers to designate the constant element in the perception of outward objects which is independent of matter, and which the mind presents to itself in accordance with its own laws. These species the schoolmen divided into sensible and intelligible, of which we shall here extract Hobbes's clear and succinct definition. "The philosophy school taught, that for the cause of vision the thing seen sendeth forth on every side a visible species, (in English) a visible show, apparition, or aspect, or a being seen, the receiving of which into the eye is seeing. . . . Nay for the cause of understanding also the thing understood sendeth forth an
intelligible species, that is, an intelligible being seen, which coming into the understanding makes it understood.' (Qf. Man, part i, c. 1)

Ideas were again introduced into philosophy by Des Cartes, with whom and his followers it is nearly synonymous with the species of the schoolmen. According to Locke, 'Ideas are whatever is the object of the understanding, whatever a man has in his mind can be said about thinking.' (Letter to the Bishop of Worcester, vol. iv., p. 376.) In this large sense the word is generally employed by English and French writers, and also by the Germans before the time of Kant, for other and distinctly different ideas—e.g., the universal idea of perfect beauty, the idea of the infinite, the idea of matter—higher but limited specification. By idea Kant eminently designated every conception formed by the reason (as distinct from the understanding), and raised above all sensible beings, all external sensible objects, all empirical, which have an element drawn from experience, for instance, organization, a state, a church; and 2nd, pure, which are totally free from all that is sensible or empirical, such as liberty, immortality, holiness, felicity, deity. Another division of the Kantian ideas is into theoretical and practical, according to a similar division of the reason itself. Thus the idea of truth is a theoretical, that of morality a practical idea.

(Trendelenburg, De Id. Patonis; Richter, De Id. Pl.; Dugall's Werk. Essays, Appendix ii.; Ritter's History of Philosophy; Royer Collard's Lexicon, in the 3rd vol. of Jouffroy's Oeuvres de Reid; and Kant's Kritik der reinen Vernunft.

IDEAL has two uses, philosophical and critical. In the former it signifies, 1. whatever belongs or relates to ideas generally. It is in this sense that the word is employed in the phrase 'ideal theory,' in the controversy between Reid and Priestley. According to this theory, the understanding does not perceive external objects themselves by means of the sensuous organs, but the organs of sight and touch transmit to the mind certain ideas, the subtlety of which interiorly it perceives within itself. Locke, who received the term idea from Des Cartes, seems unconsciously to have adopted, with the use of the word, the scholastic doctrine which it involved. For he expressly declares that our ideas of the primary qualities of bodies are resemblances of them, but that those produced by secondary qualities are no resemblances at all. From this explanation of the means of perception Locke has, on the one hand, been represented as the origin of modern Idealism; while on the other, in consequence of the superior value which he evidently gives to the testimony of sensation, his authority has been claimed by the opposite school of Ideology, as founded by the disciples of the Jesuits. Though the secondary sense of the word is more limited, being confined to a peculiar class of ideas created by and solely subsisting in the imagination. Connected with this especial signification is its use in the philosophical history of the term 'ideal.'

The Ideal signifies something which, although not existing in the reality of sensible things, subsists actually in thought—the joint creation of the reason and the imagination, the archetype and pattern of supreme and perfect beauty. Although unreal in nature, this ideal is not unnatural; it is the absolute sum and unity of those scattered beauties which nature, with a lavish but impartial hand, has scattered among her myriad phantoms. This type of faultless beauty is indeed unapproachable by the artist; yet the more perfect the ideal which kindles his enthusiasm and animates his fancy, the higher will his efforts tend, the nobler will be the energy of his art, and the nearer his approximation. An ideal term is absolutely free from the objects of sense, as the objects of the sense are singular in their nature, and as there can be no science of singulars ('singularium nulls est scientia,' Bodin), so too there can be no ideal of the sublime. The statue of Judah and the Indian peacock in Flaxman is ideal of the sublime, but as it observes all those rules of beauty from which the Greek artists never deviated, in spite of its colossal dimensions, the sense of proportion is mingled with the emotions it excites, and there is wanting that feeling of the inadequacy of our sensations which is awakened by vastness and immensity in objects, and which constitutes the emotion of sublimity.

IDEALISM, the designation of many different systems of philosophy, may perhaps be most properly understood as the name of a school of the theory of ideas; and of Jewish philosophy. This theory was analyzed by the ancients, who distinguished it from the theory of the spirit.

1. As the essence of the mental life is free activity and vital motion, as opposed to the inorganic and passive nature of the corporeal, the name of Idealism is rightly applied to those systems of physiology which make the primary substance and original of all things to be certain forces invisibly working throughout the universe. To the followers of this class belong the dynamical philosophers of the Ionian school, Thales, Anaximenes, Diogenes of Apollonia, and Heracleitus.

The fundamental position of their several doctrines was the assumption of a living energy which as it develops itself imperceptibly undergoes constant development and division into a transmutation which is the cause of all generation in nature. For water, the primary substance of Thales, was not the simple element, but water pregnant with vitality; the finite air of Anaximenes was the intermediate between potential energy; and the intellectual primary of Diogenes was not merely the atmospheric air, but a warm and perfect breath of life which pervades and ensouls the universe. While however in these philosophers the philosophical idea is more or less mixed up with diverse sensible conceptions, Heraclitus seems clearly conscious of speaking figuratively of the primary substance. With him a universal and absolute life is the cause of all phenomena; which is indeed the metaphysical idea manifested in the vitality of fire and the rational soul, which is like fire, while in other phenomena it is inherent, although not so obvious and immediately cognizable. In this class of idealists among moderns we must reckon Bos- tokh and Leibnitz, who propounded the idea of a universal system of forces; while, according to the latter, all beings are of the same nature. Activity and simplicity are the essential characters of all, and are so many forces or causes which in the terms monads, or the idea, or the perception, the faculty of perception, or of reflecting within themselves, as in a mirror, the universe. These images however of perception cannot become the objects of knowledge, unless in these monads, which possess also the idea of the same substance, in which they are enabled to distinguish and see in themselves those images. It is therefore this faculty of apprehension which constitutes the difference between the so-called material and spiritual; and as the faculty itself admits of different degrees, there are corresponding orders of beings as so many perceptions, or of reflecting within themselves, as in a mirror, the universe.

2. Another species of Idealism considers the real as simply ideal, and argues that only ideas and ideas of ideas correspond to anything actually existing, but by contemplating these as objective, we transmute the merely ideal into the real. The fundamental axiom of this idealism is the priority of the idea to the thing. Hume and Berkeley, as well as several other philosophers, who also consider the idea of God as the primary substance, and the philosopher of Leibnitzian metaphysics, in which idea is the actual form of the universe, consider the world itself as an idea, as the highest idea of the mind, the idea prius, reala posterioris. Accordingly, the real only exists so far as it is necessarily conceived by us, so that the external world is purely a creation of our conceptions, and, in other words, the real is a product of the idea. To this class is referred the Platonistic attempt to account for the existence of the sensible world by his ideas alone, without recourse to any other nature alien and foreign to them. By some, even the Aristotelian philosophy is designated as ideal in this sense, at least so far as regards its fundamental principle.

3. A third system of Idealism proceeds to the absolute idealism, which is the case of all material existences. This species of Idealism was impossible among the ancients, who did not oppose mind so sharply to matter as to deny the possibility of their interaction, but tacitly supposed their similarity, opposing only their incorporeity, as form and substance, the latter being a mere form, but also the matter, of the conception of external things out of the mind itself, or, in his terminology, of the ego (Lcb).
can enter the unextended soul, and Locke afforded, by his doctrine of ideas, the arguments for its support. The system of Berkeley is briefly this: matter does not exist independently of our sensations, but conceptions of a material world are produced by the operation of the deity upon our understanding, and the material world exists only in the divine intellect, who awakes in us certain sensuous conceptions in a definite order, which order is what we call the common cause. 4. The last species of idealism is more philosophical, and, without denying or asserting the existence of a material world, is content with confusing an ignorance of its nature. It pretends not to a knowledge of things themselves, but to a knowledge of the mind forms, according to the laws of its own nature, upon the occasion of the excitement of its sensuous organs, without determining whether these ideas correspond or not to the existing causes of things, whatever they may be. To this class belong Malebranche and Kant. According to the former, mind and matter cannot act upon each other, and the sensations of the mind are so many occasional causes operating by a constant miracle of divine agency. (Deus ex Machina.) According to the latter, all that we know of outward objects is that they furnish the material part of our conceptions, to which the mind furnishes the form agreeably to certain natural laws; and that the things themselves, which he calls phenomena, we absolutely know nothing, but note only the modes under which they appear to us.

The question of IDEOLOGY (the science of ideas or mind) is the term by which the later disciples of Condillac, under the Directory and the Empire, have designated the history and evolution of human ideas considered as so many successive modes of certain original or transformed sensations. Proceeding from this question, the absolute view, noting only the logical simplicity of the writings of this school, the subtility of its abstraction, the boldness of its generalisations, or its analytical dexterity in reducing an idea to its simplest equation, the most celebrated of philosophical schools in France is Cabanis as its physiologist, Garat and Volney as its moralists, while its metaphysical aspect is ably exhibited in the "Idéologie" of Destutt de Tracy. We may add the facts and causes of the same kind, e.g. dog and lene are the same relatively to the common notion Quadruped, under which they are both contained. Again, in physics, a tree may be asserted to be the same in relation to all the rights of property, notwithstanding the physical change it undergoes from the constant segregation of old and aggregation of new particles. Lastly, it is only in this logical use of the term that we can be said in memory to be conscious of the identity of the re-produced and the original idea, for if they were absolutely identical it would be impossible to distinguish between the first appearance and the recurrence of an idea. (An-illon.)

According to Butler it is impossible to define the idea of personal identity, but it is easily ascertained; for a comparison of one's self in any two moments of our existence suggests immediately the idea, and at the same time the identity of ourselves. (Essay on Personal Identity.) Reid's view is more simply stated, that what happened 30 years ago, without a conviction, as strong as memory can give, that the same identical person who now remembers that event did then exist. ( Essays, ch. vii.) To the objection being supposable, the same cannot be the same in any two moments, and that therefore, as consciousness constitutes personality, there cannot be any identity of person, Butler answers, that consciousness presupposes and consequently cannot constitute personal identity, and that the object perceived may be the same notwithstanding that the perceptions by which it is discerned are distinct and different. Locke's opinion on this subject appears to have been undecided. The identity of the same man consists," he says, 'in nothing but a participation of the same life, by constantly fleetting particles of matter in succession vitally united to the same organised body.' But personal identity he defines to be the sameness of a rational being. (Locke, On the Understanding, p. 2, c. xxiv., s. 6.)

With respect to identical propositions, it is rightly observed that the greatest assurance and most certain knowledge we can have of the co-existence of propositions as in the schools are called identical. (Sir Kenelm Digby, On Man's Soul, c. i., p. 28.) For in deductive reasoning the proposition and assumption which make the major and minor premises of the regular syllogism are only logical combinations of the identical position in physics, that the whole is equal to its parts. Things which are logically identical may be conceived to be so many parts constituting a whole (genus); and the principle, 'de omnibus nullius' is rightly expanded thus: whatever belongs, or not, to a constituted whole, does or does not belong to all its constituent parts. In the same manner all mathematical propositions are identical, for these things are identical (in te veris f $f + f$ eiusmod, Metap. x, c. 3): the ultimate form to which all equations are reduced being $a = a$. It is the want of this identity that constitutes the difficulty, or rather the impossibility of demonstating anything, although this difference is neither of degree in the knowledge from the inferior certainty in the latter arises from the difficulty of determining, in matters which fall within its domain, what really are all the constituent parts in any whole, or generality, and therefore its mode of combining the various whole consists of certain determinate and limited parts, so that the procedure to a knowledge of the parts is easy.

But the system of absolute identity is meant the doctrine which teaches the oneness of the subject and object (spirit and matter) as merely different aspects of one substance.

IDES. [Kalendar.]

IDIA, Lamouroux's name for a genus of recent Polyparia, allied to the Lituariae, Lyncinae, and Laminidae of Brunn and Lamarck. 

IDMONEA, a genus of Polyparia, described by Lamouroux as closing the group of Miliporids. It is ramosa, the branches triquetal in section, cellulosiferous on two faces, or yellow, blue prominent in transverse rows. From the sobre of Caen (Exposition des Polypares). A recent species has been found at Japan; and two fossil in the calcareous guissier (Brom.)

IDOCRASE, Vbuatia, Pyramidal Garnet, &c. This mineral occurs crystallized and massive; the crystals are generally small and in clusters, and are embedded in the matrix of a crystal. Cleavage parallel to the primary planes, distinct, and so parallel to the diagonal of the prism. Fracture uneven, slightly conchoidal, or rather undulated. Hardness 6. Somewhat glassy, or rather translucent, with various shades of brown, black, grey, blue, green, and yellow. Streak white. Lustre vitreo-resinous. Translucent and transparent. Refraction double. Specific gravity 3.08 to 2.4. By the blowpipe is fusible with exhibition into a yellowish transparent globule, and with borax gives a glass tinged green with oxide of iron.

The massive varieties are amorphous; the structure is fibrous, granular, or compact.

Idocrase occurs with both in primitive and volcanic countries. It occurs in the masses ejected from the Vbuatia; the crystals are sometimes of large dimensions.

It was found originally in the neighbourhood of Vbuatia, and since in many other parts of the world. Different varieties have been called by different names; thus Cyprine is cupreous or blue idocrase; Loboite, greenish yellow. Egeria, found near Eger, in Bohemia, is of a liver-brown colour.

Analysis

<table>
<thead>
<tr>
<th>Compound</th>
<th>Symbol</th>
<th>Formula</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>Si</td>
<td>SiO₂</td>
<td>35-50</td>
</tr>
<tr>
<td>Aluminium</td>
<td>Al</td>
<td>Al₂O₃</td>
<td>33-00</td>
</tr>
<tr>
<td>Lime</td>
<td>CaO</td>
<td>CaO</td>
<td>29-24</td>
</tr>
<tr>
<td>Oxide of Iron</td>
<td>Fe₂O₃</td>
<td>Fe₂O₃</td>
<td>5-70</td>
</tr>
<tr>
<td>&quot;Manganese</td>
<td>MnO</td>
<td>MnO₂</td>
<td>0-25</td>
</tr>
</tbody>
</table>

[Note: values in grams]
IDYIA. [ISOPODA.]

IDRIA. [LYTHRA.]

IDRIALTIN. [HERCNOGEN. p. 397.]

IDUMAEA (Ἰωμαία), usually called EDOM (Ἔδωμ) in the Old Testament, included, in the time of Christ, a considerable portion of the southern part of Palestine, and extended on the south-west as far as the Lake Serbonis (Pliny, Nat. Hist., v. 14); but in the time of the Old Testament, belonging to the hill-country or the mountain district in the north of Aram which extended from the south of the Dead Sea to the bay of Elana in the Red Sea. (1 Kings, ix. 26; 2 Chron., viii. 17.) The Edomites, who were descendants of Lot's son Edom (Gen. xxxvi. 9, 43), originally dwelt on Mount Seir (Gen. xxxiii. 3; Ez. xxxv. 15), in the neighbourhood of the Moabites (Judg. xi. 18; Is. xi. 14). They were governed by kings from the earliest times (Gen. xxxvi. 31, 32; Num. xx. 14); but apparently possessed considerable power when the Israelites invaded Canaan (Num. xx. 14-21; xxii. 4; Judg. xi. 17). They were defeated by Saul (1 Sam. xiv. 47), and were made tributaries of the Jews during the reign of David (2 Sam. viii. 14). The conquest of Edom was of great importance to the Jews, since it enabled Solomon, by obtaining possession of the ports of Elath and Ezion Geber on the Red Sea, to participate in the advantages of the trade with Egypt.

After the division of the Jewish kingdom during the reign of Rehoboam, the Edomites continued subject to Judah till the reign of Josiah, when they revolted, and were again attacked by Nebuchadnezzar (2 Kings, iv. 20, 22.) They were subdued again during the reigns of Ahasiash (2 Kings, vii. 7; 2 Chron., xxvii. 11) and Uzziah, called also Azariah (2 Kings, vi. 22; 2 Chron., xxvi. 3); but after the death of the last of the Edomite kings, God's people were suffered to remain in possession of the country for a long time. (2 Kings, xv. 7, 8.) The Edomites seem to have sided with the Babylonian empire, the Edomites in the north being again mentioned as an independent people, who had obtained possession of the southern part of Judaea as far north as Hebron. (1 Macc., v. 65.) They appear about this period to have been driven from their own land by the Nabataeans, and the Bedouin race, who occupied the desert east of the Dead Sea and the bay of Elana by the Nabathaeans, who are supposed to have been descended from Nebajoth, the eldest son of Ishmael. (Gen. xxv. 13.) The Edomites were constantly at war with the Jews after the return of the latter from Babylon (1 Macc., v. 65; 2 Macc., xii. 32), till they were entirely subdued by John Hyrcanus, who compelled them to submit to circumcision and to observe the Mosaic law. (Josephus, Antiq., xxxi. 9, sec. 1.) From this time forward they seem to have been regarded as a part of the Jewish nation, and were governed by a procurator appointed by the Roman emperors. (Joseph., Antiq., xiv. 1, sec. 3.) One of these governors, Antipater, a native of Idumaea, was made by Augustus the guardianship of the kingdom of Judæa (Joseph., Antiq., xiv. 8, sec. 5); and was succeeded by his son, the celebrated Herod, who afterwards became king of the whole country, and put an end to the dynasty of the Edomite princes. The Idumæans marched to the assistance of Jerusalem when it was besieged by Titus, and entered the city; they did not however continue till it was taken, but returned to their own country laden with plunder. (Joseph., Bell. Jud., iv. 12, sec. 3.) We have no further mention of the Idumæans in history. Origen, in his 'Commentary upon Job,' informs us that the name of Idumæa did not exist in his day; and that the inhabitants of the country were called Edomites and spoke the Syrian language.

Potency is the only author who applies the name of Idumæa to the country west of the Jordan. The whole extent of Idumæa is frequently alluded to in the Roman emperors, including all of Arabia, or of Arabia Petraea, (Sueton., Cesar, lii. 12; Juvenal, viii. 160; Statius, Silv., i. 6, v. 2; Martial, ii., x. 50; Valerius Flaccus, Argonaut., i. 12.)

The wisdom of the Edomites is celebrated in the Old Testament. (Obad.)

(Reclinical Palestina; Vincent's Peripis. of the Erythrean Sea, vol. i., pp. 234-251, in which a history of Idumæa is given; Michaelis, De Antiquissima Idumæorum Historia; Wattenberg, Reallexicon Bartsch, Ergänzung.)

IDYA. Olden's 'Die Frosch' for the Frogs, which are formed after the manner of Berœ ovata. [CICOGRA. vol. vii., p. 164.]

IDYIA. Rafaquesque's apellation for a genus of crustacea, to which Desmarestalliates, among other such genera, as knowing nothing of them beyond the names. 

IDYLL (Greek, ἴδυλλιον; Lat. Idyllum or Edyllum) is a poem descriptive chiefly of the processes and appearances of external nature; or of cheerful and simple sentiments; or of these in conjunction with the appearance of nature. The epithet, the inscription, the sonnet, and most of the epistles of poets writing in their own persons, are called Idylls. Their style has been more cognate to verse than the name of the art, and may be seen by referring to the 'Idylls' of Ausonius. In English poetry, the 'Seasons' of Thomson, Shenstone's 'Schoolmaster,' the 'Cotter's Saturday Night' of Burns, the 'Allegro' and 'Penseroso' of Milton, Beattie's 'Minstrel,' Goldsmith's 'Deserted Village,' &c. belong to this class.

IEREA, the generic name of a fossil Polypliier from the blue clays of the Vales Noires (Calvados), described by Lamoureux, who is doubtful of its affinities, but ranks it among his Polyperia articaria. Bronn places it among the Siphonina.

IGALU. [MORAVIA.]

IGNATIUS, one of the earliest of the apostolic fathers. [APOSTOLIC FATHERS.] Antioch was a great seat and centre of Christianity from the very earliest times. St. Paul resided there many years, and brought the Christian communions into regular order and connexion with the apostles and their successors. The Christian communities were the first to subscribe to the apostolic canons. The primitive Christians of Antioch were the first to adopt a special form of liturgy, and to appoint archbishops for the churches of their own choice. It was probably at Antioch that the term 'bishop' was first used to denote an officer already in existence. The bishop of Antioch claimed the distinction of being the first to ordain bishops in Syria and to confer orders on clergy. The bishop of Antioch was the ecclesiastical head of the East. St. Ignatius lived in the first century A.D. He was a disciple of St. John the Evangelist, and a contemporary of St. Paul the Apostle. He was a catechumen at Rome, and was appointed bishop of Antioch by St. Peter the Apostle. He was a martyr, and died in Rome, A.D. 107. He wrote seven letters to the churches of Asia Minor, and one to Polycarp, after having been seven years on the see. His writings contain many valuable instructions and maxims, and are of great importance to the history of Christianity.

IGNATIUS LOYLA. [JEZUITS.]

IGNITION. [HEAT.]

IGUANA. [CROCODILIA.] The name is here given to a genus of Saurians, in which he included various forms, such as Agama, Lophyrus, Calotes, &c. Du Bois separated from this heterogeneous collection Agama, Draco, and Basiliscus; and Wagner, striking out the word Iguna in their nomenclature, distinguished two genera from Du Bois into the genera Hypsilophos, Metopoceros, and Amylbryyn,
The teeth of the Iguana vary according to the ages of individuals; and MM. Duméril and Bibron state that they seem to be omnivorous, and indeed the structure of their intestines would lead to the conclusion that they have an omnivorous diet. 

There is a double row of small teeth on each side of the vault of the palates.

Habits, Food, &c.—MM. Duméril and Bibron state that the Iguanas are herbivorous, and indeed the structure of their intestines would lead to the conclusion that they have an omnivorous diet.

There are only three species admitted by MM. Duméril and Bibron, and of these we select Iguana tuberculata as an example. A multitude of synonyms are collected by these zoologists, from which it appears that this species has been described by a great many names. Thus they point out that Spix, in his work on the 'Reptiles of Brazil,' has under the names of Iguana squamata, Igu. viridis, Igu. Causa, Igu. emarginata, and Igu. Lophorhides, represented Iguana tuberculata of Laurenti, 'L'iguane Ordinaire d' Amerique de Ouviere, the Common Iguana, at five different epochs.

The figures will give some idea of this animal, which is yellowish-green below, and above of a green more or less deep, becoming sometimes bluish, and at others of a slate colour. In general there are on the sides of the body brown stripes or zigzags edged below with black. There is a line, as it were, below, and as it were a shortening above, of the rows of the teeth. The tail is surrounded with large brown rings, which alternate with others of green or yellowish-green. Length seldom exceeding five feet.

Locality, Great part of South America; the Antilles.

Utility. — This species is considered excellent for the table. Delicatissima and appressa are two of the specific names that have been assigned to it. It is not however, a small animal, the young are seen forcing their way upwards as soon as they have been disturbed at the base of the older teeth which they have to replace.
ever deemed very wholesome, and is even considered injurious to those who have suffered from certain diseases.

Iguana tuberculata. a, Head and anterior extremity, two-fifths of the natural size; b, Hind foot, same size. A View of the entire animal, much reduced, is given in the opposite column.

Wagner makes this species the type of his genus Hypnopius.

IGUA'NIDÆ, an extensive family of Saurians, of which the genus Iguana may be considered the type. MM. Duméril and Bibron, in their Reptilologie (1837), treat of these reptiles under the name of Lizards Iguaniens, ou Sauviers Écroités. They divide the family into two subfamilies, the Pleurodontes and the Acrodontes.

Under the first of these subfamilies they arrange the following genera:—Metopoceros (Wagner), Alagonocus (Duméril and Bibron), Cydura (Hartlaub), Isaura (Laurenti), Amblyrhynchus (Bell, being the Amblyrhynchus of Gray and Wiegmann, but not of Wagner), Brachyphorus (Cuvier), Phrynornia (Wiegmann), Calistaurus (De Blainville), Polyurus (Cuvier), Tropidolepis (Cuvier), Hypsophorus (Wagner), Plica (Gray), Hypsophora (Bois), Tropidodon (Dum. and Bib.), Hololepis (Dum. and Bib.), Tropidurus (Wagner), Isaura (Laurenti), Basiliscus of Wiegmann, Corythodesmus of Kaup, Echordophorus of Wagner), Corystophanes (Bois, Corythophanes of Wiegmann and Gravenhorst, Chameleon of Wiegmann, Gravenhorst, and Gray), Sermoecercus (Dum. and Bib.), Strobilurus (Wiegmann), Ophryos (Co., Tropidurus of Wiegmann, Fitzinger, and Gray in part), Hypo-

Iguana tuberculata.
are often articulated telescopic apophyses, which are in reality the rudiments of ribs. The dorsal vertebrae, meaning by that term the vertebrae which carry the ribs, vary much in number in the different genera. The first lumbar vertebrae are like the dorsal, except that they are without the articular facets which characterize the latter. Generally there are but two pelvic vertebrae, which carry the ilium or pubis. The ribs are, in general, slender, weak, rounded, and of the same form, though they vary in their curvature; the shaft is little bent, depressed, and compressed on the thoracic region. The first or anterior ribs are joined to the lateral parts of the sternum, or to a series of small bones which occupy the lower part of the breast; they are joined to the mesial part of the mesial bone, the vertebrae and, in the chameleons, for this disposition occurs in Polygryus and Anolis. In the Dragons the posterior ribs are free and prolonged in the thickness of the skin of the sides, in order to sustain the sort of parapet extending on the lateral parts of the body between the anterior and posterior limbs. All the species of the family have two pairs of limbs always apparent, and terminated by toes, the number of which varies but little. Their conformation and length have been described as generic characteristics principally in the case of Anolis, and some others which have bore some particularities, such as Sitana. The presence of a shoulder formed of two bony bars and of a pelvis, separates these saurians from the serpents.

The general form of the body and the disposition of the skeleton scarcely vary, except in the proportions of the different parts, those on the pectoral side being more elongated than the lumbar; the tail and in the configuration of the vertebrae, the spinous and transverse processes of which correspond to the external state of compression or depression. In the genera species, the ribs, as in those of Lophyrus, Basiliscus, Polygryus, and Anolis, the vertebrae exhibits two or three projections, sustained by the series of spinous apophyses which often form one crest which has caused M. Duméril and Bibron to name the family Extremintus. The disposition is most marked in Iguana, Anolis, and Agama; whilst in Stelotilus and Uromastix the dorsal spinous process but little. The bodies of the vertebrae which constitute the tail are much shorter in those species in which that part is not long, Ophyrusophalus for instance, than in those which have it excessively prolonged. In these last, take Iguana and Anolis for example, there is another pecularity, namely, that the bodies or central and cylindric parts of the caudal vertebrae which are large and dilated at their extremities for articulation, have, at the same time, the mesial portion more slender and fragile, so that it is in this portion that fracture often takes place, which is followed by a contraction and consequent deformity when the tail often in that case presents. M. Rousseau (père) found in the skeletons of those saurians which had undergone mutilation of the tail a long cartilaginous cone in lieu of a rib. G. and Carus has marked, that the spinal chord is not renewed in this cartilaginous stem, which is produced in lieu of the caudal vertebra.

Organs of Sensibility.—Sight and hearing appear to be very well developed in this family; with regard to taste and smell, the former seems to be present in a very fair degree; touch moderate. The eyes of all the Iguanians are furnished with movable lids; the orbit in which they are placed varies in its extent and in conformity with the limits which the bones of the face and cranium admit; the greater part have a superciliary arch, which is sometimes tuberculous and very projecting, as in Ophryossa and Hypsibates. MM. Duméril and Bibron state, that up to the time when they wrote they knew of none which had a defined pupil, though it is asserted that some are nocturnal. With the exception of some genera, Otocephalus and Phyrgophonus in particular, in which it is not apparent, all the Iguanians have an auditory canal, more or less enlarged at its external orifice on a level with the surface of the head; sometimes, as in some species of Agama, it is only a simple slit, the entrance when they wrote they knew of none pointed, and, as were, spiny scales. The sense of smell is well developed; it is not as yet apparent how much developed in the Saurians generally, but in the family under consideration it appears to be at a very low rate, for there is no unfructifying in the air sinuses; the external orifices of the nostrils have but little humility, and are very small. They are situated generally near the extremity of the muzzle, and approach each other above; they open within the mouth by a simple slit to which the tongue may be applied, and seem principally, if not entirely, destined to aid in respiration.

The tongue is in general short, large, and mobile at its extremity, but it is not deeply divided at its end, which is free. The base is not retracted into a sheath, and this is a character which distinguishes it in particular from that of the Varanians and Chameleons. Wagler has employed the term tongue, but it is evident that the organ is always humid, and covered with a glistening secretion: its papilla, which vary in form, being in some instances conical, and in others, scaled, or laid with flattened elements, serve to be destined for the perception of sapid substances: but its principal office seems to be to direct the movement of the food submitted to the action of the teeth, and to assist in deglutition. The or Ayinodes, to which it is fastened, presents important modifications in different genera. Its horns are much prolonged in some species, and serve to support the dewlap, or longitudinal fold of the integuments under the neck and jaw, in Sitana, Basiliscus, Draco, &c., and especially in Anolis, as particularly noticed and demonstrated by Mr. T. Bell.

Organs of Digestion.—These present nothing very remarkable in this family. The stomach seems to be a continuous sac, the alimentary canal, or rather tubes, which are most often in another direction. There is no true cardia. The ventriculus, properly so called, is often conical, and the pylorus is not distinguishable except by a slight swelling, and a strong prominence on the right side of the body, in the region of the hepatic portal vein; in Sitana, Iguana, and Basiliscus; in Polygryus, Galeotes, and Lyriophorus, the pylorus is but little marked, on account of its shortness and the thinness of its parieties. The intestines vary in length, in species which have the tail very long, as in Iguana, the extent of the digestive tube, is nearly one-third of the total length of the spinal column. There is no apparent distinction, in some cases, evident between the small and large intestines, so that there is often no concurrence of the four parts, as is seen in the intestine of Iguana, Anolis, and Sitana, whereas, contrary to Iguana, Galeotes, and Lyriophorus, there is a true cul de sac at the termination of the small intestine where it opens into the greater canal. The pancreas is voluminous, it is situated under the tail, in Iguana, Isturus, and Sitana; the kidneys are nearly cylindrical, and situated in the spleen vary. It is most frequently placed at the middle of the mesentry, under the stomach; sometimes on the right, as in Iguana; sometimes on the left, or at the middle of the lower portion of the stomach, as is observable in the greatest number.

The Organs of Circulation and Respiratory present no remarkable difference from those of other Saurians, and the same uniformity in all; the same uniformity in the Gryphosaurus.

Integuments.—These present various modifications. We have the polyedric tubercules of Grammatophorus; the spines of the neck in Iguana; those of the tail in Dorsiphorus, Strubelurus, Stenecurus, Uromastix, and Tropidosaurus; the plates of the scales of Ophryossa, Peliodogaster, and Echymemnus; the cutaneous expansions of the different regions of the dorsal and caudal crests in the greatest number of genera, but especially in Iguana, Isturus, and Basiliscus; those of the nape on the occiput in Corphophonus and Basiliscus; of the flanks in Draco and Calitaves; and of the neck, under the form of a dewlap, in Sitana, Draco, and Iguana; or in the lateral parts in front of the limbs, as in the Ophryusa, and Anolis. The pores, whether of the thighs, sometimes in a simple line, sometimes in two longitudinal and parallel rows, or in front of the anus, are employed by M. Duméril and Bibron in the classification of the genera. In the latter few species, they are in general elongated and terminated by crooked nicks; Anolis alone presents a peculiar dilatation under the penultimate phalanges. The shorter the toes and the nails, the less are the pustules of Ophryossa. In all the species, the sex of the most of the species are by no means ill-adapted for...
cropping vegetable substances. The family are generally nimble. The compressed and lengthened tail of many species is most useful as an instrument of progression when swimming across the inundated savannahs, and their crooked nails assist them in climbing trees and pursuing the smaller animals on which they occasionally prey.

Geographical Distribution of the Family.——The Iguanidae are all inhabitants of warm climates. The Pleurodonts, with exception of Brachylophus, belong exclusively to the New World. The Acrodonts, on the contrary, are confined to Asia, Africa, Australasia, and, in a single instance, the south of Europe. All the Iguanians hitherto noticed inhabit South America, with the exception of a Phrynosephalus and a Tropidokpis, which appear to be natives of North America.

Only one Iguanian belongs to Europe, the common Stellio, which is found also in Africa and Asia. In this last-mentioned part of the world there are 32 others, of which 28 belong to the East Indies. Among the four others may be reckoned the Brachylophus, which is the only one of the subfamily of Pleurodonts which is excluded from America; and three Phrynosephalus, whose habitation seems to be limited to the north of Asia.

In Africa, besides the common Stellio, 12 other species of Iguanians occur, namely, one Phrynosephalus, three species of Uromastix, and eight Agamam.

The Iguanodon is a gigantic species which are referred to the genus Grannomatophorus, an Uromastix, and the Chlamydosaurus. (Duméril and Bibron.)

Our limits do not allow of our stating in detail the views of the several species which have been collected by M.M. Duméril and Bibron under this great family, and we must refer the reader to the works of Bell, De Blainville, Boë, Cuvier, Daudin, Fitzinger, Gray, Kaup, Lartet, Laurent, Meek, and others; and especially to the volume of M.M. Duméril and Bibron, a whole subject is thoroughly and luminously discussed, and whence this article is principally abridged.

Iguanodon, the name of an extinct gigantic reptile, whose remains were discovered by Dr. Mantell. In its characters this fossil Saurian closely approaches to the genus Iguana, and there can be no doubt that it was herivorous; indeed Cuvier, in his first essay, took the teeth for those of a Rhinoceros. Dr. Buckland, who dilates on the admirable structure of these teeth, considered with relation to the demands made by the habits of the animal, observes how well they are adapted for cropping tough vegetable food, such as the Caltrop and similar plants which are found buried with the Iguanodon. "The teeth," writes Dr. Buckland, "exhibit two kinds of provision to maintain sharp edges along the cutting surface, from their first formation, until they were worn down to the very stump. The first of these is a sharp and serrated edge, extending on each side downwards, from the point to the broadest portion of the body of the tooth. The second provision is one of compensation for the gradual destruction of this serrated edge, by substituting a plate of thin enamel, to maintain a cutting power in the anterior portion of the tooth, until its entire substance was consumed in service. Whilst the crown of the tooth was thus gradually diminishing above, a simultaneous absorption of the root went on below, caused by the pressure of a new tooth rising to replace the old one, until by this continual consumption at both extremities, the middle portion of the older tooth was reduced to a hollow stump, which fell from the jaw to make room for a more efficient successor. The young tooth somewhat resembled a serrated lancet. Dr. Buckland observes, that this serrature ceased at the broadest diameter of the tooth, that is, precisely at the line below which, had the serrations been continued, they would have had no effect in cutting. As these saw-like edges were gradually worn away, the cutting power was transferred to the enamel, which was continued by alternate longitudinal ridges and furrows, the latter serving as ridges or buttresses to strengthen and prevent the enamel from scaling off, and forming, together with the furrows, an edge slightly waved, disposed in a series of minute grooves, or fluted chisels; hence the tooth became an instrument of greater power to cut tough vegetable substances under the action of the jaw, than if the enamel had been in a continuous straight line. By these contrivances also, it continued effective during every stage through which it passed, from the serrated lancet point of the new tooth to its final consumption."

The teeth of Iguanodon: a, young tooth; b, a, teeth further advanced, and worn.

The size of this giant of the Weald in former ages was enormous. In Dr. Mantell's collection there is a portion of a femur twenty-two inches in girth in the smallest part. The thigh bone, then, of the Iguanodon exceeded in bulk that of the largest elephant, and its length is on good grounds calculated to have been from four to five feet. Dr. Mantell carefully compared the bones of the Iguanodon with those of the Iguana, and by taking an average from eight separate parts of the respective skeletons, he gives the following as the dimensions of the former:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length from snout to the extremity of the tail</td>
<td>70</td>
</tr>
<tr>
<td>Length of tail</td>
<td>52½</td>
</tr>
<tr>
<td>Circumference of body</td>
<td>14½</td>
</tr>
</tbody>
</table>

The thigh bone of the Iguanodon is considered by Dr. Mantell to be twenty times the size of that of a modern Iguana: but as animals do not increase in length in the same ratio as in bulk, it does not follow that the Iguanodon attained the length of 100 feet, although it probably approached 70 feet. (Buckland.) On the snout of this monstrous reptile was a nasal horn, and its appearance must

have realized the wildest poetical fictions of the Dragons of old. In Dr. Mantell's museum is a large portion of the skeleton of one of these Saurians, from the quarries of Kentish-rag near Maidstone. Dr. Buckland remarks that the locality of this unique skeleton shows that the duration of this animal did not cease with the Wealden series, and he adds that the individual from which it was derived had probably been drifted to sea, as those which afforded the bones in the fresh-water deposits subjacent to this marine formation had been drifted into an estuary.

Geological Distribution.——The Wealden fresh-water formation of the South of England, intermediate between the marine calcite deposits of the Portland stone and those of Vol. XII.—3 L
the green-sand formation in the cretaceous series. Tilgate Forest. [Hastings Sands] Isle of Wight, and Furbeck.

ILCHERST. [Somersetshire.] ILDEFONSO, ST. [CASTILLA.]

ILIE, DE PLANTAGENET, a prominent figure from France, forming one of the military governments into which, under the old régime, France was divided. Its greatest length was, from north-east near Léon to south-west near Dreuix, 144 miles; its greatest breadth, at a distance of 10 miles from the head of the Grand Triané, a feeder of the Oise, to Courtenay between Montargis and Sens. It was bounded on the north by Picardie, on the west by Normandie, on the south-west by France and Sens, and on the south by Oise. This district was watered by the Seine and its tributaries, the Yonne, the Loing, the Marne, the Oise (with its feeders the Aisne and the Terrein), and the Eure. It is now divided into the departments of Aisne, Oise, Seine, Seine et Marne, and Seine et Oise. The principal subdivisions and towns of this province are given elsewhere. [FRENCH.]

Le Paris, or the Ile de France proper, was included in the duchy of France, which comprehended besides, the county of Orléans, Le Gâtinois, Le Châtrai, Le Blaisois, Le Perche, Le Touraine, L'Anjou, Le Maine, the district of Sologne, and parts of L'Amiénois and Le Beauvaisis. The capital of this district was held in the twelfth century by the Capetian dynasty by a race of powerful nobles, who acted an important part in the history of France. In the year 961 Charles the Chauve bestowed upon his kinsman Robert l'Angévin, Duke of Normandie, his province between the Seine and the Loire, under the title of the Duchy and Marquisate of France. His object was to make the power of this chieftain a barrier against the Bretons, who were troubling the frontier. This Robert, while he lived, bravely supported his kinsman against his enemies, foreign and domestic. He died in battle against the Northmen, A.D. 966.

Eudes, son of Robert le Fort, was count of Paris, which title he inherited in his father's lifetime, and duke of France. He bravely defended Paris against the Northmen, who besieged it, A.D. 985, and compelled them to raise the siege. On the death of Charles le Gros, A.D. 986, Eudes was elected king; but was defeated in a battle at Nevers, and was killed in it, A.D. 986.

On the death of Eudes, his brother Robert, who during the reign of Eudes had received from him the county of Poitiers, became duke of France. He fought against the Northmen on behalf of Charles le Simple, against whom he subsequently formed a league with Raoul, son of Richard duke of Bourgogne, and other lords, and renounced his allegiance for the benefit of the nobles of Sologne. In the course of the troubles that followed, Robert, finding himself at the head of a powerful party, caused himself to be proclaimed king, and was consecrated at Reims by Wautier, archbishop of Sens, A.D. 992. Charles however, being supported by the counts of Toulouse and Avignon, attacked Robert in the plain of Sossains. Robert fell in the battle, but his son Hugh continued the combat, and succeeded in putting Charles to flight. The battle was fought A.D. 992.

Hugues, called by the chroniclers Le Blanc, otherwise Le Grand, and, from his holding several abbots in commendam, L'Abbé, succeeded his father in the duchy of France, and was permitted to possess the crown, though he had bad it at his disposal, but bestowed it on his brother-in-law, Raoul duke of Bourgogne. He was engaged in war with the Northmen on the Loire, and with Heribert, or Heribald, the emperor of the Franks. Upon the death of Raoul, A.D. 995, Hugues procured the return of Louis V, surnamed Outremer, son of Charles le Simple, from England, where he had been conveyed by his mother. Louis was only sixteen years old; and Hugues at first virtually exercised the regency with a large degree of power, though without the title of regent. But Louis having a year after emancipated himself from tutelage, Hugues formed an alliance with Heribert of Vermandois (Champagne) and Gisilbert duke of Lorresai and subsequently with Clémence Longue of the duchy of Normandie, against his sovereign. Hostilities, though delayed for a time by the intervention of the clergy, broke out; the rebel lords were supported by Otton, or Otho I, emperor of Germany, whose sister Hugues had married, but were after a time reconciled to Louis, A.D. 995, and peace was restored. Hugues subsequently obtained the king the whole of the duchy of Bourgogne, of which he bad previously held a part.

On the assassination of the duc de Normandie by the count of Flandres, Louis Ottemer attempted to seize the duchy, to the prejudice of the young duc, Richard Hugues at first engaged to assist Richard; but the king having offered him a share of the spoil, he accepted the offer, and joined in the invasion of Normandie. The attempt was unsuccessful. Hugues was involved in new disputes with his sovereign, whom he got into his power, and retained, until compelled to release him by Otton of Germany, who came with an army to his rescue. The war between Hugues and Louis was continued, and the quarrel was made up. Louis died the year after, and Hugues assisted in raising his son Lothaire to the throne. Hugues however possessed the real power of the sovereignty till his death, A.D 996.

Hugues, surnamed Capet, son of Hugues Le Blanc, was young at his father's death, but by the protection of Richard duke of Normandie and Brunon archbishop of Cologne he succeeded in obtaining from the king the investiture of his inheritance, comprehending the duchy of France, the counties of Paris and Orleons, and the abbey which an ancestor had possessed. He became in effect ruler of the country, and exercised his power in a way to give general satisfaction. He was a true Capet, and governed the vassals of France, was obliged to retreat, and Hugues attacked his rear-guard, and put it to flight on the banks of the Aine. King Lothaire died A.D. 996, recommending his son as successor, Louis V, Le Fainéant, to the guardianship of his son. Louis died 997, at Compiegne, and his uncle Charles, brother of Louis, being unpopular, Hugues assembled his friends and procured himself to be chosen king of France. Thus the Capetian dynasty replaced the Carolingians. The power was at this time reduced to the lowest point. It extended only over four or five cities, of which Leau was the chief. The hereditary domains of Hugues were therefore a base on which the accession to the crown could be held, but the progress made by his vassals in the counties of Paris and Orléans toward independence kept the authority of his successors low, until extended by the activity of Louis VI, and the policy of Philippe Auguste. With the accession of Hugues the separate history of the duchy of France terminates. [FRANCE.]

The treatment must therefore vary according as one or other of these conditions is presumed to exist. In the first cases the remedies adapted for colic, combined with active purgatives, should be employed; while in those at tendency with mechanical obstruction, in which there is always great tendency to inflammation of the intestines, bleeding should be had recourse to, together with purgatives combined with opium, stimulant enemata, and aoynes.

ILL. [INTERVERTEBRAL.]

ILLUS, or ILIAC FISTULAS, is the name given to a severe form of intestinal disease, characterized by violent gripping pain around the umbilicus, spasm and retraction of the muscles of the abdomen, obstructed consternation, and vomiting. These symptoms are however common to several forms of intestinal obstruction. In cases of colic [Colic] from spasms, or, as some suppose, paralysis of a portion of the intestinal canal, but more commonly they are the result of some mechanical obstruction of the canal, as by intussusception, internal hernia, or conlusions and ileus.

ILLEX is a name given to two very different plants. As of a species, it indicates the Evergreen Oak of the South of England, or Quercus Ilex. Of a genus, it belongs to the common Holly, Ilex Aquifolium. This latter plant, which constitutes so beautiful a feature in the winter scenery of many parts of England, and whose scarlet or yellow berries commonly appear without the little white berries (hence the name Holly-tree) and dwelling-houses at Christmastime, is in Great Britain upon the most northern limits within which it ranges in a wild state. It is however at least at the limits that it attains its greatest size and beauty, but it occurs sometimes in several districts in the middle of the country, and the southern side of the range of the Caucasus, where it is only a hush, and it probably extends far to the eastward. It is chiefly valued as a shelter
in winter, and an ornamental tree, but its fine-grained, heavy, compact timber is used for a great number of useful purposes, especially by the turner and manufacturer of instruments. The annual yield of menhirs is considerable.

Besides the common Holly and its numerous varieties, the genus Ilex comprehends a large number of species, the most important in the British flora is Ilex aquifolium, the leaved species of Minorca, a very handsome kind, which is hardy in the middle and south of England; the I. viminalis, or Cassena tree of the North Americans, whose leaves provide the barkers have the disagreeable of being poisonous, producing purgative and violent emetic effects.

The course of the Meu is in the department; that of the Oust and the Cher, and of the Aff, a feeder of the Oust, for a short distance on the border, but never within it. The Meu, Oust, and Cher are all navigable for a short distance.

The Couesnon rises just beyond the eastern boundary of the department, and at first flows westward, but gradually turns to the north and enters the department through the inlet of the English Channel; its length is about 44 miles; the lower part of its course, which is navigable, is chiefly in the department of Manche. Its principal tributary is the lid, which is the name given to the French name of the river. It flows north-west to Dinan, in the department of Côtes du Nord. At Dinan it turns northward and re-enters the department of Ille et Vilaine just above its outlet, which is to the south of Rennes. Its width is about 41°; it is navigable below Dinan, 14 or 15 miles above its mouth.

The only canal, that of the Ille and the Rance, commences in the Vilaine at the junction of the Ille at Rennes, and follows the valley of the Ille to near its source; then it crosses the Menes range to the valley of the Rance, which it follows to the neighbourhood of Dinan, where it communicates with the navigable part of the Rance. The lowest level is where it crosses the Menes range near Hédré; on the side of Rennes are twenty locks in a slope of 21 miles long; on the side of Dinan twenty-eight locks in a slope of 18 miles long. The canal, though of the utmost importance, is only about 55 miles, the greater part of which is in this department.

The road from Paris to Brest crosses this department through Vitre, Châteaubourg, and Dinan; but the road from Rennes to Lorient branches off from this at Rennes. The road from Paris to Doul and St. Malo, which branches off from the Brest road at Mayenne, crosses the northern part of the department through the principal towns and mountains, and other government roads leading from Rennes in various directions. The whole length of the government roads is nearly 400 miles, but little more than half of this length is in a state of repair.

The climate of the department is temperate; the thermometer seldom rises in summer above 77° Pahr, or falls in winter below 30°; but the south and south-west winds, which are prevalent, render the climate rainy; fogs are common, especially in spring and autumn. The agricultural produce consists of barley, oats, rye, malt, or mixed corn, a little wheat, and a considerable quantity of buckwheat. The grain raised is barely sufficient for the consumption of the department. The cultivation of hemp and flax is considerable, and the quantity of fruit grown, apples and pears, is also great. The order of this department will bear a sea of six miles, and a little salt in the St. Malo, and a small quantity of very light white wine is made. The quantity of pasture-land is considerable: the butter of this department is among the best in France. The breed of sheep has been largely improved by crossing it with the Spanish sheep. The quantity of waste land is very great, perhaps one-fourth of the whole area of the department. The quantity of woodland is small. There is abundance of the beech, oak, and tumbled among all kinds of timber in the department, along which it has its course for some miles, and then quits it to flow through the department of Morbihan to the ocean. Below Rennes it receives the Meu, the Oust, and the Cher; it is navigable from the supply right up to the mouth of the Sum and the Sam and the Cher on the left. Its whole length is about 105 miles, of which three-fourths belong to this department. It is navigable from Rennes, where it is joined by the canal of the Ille and the Rance.
The number of cantons, or districts under a justice of peace, is 43 in the whole department.

The arrondissement of Rennes contains the city of Rennes, at the junction of the Ille and the Vilaine, which had, in 1836, a population of 35,532 (RENNEs); and the towns of Hédé near the canal of the Ille and the Rance, and Chécy 6 mi. between the Seiche and the Vilaine. Neither of these towns is of any importance. Hédé is in the midst of the Menes mountains.

In the arrondissement of Fougeres are Fougeres, near the source of the Couesnon, and on the road from Paris by Mayenne to Dol and St. Malo, with a population, in 1836, of 9386 (FOUGERES); St. Georges de Reintembault, near the Brevon (population 3258); Louvigné du Desert (population 3349); Antrain on the Couesnon, at the junction of the Oudon; Bazoges, near Antrain (population 4500); and St. Aubin de Cormier, on the ridge of the Menes mountains, between Fougeres and Rennes. The last-mentioned place has a population of about 500 or 600 in the town and in the three times that number in the whole commune; but some historical interest is attached to it: it has an ancient castle, built in the year 1222, by Pierre Mauclerc, duke of Brittany [BRETAGNE], of which the lofty ruin of a tower in the midst of the ruins remains. At St. Aubin de Cormier a great battle was fought in the year 1488, between the forces of Charles VIII. of France, then in his minority, and those of the duke of Brittany, Françoise. The French were commanded by Le Trimmelle, then a mere youth; and the Bretons had the presence and aid of Louis, duke of Orleans, afterwards Louis XII., the prince of Orange, and other malcontent French nobles. The Bretons and their allies were defeated.

In the arrondissement of Montfort are Montfort-sur-Meu (population in 1836, 1772); St. Mén; Pélion, on the road from Rennes to Lorient (population 3305); Le Gué, close to Pélion and the Breton. Montfort retains some portions of its ancient walls.

In the arrondissement of St. Malo are St. Malo, at the mouth of the Rance, which had, in 1836, a population of 9744, or, including suburb St. Servan, of nearly 20,000 [MALO, St.]: Dol, near the sea (population 5998 town, 3939 commune); Châteauneuf, near the Rance; and Cancal (population 4880) on the sea. This last is a small sea port well known for its oysters, which not only supply Plymouth, but furnish also the English boats with oysters, which are laid in the beds in the estuary of the Thames and adjacent rivers.

The arrondissement of Vitre contains Vitre (population, in 1836, 8901), and Châteaubourg on the Vilaine, and La Guerche (population 2100 town, 4219 whole commune), near the Seiche. Vitre is an ancient Breton town. Some antiquaries have thought that its walls have some traces of Roman building, but this is regarded as an error. It was the place of meeting of the states of Brittany before the Revolution. It is neither well built nor neatly kept. Savary, author of the 'Lettres sur l'Egypte,' was born here, and it was for some time the residence of Madame de Sévigné. The neighbouring town of St. Aubin has some charming pretentious buildings and a mineral spring of considerable resort. In the neighbouring castle of Rochers several articles once belonging to Madame de Sévigné are kept as relics.

In the arrondissement of Redon are Redon (population, in 1836, 4506), at the confluence of the Oust and the Vilaine; Fougeres (population 5501), near the Cher; Bain (population 3490), near the Samon; Loézé, on the road between Redon and Rametz; and Rion, now considerable trade with Rennes and other places. Vessels of 200 tons can come thus far up the Vilaine. At Rénac, a village near this town, cheese is made, which is sold under the name of Gruyère. At Bâu are several small manufactories.

The population, when not otherwise mentioned, is that of the whole commune, according to the census of 1831. The coarse wool and sail-cloth of this department are in high repute. Paper, starch, leather, and glass are made, and a great quantity of cordage. There are some ironworks and establishments for bleaching wax. The chief exports of the department are rye, hemp, linen thread, coarse linens for sails and wrappers, cider, leather, butter, wax, honey, and hosiery. St. Malo is the chief seaport. Several vessels belonging to the towns and places on the coast are engaged in the India trade, and in the whaling and cod fisheries.

The department constitutes the diocese of Rennes, and is in the jurisdiction of the Cour Royale, and the circuit of the Académie Universitaire of that city. It is comprised in the thirteenth military division, the head-quarters of which are at Rennes. It sends seven members to the Chamber of Deputies.

Education is in this department very backward; it is however somewhat more advanced than in the neighbouring department of Loire Inférieure, and considerably more so than in the other departments into which Breton has been divided. Of the young men enrolled in the military census of 1829-30, only 25 in 100 could read.

In the time of the Romans the department was inhabited by the Redones, a Celtic people, whose name has been preserved in those of the capital and the town of Redon. It was comprehended in the district of Armorica. In the Roman division of Gaul it was in Lugudunensium Tertia. In the downfall of the empire it became part of that independent state which, from the infusion of British population, took the name of Bretonia [BRETAGNE], and shared all the revolutions of that duchy. It was the scene of contest in the Vendéan war.

**ILLIÆBRÆÆÆÆÆ, a small natural order of Exogenous plants, chiefly consisting of herbaceous weeds found in the temperate parts of the world: they differ from Amaranthaceæ in nothing except having stipules and a tendency to produce petioles; from Alisaceæ in little more than having stipules and from Portulaceæ in their seeds not being in pairs. This order is one of those which break down the limits between Polyetalous and Apetalous plants, and prove how entirely artificial are such divisions. The species are often conspicuous, especially when dried, for their silver stipules and shining calyces, and are sometimes beautiful microscopic objects; but they are too small to be interesting in any other way, and are of no known use. They occur in various parts of the world, especially in the countries bordering on the Mediterranean.**
twenty-seven petals arranged in several rows below the numerous stamens and pistils. The capsules are disposed in a circular manner, and open upwards; each contains a single shining seed. The species are few in number, but widely distributed. Two are indigenous in Florida; and the others in China and the neighboring islands. *I. floridanum* is a red-flowered species, of which the leaves are very much smaller than those of the Chinese. *I. parviflorum* also, a native of North America, has similar properties, but is of smaller growth.

The most important species however is *I. amureum*, or the aniseed tree of China, of which the fruit is exported from Canton, and well known in commerce by the name of *pang-sang* or *saratoo flower*. The Chinese use it in substance both as a condiment and a stimulant medicine, and burn it as incense in their temples. The tree flourishes in China and some of the Philippine Islands, and is also found in Java and other parts of the East Indies. M. Perrotet also mentions that there is an underscribed species at Manilla, which is there called San-ki; that its leaves are mixed with their tea and coffee in the Philippines, and that a liqueur is likewise prepared from its fruit.

ILLINOIS, one of the states of the North American Union, is bounded on the south-east by the Ohio, which separates the highest from the lower lands, by the Wabash for 190 miles direct distance, and by a meridian line to lake Michigan for 162 miles, by which river and line it is separated from Indiana; by the western coast of Lake Michigan for 57 miles; on the north, by the parallel of 42° 30' N. lat. and 87° 25' W. long., by which it is separated from the Huron territory; on the west by the Mississippi, which separates it from the Missouri territory for 200 miles, and from the state of Missouri for 340 miles. The whole circuit of the state is 1767 miles, and its area is 57,840 square miles, or somewhat more than the area of England and Wales. It lies between 42° 30' and 37° N. lat., and thus comprehends 5° of latitude. The Mississippi, Ohio, and Wabash rivers are navigable almost throughout the state. The Illinois, or Kaskaskia, rises on the east side of the state, and, flowing to the south-west for about 250 miles, falls into the Mississippi about 80 miles above the junction of the Ohio. The Illinois, above its mouth, is called Peoria, 20 miles long and 2 wide. A morass at its source in wet seasons discharges a part of its waters into the river, and a part into the Chagoa, a small stream which flows into lake Michigan. This large river takes the name of Illinois only from the presence of the Plain River from the north-east and the Kankakee from the east, both considerebly streams, and navigable for boats. Thirty miles below their confluent Fox River falls into the Illinois from the north: it rises in the Huron territory, and has a course of about 250 miles south-west, more than half of which is in this state. The Fox River is sometimes considered the main branch of the Illinois, but whether we reckon by this or the Kankakee branch, its course is about 400 miles, in 90 miles; the largest of these tributaries, has a very winding course to the west of more than 250 miles, of which 140 miles are navigable, and it falls into the Illinois about 130 miles below its mouth. Roan River, about the last, and entering the state Illinois on its north boundary, crosses it in south-west course of about 200 miles to the Mississippi. The principal tributaries of the Wabash in this state are the Embarras river, which joins the Wabash 10 miles below Vincennes, after a south and south-east course of about 150 miles; and the Little Wabash, which falls into the Wabash about 12 miles above its mouth. There is a range of low hills near the Ohio, and the western part of the state has an undulating surface; but with these exceptions, Illinois is one great plain, having a general slope to the south-west. It is estimated by Darby that every part of it is lower than the level of the Ohio about 400 and 1000 feet above the sea-level, the mouth of the Ohio being 320 feet above the level of the Atlantic. Its soil may be thus divided:—1. The alluvial lands on the rivers, which are from one to two miles wide and are subject to occasional inundation. 2. Dry prairie lands on the borders of the alluvial soil, and elevated above it from 30 to 100 feet. These lands sometimes almost touch the rivers, and are generally less fertile than the river lands, are preferred as not being subject to inundations. 3. Wet prairies covered with coarse grass. 4. Timbered land, some of which is sterile, but the greater part very fertile. It is supposed that this state contains more good arable land than any other in the Union. The American Bottom, a tract on the Mississippi extending above the mouth of the Kaskaskia for 90 miles, is noted for its fertility. Its soil, which is the richest river alluvium, contains cuttings uncharged for 20 feet below the surface, as some portions of it have produced Indian corn without intermission and without manure for near a century. The minerals are iron, copper, and lead in the north-western part of the state. The angle of the Mississippi has had a very large share of the most celebrated gold, supposed to be the richest in the world. The mining district is 260 miles in extent, and passes to the north of the state. Coal is found in every part of Illinois: salt springs are common, and the common saltstones, granite, and marl are found. The usual rocks. The climate is very much the same as that of Missouri, except that it is more humid, and in general less healthy. It is remarked that there is a considerable difference in the climate between the north and southern parts of the state. At New Harmony, which is in 38° 11', and opposite the southern part of the state, on the east bank of the Wabash, the thermometer has been observed as low as 5° below zero of Fahrenheit. Darby doubts if the mean heat of April would reach 25° Fahr. Illinois is divided into 52 counties: its population in 1830 was 157,445, of which 747 were slaves, who were brought here while it was a territory: by the constitution no more slaves are allowed to enter than sufficient to number those in the state, except those of salt and lead: of lead 8,000,000 lbs. were produced in 1830. There is a single bank in the state, with a capital of 200,000 dollars.

Vandalia is the state capital, a small village near the centre of the state, is the seat of government, but it is yet merely a village. There is no town in the state which contains 1000 inhabitants. Kaskaskia, near the mouth of the river of that name, and Cabokia on the Mississippi, are old French settlements. Belville and Galena on the Mississippi, and Shawnee town on the Ohio, are the most flourishing towns in the state, but the population of none of them exceeds 600. Illinois college is the only public seminary. The Methodists, Baptists, and Presbyterians are the prevailing sects. The legislature consists of 25 senators and 55 representatives.

This state is within the limits of the cession which Virginia made to the United States in 1787; but the first settlements made in it were by the Canadian French before 1763. It was governed, with Indiana, as a territory of the United States, without a separate government, until 1809. In 1818 Illinois was admitted into the Union, in which year its constitution was formed.

ILLUMINATING [MANUSCRIPT].

ILLYRIA, THE KINGDOM OF. The name of Illyria had disappeared for many centuries from the number of European countries, when Napoleon, after the conclusion of peace at Lunebourg, in 1814, placed the Illyrian kingdom ceded by Austria, including Dalmatia, the name of the Illyrian Provinces. Those countries being recovered by Austria in 1813 and 1814, several of them were formed into the kingdom of Illyria, the extent of which was reduced in
1822 by the separation of the circle of Carlsbad and of the Hungarian Littoral, which was annexed to Hungary. The kingdom of Illyria, as now constituted, lies between 46° 43' and 46° 25' N. lat., and 12° 14' and 16° E. long., and is bounded on the north by Austria and Styria, on the north-east by Styria, on the south-east by Croatia and Istria, on the south by the Adriatic, on the west by the Carniolan hills, and there is the Vipava and the Isonzo. The area of the kingdom, according to the latest authorities, is 10,801 square miles. The population was stated to be, in 1834, 1,154,885, and on the 1st of January, 1837, 1,193,828.

Division.—The kingdom of Illyria is divided into two governments, Laybach and Trieste, which are entirely independent of each other.

1. The Circle of Laybach has an area of 6746 square miles, 743,217 inhabitants, 24 cities, 42 towns, and 5929 villages. It is subdivided into five circles, the first three of which formerly constituted the duchy of Carniola, and the two others the duchy of Carinthia.

2. The Circle of Laybach has an area of 742 square miles, and about 166,000 inhabitants. The chief town is Laybach, the capital of the circle and the government, situated in an extensive valley at the mouth of the navigable river Lain, which divides the city into two parts, connected by five bridges. Laybach has with its eight suburbs has 11,275 inhabitants. It is a bishop's see, and has a fine cathedral, twelve other churches, a lyceum, a gymnasium, and other excellent institutions. The castle is situated on a commanding eminence. At a short distance to the north of the town there is a stone bridge of 11 arches, 640 paces in length, over the Sava. Laybach is celebrated for its lace-making. It is mentioned by the writer in 1546. The chief towns are Stein, which gives its name to the Steiner Alpe, from the summits of which, 10,274 feet above the level of the sea, there is a magnificent prospect over Carniola; Kranj, which is the capital of a Knezhest, famous for its manufacture of sythes, sickles, &c.: none of these towns have so many as 2000 inhabitants.

3. The Circle of Neustadt (otherwise Lower Carniola) has an area of 1239 square miles, and about 187,000 inhabitants. The chief town is Neustadt, the capital of the circle, beautifully situated on the river Gurk; a very pretty regularly built town, with three churches, a gymnasium, a Franciscan convent, and 1800 inhabitants. None of the other towns are of any importance.

4. The Circle of Adelberg (otherwise Inner Carniola) has an area of 1138 square miles, and 97,300 inhabitants. Adelsberg, the capital, a well built town, with 1356 inhabitants, is noted for the remarkable grotto in its vicinity. The town has a very beautiful position in the midst of a picturesque and fertile country. The town is famous for its quicksilver mines, which were accidentally discovered by a peasant in the year 1497. It is situated partly at the bottom of a narrow valley surrounded by high mountains, and partly on the banks of the river Isonzo, and partly on several low hills, of which that called Mount Calvary is distinguished by its height and picturesque form. The town consists of about 400 houses, with 4139 inhabitants, who subsist partly by lace-making and straw-plaiting, but the greater part are employed in the mines and works. The entrance to the mine is nearly in the middle of the town, by a large iron gate, which opens to a horizontal passage hewn in the solid rock, leading to a flight of 757 steps cut in the limestone rock, which are kept in perfect order, and provided with a handrail. At the foot of this staircase there is a small aisle serving as a chapel, where the miners perform their devotions before they proceed into the mine, and where a great monument stands on the tomb of one of the miners, whose name is inscribed on a marble slab. The grotto is one of the greatest curiosities in the Austrian empire, and unequalled for the order, beauty, and safety which are remarked in every part. The noxious exhalations of the quicksilver, which sometimes occurs in the mineral, and is a very injurious poison, are caught by a tube which runs down into the soil, and is then conveyed into the air, where it is changed into a more harmless gaseous compound. The greatest depth of the mine is 750 feet. The produce of these mines has very materially diminished; it is stated to have formerly amounted to 18,000 cwt. of quicksilver annually; in 1832 it was said to be 9000 cwt., and Cannabich, a highly esteemed author, in his "Geography," published in 1838, says it is now only 1300 cwt. Black bow is the quicksilver which is used in the manufacture of cinnabar, which produces 1800 cwt. annually. In the vicinity there are marble, jasper, and freestone. All the establishments for smelting, refining, &c. are admirably conducted, and there are numerous benevolent institutions for the poor miners, whose health is most dreadfully impaired by the deleterious atmosphere in which they are compelled to 'ply their sickly trade.'

5. The Circle of Villach (otherwise Upper Carniola) has an area of 1626 square miles, 13 towns, and 1147 villages. The chief town, Villach, is situated on the banks of the Drau, which is here navigable, in a deep valley, and in a beautiful country, which has been called the Inner Austrian Switzerland. The town, which was formerly much larger than it now is (perhaps the Julium Carnicum, Colonia Julia, or Forum Vibi of the Romans), has 2400 inhabitants. Villach was formerly a staple spot for the commerce between Italy and Germany, and the traffic is still considerable.

II. The Government of Trieste, comprehending the city and territory of Trieste and two circles, has an area of 4555 square miles, 677,215 inhabitants. The three chief towns are Trieste, a capital city, situated by the Adriatic, on the border of Slovenia, of the Circum-Murania, and of the Kingdom of Hungary; Carniola, 52,000 Italians, 19,000 Germans, 2300 Jews, 2320 Greeks, and 40 Armenians. 1. The Territory of Trieste has an area of 40 square miles, and, including the city of Trieste, the most important seaport and commercial town in the Austrian dominions, 55,000 inhabitants. 2. The Circle of Istria has an area of 2178 square miles, and 192,544 inhabitants. The chief town of the circle, Mittenburg or Piazzo, has 4865 inhabitants. The main town is Trieste, Capo d'Istria, a seaport on an island in the Adriatic, connected with the continent by a bridge, 3500 feet; Rovigno, 9500 inhabitants; Pula, celebrated for its fine Roman antiquities; Pirano, 6300 inhabitants; Dignano, 3000 inhabitants. To this circle belong the following islands in the Gulf of Quarnero, viz., 1. Chero and Osero, united by a bridge, having an area of 78 square miles, and 14,000 inhabitants; chief town, Chero, 3000 inhabitants; Rusin piccolo, 3500 inhabitants, the largest harbour in the circle; Pirano piccolo, the smallest; a man of war is kept in the south-east of the island; there is an area of 98 square miles, 15,000 inhabitants; chief towns, Veglia, a bishop's see, 1200 inhabitants; and Visca (including Vescavacca), 3000 inhabitants. 3. The Circle of Görz has an area of 1837 square miles, and 92,795 inhabitants, with a population of 90,000, of whom 37,000 are Germans, 33,000 Italians, and 20,000 Slovenians. The chief town is Görz, 9700 inhabitants [Gosz or Gorsz]; Aquileja, 1400 inhabitants; Grado, 2200 inhabitants; and Monfalcone, 1500 inhabitants, where a new harbour called Porto Rosse was opened in 1825.

III. The Coast of the Country, Soil, Climate.—Illyria is a whole a mountainous country, but the coasts are partly low and sandy, and partly marshy, especially towards the west. On the west the bay of Trieste, and on the east that of Quarnero, run deep into the land, and form the great peninsula of Istrià, the extreme point of which is Capo Promontore. In the circles of Villach and Clagenfurt the soil is good, and the valleys are in general fertile; these two circles would produce sufficient corn for the consumption of the whole empire, if they were not so much soiled by salt, which so much of the surface, and the elevation above the sea did not produce a temperature unfavourable to vegetation. The circles of Neustadt, Adelsberg, and Laybach consist of large, thin, sandy loams, and have but few hills. In the coast there is a dry limestone soil, and in many parts suffers from a scarcity of water, but the vegetation is very luxuriant. Three great chains of mountains traverse the kingdom from west to east, and the breadth of the country being, besides, but very short, there is a large extent of sea, around the coast. The climate of these parts is rather warm in summer, and cold in winter.
quantity visited of these caverns are the Adelberg grotto and the Magdalzen cavern, both near Adelberg. The first is distinguished by its extent and the extraordinary number and beauty of its stalactites. The Magdalzen cavern is remarkable on account of a small lake in it, in which the *Proteus anguinus* is found. Illyria has only two principal rivers: the Drave and the Drava; these rivers flow through the circles of Villach and Clagenfur; and the Savze becomes navigable at Laybach. On the coast are the Ionzo and the Quiet; there are besides, in the government of Laybach, many smaller rivers, or brooks, which are numerous under the same name, both here again; others become dry during the summer. There are no canals for navigation; the only canal, that of Wörth, in the circle of Clagenfur, serves only to float timber. Of the numerous lakes, the largest are the lake of Clagenfur, 7 miles long and 4½ miles wide; this is the deepest and most beautiful lake in Carnithia, and the surrounding scenery is highly picturesque.

The most remarkable lake in Carniola is that of Zirknitz, in the circle of Adelberg, about three miles long, and from one and a half to two and a half wide, of which many wonderful stories are told, all originating in the fact that it is sometimes quite full to the brim, and at other times dry, and without any regularity or regard to the season of the year; sometimes it does not dry up for years together, and, in minutes, it fills with waters from the adjacent lakes, but there are none that enjoy any remarkable celebrity. The climate of course varies in different parts. The lofty mountains covered with snow, which either near or far from the coast abound, cause the air to be rather sharp and raw in the circles of Villach and Clagenfur; the vine does not thrive here. Though there are some persons afflicted with gout, the climate is on the whole healthy. It is much milder in the circles of Laybach, Adelberg, and on that part of Carniola where the woods of chestnut, and maize flourish. The government of Trieste has a hot climate; the vegetation is luxuriant, and the choicest fruit would succeed if the soil were good; for in the poorest part of the kingdom, the farmer would do well, as do the olive and the orange in the territory of Trieste; it is to be regretted that there is a deficiency of water. In the western parts on the coast the air is rendered extremely unhealthy by the exhalations from the lagoons.

With respect to its natural productions, Illyria is inferior to many other parts of the empire. It however abounds in mineral wealth. For quicksilver, it has coped of the finest quality; excellent iron, lead, silver (but in small quantities), cinnabar, alum, coal, and, besides a great variety of marbles, rock-crystal, porphyry, jasper, garnets, &c.

The vegetable products contain many rare Alpine plants, medicinal herbs, and roots; also wheat, rye, barley, oats, maize, buck-wheat, potatoes, pulse, some flax, hemp, and hops, garden vegetables, fruit. The forests have been much thinned for the use of the iron works, but there is still an abundance of pine, oak, and other timber. In the animal kingdom there is nothing remarkable. The horned cattle and the horses are in general small, but the breed has been much improved of late years. The largest flocks of sheep are in the islands, especially Veglia, which has likewise many horses. Swine and poultry abound everywhere. Of wild animals there are stags, fallow deer, wild horses. Carniola, most of it being mountainous, is the only part of the kingdom where the wild boar, foxes, &c. Bears and wolves are rare. The game consists of pheasants, bustards, partridges, snipes, and waterfowl. Singing-birds and birds of prey are numerous. The fisheries are very important, especially the tuna, mackerel, and anchovy fisheries.

**Manufactures and Trade.**—Though Illyria is not a manufacturing kingdom, it has coped of the woollens, woollen manufacture, which are pretty equally dispersed over the whole kingdom. The most important manufactures are those of various articles in iron and steel. There are considerations of wool, in the manufacture of cloth, which is exported in large quantities, wrought in the finest manner, and sold in the kingdom in all directions for the convenience of commerce, which chiefly consists in the transit trade between Vienna and Trieste.

**History.**—Antient Illyria comprehended all the provinces on the east coast of the Adriatic, with the adjacent islands as far as Epirus, and was inhabited by a people called by the general name of the Illyrian nations. Illyria also extended into the interior as far as the Ister (Danube) and the Alps which lie between Italy and Germany. The Macedonian nations formed the eastern boundary. Within these vague limits there were several petty states, which latter were to a great extent the property of the Republic of Venice, and to a considerable portion of the Austrian and part of the Turkish dominions, there were other nations, and particularly Gauls, mingled with the Illyrians. (Strabo, 312, &c.)

The Illyrians enjoyed all the advantages of a maritime power. They were the first to domesticate the horse. They enjoyed the greatest advantages for prosecuting a piratical warfare. They were the first to domesticate the horse. They enjoyed the greatest advantages for prosecuting a piratical warfare. They were the first to domesticate the horse. They enjoyed the greatest advantages for prosecuting a piratical warfare. They were the first to domesticate the horse. They enjoyed the greatest advantages for prosecuting a piratical warfare. They were the first to domesticate the horse.

In the sixth century colonies of Slavonians from Russia and Poland settled in the country, and soon made themselves independent of the Illyrians. They are the core of the present kingdoms of Croatia and Dalmatia. The Venetians and Hungarians took some small portions (1090): in 1170 the kingdom of Rascia was created, out of which, 200 years later, Bosnia and Herzegovina was established; but was conquered in 1270 by the Hungarians; but both they and the Venetians soon lost almost the whole country to the Turks, the Venetians retaining only a small part of Dalmatia, and the Hungarians Slavonia and Croatia.

**IMAGINARY.**

[**IMAGINARY.**]

IMAGINATION denotes in its widest sense that faculty of the mind by which it produces all thoughts and ideas as materials for every other mode of the mental activity. It is often employed in a narrow acceptance as synonymous with fancy, which properly is only a particular species of imagination or fancy, which judiciously employes the domain of this faculty according to the definition of Dr. Reid, who confines it to a lively conception of the objects of sight, and makes the imagination to differ from conception only as a part of the latter. Sir David Hume on the other hand teaches that 'the pleasures of imagination are such as arise from visible objects, since it is the sense of sight that furnishes the imagination with its ideas.' In its widest signification however imagination is coextensive with invention, furnishing the writer with whatever is most happy and appropriate in language, or vivid and forcible in thought. In the same manner it is the imagination that suggests to the scientific inquirer those bold conjectures of analogy or those analogies by which the scientific proceeds from its premises to its conclusions. It is the imagination which supplies its usefulness to man. Indeed, to adopt the language of Mr. Dugald Stewart, 'All the objects of human knowledge supply materials for her forming hand; diversifying instead and making the mode of her operation remains essentially uniform.'

It is in this illustrative activity that imagination differs from conception, which also is a reproductive faculty, but only on a lower level; for the imagination gives new and particular ideas; while the former, when once awakened by the presentation of a single thought, produces out of its storehouse of ideas all the manifold variations of similar and dissimilar. In this procedure, while it is bound by the general rules of the science which it proceeds, and by the principle of its combinations. Accordingly every age and every sex, every form of government and of religion, is said to have its special accession; and what is called a knowledge of laws consists in nothing else than
a knowledge of the train in which their ideas respectively succeed to each other.

A disordered imagination exhibits itself chiefly under three forms or characters: the fantastical, the fanatic; and the enthusiast; and similarly the due succession of its representations may be triply distinguished into the natural, the logical, and the poetical.

The nature of the imagination depends on the happiness or misery of the individual. Acting upon human hopes and fears, it assumes the name of sensibility, and by the bright or sombre images with which it fills the distant prospect of life it affords a double relish to every enjoyment: it gives a keener edge to sorrow and misfortune.

IMBAUS. [HIMALAYA MOUNTAINS.]

IMBROS, an island of the Egean Sea near the southeast coast of Crete, 18 miles southeast of the island of Samothrace, and about 22 miles northeast of Lemnos. It is now called Imbro, and also Lembro. It is of an oval form, and its circumference has been reckoned at about 30 Italian miles of 60 to a degree of latitude. (Dapper, Description des Isles de l'Archipel.) Its surface is hilly and well wooded, and it abounds in game. The valleys produce abundantly corn, wine, oil, and cotton. The island is watered by a stream called Ibaus, besides many springs. The population consists of about 4000 Greeks, who inhabit four villages, the principal of which has a castle, and is called Imbro. This island was in remote times the seat of the worship of the Cadiri, like the neighbouring islands of Samothrace and Thasos. (Coutinney, Voyages en Macedoine.) It was taken by the Persians about 509 B.C., under Otanes, general of Darius Hystaspes.

It was afterwards possessed in succession by the Macedonians, by Attalus, King of Pergamos, and lastly, by the Romans.

A coin of Imbro.

BRITISH MUSEUM. Actual size. Copper. Weight, 86 grains.

IMRETIA. [GEORGIA.]

IMITATION, in Music. [Prelude.]

IMMATERIALISM. [Berkley; Materialism.]

IMOLA, a town and bishop's see of the Papal State, in the delegazione or province of Ravenna, is built in a fine plain on the banks of the river Santerno, over which there is a handsome suspension-bridge. Imola is upon or near the site of the ancient Roman colony of Forum Corneli, but the present town was built by the Longobards. The town with its suburbs contains 10,500 inhabitants (Cinise, Statistica). It has a fine cathedral and several other churches, a theatre, a handsome hospital, a college with a library of 4000 volumes, and a considerable manufactury of cream of tartar. The country around produces good wine. Imola is on the high road from Bologna to Rimini, at the point where another road branches off to Ravenna. Barnaba Chiaromonti was bishop of Imola before his exaltation to the papal chair under the name of Pius VII.

IMPACT (in and panggo), the shock of two bodies, one or both of which are in motion: impact and collision are the technical terms used in mechanics for the meeting of bodies which are in motion.

It is usual to treat the first principles of this subject by supposing the bodies to be spherical; and for the following reason. When a body receives a blow, if it be free to turn as well as to move forward, a rotatory motion is, generally speaking, produced, as well as a motion of translation. Suppose the path of these two of the motion in a line which passes through the centre of gravity, no rotatory motion is produced. Now if two equal spheres move upon a plane, it is obvious that when either strikes the other the direction of the blow passes through the centre of gravity. Making use then of equal spheres, the same or different weights, moving upon a level plane, let it be remembered that all conclusions apply equally to bodies of any form, having no rotatory motion, and striking each other in such a way that the line joining their centres of gravity passes through the point of contact at the moment when they strike.

The simple mathematical theory of impact proceeds, like other mechanical theories, upon suppositions which can only be approximately obtained in practice. For instance, if in the preceding supposition the level plane and the balls exercise any friction on each other, the consequence is that the balls will begin to roll on the table, even though the blows which set them in motion pass through their centres. To the existence of this friction are due many phenomena which a game at billiards will present, and which will not result from the common theory.

Let the table, then, be supposed to exert no friction on the balls, so that one of the latter, struck by a blow the direction of which passes through the centre, will move along the table without rolling.

Let us then suppose the ball A to be impelled directly towards an immovable obstacle, such as an upright ledge at the end of the table. On striking this ledge, the ball will, generally speaking, recoil more or less. Some substances will hardly give any recoil, while others will send the ball back with nearly the same velocity as that of its approach. This spring or elasticity is more easily measured than explained; it arises in the following manner. At the moment of impact, the ball contracts the part of the obstacle against which it strikes, which pressure continues until the reaction of the obstacle has destroyed all the velocity of the ball. At the same time the parts of the ball close to the point of pressure are compressed in a parallel manner. If then there were no effort in the parts of the obstacle nor in those of the ball to recover their former position, the ball would remain at rest, close to the obstacle. If the recoil were complete, that is, if the parts of both bodies, supposed to be reduced to a perfect elastic force equal to that which disturbed them, the recoil would rapidly but gradually increase until the ball recoiled equally with respect to the surface of contact. Two cases are possible here: either the part of the substance which formed the barrier was wholly elastic; or the part of the obstacle is wholly inelastic, and its force inelastic. In the first case they are said to be wholly inelastic, and in the second the elasticity is said to be perfect. But if only a fraction $e$ of the velocity of approach is recovered, then $e$ is said to be the measure of the elasticity of the bodies.

Now suppose the ball A (which is so small that its size may be neglected) to approach obliquely towards the obstacle XY, say in the direction CD. Let CD be the velocity of the body, or length moved over in one second. Then [Composition; Velocity] the velocity CD is equivalent to the two velocities

$$\frac{c}{x}, \frac{d}{y}$$

cities CK and KD. The first is destroyed, and then partially restored by the impact; the second remains unaltered, except by the friction at the moment of impact, which we do not consider. If then we take DL equal to KD, and draw LM perpendicular to XY, and in length such a fraction of KC as is of 1, the ball will move after impact with the velocities DL and LM, that is, with the velocity DM in the direction DM. If the system were perfectly inelastic, the ball would proceed along DL; if perfectly elastic, the ball would be equal to CK, and DM and CD equally inclined to XY. If the size of the ball be taken into account, XY must be supposed to be a line parallel to the obstacle, and distant from it by the radius of the ball.

The principles upon which are determined the velocities after impact of different balls which strike one another are as follows:

1. If la perfectly inelastic balls move towards each other in opposite directions, and with velocities inversely proportional to their weights or masses, they destroy each other's velocities and remain at rest. Thus if A were twice as heavy as B, but if B moved twice as fast as A, there would be no motion after impact [Momentum; Motion, Laws of]. Let $\alpha$ be the velocity of A, and $\beta$ of B; then $\alpha$ and $\beta$ being expressed in the same units of weight, and $\alpha$ and $\beta$ denote the same length of time, the preceding condition is fulfilled when $\alpha = \beta$.

2. If the same velocities be added to or taken from both balls, so that their rate of approach is not altered, the forces
exerted in the shock will not be altered, and the rate of recess after the shock will not be altered. Thus a cannon ball rebounding from a wall, both having the motion of the earth, strikes with the same force and rebounds in the same manner as it would do if the motion of the earth were taken from both, or if the earth were at rest.

Now let two balls, A and B, move in the contrary direction, with the velocities a and b, A being the hindmost, and a the greater velocity. Give to both the velocity x in the contrary direction, x being greater than a, but less than a, so that the actual velocities become a - x and x - b in contrary directions. Let x be so taken that A (- a - x) = B (x - b), so that after the impact there would be no motion if A and B were quite inelastic. Hence x = Aa + Bb divided by A + B. Let e be the measure of the inelasticity, so that instead of resting, the balls rebound with the velocities e(-a-x) and e(x-b). Let the first-mentioned direction be called positive, and its contrary negative. Then

\[
\mathbf{a} = \mathbf{a} - x\text{ is in the negative direction, and } \mathbf{e} = \mathbf{x} - b\text{ in the positive direction. Restore both the velocity } \mathbf{x} \text{ in the positive direction, which was taken from both, and which did not affect the impact, and the velocities after impact are:}
\]

- **Velocity of A after impact:** \(x - e = (a - x)\) in the positive direction, or \(e = (a - x) - x\) in the negative direction, according \(x\) is greater or less than \(e (a - x)\). That is, the velocity of A after impact is \(x - e = (a - x)\) which is in the positive or negative direction, according as \(x - e = (a - x)\) is positive or negative.

- **Velocity of B after impact:** \(x + e = (x - b)\) in the positive direction.

Substitute for \(x\) the value already found, or \((Aa + Bb)/(A + B)\), and we have, after the impact,

\[
\text{Velocity of } A = \frac{Aa + Bb - e a - b}{A + B} = u.
\]

\[
\text{Velocity of } B = \frac{Aa + Bb + e a - b}{A + B} = v.
\]

**Velocity lost by A** = \(1 + e (a - b)\) \(A + B = a\).

**Velocity gained by B** = \(1 + e (a - b)\) \(A + B = a\).

**Momentum lost by A** and gained by B = \(1 - e (a - b)\) \(A + B = a\).

\[
Aa + Bb = Aa\mathbf{a} + Bb\mathbf{b} - (1 - e\mathbf{a} - e\mathbf{b})^2 = \mathbf{Aa} + \mathbf{Bb} = \mathbf{Aa} + \mathbf{Bb} - \frac{e^2}{1 + e^2} [\text{Ves viva}].
\]

The preceding formulæ will remain true when the bodies are moving in contrary directions, if, the direction of A's motion being called positive, the velocity of B, or \(e\), be made negative. The signs of the formulæ shall show in which direction the motion after impact takes place. The following conclusions will now be readily deduced by any one who understands the preceding results.

1. **If two inelastic balls move in the same direction, they do not separate after the impact, but either move on with a common velocity, or are reduced to rest.** If both move in the same direction, the velocity after impact is \((Aa + Bb)/(A + B)\); but if they move in different directions, the motion after impact is in the direction of that half of which the momentum \((Aa + Bb)/(A + B)\) is the greatest, and the velocity is \((Aa - Bb)/(A + B)\) or \((Bb - Aa)/(A + B)\). When the moments are equal, there is no motion after the impact.

If \(b = 0\), or if one of the balls be at rest before impact, the velocity after impact is \(Aa/(A + B)\). To deduce these results, make \(e = 0\) in the formulæ, and give the velocities their proper signs.

2. **If two perfectly elastic balls move in the same direction they separate after the impact, the velocity of the foremost being augmented from \(b\) to \(b + 2(a - b)\); \(A = (A + B)\).** But the velocity of the hindmost is altered, either destroyed, or made to change its direction, the algebraical formulæ for the velocity after impact being \(a - 2(a - b) B/(A + B)\). This is nothing when \(B\) exceeds \(F\), C, No. 760.

A, and when \(b\) is to \(a\) as \(B - A\) is to \(2B\). And according as \(b\) is to \(a\) in a less or greater ratio than the preceding ratio, A's velocity is or is not altered in direction.

3. **If two perfectly elastic balls move in opposite directions, that of A being called positive, the velocities of A and B after impact are determined in magnitude and direction by the formulæ**

\[
a = (a + b)/2B + b = r(a + b)/2A + B.
\]

4. **If two perfectly elastic balls be equal in magnitude, the velocity of each after the impact is that which the other had before the impact, both in magnitude and direction.**

5. **In all cases perfectly elastic balls proceed from each other after impact with the same velocity with which they approached before impact; since if \(e = 1, v = u = a - b\).** But in every other case the rate of recess after impact is the same proportion of the rate of approach before impact which \(e\) is of 1.

6. The **vis viva** of a couple of perfectly elastic balls is the same before and after impact; in every other case it is less after impact than before.

Now suppose two balls A and B to move in directions oblique to one another, and to strike each other. Decompose the velocity of each ball into two, one in the line joining the centres at the moment of impact, and the other perpendicular to it. The pair of velocities perpendicular to the central line will not be altered by the impact; and as far as the remaining velocities are concerned, the case is precisely the one already solved. Find the velocities in the central line as altered by the impact, compound them with the perpendicular velocities which remain unaltered, and the resulting velocities and directions will be those with which the balls will proceed after the impact.

To take the most simple case, suppose the ball A, moving in the direction EC, and with the velocity EC, to strike the ball B, which is at rest. Join D and C, the centres of the balls, and decompose EC into FC in the line joining the centres, and EF perpendicular to it. Then A will only strike the ball B with the velocity FC. Suppose that by the preceding rules it is found that A, striking B at rest with the velocity FC, will be thrown back with the velocity CG, while B is struck forward with the velocity DK. Then B will receive this velocity, and this one only: as to A, it has after the impact acquired the velocity CG, which it combines with the velocity GL, equal and parallel to EF, so that GL represents the velocity and the direction of the motion of A after the impact.

In every case of impact, when the balls approach one another with uniform velocities, the centre of gravity of the balls moves uniformly, and in a straight line. After the impact, though the directions and velocities of the balls may have changed, yet their centre of gravity still continues to describe the same line, and with the same velocity as before. This proposition is proved in all works on elementary mechanics.

IMPATIENS, a genus of plants so called from the sudden and elastic force with which they burst their capsules; hence 'Noli me tangere' is the name of one of the species. Another is well known as a highly ornamental annual by the name of Balsam, whence the natural family to which it belongs has been called BALSAMINE. The genus is especially an East Indian one, though single

VOL. XII. - 3 M
species extend into Europe, Siberia, and North America. Linnaeus was only acquainted with seven or eight species, but Dr. Wight, in the 'Madras Journal,' vol. ii., states that not less than one hundred species are now known, and almost entirely from the mountains of the peninsula of India, and the Himalayas, in those forests as far north as the Sutlej, and in 36° of N. latitude, at as great elevations as 7000 feet. They are absent from the plains of India; some are found on the Malabar coast, little elevated above the sea, but the Himalayas, by the thinness of the soil and as it is stated that they are only found in the Himalayas during the rains, and hence inferred that the moisture and moderate temperature, as well as the equability of both during the rainy season, are attributable to the heat and moisture of the peninsula; but Dr. Wight has since ascertained that the species are chiefly found at elevations of 4000 and 4500 feet, in a season when there is moisture combined with a moderate but equal temperature. These facts are important as showing the influence of climate on vegetation; and useful as affording hints and principles for the cultivation of these plants at a lower temperature than is necessary for the plants of the plains from the same latitude, though greater pressure, or otherwise, has been observed in the cultivation of balsams in this country.

**IMPENETRABILITY.** A name given to the property of matter, the existence of which is suggested when we see that an object, once solid, cannot be part of another object is either resisted by the latter, or its success preceded by the removal of the latter. It is then but another name for the cause of that resistance, which we know by the term touch, and which is necessary to every idea which we form of matter.

The impenetrability of matter can only be taken in conjunction with the hypothesis of its porosity. Otherwise, it might be successfully disputed. Salt may be dissolved in water without increasing the bulk of the fluid; the (impenetrable?) matter is then penetrated; or else the matter of the fluid has interstices. But if any attempt be made to press the fluid into a smaller space, the impenetrability of the object will appear by its resistance to the pressing substance.

Are we not then making a purely gratuitous introduction of words to supply explanations of phenomena? When matter resists, we have recourse to impenetrability, which is merely saying, so soon as we find resistance, that matter has a power of resisting. But when we ascertain that different portions of matter can be made to fill the same space, whether by solution, pressure, or otherwise, we then appeal to a porosity which we cannot make visible, and presume that matter has empty spaces in which other matter may be placed. This is very much like nature's horror of a vacuum, and other explanations of the same kind.

The answer to this difficulty, and others of a similar kind which occur in attempting to define simple mechanical terms is, that the beginner must not receive them as explanations or as axioms, but simply as statements of observed phenomena, or at best as terms which imply that explanation is wanted, and serve, till further explanation, to enable us to recall the phenomena themselves and the universality of their existence. Subsequent study and experience must ascertain the character of this impenetrability, that is to say, the laws of the resistance from which it derives its name. The term is useful to remind us that there is a certain kind of resistance which shows itself as a great matter; that it is neither its etymology nor any common notions attached to it must be allowed to dictate any conclusion as to the nature, mode of action, or consequences of that something.

As to the action of water upon matter, the water itself is shown by others than the rolling ball which is another, the rolling balls absolutely touches the stationary one before it causes motion. There are many circumstances from which it can be inferred, with the highest degree of probability, that such contact is only apparent, and not real. It must be concluded that when the two balls come within a certain small distance of another, repulsive forces, of the cause and mode of action of which we know nothing, begin to be excited between those particles of the balls which are nearest to each other, and is not our interest to go further into the preceding subject than the mere mention of what are called molecular attractions and repulsions, and this merely to point out that the action of matter upon matter must be admitted to commence before the instant at which their surfaces come into contact. [Inkeep.]

**IMPERIAL CHAMBER: KAMMERGERICHTE.** The highest judicial court of the German empire, was established in 1495 by Maximilian I., in consequence of the earnest representations of the Diet, for the purpose of determining the jurisdiction of the emperor and other members of the empire, administering impartial justice, and thus restoring internal tranquillity to Germany. The chamber consisted of a judge or president appointed by the emperor, and sixteen assessors, half of whom were nobles, and the other half doctors or licentates of law, all chosen by the emperor out of the lists of candidates presented by the States. They were all irreproachable, and for life, which was a novel feature of this court. They were induced by majority of voices, the president having a casting vote. The Imperial Chamber held its sitting at Frankfurt-on-the-Main, but it was afterwards removed successively to Worms, Nürnberg, Augsburg, Ratisbon, and lastly to Wetzlar, there being incessant changes till the dissolution of the empire in 1806. The authority of this court was at first very limited, in consequence of the indefinite exercise of the Imperial prerogative, and the establishment of the Aulic council, which was the only body that could appoint or remove the officers. The emperor, however, made the chamber the seat of a great many of his personal and imperial offices, and added to it the jurisdiction extended by Maximilian to take cognizance of suits concerning the empire. [AULIC COUNCIL.] When however the Aulic Council assumed the right of citing and examining the charters of Cologne and other important cities, the emperor, it appeared, was taking this stretch of authority as an infringement of the rights of the Imperial Chamber. (Coxe's 'House of Austria.') Charles V. remodelled the Imperial Chamber, and framed new regulations for its proceedings, which had been greatly praised by competent judges. (Piller, 'Handbuch der Entwicklung der germanischen Constitution.') He also established an annual visitation for the purpose of inspecting the proceedings of the chamber, making a report thereon. The chamber was divided into five sections, or particular courts of the parties concerned. The visiting commission consisted of one commissary appointed by the emperor, and other commissaries or delegates appointed by several of the electors ecclesiastical as well as secular, and by one of the Imperial cities. By the religious peace of 1555 it was agreed that the judge and assessors might be taken indiscriminately from among members of the old religion and of the confession of Augsburg, but it was not until the peace of Westphalia that the proportion of each was definitively settled. The number of assessors was then extended to fifty, of whom the Protestant states presented twenty-four, and the Catholic states a like number; but by subsequent regulations being left to the emperors, the persons appointed were of course Catholics also, making the number of Catholics twenty-six in all. For the quicker dispatch of business the chamber was divided into sections called 'kammergerichte,' each presided over by a member, usually having for president a count or baron of the empire, who was styled presiding assessor. These presiding assessors were afterwards styled presidents of the Imperial Chamber, but were distinct however from the chamber judge or first president of the whole court. By the same peace of Westphalia the Aulic Council also was remodelled, and, being opened to Protestants as well as Catholics, became a court of the whole empire, with exclusive jurisdiction over cases concer- ned principally, and from that time the business of the Imperial Chamber was engrossed mainly by private lawsuits rather than with affairs concerning the States. (Franck; Cox; Dunham, 'History of the Germanic Empire;' Harleson, 'Kammergerichter Archiv.' Müller, Kammergerichtsordnung.')

**IMPETIGO** is a term which has been employed by writers in many independent significations, and for various diseases, and has been confined to a description of an eruption, or such an eruption as Dr. Willan has defined to be "an eruption of yellow itching pustules, appearing in clusters and terminating in a yellow, thin, sebaceous crust." It is commonly known in this country as the 'lump,' or 'running sore,' and is not our business in this article to go further into the preceding subject than the mere mention of what are called socalled attractions and repulsions, and this merely to point out that the action of matter upon matter must be admitted to commence before the instant at which their surfaces come into contact. [Inkeart.]
IMPELUS. [Momentum.]

Imports and Exports are terms used to denote that part of the commerce of a country which is carried on with foreign countries, with its external possessions and dependencies. The foreign trade of England is coeval with its earliest history. It must not however be supposed that the commercial dealings of those early days bore much resemblance to those of modern times. The trade of the ancients consisted of a few persons, who, like merchants of the Jacobean period, carried on their commerce with foreign nations, and who, like our forefathers of the past, were compelled to trade with Great Britain.

We 255 exports of the quantity of wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, sugar, and the amount of 28,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.

A statement of the trade of England, said to have been found upon record in the Exchequer, and quoted in a tract called the "Great Britain," published in 1538 by Edward Misselden, the list of our imports only wool, coarse woollen cloths, and a small quantity of leather, amounting in value to 24,184l., including the export-duty; while the imports included fine woolen cloths, wax, wine, and the amount of 33,970l. The shilling at that time contained 213 grains of silver. Taking into account the different value of money then and at present, these values are equivalent to 726,604l. and 65,219l., respectively.
The list of our imports from foreign countries and from British colonies and dependencies comprises almost every article of use and of luxury which cannot be profitably produced within the kingdom, including in this description most of those raw materials of manufacture which give employment to a large proportion of our population, and therefore make up a great part of our exports. The actual value of the cotton, flax, silk, and wool imported in 1836, and a great part of which was afterwards exported in a manufactured state, amounted to at least £20,000,000. It is mainly owing to the mechanical inventions which have given such extension to those branches of manufacture that England has hitherto maintained her commercial superiority, and has been enabled to maintain the sustenance of her immense and continually increasing population.

IMPOSSIBLE. [NEGATIVE AND IMPOSSIBLE QUANTITIES.]

IMPOST (Imposta, Italian), the horizontal mouldings seen as a sort of coruscation to the piers of arches, and on which the archivolt, or curved mouldings and faciae surrounding the arches themselves, rest. Like these latter the impost is made plain or richer according to the order employed; it was of late years little known, except when the archivolt of the arches are omitted, either the impost is omitted likewise, or a plain band is substituted for it. This is generally done in basements beneath an oratory only richly decorated with joints of betylastics, suitable for decocting, and giving the requisite architectural expression. Imposts are contrary to the genius of the Pointed style, but, except in the case above alluded to, it has been usual in Roman and Norman architecture. We have however a few recent instances in which impostes have been omitted, and the archivolt of the arch continued vertically down the edges of the piers. This was a practice followed by Soane, both in his designs and many of his executed buildings; and it has also been adopted by Burton in the arches of the Ionic screen and opposite gateway, Hyde Park Corner, Piccadilly; but the choice is happy, especially, in respect of the superstructure, though it may be tolerated in buildings on a small scale, or which make no pretensions to correctness of style.

IMPREGNATION (in Vegetable Physiology). Plants, like animals, are in their more perfect species furnished with organs, by the mutual action of which they are multiplied; the matter contained in the one fertilizing that which belongs to the other, and the result being a young plant or embryo, or vegetable fetus. In what way this circumstance occurs, was all of late years little known, except in the most superficial manner: modern observation has however thrown great light upon the subject, although the inquiry is still in want of much ulterior investigation.

IMPRESSION (in Vegetable Physiology). Plants, like animals, are in their more perfect species furnished with organs, by the mutual action of which they are multiplied; the matter contained in the one fertilizing that which belongs to the other, and the result being a young plant or embryo, or vegetable fetus. In what way this circumstance occurs, was all of late years little known, except in the most superficial manner: modern observation has however thrown great light upon the subject, although the inquiry is still in want of much ulterior investigation.

IN A

IMPROPRIATIONS. [Benefice, p. 219; Titles.] IMPROVISINGatori are extempore versifiers who, without preparation, pronounce a certain quantity of verses upon any given subject. This practice is of frequent occurrence in Italy, and the facilities which the structure of the Italian language affords to versification, and the ease and flow of language and the quick adoption of necessary ideas and images to the main subject, which rivet the attention and excite the surprise of the listener. Some improvisatori have been men of real information and poetical genius, and their compositions are consequently superior. An Austin friar of the name of Brother Philip, blind and living in the time of Sixtus V., is mentioned as having done wonders in this way. In our day, Mr. Godden, a considerable poetical talent, was made improvisatore to Napoleon's court, with a handsome salary, and Sgrici of Florence has become known throughout Europe by giving specimens of his art in the various capitals. Several of them, however, mix themselves with themselves in the same art; they are styled improvissorici.

IMPULSE. When a body rolls down a gently-inclined plane we can see the gradual alterations of its velocity, and it can readily be shown that a body has two different velocities it takes in succession all intermediate velocities, or that the change of velocity is perfectly gradual. But when a body is violently struck, as in the case of a ball discharged from a state of rest into one of rapid motion, without having passed through any of the intermediate states. In this case it is clear that there is a sort of external resistance to the body, which must be interpreted to mean, any cause by virtue of which velocity is communicated suddenly and without gradation. Though the term impulse may be of convenient application to cases of motion in which velocities are changed very rapidly, it must be remembered that the idea of absolutely instantaneous change of velocity is in no degree less absurd than that of a point which is in two different positions at the same instant of time. Impulse then must be considered as a pressure caused by one body on another, increasing so rapidly with the time as to produce large effects in a small fraction of a second. Some account of the manner in which impulses act is given in the article PRESSURE.
herence of hereditary feuds, placed the conquering Britons under the protection of the state, and exposed and punished the
frauds which might be committed in the transfer of
merebanids and the cultivation of land. The first of the
great military successes of Ina was achieved against the
people of the EGGLESTONS, who, before his accession, had
slain Mollo, the brother of Ceaddwalla, but who, with his
king Whitr invalidate were, in 692, forced to submit to Ina, and to
pay him the full eare, or legal compensation, for the murder
of the nobleman during his voyages to Rome and to other
patriarchal courts of silver, and Malmesbury, certainly by a great
exaggeration, at 30,000 marks of gold. In 710 we find Ina engaged in
war with the Britons of Cornwall, under their king Geront of
which, finally subdued, and even, it is said, compelled to resign
his dominions. A subsequent contest with Cedred, king of
Mercia, was terminated, in 715, by the battle of Wednes-
borough, where however it is doubtful which side obtained the
victory. The last year of Ina's reign were disturbed by the
attempts of several pretenders to the throne—one of
whom, called the Atheling Cynwulf or Canulf, was slain in
721; and another of whom, called Eadwyrb, after being
driven from the castle of Taunton, in which he had in the
first instance fortified himself, was placed at their head by
the people of Sussex, and was not finally put down till 725,
and was not finally put down till 725, and it is quite
possible that the story is true, for the King, in his letter,
was found in St. Paul's Cathedral, and it was added for the
support the tax called first Roscemont, and afterwards Peter's
Pence. He was however a great benefactor of the church;
and the abbey of Glastonbury in particular was indebted
to him for ample augmentation, and the exacting of
his taxes, to
take away from his family its
prestige. He is of course a great favourite of the monkish
historians; but in this instance their panegyrics seem to
have been deserved by the real merits of Ina, both as a
warrior and as a legislator.

INACHUS, a genus of brachyurous crustaceans, placed
by M. Milne Edwards under his tribe Macropodinae. [Ma-
cropodinae.]

INACTING. [GRAPHING].

INCA. [PREH.]

INCANDESCENCE. [HEAT.]

INCIDENCE, ANGLE OF, the angle made by a
straight line which passes through any point of a line or
surface, with another line or surface at the points where
the straight line is tangent to that line or surface, drawn
through the point in question. The term is little used except in optics.

INCOEREE. [DEFINITION.]

INCLINATION (commonly called the dip) of the mag-
netc needle is the angle which such needle, when supported
on its centre of gravity, makes with the plane of the horizon.
The instrument by which this inclination is exhibited is a
slender cylindrical or prismatic bar of steel, from six to ten
inches long, having, perpendicularly to its length, a short
axis of bell-nut, usually passing through its centre of
gravity, which is the middle point of the bar. The latter,
prevailing to being magnetised, would of course, if sup-
ported on or suspended by its centre of gravity, remain at
rest in any point with respect to the horizon; but on
receiving that quality by any of the ordinary processes it be-
comes a magnetic needle, its axis is or remains horizontal, and
its position is then determined by the direction of the resultant.
In general the horizontal axis is made to rest on the
edges of two plates of agate, and a graduated circle of
brass, having its centre coincident with the point of gravity
of the needle, serves to show the amount of the inclina-
tion. The plane of the circle is in a vertical position, and
when the inclination is to be observed it must be made
true coincident with the plane of the circle, which is to the
plane of the horizon, the point of the needle's motion, motion of the
gravity of the needle, showing the angle of gravity
of the needle, shows the amount of the inclina-
tion. The plane of the circle is in a vertical position, and
when the inclination is to be observed it must be made
to coincide with the plane of the circle which passes through
the line of sight, if the needle's motion, is the de-
cline of the needle, or commonly the variation. [De-
cline: VARIATION.]

It is probable that the above incoerence is
quite intended to say that the plane in which the needle moves by the
action of the magnetic power in the earth is exactly per-
pendicular to the horizon, though its deviation from such
plane is so small as to be insensible in the most delicate
observation.

The discovery of the inclination or dip is ascribed to
Robert Norman, who observed that in London it amounted to
nearly 72 degrees. This ingenious person, in order to
ascertain whether or not the inclination was the same in
other parts of the world, furnished needles properly mounted
and fitted to several commanders of ships who were engaged in mak-
ing
ing voyages to various places, and in a description of
the answers he received from them he mentions that
about the equator the needles remained nearly parallel
to the horizon; that on sailing northwards from thence
their north ends became depressed, and on sailing south-
wards their south ends became depressed; whereas, in a
sequence of this information Norman, in 1576 or 1581, pub-
lished his work entitled 'New Attractive,' in which he
announces the discovery; and without expressly saying
that he considered the needle to be attracted to the earth,
he mentions its tendency to some point within it. Error
ously supposing the inclination to be subject to an invari-
able law, he states that at the poles of the earth the needle
will be perpendicular to the horizon; and he held out a
prospect that the latitude of a ship at sea might, by means
of this instrument, be easily

Dr. Gilbert, who in 1600 published his work 'De
Magnete,' was the first to ascertain the
dip of a magnetic property; he supposed however that this
property existed only in the terrestrial particles. Dr. Halley,
in order to account for the changes observed in the direction
of the needle, imagined that the earth is hollow, and that
the magnetic needle is an instrument, which was

He also endeavoured to explain those changes by assuming
the existence of four magnetic poles, two in the arctic and two in
the antarctic regions; the latter not diametrically oppo-
site to the former. But it will readily be imagined that
hypotases, formed at a time when comparatively few ob-
servations had been made, could lead to no useful results;
and difficulties ascribable to the idea of a hollow earth,
the earth, it must be admitted that the prospect of being
enabled to assign correctly the law of its phenomena is still
very remote.

From the observations of La Caillé, La Peyrouse, and
Humboldt, it seemed that the series of places on
the surface of the earth where the magnetic needle rested in a
position parallel to the horizon were situated on a great
circle of the sphere inclined to the geographical equator
in an angle of about 12 degrees; it was supposed to cross the
latter in two points diametrically opposite to each other,
and one of these was placed in 113° 14' W. long. This
was therefore denominated the magnetic equator.
The

the experiments of M. Humboldt, which were published
in 1805, first made known the fact that the intensity of the
magnetic attraction in the earth is least at places where the
dipping-needle is horizontal; they also showed that,
with considerable irregularities, the intensity increases with the
increase of the inclination. From comparisons of the
observed intensities with the inclinations and the positions of
the places of observation on the earth, M. Biot investi-
gated the seat of magnetic attraction in the latter; and his
conclusion is, that this seat is definitely near the centre
of the earth. He also obtained from his formula the same
type respecting the inclination as was before announced by
Kraft. And Dr. Young, in 1820, from a consideration of the experiments of Humboldt,
was led to suppose that the intensity of the magnetic
force would vary as the sine, or as the 

Unfortunately the observed irregularities of the inclina-
tion in different places are so great that no reliance can be
placed on either of the above formulæ. On the spot assigned
by Biot for the magnetic poles, it was found the inclination to be little more than 80 degrees; and
This officer observes that no position can be proposed for the magnetic poles with which (if the magnetic equator and parallels are supposed to be circles of the sphere) stations whose magnetic latitudes are the same will not have differences of dip amounting to 10 or 15 degrees; and he considers, that on such an hypothesis, the inclination cannot be taken as an indication of magnetic latitude. In fact, it is now ascertained that the magnetic equator is a curve of double curvature, and crosses the geographical equator in three or four places.

The two voyages made by Captain Sabine, in 1822 and 1833, one towards the equator, and the other towards the north pole, have furnished the latest information we possess concerning the effects of terrestrial magnetism. At the island of St. Thomas, near the equator, the inclination of the needle was 0° 4' towards the south; the inclination was towards the north as the ship returned to Europe; at London, it was found to be 70° 3' north; and at Spitzbergen, the most northern station, it was 81° 11' north. The intensities were determined at all the stations by observing the times in which ten vibrations of the dipping-needle were made; and, being reduced to the value of the intensity when the inclination is nothing, the results were found to differ so much from those indicated by the above formula, as to be decisive against the supposition that any relation subsists between the inclination of the needle and the intensity of terrestrial magnetism.

It may be stated here that the result of Captain Sabine's experiments relating to the intensity is, that the latter increases in going from the magnetic equator towards the pole, according to the formula

\[ \sqrt{1 + \cos^2 \phi} \]  

(\( \phi \) being the distance, in degrees, of the given place from the magnetic pole); whereas the intensity at the magnetic pole appears to be twice as great as that at the equator.

Captain Sabine places the pole in lat. 60° N., long. 60° W. from Greenwich (Sabine's Pendulum, &c., Experiments, p. 455); but from the observations of Sir Frederic Perry it would appear to be situated in about lat. 70° N., long. 100° W.

When it is intended to observe the amount of the inclination by means of the dipping-needle, the latter having been placed on a horizontal axis passing through the centre of gravity, it will be necessary first to bring the vertical circle into the plane of the magnetic meridian by means of a horizontal needle, which, having been placed for the purpose on a pivot provided for it, is immediately afterwards to be removed; the axis of the dipping-needle must then be placed on the agate plates, which by means of a screw are to be adjusted so that the axis may pass through the centre of gravity. The needle being then made to rest in the position which it assumes, that is, nearly in the direction of the magnetic attraction, it must be caused to vibrate on its axis, like a pendulum on its point of suspension, by bringing a small weight near either of its extremities; after several oscillations it will again rest nearly in the same place as before, and the value of the inclination may then be read on the graduated circle. This must be repeated several times. The face of the circle should then be reversed by turning the latter half round on the vertical axis, and the needle should be made to perform as many vibrations as before; after which a mean of all the inclinations thus observed must be taken. The poles of the needle are then to be reversed by the usual process, and a mean of the inclinations again found, after a repetition, with the reversed poles, of all the former operations. The true inclination will thus be very nearly obtained.

Together with the method just described, it will be sometimes convenient for determining the inclination, to use an element which can be more readily estimated than the precise point at which the needle rests on the circle; and this is in which the needle makes a given number of vibrations. On such time the amount of the inclination may, in the following manner, be shown to depend.

Let NCS (fig. 1) be the direction of the needle in the plane of the magnetic meridian; take NC to represent the intensity of the magnetic force in that line, and resolve this force into the forces represented by CN and nN, in a horizontal and vertical direction respectively. Then, representing the force in CN by M, and the angle NCM of inclination by \( d \); if the needle be made to traverse horizontally by a weight applied to some part of the arm CS, the intensity CN may be expressed by M cos. d. Again, if the needle be placed in a vertical plane perpendicular to the magnetic meridian, the horizontal intensities on the two arms being counteracted at C, the point of support, it follows that the needle will assume a vertical position, and that nN, or M sin. d, will represent the intensity in that direction. Now, like the force of gravity in producing the vibrations of pendulums, the intensity of the magnetic force is proportional to the square of the number of vibrations made by the needle in a given time; or, the time of making one, or any given number of oscillations, is inversely proportional to the square root of the force of attraction. Therefore, if we count the time \( T \) in which a given number of oscillations are performed by a dipping-needle moving freely in the plane of the magnetic meridian, and the time \( t \) in which that number of oscillations are performed by the needle in a plane perpendicular to the meridian, we shall have

\[ \frac{\sin d}{\sin t} = \frac{T}{t} \]

Likewise, if we count the time \( T' \) in which a given number of oscillations are made in the plane of the magnetic meridian, as before, and the time \( T'' \) in which that number are made by a needle when traversing horizontally, we shall have

\[ \frac{\sin d}{\sin t} = \frac{T'}{T''} \]

By either of these methods the amount of the inclination \( d \) may be obtained.

It is seldom that the horizontal axis will be found to pass precisely through the centre of gravity of the needle; and if not, when the weight of the earth becomes combined with that of gravity, so that the inclination due to the former is either increased or diminished by that which depends on the latter; and the observed inclination requires a correction in order to reduce it to what it would be if the centres of gravity and motion were coincident. For the purpose of obtaining the amount of this correction with precision, by rendering the effect of gravity very perceptible, Professor Mayer caused a wire with a brass ball at one end to be screwed into a needle, perpendicularly to the length of the latter, and immediately above or below the horizontal axis. Previously to being magnetised, the needle was made to balance itself accurately in a horizontal position when the wire and ball were below the point of support; and the place of the centre of gravity was, consequently, somewhere in the axis of the wire. Then, by observing the inclination both when the ball is up and when it is below the axis of the needle, the intensity of magnetism and the action of gravity may be eliminated; and a formula expressing the truth, in terms of the observed inclinations, may be obtained.

Let NS (fig. 2) be the needle in the plane of the magnetic meridian, and C be the place of the horizontal axis. Let NA be the direction in which the magnetic attraction NA, Fig. 2.
sets on the needle, and let the same line represent that force; also, let NV be a vertical line: then \( \angle ANV = \theta \) will be equal to the complement of the needle's true inclination; and, SN being produced, \( \angle NSN = \theta \) is the complement of the observed dip or inclination. Resolve NA into NS and AN by drawing the latter perpendicularly to SN produced; then \( \angle NAS = \theta \). This will express the effective force of the needle's magnetic attraction in that direction. By \( AN = AN \) sin. \( \theta \), or (by trigonometry) \( AN \) (sin. \( \theta \) cos. \( b \) cos. \( d \) sin. \( d \) cos. \( b \) \) and this being multiplied by \( NC = \theta \) gives the energy of the magnetic power to turn the needle about C.

Let B be the brass ball at the end of the wire CB, and let G be the centre of gravity of the needle and ball. Then, taking G as the weight equivalent of the heavy body, and resolving the latter perpendicularly to NS and parallel to the latter perpendicular to NS: the last produces no effect to turn the needle about C; and the former is equal to W sin. C. Grop. or W cos. b. Then, if CG be represented by \( g \), we have Wg cos. b for the effect of the weight of the needle to turn the latter about C. This force, in the above position of the ball, acting in an opposite direction with respect to the magnetic power at N, must be subtracted from the latter, in order to give the combined effect of both gravity and magnetism on the needle; and, in the case of equilibrium, we have

\[
MF (\sin. b \cos. d - \sin. d \cos. b) - Wg \cos. b = 0.
\]

or, dividing by \( M \) cos. b, and putting \( \cos. b = \frac{Wf}{MF} \) we get

\[
\tan. b \cos. d - \sin. d - C = a; \text{ whence } \tan. b = \frac{\sin. d + C}{\cos. d}.
\]

By reversing the needle on its fulcrum C, so that G may stand above C, we should have, in like manner,

\[
\tan. b' = \frac{\sin. d - C}{\cos. d}; \text{ and combining together these two equations we obtain finally,}
\]

\[
\tan. d = \frac{1}{\tan. b + b'};
\]

where \( b' \) and \( b \) are the complements of the two observed dips or depressions of the needle, and \( d \) is the complement of the required inclination.

One of the needles used by Captain Sabine in the voyages of 1822 and 1823 was of the kind last mentioned. [Magnetic Variation.]

**INCLINATION.**

The inclination of two lines is a phrase commonly used for the angle which they make with one another. Thus two lines which make a very small angle are said to be at a very small inclination to each other. Looking at the etymology of the word, and its use in common language, it would seem proper to say that one line is without inclination to another when the two are perpendicular to each other; and that the other is a certain inclination. But custom has settled otherwise, and has, in fact, made the word inclination synonymous with angle; while the term angle of incidence holds the place which, according to etymology, belongs to angle of inclination.

**INCLINED PLANE.**

Among the mechanical powers, as they are termed, meaning the contrivances by which pressure is advantageously applied, the inclined plane has held a place in practice in every country in which the arts have made any progress. But the introduction of this contrivance into the theory of mechanics dates from the time of STEVINUS, to whose life we refer for an account of the very remarkable addition which he made to the first principles of statics by means of the inclined plane.

If a weight be placed upon a horizontal plane on which there is no friction, it is obvious that the weight will be entirely supported, and that any horizontal pressure, however small, will cause motion. If the same weight be made vertical instead of horizontal, the weight cannot be placed upon it, for if the heavy body were made to touch the plane and then left to itself, it would fall down the plane exactly in the direction of its lowest position, and fall if there were no plane; that is, supposing there to be no friction.

If the plane be made to assume an oblique or inclined position, the effect produced will be intermediate between those two, without friction. No principle of rest, nor will it acquire velocity as rapidly as when it is freely falling. The reaction of the plane will counterbalance a portion of the weight, as follows:—Let AB represent a section of the plane, and G a section of the weight. Let GV represent the magnitude and direction of the weight, and draw GW and WV perpendicular and parallel to AB. Then [Composition] the pressure GW is equivalent to the two pressures GW and WV, of which the former is destroyed by the resistance of the plane, and the latter only acts to propel the heavy body downhill. Now WV is to GW as BC is to AB; that is, a weight placed upon an inclined plane is propelled down the plane by such a fraction of the whole pressure of the weight as the height of any section of the plane is of its length.

If then it were required to draw the heavy body G up the plane, any pressure exceeding WV would be sufficient for the purpose; and a pressure equal to WV, applied in the direction AB, would keep the weight at rest.

If a body which is placed at B on an inclined plane be allowed to fall to G, the velocity which it will then have, and the time of describing BG, are determined as follows:—Let BK be vertical, GM horizontal, and GK perpendicular to BG. Then the velocity at G is that which would be acquired by a body falling freely from B to M; and the time of describing BG would be that in which a body falls freely from B to K.

From hence follows immediately the remarkable proposition that if any number of chords be drawn from the highest point of the circle, and if these chords be the sections of as many inclined planes, the times of falling down any two of these chords are the same.

The preceding results are obtained by applying the method explained in the article FALL OF BODIES. Using the notation in that article, and supposing \( \theta \) to be the angle by which the plane is inclined to the horizon, the accelerating force which urges the weight downwards is \( g \sin. \theta \).

Consequently we have the following equations:

\[
\begin{align*}
v &= g \sin. \theta \cdot t, \\
\sin. \theta &= \frac{v}{g}, \\
\sin. \theta &= \frac{v^2}{g}, \text{ and } v = 2g \sin. \theta. \end{align*}
\]

Here \( v \) is the length BG: and \( a \sin. \theta \) is BM.

The preceding results suppose friction not to exist: now let there be a friction, the proportion of which to the pressure is the fraction \( k \). Then W representing the weight, the propelling pressure \( WV \) is \( W \sin. \theta \). But the pressure due to the weight \( gW \) is \( g \cos. \theta \). Consequently \( WV + gW \cos. \theta \) is the amount of pressure down the plane which friction will resist. If then \( k \cos. \theta \) be greater than \( W \sin. \theta \), that is, if \( k \) be greater than \( \tan. \theta \), the weight will not move; if \( k \) be equal to \( \tan. \theta \), the weight will be just poised; if \( k \) be less than \( \tan. \theta \), the weight will move downwards with an accelerating force \( g \sin. \theta - k \cos. \theta \).

There are many remarkable properties connected with the motion or equilibrium of bodies on inclined planes; but the preceding are those which are most fundamental and most frequently required.

**INCOMMENSURABLE, INCOMMENSURABLES, THEORY OF.** The application of arithmetic to any science of concrete magnitude supposes a certain magnitude to be taken as unity, and all other magnitudes to be expressed by the number of times or parts of times which they contain this unit. Such an application therefore requires the assumption of this proposition, that all magnitudes are either fractions or multiples, or compounded of fractions and multiples, of any magnitude that may be named. This proposition is not true; for instance, we shall presently prove that if the side of a square be called \( i \), no number or fraction whatever will exactly represent the diagonal. But we shall also prove that it may be made as nearly true as we please; for instance, that we may find a line as nearly to the diagonal as we please, which shall be a definite arithmetical fraction of the side. Quantities which are so related that when one is capable of being represented in terms of a certain unit the other is not, are
called incommensurables. The reason is as follows:—any two whole numbers or fractions of the same unit must have a common measure; thus all whole numbers have the common measure 1; and any two fractions, $a$ and $b$ (a, b, p, and q being whole numbers), have the common measure $\frac{1}{pq}$, which is contained exactly $aq$ times in the first, and $bp$ times in the second. Conversely, any two magnitudes which have a common measure can be arithmetically represented by the same unit: for if $A$ and $B$ have the common measure $M$, and if this measure be contained $7$ times in $A$ and $10$ times in $B$, then it is evident that by taking $M$ as the unit of measure, and $\frac{1}{7}$ of $A$ and $\frac{1}{10}$ of $B$ to add to $E$. If then there be two magnitudes which cannot be represented by means of the same unit, they cannot have any common measure, and are therefore incommensurable. It also follows from the preceding that any two incommensurable magnitudes must be to one another in the proportion of some one whole number to some other whole number.

To prove that there are such things as incommensurable magnitudes, we shall take the fifth (and last) proposition of the tenth book of Euclid, which demonstrates that the diagonal and the side of a square are incommensurable. Let $D$ be the diagonal and $S$ the side, and if they be not incommensurable, let $a$ and $x$ be two whole numbers of which they are proportional, that is, let $M$ be a common measure, and let $D$ and $S$ severally contain $m$, $a$ and $x$ times; then the square on $D$ will contain the square on $M$ as $m$ to $m$; and the square on $S$ will contain the square on $M$ as $a$ to $a$. But the square on $D$ is double of the square on $S$; therefore $m$ is twice $a$. Now let $a$ and $x$ have no whole common measure except unity, which may be supposed, for if they have a common measure divide both by it, which will give two whole numbers in the same proportion; and so on until no common measure is left. Then because a times $a$ is double of $x$ times $x$, a times $a$ is an even number; whence $a$ is an even number, for if a were odd, $a$ times $a$ would be odd. Therefore $x$ is not an even number, for if it were, $a$ and $x$ would have the common measure 2; whence $x$ is an odd number. Let $k$ be the half of $a$, which is a whole number, since $a$ is even; whence $a = 2k$, and $\frac{x}{k}$ is also an odd, and thence it follows that $\frac{x}{2k}$ = $\frac{1}{2}$. Therefore $x$ is an even number, and $x$ also, for if $x$ were odd $x$ would be odd; whence $x$ is even. But it was just now proved to be odd; so that the same number is both odd and even, which is absurd. This contradiction follows whenever we suppose $S$ and $D$ to be in the proportion of any two whole numbers; consequently $S$ and $D$ are not in the proportion of any two whole numbers, and therefore are incommensurable; for if they were commensurable they would be in the proportion of some two whole numbers.

We have next to prove that any two magnitudes whatsoever, being incommensurable, may be made commensurable by some small alteration as we please in each. Let $A$ and $B$ be two incommensurable magnitudes, and let $K$ be a third magnitude of the same kind, which may be as small as we please, provided only that it be given and known. [Indefinite.] Now, some aliquot part of $K$ must be less than $K$; if not the hundredth, try the thousandth; if not the thousandth, try the millionth, and so on. Whatever $K$ may be, it is possible to divide $A$ into equal parts, each of which shall be less than $K$. Let $M$ be such an aliquot part of $A$, and having divided $A$ into its parts, set off parts equal to $M$ along $B$. Then $A$ and $B$ being incommensurable, $B$ will not contain $M$, the measure of $A$, an exact number of times, but will contain it, say $m$, and another part, $n$, which is also $\frac{1}{m}$ of $M$, say $\frac{1}{m}B$. From this it is obvious that $B$ does not differ from either $BG$ or $BL$ by so much as $GL$, and therefore not by so much as $K$. But $BG$ and $BL$ are both commensurable with $A$, since all three are multiples of $M$. Here there are $BG$ and $BL$ that are incommensurable and the second part, which is a little greater, neither differing from $B$ by so much as $K$, but both commensurable with $A$. Thus it is also evident that two whole numbers may be found which shall be as nearly as we please in the same ratio as two given incommensurable numbers.

The difficulty thus inherent in the application of arithmetic to concrete magnitude is not met with in practice, because no case can arise in which it is necessary to retain magnitudes so small that the question of incommensurability does not immediately arise. It may, however, be permitted. But though exact reasoning, where any error, however small, is to be avoided, it is obvious that the arithmetic of incommensurable magnitudes, and the arithmetic if there be a single incommensurable magnitude, may be confounded. The difficulty was overcome by Euclid, in the manner pointed out in the article PROPORTION, so completely and effectually that nothing has been added to his solution of it except unsuccessful attempts to evade it. Those who, upon each other are said to be divided, can not, as shown in the fifth book of Elements, be divided by either the tacit assumption that all magnitudes are commensurable, which is not true, or some metaphysical play upon words, which a person who feels the rigor of Euclid places on the same shelf with nature's horror of a vacuum, and other explanations of the same kind. We could even point out a celebrated work on geometry which expressly rests on being able to make its errors too small to be perceived by the senses, and asks for no other reception of propositions which involve incommensurables.

The doctrine of incommensurable quantities was carried by Euclid to an extent which would excite as much admiration as the doctrine of the proportion of his work were generally known and read as the production of a person unassisted by algebra. [Irrational Quantities.] INCOMPATIBLES (in Chemistry). Such salts or other compounds as suffer mutual decomposition when made to act upon each other are said to be incompatible. The book of incompatible attempts to determine all that is possible, and the manner in which bodies undergo in consequence of their incompatibility that numerous important processes depend; thus the salts of barytes and those which contain sulphate of barytes always decompose each other, and the sulphate of barytes, which is insoluble and precipitated, being washed, dried, and weighed, indicates the quantity of sulphuric acid, and consequently that of the salt containing it, which is decomposed by the sulphuric acid.

INCONCINNUS INTERVALS, in music, are sounds which agree with no scale, therefore are disagreeable to the ear, and never used in any kind of composition.

INCREMENT and DECREMENT. If the two quantities are considered together, one of which is greater or less than the other, the latter is said to be the former with an increment or decrement. In the older English writings the calculus of differences is called the method of increments and decrements. The philosophy refers to the proportion or the relative change or increase of magnitudes being generated by continued increase or decrease as in the method of fluxions, so that two different magnitudes are spoken of as the same thing in different states, and of the same quantity in different times. Such an idea may, however, be occasionally avoided by his stopping to interpret 'let $A$ become $x+y$ as follows:—' let us, having considered the value of a function of $x$, proceed to consider the alteration which will arise if $x+y$ be written instead of $x$.

INCUS. [Ear.] INDEFINITE means 'not given or defined in magnitude. Thus a definite straight line is that of which the extremities are known; an indefinitely straight line is one of which the direction is given, and which may be supposed to have any length, or which can be lengthened if necessary, without contravening any of the conditions of the problem. Thus in Euclid, in the first book, constructs an equivalent triangle upon a definite straight line; and shows how to draw two lines making with one another the same angle as that made by two given indefinite straight lines.

The term is also a little general, and the use of the word infinite which is found in many mathematical works; namely, the employment of it to avoid the odium which attaches to the word infinite. Thus we hear of making a magnitude indefinitely small, and indefinitely great, and infinitely close to the earth, of the circle being a polygon of an indefinitely great number of sides. In all these cases it would be better, with a proper definition, to use the word infinite at once.

A want of proper distinction between definite and indefinite magnitude makes a great deal of confusion. For instance, it is said that if a straight line be halved, if its half be then halved, and if fresh portions be continually taken, each of which is
the half of the preceding, the result will at last become less than any line which can be named. This is not true of the line which is to be named indefatigable; that is, if we may at any part of the process make it as small as we please: for it is obvious that whatever a line may be, a smaller line can be named. But it is true of a definite line which is to be named indefinitely. For, if we insert at every point of the process: name any line, however small, but such as you name it let it remain; then by continually halving any other line, however great, you must at last arrive at a line which is less than the line from the middle of the preceding. For, a line of a length less than any line which can be named has often occasioned a difficulty by not specifying the time at which it is to be named. The language used by Euclid himself is as follows. Let the straight line AB be given. How is it possible to a question: 'Two unequal magnitudes being given, if it be possible one can be taken away from the other, and the difference be less than what remains, a shorter line than that on which there is no line between the two magnitudes'.

**INDENTURE. [DED.]**

**INDEPENDENTS.** the name of a sect, class, or denomination of English dissenters, one of the three which united form the Three Denominations, the other two being the Presbyterians and the Baptists.

When the principle of resistance to the power which maintains them in or destroys them, is a part of the principle of Christian practice and opinion had received encouragement and was successful, it was not to be expected that nations who recognized the principle would agree among themselves respecting definite articles in their mode of conducting religious freedom. In England this did not happen at the time Puritans and Independents, for in that form and order from the time of the Reformation, with the slight exception of the period of the Commonwealth. There were many people in England who objected to several things which made a part of the constitution of that church; and as their objections consisted very much in the desire to secure from the penalties of punishment which were given to such in its forms, they were called in derision Puritans and Independents, in which allusion was also included to the greater strictness with which they observed their religious duties, and their supposed peculiar preciosity in respect at one to an exactness of conformity to Scripture precedent and to the obligations of a severe morality.

These persons were not all of one mind within themselves. Many united with these distinguishing characteristics the principle that, there being no scriptural authority for the Episcopal order, the government of the church or the superintendence of its ministers ought to be vested not in an individual but in a body of ministers, to be known by the name of Presbyterians. There were others who would have no union or government of the church, who regarded each congregation of faithful men as being in itself a church, and the members of whom, as forming a body which was independent of every other, and competent to its own direction and government without any interference from presbyters, bishops, or from the state itself, this is the pure principle of English Independency.

Robert Brown, a clergyman of the reign of Elizabeth, is generally reputed to be the first person in England who publicly avowed this opinion, and set upon it by the establishment of various such separate churches, which however had no enduring existence. There is some question whether he retained his opinions to the last; but it is certain that after he had given no small trouble to the authorities in the church, he was presented to the living of Achnish in Northamptonshire. He was cited with a warrant to appear before the court of High Commission to answer for his opinions. The record of this case is, however, not extant, and no account of this person may refer to the _Biographia Britannica._ He closed a long and very troubled life in the gaol at Northampton, or very soon after he had left it, in 1630.

One person, with some of them of celebrity in the history of the Puritans, adopted the opinion, but were restrained from acting upon it by the laws then in force for maintaining the Church of England as then established. But when Episcopacy was abolished, there was a large party of these Independents which suddenly presented itself, who had a great share in the struggle which was then made, and who were the means of preventing the establishment of a national church, of which it was the object of being the larger portion of the Puritan body taking part in the contest to form. Cromwell P. C. No. 781.

belonged to the Independents. Dr. John Owen, dean of Christ Church, who was also a time vice-chancellor of the University of Oxford, is considered as the chief ornament of this denomination at the time (the Commonwealth) when it first became considerable.

What the issues might have been of the struggle between the principle of national government and the principle of Presbyterianism cannot now be told, the king being soon restored, and with him the Episcopal church. In 1662 the Act of Uniformity was passed, the object of which was to exclude from the orders of the church those who could not subscribe to the three distinct forms indicated by the Act, and to require divines, in the terms of either of these opinions. The act required a direct acknowledgment of the principle of Episcopacy. The effect of it was, that about 1900 ministers retired from the church. These were the ministers whom Independents mean when they speak of the illustrious two thousand, 'the ejected ministers,' or 'the Bartholomew worthies.' During the reign of Charles II. every effort was made to continue their ministry. But it was all in vain. They, or at least the greater part of them, persisted in preaching, notwithstanding the certain penalties of imprisonment and fine. Hence the Revolution of 1688 freed them from these penalties; one of the first acts of the new government being to grant toleration to them, that is, to allow them to open meeting-houses, or chapels, and to conduct the service of the Lord in their own way.

The Independents were incomparable at that time as compared with the Presbyterians. Both however (and the Baptists also) built chapels for themselves and formed themselves into independent, called the 'Presbyterian congregations and the Independents; and each denomination had its own board or fund.

The Act of Toleration was passed in 1689, and for the seventy years succeeding date the Independent denomination was as flourishing as the time with which the body of Dissenters dwindled, and it would probably by this time have become extinct but for the state of things which we have now to describe.

About the middle of the eighteenth century there was an extraordinary revival of religious zeal under the influence created especially by the Wesleyans and Whitefield. The Dissenters, like the Church, had adopted the principle of the dissenters in religion, and to present the paternal government of God as a source of consolation and hope, to hold out the prospect of future accountableness and of eternal life, to show the evidence which we received from Jesus Christ as the minister and messenger of his heavenly Father, were the principal subjects on which it was the duty of Christian ministers to insist. This it was easy to represent as an abandonment of the principle that the church was distinct from the world; and that Christ had risen from his triumphs in heaven, an independent missionary, to one of the three Methodist bodies; the Wesleyan Methodists, the Whitefield Methodists, or the Countess of Huntingdon's Connection; but there were many who declined to unite themselves with any of these bodies, and formed themselves into separate churches upon the Independent principle. This new body of persons incorporating with themselves the small remains of the old Independents of England, who, in some instances had, throughout the period by some called the period of Religious Indulgence, adhered to the original opinions of the Puritan body at large, which were Calvinism, and had continued to make those opinions prominent in the public services, or joining themselves to the Independents as it were a new form that vast body of Dissenters called Independents. By this accession the Independent denomination now greatly outnumbered the Presbyterian denomination, and for the last few years has determined the proceedings of the body of Dissenters when acting in concert.

Of late however this concert has been disturbed. The body of Presbyterian Dissenters have withdrawn from the union of the three denominations, and the once acknowledged independence of the Presbyterian denomination is restored.

The Independents have numerous chapels in London and in various parts of the country, with many very acceptable and popular ministers. They have also several institutions established, by which the principle of Independence, which maintain the principle of Independence, are in general strongly opposed to a national establishment, whether VoL XII. - 5 N
Episcopal or Presbyterian; and in doctrine vary, from the high Calvinism of the Savoy Confession, which exhibits the doctrines held by the Independents of the time of the Commonwealth, to the most moderate form of orthodoxy.

The number of Independent ministers is about the same as the number of chapels. The following is a list of the colleges and academies which are exclusively confined to the education of ministers for the Independent denomination. Some of them have wealthy endowments for their support. Very few Independent ministers are able to pay the expenses of their own education.

Homerton college, Middlesex, founded in 1720. The number of students is about 20; the term of study is 6 years.

Rotherham college, Masborough, Yorkshire, founded in 1726.

Coward college, University college, London, was, previous to the removal of the institution to London, at Wymondley, Herts. Dr. Doddridge was the first tutor of this college.

Number of students, about 18; term of study, 5 years. This college is more richly endowed than any other dissenting college.

Highbury college, Middlesex, founded in 1778. Number of students, 40; term of study, 4 years.

Western academy, Exeter, founded about 1750.

Airedale college, Undercliffe, near Bradford, Yorkshire.

Newport Pagnell academy, founded in 1783.

Hackney academy, Middlesex, founded in 1802. Term of study, 1 year.

This college has been recently founded at Birmingham.

The following list of the number of Independent chapels in the different counties of England is taken from the Supplement to the 'Congregational Magazine' for the year 1825, and the time when many new Independent chapels have been built:

Bedfordshire, 8; Berkshire, 14; Buckinghamshire, 21; Cambridgeshire, 23; Cheshire, 7; Cornwall, 31; Cumberland, 57; Devonshire, 111; Dorsetshire, 29; Durham, 13; Essex, 64; Gloucestershire, 39; Hampshire, 49; Herefordshire, 11; Hertfordshire, 28; Huntingdonshire, 9; Kent, 44; Lancashire, 38; Leicestershire, 17; Lincolnshire, 40; Middlesex, 4; Monmouthshire, 24; Norfolk, 21; Northamptonshire, 35; Northumberland, 8; Nottinghamshire, 12; Oxfordshire, 14; Rutland, 3; Shropshire, 32; Somersetshire, 47; Staffordshire, 32; Suffolk, 33; Surrey, 27; Sussex, 31; Warwickshire, 30; Westmoreland, 12; Wiltshire, 38; Worcestershire, 10; Yorkshire, 154; North Wales, 172; South Wales, 302—Total, 1683.

Indeterminate, a word which is mostly applied in mathematics, not to the character of a magnitude, but of a problem. A question is said to be indeterminate when it admits of an infinite number of solutions: if the number of solutions, few or many, be finite, the problem is sometimes, but not always, indeterminate. The word indeterminate is also applied to the co-efficients of an assumed form of expansion, and the investigation by which they are then found is called the 'method of indeterminate co-efficients.' But when thus used, the word means nothing more than unknown, and the co-efficients are unknown or undetermined quantities. In the French mathematical writings, the word indetermination should sometimes be translated by indeterminisme, sometimes by arbitrary, and sometimes by undetermined, or unknown.

INDEX. [Exponent.]

INDIA. [Hindustan.]

There are at present three presidencies of India:—


Bengal Calcutta Lord Auckland
Fort St. George (or Madras) Madras Lord Elphinstone
Bhopal Bombay Sir Robert Grant

Lord Auckland is also Governor-General of India. The Bengal Presidency was in Nov. 1834 (under powers given by 3 & 4 Wm. IV., c. 85, s. 38) divided into two, namely, the Presidency of Bengal, and that of Agra; but at the end of 1835 the Agra Presidency merged again into that of Bengal. The Company still retain, by the above act, the power of dividing this Presidency.

Some years ago there was another presidency, called the Presidency of Prince of Wales Island, Singapore, and Malacca; but it now forms part of the Bengal Presidency, though the chief civil officer there is still called governor, on account of certain legal technicalities.

During part of the duration of the Agra Presidency, the seat of government was at Allahabad, a circumstance which has given rise to some confusion. The reader should bear in mind these facts in his perusal of the article Hindustan.

INDIA COMPANY. [East India Company.]

INDIAN CORN. [Maize.]

INDIAN RUBBER. [Caulcus.]

INDIA/NA, one of the states of the North American Union, is bounded on the south-east by the Ohio, which separates it from Kentucky for 260 miles, or 456 miles reckoned along the line of mean low-water springs of the meridian line, which separates it from the state of Ohio for 177 miles, and from the Michigan territory for 10 miles; on the north by the parallel of 41° 47' N. lat. to Lake Michigan for 110 miles, and by the southern extremity of a lake of 60 miles; on the west by a meridian line to the Wabash for 163 miles, and by that river to its mouth for 120 miles direct distance, which line and river separate it from the state of Illinois. It is about 235° 48' and 41° 47' lat.; its circuit is about 900 miles, and its area is 36,500 square miles, or about 14,000 square miles less than the area of England.

The Ohio and the Wabash are the most important rivers of the state; the Wabash is navigable for 163 miles, and flows through the state, having a course first to the north and then to the south-west; it then makes a great bend to the south, and flowing in that direction about 90 miles it becomes the boundary of the state. The Wabash emerges through this state, and along its western boundary, is between 600 and 690 miles from the mouth of which distance it is navigable except at its falls or rapids. All the other principal rivers of the state are tributaries of the Wabash: the White River enters the Wabash about 129 miles above its mouth, and is formed of two main branches, of which the northern has a south-west course of about 300 miles, and the East Fork has also a general south-west course of 400 miles. Both of them receive several large streams of the Ohio, but the more important are the Tippecanoe and Kiel rivers from the north-east, the Mississinewa from the north-east, and Little River from the north-west. White-water rises in Ohio, and entering this state by its southern extremity, after a course of 60 miles, returns to Ohio and falls into the Miami. Many streams fall into the Ohio, but none of much magnitude. The same remark applies to those which flow into Lake Michigan.

The two branches of the Maumee, which flow into Lake Erie, the St. Joseph's and St. Mary's, both enter this state from Ohio before their confluence, and, what is most remarkable, in a course almost directly opposite to that which the principal stream takes after the junction. Both the Kankakes and its rapidity, and the Pikiare, passing through the highlands and between the former has the greater part of its course likewise in it.

This state, like Illinois, has a general slope to the south-west. Like that state also it is, with few exceptions, one of the great prairies of the United States, and is indented by the course of the great bend of the Wabash, and the state is skirted on the south by those eminences called 'Ohio hills,' which sometimes touch the Ohio and sometimes retire from it for two or three miles; they occasionally rise 300 feet above the river. The timbered and prairie lands are more intermixed in this state than is usual; and the alluvial river bottoms are all wide. The soil is admirably suited for grass and grain. The climate is somewhat more equable than that of Illinois, and milder than that of western Pennsylvania. It is everywhere healthy except in the neighbourhood of the wet prairies and swamps. Iron, copper, coal, and salt springs have been found, but the mineral wealth yet unknown. Among its most important caves is one of great extent near the Ohio, in which Epsom salts are found in lamps from one to two pounds weight. A bushel of its earth yields from four to twenty-five pounds of the salt. Nitre and gypsum are found in the state.

Indiana is divided into sixty-four counties. Its population by the last census was 348,081; its increase in ten years was 139 percent. The agricultural products of the state are wheat, corn, and potatoes. The grape is a native plant, and the vine has been found, though not so luxuriant as that in other states, also reared. The most successful vineyards in the United States are at Vevay on the Ohio. They are managed by the Swiss settlers at that place, and consist of native species of the vine. The foreign being found too succulent in that soil and climate.

A canal designed to connect the Wabash from the mouth
of the Tippecanoe with Lake Erie through the Maumee River is in progress, and when completed it will probably be the channel by which Indiana and a part of Illinois will receive their foreign merchandise from New York. Its whole length will be 211 miles, of which about 40 miles is in Ohio. In June, 1834, there was but one bank in the state, with a capital of 150,000 dollars. Another has been chartered.

Indianapolis, on the east bank of White River, in 39° 47' N. lat., is the capital of Indiana. It is near the centre of the state, and was founded in 1812. The population of Indianapolis in 1830 was only 1250, but, like other towns in the state, it is rapidly increasing. Vincennes, on the Wabash, 150 miles above its mouth, was settled by the French about 1690: the population is about 1800. New Albany, on the Ohio, a town below Louisville, is the most important town in the state, containing a population of 3500. Jeffersonville, opposite to Louisville, is a small but handsome town with 1600 inhabitants. Madison, midway between Louisville and Vicksburg, is the most important town in Harrodsburg; its population is 5000. Vevay, on the same river, 45 miles below Cincinnati, contains about 1500 inhabitants, chiefly Swiss. New Harmony, on the Wabash, was founded in 1814 by a society of Germans, under George Rapp, who some years afterwards sold the establishment to Robert Owen, and removed with his followers to Pennsylvania. There is a college at Bloomington, and another at South Bend, the only important educational institutions in the state. The Baptists are the most numerous sect, and next to them the Presbyterians and Methodists. The general assembly consists of a senate of 30 members, and a house of representatives of 60 members. The state government is typical of the American system; the state do not generally exceed 40,000 dollars. Indiana was included in the cession of Virginia to the United States in 1787. It was placed under a territorial government with Illinois and Michigan on October 26, 1809. In 1816 it became a state and formed its present constitution.

About 5000 Indians still remain in the northern part of the state: they are principally Pottawatamies and Miami.

INDIANITE. This mineral occurs in granular masses. It is white or yellowish, somewhat opaque, and glassy when fresh. It is easily detached in large plates: the fracture is conchoidal; the specific gravity is 2.74; intransitive; intumescent in water; it occurs associated with garnet, felspar, fibrolite, and hornblende.

INDICATORIAE. Mr. Swainson's name for the Honey Guides, a subfamily of cuckoos (Cuculidae).

There appears to be but one genus, Indicator (Le Vail.), which is thus characterised. Bill straight, fitch-like, the base triangular; the sides compressed. Oulmen and gonys equally inclined towards the tip; gonys angulated. Wings lengthened, pointed. Tail moderate, rounded. Feet short, large, naked, with broad claws. Toes not webbed.

Mr. Swainson is of opinion that the nearest approach to the creepers yet known is made by the African Home-guides, whose bill is not unlike Orthomysis; and he adds that the European is not in any way inferior in the perpendicular manner in which any others of this family: the same zoologist has pointed out the affinities of Indicator to Buphaga.

The species are not numerous. The stories told of these birds indicating the nests of grizzled and guiding men to them by their motions and cries, from the time of Sparman downwards, appear to be perfectly authentic, though some great travellers affected to disbelieve them, Mr. Swainson enumerates Bruce and Bruce and a long list of other men who have heard or been shown the beautiful and inexorable red of this bird. Mr. Swainson then proceeds to describe his Indicator leucoticus, (Ind. albumriste, Temm.) (Birds of Western Africa; Naturalist's Library; Ornithology, vol. viii., 1837.) Mr. Swainson then proceeds to describe his Indicator leucoticus, (Ind. albumriste, Temm.) (Birds of Western Africa; Naturalist's Library; Ornithology, vol. viii., 1837.)

Mr. Blyth gives a description of Indicator coccineus in South Africa (1835), says, 'The little honey-sucker, or Indicator, kept fluttering before us in the cry of cherry, cherry, as if inviting us to follow. It is frequently known to conduct travellers to a nest of honey deposited in the hollow of a tree. I have however heard many instances mentioned of its stopping short of the hive, and hovering over a spot where a lion or tiger has been reposing, justly establishing its character as an indicator. Mr. Van der Neer informed me that he was once induced to follow it in expectation of discovering honey; and on pushing through the thick brushwood that enveloped the trunk of a tree over which the indicator was hovering, he suddenly upon a leopard: at the same instant the animal made a spring in a contrary direction, and, much to his gratification, disappeared, without attempting to do him any injury, being evidently much as surprised at the intrusion as the Veldt corbett had been at so unexpected a encounter.'

Geographical Distribution of the Indicatorinae.—Africa.

The other subfamilies belonging to the Cuculidae are:


The Coccynae, or Horn-billed Cuckoos, are characterised as having the wings short and rounded, the nostril linear, the bill curved, the margins of the upper mandible rounded, the tail very long and concealed.

The genera comprised by Mr. Swainson under this subfamily are:

1. Seriornis, which has the bill short and strong, the gonys thick, angulated, and arched; the culmen thickened and arched; the tarsus and middle toe equal, the lateral toes unequal, and the claws short.

Example, Seriornis cristatus (Sw.)—Cuculus cristatus.—Indonesia.

2. Zanclostomus. Bill much compressed throughout, gonys curved downwards, culmen and upper mandible greatly curved, and the basal margin considerably dilated; wings, tail, and feet as in Seriornis; the lateral toes unequal, and the upper mandible not curved outwards, but slightly dilated. Locality, Old World; Zanclostomus vultor (Plate 39, Fig. 74; A. S. A. H. R. I. H. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.)

Example, Zanclostomus civet (Linnaeus), Phoenicoparrus javanicus (Vieillot).—Java.

3. Cuculus (Vieillot). Bill moderate, thickened at the base, compressed; gonys straight; the basal margin of the upper mandible not curved outwards, and scarcely dilated; the tarsus and middle toe of equal length; lateral toes unequal. Locality, America only. Example, Cuculus vagans (Vieillot).—Brazil.

4. Coccyzus (Bocage). Bill moderate, thickened at the base, compressed; gonys straight; the basal margin of the upper mandible not curved outwards, and scarcely dilated; tarsus and middle toe of equal length; lateral toes unequal. Locality, South America. Example, Coccyzus surinamensis (Sw.)—Brazil.

5. Centropus (Jefferson). Bill strong; tarsus and middle toe equal; anterior claws slightly unequal; hinder claw very long and nearly straight. Locality, Africa. Example, Centropus senegallensis (Vieillot). Mr. Salt, in his 'Travels,' notices this bird as common in the mountainous districts (Abyssinian), generally sitting in the thick timber and thorny bushes, whence it is difficult to drive it.

Geographical Distribution of the Coccyzus.—Asia, Africa, America.

The Coccyzus, or Horn-bill Cuckoos, consist of the following genera:

1. Crotaphaga. (Crotaphaga, vol. viii.)

2. Dasylophus. Bill large, strong and compressed throughout; gonys angulated; culmen gradually arched; frontal feathers long; tail-feathers and covert-feathers white. The nostril bar, oval, close to the gape, placed in a groove of the bill, and defended by stiff, erect bristles. (Sw.)—Ex. Dasylophus superciliosus. (Sw.)—Phoenicoparrus eurystomus (Vieillot). (Sw.)—Phoenicoparrus eurystomus. geographical distribution of the Crotaphaga, Africa, America.

The Leptostominae, or Long-tailed Cuckoos, consist of the following genera:

1. Xiphocolax (Vieillot). Bill lengthened, longer than the head, and straight, except towards the tip; the culmen convex, the gonys straight, the upper mandible with its margins finely crenated; orbits naked; wings moderate, second and third quills longest; feet short.—Example, Xiphocolax unicolor. (Sw. & T.)

2 N 3
Anadema. General structure of Sauromachia: but the upper mandible is only notched at the tip, the margins are entire; wings much rounded, the four first quills graduated. (Sw.) Locality, India. Example, Anadema rufescens. Leptostoma. Bill very long and entire; wings very short and rounded. Accounted for by long and indigo; tarsus much longer than the toes. Example, Leptostoma longicoluca.

Mr. Swainson considers Leptostoma to be the glottatorial type of the Cuculidae. Centropus he also considers to be a gradual type.

Geographical Distribution of the Leptostominae, India, America. [Cuculidae: Cuculinae.] INDICATION; CYCLE OF INDICATION. (Period of Reproduction.)

INDICATION is a written accusation of one or more persons of a crime or misdemeanor preferred to and presented by a grand jury. The sheriff is bound to return to every session of the county and term of the grand jury. They are prepared and written in the articles of the inquiry by a charge from the presiding judge, and then withdrawn to sit and receive bills of accusation, which are presented to them in the name of the crown, but at the suit of the accuser. The decision of the grand jury is not in the nature of a verdict upon the guilt of the accused, but merely the expression of their opinion that from the case made by the prosecutor the matter is fit to be presented to a petit jury, and that therefore the inquiry the evidence in support of the accusation only is heard. If the grand jury think the accusation groundless, they indorse upon the bill 'not a true bill,' or 'not found' by the contrary. A true bill has been returned by a bill twelve at least of the grand jury must concur. Antiquity of words, "ignoramus" and "hilla versa" were used for the like purposes. When a bill is found to be a true bill, the accused takes place in the usual form; and when the bill is found not to be true, or, as it is frequently called, 'ignored,' the accused is discharged, but a new bill may be preferred against him before the same or another grand jury. Sometimes, when the bill is ignored upon account of some slip or error, the judge will direct the accused to be kept in custody, in order to prevent him from escaping from justice. (4 Bl. Com.)

INDIES, EAST. (East India.)

INDIGENOUS. (Dyestuf.)

INDIGO, a well known and beautiful blue vegetable colour, which is extensively employed in dyeing and calico printing.

INDIGOGENAE. (Indigofera.)

Chemistry. — Indigo is found in the leaves of several plants, in which it occurs in a peculiar and very different state from that in which it constitutes blue indigo. When the leaves are dried, and is not the least vegetable matter, and it is then cut, and put, either recent or previously dried, into vats, and covered with water; fermentation takes place accompanied with the evolution of carbonic acid and probably other gaseous products, and the yellow liquor is covered with a froth which in a little time becomes a violet colour, and a substance is dissolved which is rendered blue by absorbing the oxygen of the air, and being then rendered insoluble. It is precipitated; and this, when collected and dried, is indigo.

The usual appearance of indigo as it occurs in commerce is that of nearly cubical cakes of an intense blue colour and usually contains most excellent indigo when rendered insoluble by a hard body assumes a fine copper-red polish. Indigo seldom contains more than about half its weight of pure vegetable matter, and frequently much less.

According to Berrallius the indigo of commerce, besides some part of the free indigo, contains from 15 to 20 per cent. of indigo, indigo-red, indigo-brown, and a glutinous matter. When common indigo has been treated with dilute acids, alkalis, and alcohol, the remainder is indigo-blue, or indigotin, or indigo, nearly in a state of purity. The chemical properties of this are, that it is insoluble in water or alcohol; neither dilute acids nor alkaline solutions act upon it; when heated to between 300° and 350° it rises in purple vapour, and consists of a prismatic crystal, hard, heavy, without the least soluble by strong sulphuric acid, and what is remarkable and unusual is, that, unlike most vegetable matter, it neither decomposes nor is decomposed by the acid; the solution has an intense blue colour, and is employed occasionally in dyeing, under the name of Saxon or liquid blue.

Chemists are not agreed as to the nature of this solution of indigotin; it has been called sulphate of indigo. According to Berrallius it contains indigo-blue, sulphate of indigo, and hyposulphate of indigo: the two last compounds have also been called sulphoindigotic acid and hyposulphoindigotic acid. They combine with oxides to form salts of a fine blue colour.

Of all the properties of indigotin the most remarkable is its dooxidization by bodies which have a powerful affinity for oxygen, such as the protocatechuic acid, the solution of the other indigotic acids, and also by the united action of nitric and sulphuric acids. It is by the employment of these means, and especially of the protocatechuic acid [Blue], that indigo is rendered soluble in lime-water and alkaline solutions, and thus applied to the fixing of indigotin upon cloth. According to Dumas indigotin is composed of

| Hydrogen | 3°97 or eqs. 15 |
| Carbon   | 72°34       |
| Oxygen  | 12°50       |
| Azote   | 11°13       |

100°04

Indigotin Acid is prepared by treating indigotin with twice its weight of hot nitric acid of gr. 1°260. When pure it has the form of colourless needles, which are but slightly soluble in cold water, but readily soluble in hot water and alcohol, and will be found to be a strong reducing agent. It gives off five times more oxygen; this it acquires by decomposing the nitric acid. It is a feeble acid, and acts faintly upon limus, but it decomposes carbontonates. When heated in a tube, it emits a sublime white smoke, which is composed of iron, sulphur, and phosphorus, and is rapidly taken up by water; it takes fire and burns with much smoke.

Carbustatic Acid is obtained as already described by the action of a large quantity of nitric acid upon indigo. The substances containing the nitrosyl group lose their colour, and indigo-brown, indigo-red, and glutinous, are quite unimportant substances, except that they render common indigo impure by their presence.

Manufacture and Trade. — On the discovery of Mexico the use of Indigo was found to be common among the Aztecs, who employed it to impart a blue colour to their cotton fabrics. After the conquest of Spain the plant was extensively cultivated in Central America, and in the Antilles, and its produce in those parts was for a long time greatly superior to that made in India. Since the beginning of this century however the cultivation and preparation of indigo in India have been so much improved that the imports from Bengal have again increased. The governments of the East India Companies have recommended the highest prices in the markets of Europe for the cultivation in our West India colonies has long ago ceased.

In the indigo factories of Bengal it is the custom for the European factors to provide the seed and to advance the money necessary for the cultivation to the ryots, or native farmers, who are bound to deliver to the factor, by whom they are thus supplied, the whole number of plants produced, at a price agreed upon between them. The terms of these contracts have usually been such, that any failure in the crop from bad seasons or other accidental circumstances has given to the factor command over the cultivator to whom advances have been made; the farmer by this means becomes dependent upon his creditor, so that he is compelled to deal year after year exclusively with the same factor. These factors are frequently conducted upon a very large scale, and a considerable amount of capital is engaged in them.

The seed is sown in straight furrows about a foot apart, and usually in the spring season. Great care is required to keep the young plantation moist, and to prevent the seed from being deprived of water in the early stages of vegetation. When the plants begin to blossom, which usually occurs about two months from the sowing of the seed, they are cut down about one or two inches above the ground, collected into bundles, and delivered to the factory. A subsequent growth from the same root is again ready for the sickle in six or eight weeks, and four crops are sometimes thus obtained from one sowing; consequently the cultivated area is soluable by strong sulphuric acid, and it is seldom found profitable in India to obtain more than four harvests from the same roots. Among the Arab
cultivators in Egypt the seed is sown only once in seven years, and two crops are obtained each year.

Two distinct methods are pursued for extracting the colouring matter from the plants. In most cases it is extracted by fermentation, but in some instances by scalding the plants in boiling water. The latter process is more costly, and may be considered as being a partial fermentation.

In the country to which the process is usually applied, the seeds of the plant are subjected to the process, as colouring matter is yielded by every part. Where fermentation is the process used, three wooden vats are provided, and so placed at different levels that the contents of the highest be readily transferred to the second, and again from this to the third or lowest vat. The upper vessel, which is also the largest, is called the steeping vat; in this the plants are loosely laid, to allow the liquor to cover the bottom, and water is poured over them until they are all covered to the depth of three inches: heavy wooden frames are then laid upon the plants to prevent their rising during the fermentative process. In about 18 hours this process usually begins, the plants swell and give off large quantities of gas, which mingle with a lively green colour. This fermentation is allowed to go on until all the colouring matter, or grain, as it is technically called, is extracted, after which the turmeric liquor is drawn off into the second vat. If this is done too soon there will be a loss of colouring product, and if it is deferred too long, so that the putrefactive fermentation commences, the colour of the dye will be injured. Immediately upon the drawing off of the liquor from the steeping vat, this is cleared from the refuse plants and washed, and a supply of fresh plants is subjected to the process. The turmeric liquor, upon being received into the second vat, is allowed to stand for a short time, sufficient to be separated from the supernatant water, or from the water. A great quantity of air bubbles are driven off by this beating, and the colour of the contents of the vat changes from green to deep blue. Some lime-water is added at this time, which assists the separation of the grain. This beating process must be continued so long as to separate all the grain, but if carried beyond this point a second fermentation would begin, which would materially injure the quality of the indigo.

When the grain has subsided to the bottom of the vat the supernatant liquor is drawn off, and the grain is discharged into the third vat, where a further sub stance and drawing off of liquor from, and the grain is next transferred to the sacks, which are hung up to drain; it is then placed in small wooden boxes, which are exposed to the air and sun until all moisture is evaporated, when the process is completed, and the indigo is packed in chests for shipment.

The method here described is that which is commonly pursued in America and in some parts of India; but in the great dyeing factories of Bengal some part of the drying is effected by exposure to the sun. When the beating process has been performed, the contents of the second vat are transferred to a hoister, the bottom of which is of iron, and the sides are of masonry. In this the evaporation is carried on until the consistency is sufficient to be transferred to large cloths, in which it is gradually dried by exposure to the air and sun. The great advantage of this mode of proceeding is, that it effectually prevents any fermentation after the first separation of the grain, which evil is very likely to be experienced, notwithstanding the utmost care is used to prevent it.

The method of extracting the dyeing matter from the plants by scalding is not so much employed. Indigo thus made is said to have less colouring matter, and the dye is accounted to be less permanent than that extracted by fermentation. The scalding or boiling is performed in vessels of from thirty to eighty gallons, to which fire is applied until all the colouring matter is extracted. The liquor is then strained into other vessels and beaten, as already described for the separation of the grain. The matter is then left for sub stance, when the supernatant liquor is drawn off, and the grain is put into bags to drain. The remaining drying processes are performed as already described.

The trade in indigo is of considerable importance to the manufacturing industries of this country, as it forms a very convenient means of remittance in return for the outward shipments of British manufactures. A great part of what is thus brought to England is re-exported, and this trade is of serious advantage to the country, for from this country, the United Kingdom, during each of the ten years from 1827 to 1837, were as follows:

---

History.—Its common name in India is neel, or teal, and its Sanscrit name is neele. From these no doubt the Persian neelak and the Arabic neelak were derived. In the Arabic it is also called kasheer-neel, juice or extract of the neel-plant. It is noticed by Avicenna under the name of neel, but has been erroneously considered in the Latin translation to be the analogous dyeing substance called blue, produced by Indigo tinctoria, a plant not found in India. It was undoubted known to the Greeks and Romans, as Beckman has shown in the 4th volume of his History of Inventions.

The accounts given by Dioscorides of Indicum (Indis), lib. v. c. 107, and by Pliny of Indicum, lib. xxxv. c. 27, are substantially the same. The name does not give us any assistance, for, like Persic, Armenic, and others, the name is given to plants and things in all countries, and this name was procured, and Pliny says, 'ex India venit.' Two kinds are described; one is unknown, but described as 'found swimming upon the coopers or vats in purple dyers' workshops,' according to the translation of Holland. In the same edition of Dioscorides the chapter is entitled 'On the stone Indicum ('vrs Indisce livii), and it has hence been supposed that the substance described was of a mineral nature,
but in the same way catechu was and still is frequently called *Terra Japonica.* That the true indigo was known is clear from the direction given by Pliny for detecting sophistica- tions: 'The proof thereof is by fire, for cast the right indi- 

dico upon live coals it yieldeth a flame of most excellent 

purple.' India is moreover mentioned in the *Periplus* of 

Arrian as exported from Barbiriko to the Indus to Egypt. 

That it was known at still earlier periods is probable, as 

Mr. Thomson, from the effects of chemical tests on the blue 

stains with which the selvage of Egyptian cloths is blue 

dyed, concludes that they were dyed with indigo. (Ep. 

Antiq., ii. p. 190.) The earliest notice of this substance in 

modern Europe is in a Latin treaty between Bologna and 

Pavia, where a 'indigo' is mentioned as a 'customable 

article.' Marco Polo, in the thirteenth cen-


tury, describes the process of making 'endium' in the 

kingdom of Coulum, or Colim. In the seventeenth century 

so 


great was the consumption of indigo in Europe that the 

sale of wood and dye for the use of indigo was prohibited, which, in an imperial edict published in 

1634, was denominated the devil's dye, as hops were in 

England prohibited as 'the wicked weed.' The Nurem-

burgers, therefore, compelled the dyers annually to swear 

that they would never use indigo. (Phil. of Perm. Colours, 

l. p. 166.)

Dr. Bancroft has remarked that many plants 

employed to produce the blue stain contain more or less of the basic dye, indigo, combined with a small 

portion of oxygen, and therefore capable of being extracted and held in solution by water, 

long enough at least for its application as a dye. He 

thinks that it was not until the introduction of red-dye 

witnesses from all countries, excepting India, should have thought it suf- 

ficient to pound or grind the plants naturally containing 

this basis, and leaving it to the dyer to adopt such proc- 

esses; for, with the basis in such a small 

portion of oxygen as, when assisted by the dyeing process, 

would fix it permanently in the cloth and fully manifest its 

blue colour. He further observes—'By what circumstance 

or chance the genus of hardwoods for which the Indus was a favourite 

thousand years ago to be discovered, it is impossible to say; but the blue 

colourable matter of the indigo plant might be ex- 

tracted, oxygenated, and precipitated free from almost all the 

other matters naturally combined with it, and afterwards 

brought into use by the dyers in the common manner.'

Dr. Bancroft tells us, moreover, that the first indigo 

was cultivated by the Persians as a pole-dye, and by the 

Spaniards in the first centuries after the discovery of the 

New World. Wight and Arnott state, 'We have not sufficient materials to enable us to determine if I. *Anil* be a distinct species: we know of no distinguishing character, unless it is to be 

found in two different countries, or in different climates.' But the authors of the 'Flore de Senegambia' consider them 

distinct, as do most botanists.

I. *cerulea*, Roche. This is a new species described by 

Dr. Roxburgh, and called *karneli* in Telingsa by the 

natives of the peninsula of India. Dr. R. states that from 

the leaves of this plant he had often extracted a most 

beautiful light indigo, more so than he ever could from the common indigo plant, or even from *Nerium Tinctorium,* and in a large proportion. He says it is a erect shrubby 

species, growing in dry, barren, uncultivated ground, to the 

height of three feet, and higher in good garden soil. It 

flowers late in the season, and Mr. De Candolle observes—' *Nerium* is commonly cultivated for its leaves, and at the same time the berries yield a dye, of which the most approved is that extracted from *I. tinctoria.* Dr. R. states that it comes near to *I. argentea,* Linn. The process he adopted for extracting indigo from this plant was similar to that practiced with 

the leaves of *Nerium Tinctorium,* or the sealding pro- 

cess.

I. *argentea* is a species usually stated to be a native of India, and the authority of Roxburgh might be cited for the fact. Wight and Arnott state that *I. 

argentea* of Linnans is a species more properly cultivated in Egypt and Barbary for the sake of its indigo, and, according to Humboldt, also in America. The Indian species which has been confounded with it is *I. paucifolia* of Delle, which has alternate leaflets, and linear, slightly compressed, tortoise leaflets. *I. argentea* is shrub, 

round branches, which appear of a silvery whiteness from 

pressed pubescent; leaves pinnate, one to two-pinnate; 

opposite, ovate, silky-pubescent, smaller than the leaf; 

pubescent, more compressed, 

concentric, 2 to 4-seeded.

*I. dispersa.* This, according to Humboldt, is also one of the species most approved in America, and is also the most antient hieroglyphical painting of the Mexicans. Dr. Bancroft considers it as the species called Guatemala 

indigo, which yields fine pulp, but is less productive than the other species. The stem is more than two feet long; leaves pubescent, to 4–6-pinnate; leaflets elliptico- 

oblong, smooth; racemes slender, larger than the leaf; 

and, round, suborbicular, mucronate; 2–seeded.

Plants of other genera are also employed for obtaining indigo; as Wrightia (*Nerium, Roxb.*) tinctoria, Mandarina 

*tinctoria,* Galesia *tinctoria,* but especially the two first. Dr. Bancroft (vol. l., p. 190) also adds *Splanthes tinctoria,* 

Pericallis *succulent,* Chieranthus *femorale,* also a species of 

Bignonia, and *Ranunculus,* of the African genera, with 

Amorphophalus and Sophora *tinctoria,* as also yielding a 

blue dye, or coarse sorts of indigo.

INDIVISIBLES. [Cavalier.]}

INDIES, a name of Russia, Malwa, and the capital of the dominions of Holkar, which at present consist of about 11,500 square miles on both sides of the river 

Nerbuda. Indore, which stands in 23° 42' N. lat. and 

75° 50' long., on the right bank of the river, was, at a site having been wholly destroyed by fire by Sindia, in 1801, 

during the war between that chief and Holkar. The ex- 

tension of the city since 1818 has been extremely rapid, and 

its population has increased in the last twenty years from 

10,000 to 60,000 souls. The streets are numerous and very 

paved; a great proportion of the houses are of two stories, 

and built of masonry; but there is no uniformity of plan, 

and, as is common in India, there are many dwellings in- 

terpreted by the most exact description. The raja's palace, 

which was begun in 1819, is a large quadrangular granite
building. The English residency is without the city, about a mile to the south. Indore is 371 miles from Nagpur, 456 miles from Bombay, and 1630 miles from Calcutta, all travelling distances.

INDRA, a river in France belonging to the system of the Loire. It rises in the hilly region of central France, from which the mountains of Auvergne form the nucleus. The source of the Indre is not however in the Auvergnat mountains, but near Boussec, just within the department of Cher, and on the right bank of a stream which extends from Auvergne towards the north. From its source it flows north-west past St. Brevé and Le Châtre, both in the department of Indre, to Châteauroux, capital of that department, receiving on its right the small rivers of Messines and of the Vouvre or Vannée, which receives the Magny. Close above Châteauroux it joins on the right bank by the Angotin. From Châteauroux it pursues its course to the north-west by Buanaupis, Cusset, and of the department of Indre, and Leoch and Cormery, both in the department of Indre and Loire. From Cormery it gradually turns westward, and flows past Montbazon and Azay le Rideau into the Loire. Its whole length is about 115 miles, for about 36 of which, namely from Lechos, it is navigable. Between Leochs and Cormery it receives the Indroye. Near its junction with the Loire this river is divided into several arms, one of which joins the Indre.

INDRE, a department of central France, bounded on the north by that of Loir et Cher, on the east by that of Cher, on the south by those of Creuse and Haute Vienne, on the south-west by the department of Charente, and on the north by that of Indre et Loire. Its form is compact. The greatest length is from the bank of the Cher, on the north, to near Aigueperse, on the south, 60 miles. The greatest breadth, as might angles to the length, is from the neighbourhood of St. Chartier in the east to the bank of the Gartempe, on the west, about the same distance. Its area is estimated at 2969 square miles, which is rather more than that of Lincolnshire. The population, by the census of 1831, was 226,350. It is divided into 16 arrondissements, and 49 cantons, inhabited by 12,061 in five years; and giving about 96 or 97 inhabitants to a square mile, considerably below the population of Lincolnshire, and less than two-thirds of the average population of the department. It contains, the capital, is on the left bank of the Indre, in 4° 49' N. lat., and 1° 41' E., long. 143 miles in a direct line south-west by the barriers of Paris, or 157 miles by the road through Orleans and Vienne.

The surface of the department is generally level, but there are some hills of small elevation on the western side. The Indre enters the department at the south-east corner and runs north-east for some distance, but the north-west direction divides it into two nearly equal parts. No part of its navigation is in this department. All its tributaries mentioned in the preceding article belong to this department. The Gartempe, and the Gartempe has its source just within the boundary. The eastern side of the department is watered by the tributaries of the Cher, which itself touches the boundary on the north side. Of these tributaries the principal are the Arnon, which just touches the eastern boundary, with its feeder the Témeul the Fena, with its feeder the Nahon, which receives the Moulins; and the Monon. The western side of the department is watered by the Creuse, a tributary of the Vienne, which crosses this department in a north-west direction, and receives the Bousane, into which flows the Gourdon. The Gartempe, a feeder of the Creuse, just touches the western border; its tributary, the Anglin, or Langin, receives the Benaise, and the Claise, a feeder of the Creuse, waters a portion of the western side. That portion of the department which lies between the Creuse and its feeder the Claise is covered by a very considerable extent, but of little depth. These large sheets of water produce, in the heats of summer, pestilential exhalations, very injurious to animal life. Besides the pools there are many springs or freshs, which in that district are called 'Brevins,' would bring many thousand acres into cultivation, besides removing a perpetual source of disease.

The department is entirely destitute of inland navigation. The road from Paris or Orleans to Limoges passes through it, entering it on the north-east side, and passing through Vatan, Châteauroux, and Argenton. There are roads from Châteauroux to Guéret (Creuse), Tours (Indre et Loire), Blois (Loir et Cher), and Bourges (Cher). The aggregate length of the government roads is about 250 miles, of which about three-fourths are in good repair; the remainder is out of repair or unfinished. The aggregate length of the Routes Départementales is about 192 miles, of which nearly one-half is out of repair or unfinished. The bye-roads and paths have a total length of nearly 3300 miles.

A line drawn north-west through Châteauroux determines the geological character of the department. North-west of that line is found the chalk which surrounds the Paris basin [FRANCE, Geological Chasour, vol. 2, p. 409]; south-east of it are formations between the chalk and the marl, which is near to the south. Along the southern border of the department the primitive rocks are found. Iron is abundant; many mines are wrought; and there are excellent quarries of marble, mullstones, sandstone, and limestone. Stones for lithography, gun-flints, and potters' clay are also procured.

The air is generally tolerably mild; but there is a sensible difference of temperature in different parts of the department. In the marshy districts the climate is constantly moist and unhealthy. The prevailing winds are the north-east, south, west, and north-west, especially the last, which is frequently injurious to the crops. The more common diseases are consumption, malaria, fevers, inflammation of the lungs, and rheumatism. In the marshy districts sudden blindness is not unfrequent, but it admits of cure.

The soil varies much; but, excepting in the sandy tracts, which form tolerably wide heaths, it is considered fertile. Agriculture is in a backward state, but the produce is beyond the consumption of the department. The species of grain chiefly cultivated are wheat, rye, barley, oats, and buck wheat. The vine is cultivated in all parts of the department, though not to any great extent; the wine produced is of very middling quality; half of it is exported. The cultivation of hemp is general. Very little fruit is grown, except grapes, and the art of preserving is not much known. The quantity of woodland is considerable; the oak is the most common timber tree, and there are the hornbeam, the beech, the hirch, and the siber. The ash, the oak, and the hornbeam, are the best woods. The pasture lands are extensive; a great number of horned cattle are reared; also of horses, the breed of which is receiving continual improvement, and sheep. The breed of sheep has been much attended to; and the wool has long been considered very good, and constitutes a considerable portion of the wealth of the department. Swine and goats are numerous, and poultry is abundant, especially geese and turkeys. Cattle breeds are neither very fine nor very fine, and in the north the fat is not so good. There is but little game. The rivers and pools abound in fish, but the practice of dragging the pools every two years prevents their growing to a sufficient size.

The department is divided into four arrondissements, as follows:

<table>
<thead>
<tr>
<th>Arrondissement</th>
<th>Situation</th>
<th>Area in square miles</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Châteauroux, Central &amp; N. W.</td>
<td>956</td>
<td>96,908</td>
<td>55</td>
</tr>
<tr>
<td>Le Blanc</td>
<td>725</td>
<td>75,789</td>
<td>56</td>
</tr>
<tr>
<td>Issoudun</td>
<td>499</td>
<td>47,572</td>
<td>49</td>
</tr>
<tr>
<td>Le Châte</td>
<td>528</td>
<td>56,006</td>
<td>59</td>
</tr>
<tr>
<td>Total</td>
<td>2669</td>
<td>257,350</td>
<td>249</td>
</tr>
</tbody>
</table>

There are 23 cantons, or districts under the jurisdiction of a justice of the peace.

The arrondissement of Châteauroux contains Châteauroux on the 14th of October, 1836, and Châteauroux, Dieu, or Bourg Deols (pop. 1792 town, 2113 commune), which is in fact a suburb of Châteauroux [Châteauroux; Bourg]; Argenton (pop. 2458 town, 3644 commune), on the Loire, and the Mouton; Lepron (vol. 243 town, 3085 commune), on the Moulins; Valençay (pop. 3095), on the Nahon; Buanaupis (pop. 279 town, 4416 commune), Faluau, and Chatillon (pop. 2289 town, 3339 commune), all on the Indre; and Argy, near that river.

Argenton was a place of note in the time of the Romans. It was called Argamomagus, and was on the frontier of the Bituriges and the Pictones or Pictavi. Many medals and other antiquities have been found here. An ancient fortress was demolished by Louis XIV. — some ruins yet remain.
Levroux is also of great antiquity. The Romans erected there a fortress, of which a tower is still standing, and the remains of an amphitheatre and other antiquities may still be traced. It is supposed that its Roman name was Gabatium. The town is surrounded with walls, which are flanked with towers and strengthened by a ditch. There is an ancient castle of the middle ages. Valanxay has a small château, which was the residence of the late king of Spain, Ferdinand VII., during his captivity in France. Simancas is the seat of a considerable trade in wool.

In the arrondissement of Le Blanc are Le Blanc (population, in 1836, 5,093), on the Creuse, [BLANC, L.:] Belabre, on the River La, and Sauval, on the Vienne. St. Benoist, "sur-le-Sault," between the Anglin and the Aboûx; Mézières and Marizay, on the Claise; and Assy le Furon, near the same river. St. Benoist is in the midst of the most beautiful scenery of the department. The roads and cascade of Montgiron, in the neighbourhood of it, are of great beauty.

The population given above, where not otherwise noticed, is from the returns of 1831, and is that of the whole commune.

The iron-works of the department are numerous and important: they send out cast-iron, bar-iron, pig-iron, and sheet-iron, and iron-works, at the lignes, i.e., the measure of iron. Red and black earthenware are manufactured; also woolen cloths of various qualities, common hats, cotton hosery, and a small quantity of linens. There are also some tan-yards, paper-mills, and dye-houses; and one manufacturing of saltpetre. The exports of the department consist of grain, cattle, wool, woolen cloths, and iron.

The department of Indre constitutes with that of Cher the archiepiscopal diocese of Bourges. It is bounded within the jurisdiction of the Cour Rabbin and the circuit of the Académie Universitaire of that city. It is included in the fifteenth military division, the head-quarters of which are at Bourges. It sends four members to the Chamber of Deputies.

Education is very little diffused in this part of France; it is the lowest in this respect of all the departments except seven. Of every 100 young men enrolled in the military service, 17 could not read.

This department originally formed part of the territory of the Bitturges Cubi, a Celtic nation; and in the latter Roman division of Gaul was included in the province of Aquitania Prima. It afterwards passed under the dominion of the Visigoths, from whom it was wrested by the Franks under Clovis. In the middle ages it constituted part of the province of Berry, or Berry. [BERRY.]

Indre et Loire, a department of central France, bounded on the north by that of Sarthe; on the north-east, by that of Loir et Cher; on the south-east and south, by that of Indre; on the south-west, by that of Vienne; and on the west, by that of Maine. Its form is irregular: the greatest length is from north to south, 68 miles; its greatest breadth at right angles to the length is nearly 60 miles. Its area is estimated at 2,371 square miles, very nearly that of the English counties of Dorsetshire and Wiltshire: the population by the census of 1831 was 297,016; by that of 1836 it was 304,271, showing an increase of 7,255 in five years, and giving on the average more than 106 to a square mile. This is however considerably below that of the average relative population of France, and still more below that of the English counties above mentioned. Tours, the capital, is on the south bank of the Loire at 4° 45' Lat. and 9° 41' E. long.; 125 or 124 miles in a straight line south-west of the barriers of Paris; 142 miles by the road through Orléans and Blois, or 140 miles through Chartres.

The surface of the department is generally flat, and the hills which do occur are of small elevation. The Loire traverses the department from east to west, dividing it into two parts, of which the southern is considerably the larger. It passes the towns of Amboise, Tours, Luyannes, and St. Mars, and is bounded by a barrier of covered hills, orchards, villages, and châteaux. The Cher enters the department on the east side below Montrichard, and flows west by Bicé, approaching the Loire so nearly as to pass almost to the right and to the left. The two rivers nearly parallel to that river for many miles before their junction. Two arms pass from this river into the Loire, at a distance of several miles from each other, and long before the junction of the main stream; crossing the whole tongue of land between the two rivers, and forming two portions of it into oblong islands. One of these channels enters the Loire just below Tours, the other opposite the little town of St. Mars. The Cher is navigable throughout the whole of its course in this department. The Indre enters the department on the south-east and passes to the north-west between Loches and Boussieu, where it divides into two arms, which reuniting enclose a small island; from which it is crossed by a small bridge, passing towards the west, Montbazon, and Assy-le-Rideau, to the Loire, into which it falls just at the junction of the Cher.

The navigation of the Indre begins at Loches. The Indeouy, a right tributary, joins the river at Chambray, and is in the department, but rises in the adjacent one of Indre it passes Montsoreau, and joins the Indre on the right bank. The Vienne first skirts and soon after enters the department on the south-west side, and passes first to the north, and then to the north-west past l'Ile Bouchard and Chimón into the Loire, which it joins at Candes, just on the western border of the department. It is navigable throughout. It is received at Orleans, and joins the Main, or the Loire, in the department, the Creuse, which has a part of its course in the department or on the border. The Claise, the Evre, and the Gartempe, which join the Creuse, the last on the left side, are tributaries to the system of the Aunçon, which joins the Loire near Angers.

There are some marshes and swamps, or pools, in the department. The largest are those of Rillé and Les Hommes, in the north-west.

The official returns of the inland navigation of the department are incomplete: they omit all notice of the Indre and the Cher. They give the length of the navigation of the Loire at 82,937 miles, or about 52 miles; that of the Vienne at 54,555 miles, or 34 miles; and that of the Creuse at 8400 miles, or 5 miles. The navigation of the Indre and the Cher may be estimated at about 40 miles, and of the Creuse at 50 miles. The Loire, however, during the season of the navigation of the Indre, is subject to storms, and storms which are common to the Cher, the Indre, and the Creuse, at which last it quits the department. Another road from Paris to Tours, by Orleans and Blois, enters the department on the east side, and passes along the banks of the Loire, and river fronting the whole of the eight government roads to St. Aignan on the Cher (Loir et Cher), to Châteauroux (Indre), and to Le Mans (Sarthe), with a
branch from this last road to Lavau (Mayenne). The aggregate length of the government roads is about 192 miles, of which all except seven miles of unfinished road is in good repair. The Routes Départementales have an aggregate length of 283 miles, four-fifths of which are in good repair, the rest out of repair or unfinished. The bye roads and paths have an aggregate length of nearly 7400 miles. Both departments of France are so well furnished with the means of communication, whether by land or water.

The department is almost entirely occupied by the chalk belt which surrounds the Paris basin. The valley of the Loire the chalk is covered with very deep alluvial beds, and the fertilizing mud left by the inundations of the river has rendered this district so fertile as to obtain for it the designation of the garden of France. Almost every kind of cultivated plants, especially flax, hemp, and rye, is cultivated here. It is nearly one of the most important branches of the agriculture of the department: the vineyards occupy about a sixteenth part of the soil. The mulberry is cultivated in sheltered situations for the silkworms, which are bred in considerable numbers. The walnut is very general and grows on farms, and furnishes a considerable quantity of oil. The meadows are tolerably numerous, but not many head of cattle are bred. Swine and poultry are abundant; game, including the wild boar, the stags, and pheasants, is not very plentiful. The rivers and ponds furnish some fish.

The department is divided into three arrondissements, comprehending in all 24 cantons, or districts, under a jurisdiction of peace, and 256 communes:

<table>
<thead>
<tr>
<th>Arrondissement</th>
<th>Situation</th>
<th>Area</th>
<th>Pop.</th>
<th>Comms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tours, N., N.E., and Central</td>
<td>1033</td>
<td>151,119</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>Chinon</td>
<td>642</td>
<td>90,511</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Loches, S. and E.</td>
<td>636</td>
<td>62,641</td>
<td>69</td>
<td></td>
</tr>
</tbody>
</table>

In the arrondissement of Tours is Tours, the capital of the department, on the south bank of the Loire, with a population in 1836 of 26,669; Amboise (pop. 4613), also on the south bank of the Loire; Château Renaulx, or Renault (pop. 2892), in the town of Chambord), on the Brenle; Luynes, on the north bank of the Loire; Reugny, near the Brenle; Neuvy, near the Long; St. Christophe, between the Long and the Fare; Bèrue, on the Cher; and Cormery and Montbazon, on the Indre. [Amboise; Tours. Château Renault is divided by the Brenle into the Upper and Lower towns. Luynes has a handsome hospital or almshouse, and several manufactories of lace and trimmings: it gave title to the rank of constable of France, and of the nobility of Louis XIII. In the neighbourhood of this town many of the inhabitants occupy dwellings excavated in the side of the chalk cliffs. In the neighbourhood of Bèrue is the Linhay, a thousand years old, the residence of Diane de Poitiers, and received great embellishment from her and from Catherine de’ Medici.

In the arrondissement of Chinon are Chinon (population in 1831 10,111) and the length of nearly 86 miles, on the Vienne; Richelieu (pop. 2695 town, 2782 commune), on the Mable; Faye, near the same river; Candée, at the junction of the Vienne and the Loire; Azay le Rideau, on the Indre; St. Espain and St. Maries (pop. 1599 town, 2524 whole commune), on the Manse; Bourzil, on the process, or the hill, on the slopes of the river Loire; Langeais and St. Mars, on the north bank of the Loire; Saviérez, near the Etang de Rillé; and Château La Vallière, on the Fare. Chinon is surrounded with walls, the remains of its antient fortifications, and has preserved the ruins of a castle, in which Henry II. of England died, and where Jeanne d’Arc presented herself first to Charles VII. of France. The townsmen carry on a considerable trade in wine and in preserved plums. Loches has the ruins of a castle, built in the tenth century, in an apartment of which was negotiated the marriage of John of England with Isabella, the daughter of Charles VIII. of France. It has a market, which eventually united that duchy to the crown of France. Some linens are manufactured here; and also tiles. The melons of the neighbourhood are considered excellent.

In the arrondissement of Loches are Loches (pop. in 1836, 4750), on the Indre; Beaulieu (pop. 2922 commune), which is little more than a suburb of Loches, being separated from it only by a small island of the Indre and the two arms of the river which enclose it; Montresor, on the Indroy; Preuilly, a success. Guesclin, on the Loire; Claise; La Guerche and La Haye, on the Creuse; Liguële, on the Evre; and Le Louroix and Mantelo, north-west of Loches. Loches is on a slope rising from the river Indre, and is commanded by an ancient castle which overlooks a beautiful prospect, and is rendered interesting by many historical recollections. Here Agnes Sorel sought to rouse the energies of her lover Charles VII.; here Bishop Valé a endeavored a confinement of eleven years in an im- CANTELS, and is included in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Orleans. It is comprehended in the fourth military division, the head-quarters of which are at Tours. It sends four members to the Chamber of Deputies.

In respect of education, the department is in a very backward state. Of the young men enrolled in the military census of 1829-30, only 27 in every 100 could read and write.

This department was antiently the seat of the Turones, one of the nations of the Celtic stock, whose name has been preserved in that of the capital of the department, Tours, antiently Cesarodurum. Amboise was known to the Romans by the name Ambacia. Under the later division of the Roman empire, the country of the Turones was comprehended in the province of Lugdunensis Territio. From the Romans it passed into the hands of the Franks, who hold the part north of the Loire, and of the Visigoths, who occupied all the country south of the Loire; but the conquests of Clovis brought the whole into the power of the Franks. In the middle ages it was a part of the countship of Anjou. It was the earliest seat of the silk manufacture in France, which occupied in the sixteenth century forty thousand persons; there were seven hundred silk-mills and eight thousand looms in the departments of Indre and Loire in the reign of Henry III. The townsmen gave up the manufacture of silks, and turned to the cultivation of grapes and olives; theCustoms of Tours. - The manufacture of silks for upholstery and for dress, which had long since obtained considerable celebrity, is now but little carried on. Woolen yarn, woolen cloth, carpets, and damasks, are manufactured here, and the Alten, where is the most important manufacture of the kind in France, is earthenware, and pottery. The best wines are sent to Nantes to be shipped for the Netherlands; other wines are exported to Peronne and Normandy. They have been made into rope and sail-cloth at Angers, or exported to Lorraine. Preserved fruits are sent into all parts of France, and even exported to foreign lands.

This department constitutes the archbishopric diocese of Tours, and is included in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Orleans. It is comprehended in the fourth military division, the head-quarters of which are at Tours. It sends four members to the Chamber of Deputies.

In respect of education, the department is in a very backward state. Of the young men enrolled in the military census of 1829-30, only 27 in every 100 could read and write.

This department was antiently the seat of the Turones, one of the nations of the Celtic stock, whose name has been preserved in that of the capital of the department, Tours, antiently Cesarodurum. Amboise was known to the Romans by the name Ambacia. Under the later division of the Roman empire, the country of the Turones was comprehended in the province of Lugdunensis Territio. From the Romans it passed into the hands of the Franks, who hold the part north of the Loire, and of the Visigoths, who occupied all the country south of the Loire; but the conquests of Clovis brought the whole into the power of the Franks. In the middle ages it was a part of the countship of Anjou. It was the earliest seat of the silk manufacture in France, which occupied in the sixteenth century forty thousand persons; there were seven hundred silk-mills and eight thousand looms in the departments of Indre and Loire in the reign of Henry III. The townsmen gave up the manufacture of silks, and turned to the cultivation of grapes and olives; the

INDUCTION (Mathematics). The method of induction, in the sense in which it is used in vulgar philosophy, is not known in pure mathematics. There certainly are instances in which a general proposition is proved by a collection of the demonstrations of different cases, which may remind the investigator of the inductive method. Such instances however must not be taken as permanent, for it usually happens that a general discovery is discovered as soon as attention is turned to the subject.

There is however one particular method for proving

Vol. XII—3 O
which is extremely common in mathematical reasoning, and to which we propose to give the name of successive induction. It has the main character of induction in physics, because it is really the collection of a general truth from a demonstration which implies the examination of every particular case; but it differs from the process of physics, inasmuch as each case depends upon one which precedes. Substituting however demonstration for observation, the mathematical process bears an analogy to the experimental one, which, in our opinion, is a sufficient justification of the term. Suppose that a new method will enable the mathematical reader to recognise a mode of investigation with which he is already familiar.

Example 1. — The sum of any number of successive odd numbers is a square. Let 1, 3, 5, ..., up to 2n + 1 put together give (x + 1)².

Then the next odd number being 2n + 3, the sum of all the odd numbers up to 2n + 3 will be (n + 1)² + 2n + 3, or 3n² + 4n + 4, or (n + 2)².

Consequently, if the proposition be true of any one set of odd numbers, it is true of one more. But it is true of the first odd number, 1, for this is the square of half the even number following 2 – 3; hence it is true of 1 + 3, it is true of 1 + 3 + 5; it is true of 1 + 3 + 5 + 7; and so on, an infinitum.

Example 2. — The formula x² – ax + n being a whole number, is always algebraically divisible by x – a.

In this last expression the second term a(x - a) is obviously divisible by x - a; that is, if x² – ax + n is divisible by x – a, the whole of the second side of the last equation will be divisible by x – a, and therefore x² – ax will be divisible by x – a.

If then any one of these equations be divisible by x – a, the equation x² – ax + n is divisible by x – a; the whole of the second side of the last equation will be divisible by x – a, and therefore x² – ax will be divisible by x – a.

There are cases in which the successive induction only brings any term within the general rule, when two, three, or more of the terms immediately preceding are brought within it. Thus, in the application of this method to the deduction of the well-known consequence of

\[ x + y = 2 \cos \theta, \text{namely, } x + \frac{y}{x} = 2 \cos \theta. \]

It can only be shown that any one case of this theorem is true, by showing that the preceding two cases are true: thus its truth, when \( n = 5 \) and \( n = 6 \), makes it necessarily follow when \( n = 7 \). In this case the two first instances must be established (when \( n = 1 \) by hypothesis, and when \( n = 2 \) by independent demonstration), which establish the third, the second and third establish the fourth, and so on.

An instance of mathematical induction occurs in every equation of differences, in every recurring series, &c.

INDUCTION (извятъ), as defined by Archbishop Whately, is 'a kind of argument which infers respecting a whole class what has been ascertained respecting one or more of that class.' According to Dr. Whately the word has been employed to designate three very different operations: 1. The objective process of investigating particular facts, as preparatory to Induction, which is the process of inductive reasoning of any kind; 2. A material illation of a universal from a singular, as warranted by the general analogy of nature or the special presumptions afforded by the object matter of any real science; 3. A formal illation of a universal from the inductive generalization made solely by the mind, and abstracted from the conditions of any particular matter.

The second of these operations is the inductive method of Bacon, which proceeds by means of rejections and conclusions from the singular to the universal.

Aristotle's definition coincides with the third, and induction is 'an inference drawn from all the particulars.' (Prior, Analyt., ii., 13a4.) The second and third processes are improperly confounded by most writers on logic and metaphysics, as being not only one and the same simple and purely logical operation. But the second is not a logical process at all; since the conclusion is not necessarily inferrible from the premises, for some of the antecedent does not necessarily legitimate the all of the conclusion, notwithstanding that the inference procedure may be warranted by the material problem of the science, or the fundamental principles of the human understanding. The third alone is properly an induction of logic; for logic does not contain them, but only draws conclusions from them which the mind conceives them; and that the inference is not determined by any relation of causality between the premises and conclusion, but by the subjective relation of the mind to the evidence and problem. The inductive process is exactly the reverse of the deductive; for while the latter proceeds from the whole to the part, the former descends from the part to the whole: since it is only under the character of a constituted or containing whole, or as a constituent and contained part, that anything can become the term of logical argumentation. Of those two processes, Professor Hamilton gives the following figures:

**Induction.**

\[ \text{X Y Z} = \text{B A}\]  
\[ \text{X Y Z are whole B.} \]

**Deduction.**

\[ \text{X Y Z are under B.} \]

This confusion of material and logical induction led GilleTT and others to insist on the sameness of the Baconian and Aristotelian induction; while Campbell and Dugald Stewart, who totally mistrusted the value of all logical inference, yet rightly distinguished their difference.

By Aristotle induction and deduction are viewed as in certain respects similar in form, but in others as diametrically opposed, the latter being an analysis of the whole into its parts, proceeding from the general to the particular; the former ascends by a synthetical process from the parts to the whole. The logicians who misapprehended the nature of induction reduced it to a deductive syllogism of the third form, and thereby overthrew the validity of all deduction itself, since the latter is only possible by means of the former, which legitimates the proposition from which its reasoning proceeds.

Again, the Aristotelian induction was drawn from all the particulars, whereas the confusion which Professor Hamilton has pointed out gave rise to a division of the inductive process into perfect and imperfect, according as the enumeration of particulars is complete or imperfect.

The latter gives one an irreproachable result, whereas the necessity of the conclusion is essential to all logical inference, as its demonstrative stringency depends upon the form of the illation, and not upon the truth of the premises.

(Recent Communications on Logic: Edinburgh Review, April, 1833.)

**INDUCTION.** [Benefice, p. 219.]

**INDULGENCE** is a power claimed by the Roman Catholic church of granting to contrite and confessed sinners remission of the penalty, or part of the penalty, which they ought to suffer here or hereafter in expiation of their sins. The indulgence does not remit the guilt, 'cor', nor the punishment awarded to the impudent sinner, but only the temporal penalty which the repentant sinner, after having duly confessed his sins and received absolution, has still to undergo in this life. It does not absolve anything from the belief of Roman Catholics. [Confession.] In the early ages of the church repentant sinners after confession had to undergo public punishment, often very severe in proportion to their offences; such punishments were afterwards relaxed, and the 'indulgences' of the bishops, who, in particular cases, abridged the austerities enjoined by the canons, or commuted them for works of charity and pious exercises. Such was the origin of indulgences. (De Indulgentiis, satisfact. laudabilibus, par. 219; De Indulgentiis perpetuis, ad Paulinum, par. 4; De Indulgentiis, satisf. laud. et indulgentiis, par. 219; De Indulgentiis, satisf. laud., par. 219; De Indulgentiis, satisf. laud., par. 219.)

Severally of the early fathers of the church, such as St. Cyprian (De Lupta) and St. Ambrose (De Penitentibus), next explained the abuse of this practice in their time, and...
especially that simple priests presumed to grant indulgences, which was the exclusive privilege of bishops, and that bishops themselves granted them with too much facility. The canonical or ceremonial penalties becoming in course of time disused, together with the practice of public confession, the indulgences which continued to be granted afterwards were understood to remit that part of the penance to be undergone in purgatory which was equivalent to the canonical penalty which would have been awarded by the early church. (Ch. 13.)

The 'faith of Catholici,' says Maury (Histoire du Lutherisme, vol. I.), 'has always been that the Son of God has conferred on his church the power of relieving the penitent sinner not only from the bonds of his sin by the merits of Christ's passion applied to him, but also from the punishment which he would suffer, either in this world or the next, as a satisfaction to the divine justice for offences committed after baptism. Hence St. Paul, at the request of the Corinthians, remitted to the incestuous man whom he had excommunicated, the remnant of the penalty incurred for the crime; hence the bishops of the earliest ages gave peace to apostates, and reconciled them to the church by abridging the time of the criminal penance through the intercession of martyrs, and in virtue of their sufferings, joined to those of the Saviour of the world, who redeemed them precious in the sight of God.'

The 'Bibliothèque Sacree,' quoted by the most elaborate article on the subject of indulgences, divided into eight sections, namely, 1. On the name and nature of indulgences. 2. On the various sorts of indulgences. 3. On their virtues and effects. 4. On the truth and error of certain opinions which have become mixed with the virtues of indulgences. 5. On the causes of indulgences. 6. On the subjects or persons to whom indulgences are applied. 7. On the conditions and dispositions required in order to obtain the benefit of the indulgences. 8. On the abuse of indulgences. We may observe on this last point that indulgences are granted in some cases to those who give money for the building of churches and other pious purposes; but that the sale of or traffic in indulgences has been severely reproved by many councils, and especially by the later popes. The Pope contains the clause that 'if any thing be given as the price of this indulgence, the indulgence itself becomes null.'

INDUS. [HINDUSTAN.] INDUS (the Indian), a constellation of Bayer, situated between Sagittarius and the South Pole.

INEQUALITY. (Astronomy.) For convenience, the average motion of a planet or satellite, supposed to be made in a circle which has the average distance of the body from the sun or primary for its radius, is the first object of calculation, and that of the latitude for its time, but this is to be predicted. All the alterations which are rendered necessary by the unequal motion of the planet are called inequalities. [GRAVITATION; LUNAR THEORY; PLANETARY THEORY.]

INEERTIA. This word means something equivalent to the modern English sense of inactivity, or rather of incapability, and expresses that property of matter by which it does not obey any law or motion, but requires for that purpose the action of some external cause, to the magnitude of which the change is in proportion. Previous to some remarks upon the use of this word, we shall, however, consider the principles of Newton's Principia, from which the common use of it is derived. 'The vis inertia, or innate force of matter, is a power of resisting by which every body, as much as it lies, endeavours to persist in its present state, whether it be in a state of rest or motion. This force is ever proportional to the body whose force it is; and differs nothing from the inactivity of the mass, but in our manner of conceiving it. A body, from the inactivity of matter, is not without difficulty put out of its state of rest or motion. Upon which account this vis inertia may, by a most significant name, be called vis inertia, or force of inactivity. But a body exerts this force only when another force, impressed upon it, endeavours to change its condition.'

We could wish that the use of this word were entirely exploded, and for the following reason. When a term is so constructed as to state even a property or condition of existence, about which we know nothing, except that certain phenomena always occur under certain circumstances, such a proposition may be listened to, on condition that there is no absolute or fixed phenomenon or class of phenomena which wants a distinct expression. But the meaning that the word is to be used in a purely characteristic, and not in a doctrinal or explanatory, sense. Thus the word impenetrability, though likely to cause misconception, as pointed out in the article cited, is nevertheless a good word to those who know how to use it, and a necessary word to those who desire to describe and reason on our knowledge of matter. It conveys to the mind, by the act of separation or abstraction, the notion of a cause for a phenomenon which might be conceived to exist independent of the other properties of matter. We can imagine impenetrable space, not endowed with mobility, colour, or heat, or any other accidents, an immovable void, but that which is used by Newton, we do not describe any quality of matter, but supply a term of causation for matter itself, so far as those properties are concerned which are studied in mechanics. What is the matter of a moving body? What are the dynamics? That which obeys certain three laws of motion, or presents phenomena which are of a certain threefold description. What word, according to Newton, should be used as a term of causation to remind us that the first law of motion arises from something inherent in the constitution of matter? The inertia, or vis inertia. What for the second law? The inertia. What for the third law? Still the inertia. Consequently, this inertia is literally nothing but an expression of one of the inelastic properties of matter, but other laws except those which it really does obey, and the policy of admitting such a term is not merely a question of mechanics. Need we accompany every fundamental term of every science by another, which merely signifies that there must be some reason why the thing signified has the collection of properties which it is found to possess, and not any other? We think the answer must be in the negative, in which case the word matter itself may be substituted a certain substance, the two phrases being perfectly interchangeable in every work on mechanics. [MOTION, LAWS OF.]

If the word inertia be admitted at all as one of distinction, it must have reference to the object of study, namely, mechanics. In the former we consider space only, that is, bounded portions of space: in the latter we suppose this bounded space to have inertia. But the distinction is quite sufficiently made without the introduction of the hyphen. In geometry we consider space without reference to the question, whether the space be vacuum or matter; in mechanics we consider matter.

Thus much for the use of inertia in a scientific sense: in many popular writings we find it applied as a sort of explanation of the properties of matter, which are so and so because matter has inertia. Since this vicious application of words is not by any means confined to the case before us, it is needless to add any thing in its praise.

There is one use of the word inertia which is convenient and harmless, namely, as part of the phrase moment of inertia. If we imagine a material system which admits of rotation about a fixed point, and that the radius of rotation about that axis, and the mass of the system are both so considered that the axis the less resistance will be offered to the production of rotatory motion. The law of this resistance will be explained in the article added to this article.

INFANT, a person under the age of twenty-one, whose acts are in many cases either void or voidable. As a general rule, an infant cannot make any binding contract, though to this there are some exceptions: an infant may bind himself to pay for his necessary meat, drink, apparel, physic, and such other necessaries, and likewise for his good teaching and instruction. [Co.Litt., 172.] But where an infant is living in his father's house and under his care, he is not liable even for necessaries. Necessaries for an infant's wife are necessary for him.

302
INF INF INF INF INF

Since the article Aon was published, the statute 1 Vic., 26, has been passed, by the 7th section whereas persons under age are incapacitated from making a will of personal property, which before the passing of this act they were competent to do.

It should also be observed, that an infant, how young he may be, and even a child in the womb, or as it is technically expressed, en cété sa mere, may be appointed an executor: but the statute 23 Geo. III., c. 87, disqualifies an infant, except by order of the court exercising the offices of the will, and administration with the will annexed must be granted to the infant's guardian, or to some other person, until the infant is of full age.

An infant is more is supposed in law, for most purposes, to be a person in being.

INFANT SCHOOLS. (School.)

INFANTICIDE. The practice of putting infants to death has existed from the remotest periods on record, though the motives for the act have somewhat varied. In some at least of the states of Greece the destruction of those who were weak or deformed was either commanded or allowed. In Rome infants were exposed or put to death, not only with the view of removing those who might be a burden to the state, but to prevent the too rapid increase of population. The propagation of Christianity first checked the practice; and Constantine himself did much to maintain the sanctity of the offspring of those whom they themselves destitute, and imposed severe punishments upon cruel fathers. It prevailed however to a slighter extent till the Reformation, when the use of such medicines as are described in the letter and spirit of the Cornelian Law. (Gibbon, Decline and Fall.)

Among the contemporary barbarous nations, the same motive, and the sacrifices required for their duties, induced the same crimes to even a greater extent.

In modern times, the practice, though it is not anywhere sanctioned or commanded by law, is yet permitted in many countries. In China a large proportion of the female population is naturally male, and as soon as the Hindus it was practised to a very great extent, till the marquis of Wellesley, when appointed Governor-General of India, used every possible exertion to put a stop to it. By this example, the same practice in other countries, though their efforts were successful, though unhappily for only a short time, for Bishop Heber tells us that since that time things have gone on very much in the old train, and the answer made by the chiefs to any remonstrances of the British officers, is, "Pay our daughters' marriage portions, and they shall live." (Narrative of a Journey in Upper India, and Hindu Infanticide, by E. Moor, F.R.S., 1811; including With their Island, the island and Moor) Heber remarks that in 1821 the number of males exceeded that of females by 20,000: in one district there were to every hundred men only fifty-five women, and in some places where the numbers were equal the population was almost exclusively male. The manner is this, the difficulty and expense of educating female children, and the small probability of their marrying without some dowry, while a single life is deemed disgraceful, are the motives leading to the perpetration of the crime. Amongst the Mohammedans the practice is not discouraged, though the necessity for it is greatly lessened by the habit of producing abortion, which almost universally prevails. In the numerous islands of the Pacific, infanticide is practised to such an extent, that some of them have at times, when pestilence has contributed its influence, been nearly depopulated. When Cook visited Oahu, he found its population to be more than 200,000; but in the last century it was reduced to between 5000 and 6000, and this principally from the practice of murdering their offspring. Mr. Ellis (Polynesian Researches) says that he does not recollect having met with a female in the island, during the whole period of his residence there, who had been a mother, while idiocy prevailed, who had not imprisoned her hands in the blood of her offspring. We have similarly heard of the same practice among the negroes of South America, from Hudson's Bay, Labrador, Mexico, &c.; but it is most gratifying that in all, one of the first and greatest blessings which have followed the introduction of Christianity, has been the decrease or complete cessation of this abominable custom.

In more civilized lands, although infanticide is regarded with the deepest abhorrence, and is visited with the utmost severity of the law, the expense and trouble of maintaining, and the fear of blame and loss of reputation, are motives sufficiently powerful for the occasional perpetration of the crime.

It is one of the most difficult questions of Medical jurisprudence to discover and establish the murder of a child lately born. The chief points for decision are, 1st, whether the infant, the subject of inquiry, was born dead or alive; and 2d, whether its death was the result of violence or natural causes.

To establish the former point it is necessary to prove first that the infant was not born before the end of the sixth month after conception, because before that time a fetus cannot be said to be capable of living independently. Its existence, or to be what is called stable. This being proved from the size and form of the child, the decision whether it was born alive or not must generally rest on the condition of the lungs and heart. In such cases observation must be made as soon as respiration in the air has commenced. In the fetus utero in and in the still-born child the lungs are of a dark purplish or chocolate colour, nearly like that of the liver; they are small, and occupy only a small part of the cavity of the chest, in which they lie close against the spine; they have a firm solid consistence like liver, and their edges are sharply lobed. In the child which has breathed the lungs are of a florid or rose hue; they nearly fill the chest, and are therefore capable of producing contact with its front wall; their substance is soft, spongy, and light—they crepitate or crackle when pressed, frothy fluid may be squeezed out from an abundance of minute spicules, and the interval between the chest and the heart are smoothly rounded off. If the child has breathed fully for some minutes after birth, these characters will be quite sufficient to decide the point in questions, but in more difficult cases the weight of the lungs and their specific gravity must be required to be examined. At the same time that the air enters the lungs in respiration, a much larger quantity of blood is sent to them from the heart (Heart) than had before circulated in the still-born. Hence the child determined that the weight of the lungs of still-born children is somewhat less than that of the whole body, and that of the lungs of children that have breathed, rather more than 1/4. This difference, though not sufficient to make the test by itself decisive is yet of much importance as an addition to other evidence, and is especially to be considered in connexion with the hydrostatic test which is founded on the specific gravity of the lungs. As the air and blood enter the lungs at the same time, their relative quantity although their absolute weight is increased; so that a portion of the lung of a still-born child is heavier than a portion of the same size from a child which has breathed. The weight of the lungs of a child which has breathed for some minutes, and is allowed to take a deep breath, is determined by a simple test is obtained by observing whether the lungs of the infant under examination will float or sink when thrown into a vessel of water. When carefully employed, these two tests cannot fail to decide whether the child has breathed or not, but there are circumstances which may in some degree obscure the evidence to be drawn from them. First, there are those circumstances which may cause the lungs of a child which has breathed to float in water. A certain degree of putrefaction may do this, by the quantity of gas which is generated in their tisue. This however cannot take place until the whole body of the infant is externally preserved; hence all but a part of the body remain longest unaltered after death. Nor could a competent person fail to discover the difference between lungs rendered light by putrefaction and those which had breathed; the former present large bubbles of air on their surfaces, which may be squeezed out by pressure under water, and when this has been done, the portion of lung to which they were attached will immediately sink. In some very rare cases a globule of air is imprisoned in the lungs, this having been cut off before death may also can at once be known by the air blown contained in large bubbles, from which it may be pressed out. Lastly, the lungs may have been artificially inflated after death, but in this case the alteration of colour and volume, though produced in the same manner as in natural cases, are only partial; some portions of the lungs are spongy and pulpy, but others are solid and livid. All the doubt that
might arise from any of these circumstances may be removed by cutting up the lungs into small portions and squeezing each piece firmly under water: if natural respiration has been performed, the smallest portion of lung, unless torn by the continued pressure into mere shreds, will continue to float; but in every other case the air may be so completely expelled that every portion will sink. In no case moreover, except where natural respiration has taken place, will the absolute weight of the lungs be increased; for in no other does the increased flow of blood from the heart take place.

On the other hand, there are very rare cases in which, though the child was born alive, the lungs will not float. They may be diseased, or the lungs may have been sufficiently expanded to breathe, but they afforded no evidence as to whether it was murdered or not. For, it must be remembered that the regulations of the English law directly designed to prevent infanticide. There are however institutions in this country, as well as in many other European countries, which have been founded with the view of restraining the commission of the crime, of which an account is given in the article FOUNDERING HOSPITALS: but the history of these establishments shows that though they may have rendered infanticide less frequent, they have by no means tended to preserve the lives of illegitimate children. We refer the reader to Dr. Lister's account of the London Foundling Hospital, which is a comparatively wealthy establishment, their records show an astonishing amount of mortality, in some cases as high as eleven-thirds. The course of legislation for the prevention of infanticide, and the existing laws upon the subject, which have been established in most of the countries of which we have any knowledge, are clearly and concisely stated in Dunlop's edition of Black's Elements of Medical Jurisprudence, pp. 185-194.

INFANTRY \textit{is} a name given to the soldiers who serve on foot. It is immediately derived from the Italian word \textit{fanteria}, which, though in strictness denoting a child, is in general applied to any young person. From the latter word comes \textit{fanzaccino}, and this is the origin of \textit{fanteria}, a name which was once so commonly applied to a foot-soldier.

During the time that the feudal polity was in vigour the numerous dependants of the nobility served in the wars, for the most part, on foot; and being called children, because they were so regarded with respect to their patron lords, or to the towns from which they received their support, infantry became at length the general name for that species of troops. Bocaccio, who wrote in the fourteenth century, designates by the word \textit{fanteria} the men who marched on foot in the army.

Among the ancient nations of Europe the foot soldiers constituted the chief strength of the armies. In the best days of the Grecian and Roman states battles were mainly won by the force and discipline of the phalanxes and legions, and the number of the composed of persons possessing the benefit of the cavaliers. The latter were then, as at present, employed chiefly in protecting the wings of the army and in completing the victory which had been gained by the formidables. They may be remarked also that most of the writers on tactics, from Folard downwards, express a decided preference in favour of the infantry.

The French historians agree that the ancient Franks, who were wont of a race of cut-throats, were generally compelled to march and fight on foot; and that they persevered in this practice even after they had obtained possession of the country of the Gaule, which abounded with horses. In this country also the body of the Swiss army consisted of infantry, the cavalry being formed of the thames, or rich proprietors of the land: the infantry were divided into heavy and light armed troops; the former being provided with swords and spears and other shields, and the latter having only spears, clubs, or battle-axes.

But soon after the time of Charlemagne the institutions of chivalry began to be generally adopted in the kingdoms of Europe. These led to frequent and splendid exhibitions of martial exercise, but the subsequent revolution of the sixteenth century, when the monarchs became kings, was followed by the substitution of the musketry and pike for the swords of the feudal tenantry. These institutions appear to have been the occasion of the modern armies, or of the armies composed of persons possessing the benefit of the cavaliers, who, in this country, for some time after the conquest, consisted of the yeomanry, vassals and dependants of the feudal tenants; and occasionally foot soldiers were engaged by the kings, under indentures, to serve in the wars. The English troops at that time wore a plain iron helmet called a \textit{bacinet}, and a linen doublet stuffed with wool or cotton their arms were generally pikes, but frequently they had swords and battle-axes.

Under the third race of kings in France the possessors of these arms, which were not compelled to furnish infantry for the armies; and it appears that this duty was then imposed on the towns. The troops thus raised were obliged to serve only in or near the towns to which they were attached; or if they were marched to a considerable distance from thence, they received pay. In the reign of Philip Augustus this militia must have been very numerous; for in some districts it was formed of the best persons of distinction. At the battle of Bovines (1214) the municipal militia formed the first line of the French army, but it was defeated by the German infantry which was more numerous, and even then of better quality than that of France.

In 1448 Charles VII. instituted the military denomination \textit{Francois Archers}, which consisted of 16,000 foot soldiers armed with bows. But this experiment only lasted a short time, as it was suppressed by Louis XI., who formed a standing army of 10,000 French infantry, to which were joined 6000
Swiss; and subsequently Charles VIII. added a large body of
Lansquenets, or German infantry. The reputation of the
native troops in France seems to have been then at a low
ebb; for Brantôme, in his Discours des Colonels, describes
them as being mostly the refuse of society—men with
matted hair and beards, who for their crimes had had their
shoulders branded and their ears cut off. On the other
hand the Swiss soldiers were inured to discipline; they
were protected by defensive armour and formed into deep
battalions, in which state they were enabled to render the
shock of cavalry entirely unavailing. Large divisions of
these troops accompanied the army of Charles VIII. into
Italy, in 1494, where their good conduct and discipline
greatly raised the reputation of the infantry to its ancient
standard.

The superiority of this class of troops consists in their
being able to act on ground where cavalry cannot move;
and it is obvious that the latter must, at all times, have
been nearly useless in the attack and defence of fortified
castles or towns. Even when the cavalry were held in
the highest estimation it was sometimes found convenient
for the knights to dismount and act as infantry. Froissart
relates that at the battle of Crecy the English troops were
formed in three lines, consisting of men-at-arms who fought
on foot and were flanked by archers. At Poitiers and
Agincourt also the men-at-arms engaged in a similar
manner.

The Spanish soldiery, probably from being almost
constantly engaged in warfare with the Moors, had early
acquired considerable reputation; and the gallantry of the
troops on foot, keeping the field after the cavalry had
retired, has been supposed, though this opinion of the origin
of the name is now rejected as fanciful, to have been
conferred on the designation of infantry, which was
bestowed upon them in consequence of their having been
beaten on that occasion by an Infante of Spain.

The great share which the Spanish forces had in the
wars carried on both in Italy and Flanders during the
reigns of Ferdinand, Charles V., and Philip II., their
statesmen did not neglect the success derived from the
association of musketeers with pikemen in their battalions,
caused the infantry of Spain to be considered, during many
years, as the best in Europe. But the rivalry in arms be-
tween Ferdinand and his son, the Emperor Charles V., and
Frances I. of France, and the connection of Henry VIII. of
England with both, led, in the several states of those monarchs, to the adoption of the improvements which had been introduced by the Spaniards. It may be added that the practice of keeping up
standing armies composed of men trained in the arts of
war under a rigid system of discipline, together with the
universal adoption of the musket, has now brought all the
infantry nearly to a state of perfection.

The British army at present comprehends, besides the
militia, 99 regiments of regular infantry; 3 regiments of
foot guards; a rifle brigade and the Ceylon rifle regiment;
2 West India regiments; the royal regiment of artillery
and the engine and marines.

INFECTION is the contamination of the atmosphere or
other inert substances by the deleterious or offensive qua-
lities of malaria, the matter of contagion, effluvia from putrid
animal or vegetable substances, &c. Some of these are at
once recognised by the smell, or by chemical analysis, but
the presence of others is known only by the diseases which
they produce. The same means however may be applied in
many cases for preventing the injurious effects of both
classes.

The most important and valuable method of disinfection
is ventilation, and, whatever other may be added to it, this
should never be neglected. The apartment, or whatever
requires to be purified, should be exposed to a constant
and free current of fresh air, till every trace of odour is
completely expelled, or as long as any emanation is going on.
The presence of chlorine, acids, sulphurous, or any
infecting substances, depends on their property of decomposing
the offensive gases which are so often mixed in the atmosphere
with the matter of infection, but it is questionable whether
the latter process has any influence on the ingestion of the
infection itself. However as the emanations from putrid substances
render the body peculiarly liable to the reception of in-
fecion, some of these means should be employed where any
offensive smell is present. The best is chlorine, which has
of late completely succeeded the use of the others; but
chloride of lime should be poured over any thing from
which the odour is emitted; it should be sprinkled about
the floor and on the walls; or shallow vessels containing it
should be exposed to evaporate in the air; or pure chlorine
should be dispersed in the form of gas from the materials
from which it is manufactured. (Carbon.) Fumiga-
tions with aromatic substances, as camphor, &c., are per-
fectedly useless, only serving to conceal the smell, but having
no influence either on it or the infectious particles. Perfect
cleanliness is of the greatest importance; every portion of
the room or house should be carefully and frequently
washed with hot soap and water; clothes and everything
removable should be immersed in hot water, and after being
well washed, should be exposed for a long time to the open
air, or sprinkled with chloride of lime; the walls and ceil-
ings should be whitewashed, and beds, bedding, &c.,
cleaned and exposed in the open air. Dr. Henry has ren-
dered it probable by numerous experiments that the in-
fecious qualities of substances which cannot be conveniently
washed, as trunks, packages of valuable merchandise, &c.,
may be sufficiently destroyed by exposing them to a dry
heat of 200° for not less than an hour.

INFEROB RanintA, the third order of Gastropods
in the system of Cuvier, which describes them as having
nearly the form and organization of Doris and Trilobia, but
remarks that their branchiast, instead of being placed on
the back, are arranged in the form of two long sutes of leaf-
scales on the sides of the body under the abraded border of
the mantle. He records two genera, Phyllidia and
Diphylidia.

Phyllidia.

Mantle naked, and most frequently coriaceous; no shell.
Mouth a small proboscis, with a tentacle on each side; two
other tentacles come forth above two small cavities of the
mantle. Organs of Generation under the right side for-
ward. Stomach simple, membranous; intestine short. (Cuvier.)

M. de Blainville describes the body of the genus Phyllidia
as oblong and rather convex; the head and the foot hidden
by the border of the mantle, and the body divided into
three sections, the two upper ones retracted in a cavity
which is at their base, the two lower buccal; mouth without
an upper tooth; a lingual denticle mass; branchial lamina
round the lower border of the mantle, except in front; vent at
the posterior and mesial part of the back; orifice of the organ of
generation in a common tubercle at the anterior fourth of
the right side.

Example, Phyllidia pustulosa.

Locality, the Indian Seas, where the other species have
also been found.

Diphylidia (Linguella? Lecsh).

Branchiast nearly the same as in Phyllidia, but the mantle
is more pointed behind; the head, which is demicircular
(la tete, en demi-cercle), has on each side a pointed
tentacle and a slight tubercle; vent on the right side.
(Cuvier.)

M. de Blainville thus describes Linguella, which both
Cuvier and himself seem to consider as identical with Di-
phyllidia.

Body oval, very much depressed. The mantle projecting
beyond the third of the body; except in front; head uncer-
ved. Branchial lamellae oblique, and only occupying the
two posterior thirds of the inferior border of the mantle;
vent inferior, situated at the posterior third of the right
side; orifice of the organ of generation in the same tu-
bercle, at the anterior third of the same side.

Example, Linguella Effortii (De Blainv.), Diphylidia
Brugmanni? (Cuv.)

M. de Blainville says that the locality is unknown. Cuvier
says that Linguella Effortii appears to him not to be
different from his Diphylidia Brugmanni.

M. de Blainville further says that it is probable that the
genus established by M. Rafinesque under the name of
Armina, does not differ much from Linguella. In his
Additions and Corrections" to his 'Manuel' he says that
M. Otto has discovered a species of *Lingula* in the sea of Naples.

The word *infinitesimal* is used to signify that an expression, or the corresponding magnitude, is so small as to be negligible in practice. The word *infinite* is used in its proper mathematical sense, to signify that a magnitude is so large as to be incapable of any finite expression. The word *indefinite* is used to signify that a magnitude is such as to be incapable of any finite expression.

**INFINITE, INFINITESIMAL, INFINITESIMAL CALCULUS**

The term *infinite* is used to denote a magnitude which is incapable of being expressed in finite terms. The term *infinitesimal* is used to denote a magnitude which is capable of being expressed in finite terms, but which is so small that it is negligible in practice.

The infinite is a concept which is used in mathematics to signify the absence of a limit. It is used in a variety of contexts, including the study of limits, calculus, and the theory of infinite sets.

The infinitesimal is a concept which is used in mathematics to signify a magnitude which is smaller than any finite magnitude, but which is not exactly zero. It is used in the study of limits, calculus, and the theory of infinite sets.

The term *indefinite* is used to denote a magnitude which is incapable of being expressed in finite terms. It is used in a variety of contexts, including the study of limits, calculus, and the theory of infinite sets.

The term *infinite* is used to denote a magnitude which is incapable of being expressed in finite terms. It is used in a variety of contexts, including the study of limits, calculus, and the theory of infinite sets.

The term *infinitesimal* is used to denote a magnitude which is capable of being expressed in finite terms, but which is so small that it is negligible in practice. It is used in the study of limits, calculus, and the theory of infinite sets.

The term *indefinite* is used to denote a magnitude which is incapable of being expressed in finite terms. It is used in a variety of contexts, including the study of limits, calculus, and the theory of infinite sets.
nothing. If $x$ be divided by a comparatively great quantity, the quotient is small; this quotient may be made as small as you please, if we may take the divisor as great as we please; but no divisor, however great, will make the quotient absolutely equal to nothing.

3. Every circle is a regular polygon of an infinite number of sides. An inscribed polygon of a large number of sides nearly coincides with the circle; a polygon may be made to coincide with the circle as nearly as you please, if its number of sides may be as great as you please; but no polygon, however great its number of sides, can absolutely coincide with the circle.

4. When $x$ is infinite A and B are both infinite; but A is not B. This may be said when if $x$ increase, A and B both increase, so that A and B may both be made greater than any quantity you name, provided we may then make $x$ as great as we please: provided also that $A$ increases faster than $B$, so that when you name any number however great, we, being allowed to make $x$ as great as we please, can make $A$ contain $B$ more than that number of times.

5. When $x = a$, $x$ is infinite. This may be said when $x$ is as great as you please, or nearly as great as $a$, and may be made as great as you please, if $x$ may be made as nearly equal to $a$ as we please: provided that however near $x$ may be to $a$, $x$ has still an assignable value.

The following statements are sufficient to show what is meant when the terms 'infinite,' 'infinite,' or 'infinitely great,' appear: we now proceed to the correlative 'nothing,' 'infinitely small,' 'evanescent,' &c. The independent use of the word 'nothing' is laid down by some writers, and is yet more difficult than that of infinite great. If A be an assignable magnitude, $x$ is said to be infinitely small when it is so small that it is absolutely incommensurable to A, so that $x$ may be taken as nothing. Now, unless $x$ be absolutely equal to nothing, this cannot be; so that the infinitely small quantity, as thus defined, can have no magnitude whatever. Here we seem to rest, not in an absurd, but in a useless conclusion: for what possible benefit can we derive from supposing a nothing, a something nothing by which two equal magnitudes differ. A little further consideration of the term 'nothing' will here be necessary.

There is one process of arithmetic which yields an absolute zero, namely, subtraction. From a take a, and nothing remains. Consequently, in considering the idea of the absence of all magnitude, we usually refer it to the result of that process by which it is directly and unambiguously obtained. But from no other process of arithmetic does this idea arise, except by the same train of ideas which leads us to the use of the word infinite. We cannot, for example, choose to say 'nothing' by the division of a magnitude by another; we can make the result small, smaller, as small as we please, but not absolutely nothing. When therefore we consider an equation made by addition and subtraction, the absolute zero is shown by some writers by reserving the term 'nothing'; thus, $2x + a = 0$, and $2x = -a = 0$; may be written for each other without any particular examination of the symbol =. But in any other case we can only come $0$ as the limit towards which the approach by an inexpressible succession of diminutions, no one of which is ever final, corresponding to the inexpressible succession of augmentations by which we attain the notion of infinite.

In strict analogy there with our former proceeding (more particularly if we refer our conclusion—which we can nearly attain by the use of a small magnitude, more nearly by the use of a smaller, and so on without limit, that is to say, as nearly as you please by the use of a very small, or as small, or infinitely small, but which is never absolutely attained by any magnitude however small; then such conclusion may be said, for abbreviation, to be absolutely true when the magnitude is nothing. The sentences which follow the use of the word 'nothing' are inserted here; and the common use of the preceding words may now be repeated, only changing 'infinite' and 'nothing' into 'nothing'.

But in the meanwhile the term infinitely small does not appear to have its true sense to be superseded by that of the word 'nothing.' And it is true that 'nothing,' introduced under the preceding conditions, might supply the place of an infinitely small quantity. But since there is an absolute use of the term 'nothing,' derived from subtraction, to which the mind clings, and of which we do not find the like in connection with the term infinite, we shall, after some further explanation, use the term infinitely small instead of 'nothing.'

Our explanation of the term infinite will readily show the meaning of the following assertion: two infinitely great quantities may have a finite ratio. As follows:—when A and B and any great ratio may be nearly, that is, nearer to 10 to 7; when they are still greater they may be still nearly in the ratio, and so on; and their increase may be so regulated that they become the more nearly is their number, the finite ratio, and if they may be as great as we please. Similarly, strictly remembering the preceding conditions for the introduction of the word 'nothing,' we may allow of the introduction of the following phrasing: if the magnitude A is such that means that A and B, both diminishing together, may diminish in such a way that when both are small their ratio may be nearly, say that of 5 to 3; when they are still smaller their ratio may be still more nearly in that ratio, and so on; and their diminution may be so regulated that the smaller become the more nearly is their ratio that of 5 to 3; or as nearly as you please, if they may be as small as we please.

But the idea of two nothing which have a finite ratio, however strictly defined in accordance with the preceding conditions, shock even many of those who can grasp the method of using the word 'infinity.' The absolute nothing devoid of substantial possessions of the nature of the infinite, so far as we have dealt with it, is money, which is a great, if not a perfect, majority, while to contest it for the use of a word. The term infinitely small therefore supplies the place of 'nothing' whenever the latter is introduced under the conditions correlative to the former; and this introduction is allowed. But it must be remembered that if the infinitely small quantity thus introduced is to be added to or subtracted from a finite quantity it makes no change in the latter; just as if it were nothing in arithmetic. A few instances of the development of propositions will now be given.

1. When A is infinitely small B is infinitely great. As A diminishes B increases, and B can be made as great as you please, if both are taken as zero. The arc the more nearly are the two in the ratio of 1 to 1; and the ratio may be made as nearly as you please that of 1 to 1, if the arc may be taken as small as we please.

2. An infinitely small arc of a curve is equal to its chord. The smaller the arc the more nearly are the two in the ratio of 1 to 1; and the ratio may be made as nearly as you please that of 1 to 1, if the arc may be taken as small as we please.

3. Of two infinitely small quantities, one may be infinitely smaller than the other. When magnitudes, A and B, diminish together, the smaller they are made the greater may be the ratio of A to B, in consequence of B diminishing much faster than A; and it is possible that A may be made to B in a great a ratio as you please, if both are taken as nothing. The sine of a great angle are arc. Both diminish without limit with the angle; but the smaller the angle the greater the number of times the sine contains the versed sine, and the higher the extent of the sine.

Infinitely small quantities thus used have been called infinitesimals, and a succession of infinitely small quantities, each of which is infinitely smaller than the preceding, is said to be a series of infinitesimals of different orders. Such a series is $x, x^2, x^3, &c$, in which, by making $x$ sufficiently small, any one may be made to contain the next as often as we please. The infinitesimal calculus is a name sometimes given to the differential calculus, when presented by means of the theory of infinitely small quantities, in the manner originally propounded by Leibnitz.

The preceding considerations refer to the substance of nearly all the disputes which have arisen about the first principles of the differential calculus (functions, theory of curves, &c); and the different systems noticed in that article (with the exception of that of Lagrange [Functions, theory of curves], spring out of different views of the manner of presenting them.

In the article Angle we have taken notice of the circumstance that an extension of the word 'equal' to infinite spaces which coincides, would allow of a proof of the well-known properties of Euclid. [Parallels]. Let us suppose two equal angles having their sides in the same plane. We have then two infinite spaces, of which it may readily be proved that either, may be made to coincide with the other throughout its whole extent. And if any two angles be taken, and the infinite space of the one supposed greater than the other, it may be proved that the infinite space of the greater angle is greater than the
Infinite space of the less. The comparison of such infinite space is therefore consistently with perfect clarity of reasoning which would convince any one who is capable of the most ordinary thought. Had Euclid been accustomed to the modes of thinking which involve the idea of infinite magnitude, perhaps, the subject had never been entered into, and the doctrine of spasm of the extreme arteries began to prevail. Mr. Hunter considered inflammation to be a restorative principle by which injured or diseased parts are repaired, and the doctrine of spasm of the extreme arteries he regarded as an increased action of the vessels, which at first consists simply in an increase or diminution through their natural size. This increase he imagined to depend upon a diminution of the space and that rate of inflammation he regarded as canalized through them more quickly than in the natural state; but several of the assumed facts of Mr. Hunter have since been found to have no existence, and even at the present day opinion on this divided or perplexing subject. Whatever difference of opinion exists as to the cause of inflammation, we believe all are agreed on the plan to be pursued in its reduction: this consists in the removal of all exciting causes, the abstraction of blood generally and locally, the administering of such medicines as act either by lowering the circulation generally or increasing particular secretions, and in the employment of local emollient or sedative applications.

INFLEXION. [Diffraction.] INFLEXION. A point of contrary fixture [Flexure, Contrary] is sometimes called a point of inflexion.

INPLORESCENCE, in plants, is the manner in which their flowers are arranged florally to be propagated, and is generally called a leaf-bud, with a similar origin, and capable, under particular circumstances, of reverting absolutely to that condition, it follows that the branching of that part of a plant which bears leaves is entirely a development of those, which has leaves, or leaf-buds, and therefore not in need of special explanation. But as the formation of the flower out of the materials of a leaf-bud is accompanied by many deviations from the habitual development of its parts, so is the disposition of the branches of inflorescence often in a similar way a deviation from the habitual method of arranging those parts.

Inflammation may be considered as regular or centripetal, and irregular or centrifugal: in the former all the parts are formed successively without interruption; in the latter the parts are subject to various interruptions and derangements in the progress of their formation. In centripetal inflammation the external flowers of a disk, or the lowermost of a cone, are first developed, and consequently first expanded; and hence the course of unfolding proceeds from the circumference to the centre, or, which is the same thing, the parts at the base of the axis are the first, and the spokes of the disk, or the bases of the cone, begin to grow at the apex. In centrifugal inflammations the axis of growth is arrested in its progress by the formation of a flower-bud, as at a, in the accompanying diagram; two lateral points then develop from below a, and lengthen to b, where a new flower-bud appears, and stops the growth; two other lateral points are produced from below b and lengthen to c, where a new flower-bud again arrests the progress of development, and so on. In this case it is clear that a in the centre, being first formed, will expand before b and c, etc., that b will in like manner open before c, and in the same way all the others, therefore the order of expansion of the flowers is from the centre to the circumference. To this kind of inflorescence the word cyme is usually applied. It occurs in the common Sunflower, Arctium, the Launias, and other plants.

The centripetal inflorescence, in its simplest state, is merely a branch bearing flowers instead of leaf-buds, as in the 11yssinum and the Ornithogalum: if the flowers are sessile, it is then called a spike; if stalked, a raceme. If the branch of the spike or its axis is so much contracted as to be very slender, it is then called a raceme, as in Hyacinth; and, if so contracted as to be a mere pencile or filament, it is then called an raceme, as in Hyacinth.
to become a broad das, as in the Dandelion, or Daisy, or common Artichoke, the inflorescence is called a head or capitulum; if the same thing happens to a raceme, the umbel of Astrantia, Fennel, Parsley, &c., is the result.

Let the flower-stalks of the raceme be branched or race-mose, and the race is produced. To these primary forms of inflorescence all others are referrible, as simple and generally unimportant varieties.

INFLUENZA (La Gripppe, Fr.).—Influenza, the name given both to this and to an ancient notion of nature, which has spread more extensively than any other epidemic; and this universality of its attacks, together with the greater severity of its symptoms, principally distinguishes it from every other species of morbid condition, whether it be such as is seldom fatal except to the aged, or to those previously suffering from or having a tendency to pulmonary disease. Notwithstanding the great frequency of this epidemic, it is remarkable how little variety there has been in its symptoms, and the records of cases which occurred in 1510 nearly resemble those which have been observed during its latest visitations. The following are the symptoms which most generally characterize it— the person is seized with slight chills, weight and pain, sometimes severe, and feeling the over the eyebrows, there is an increase of the lacrimal and nasal secretions, with loss of appetite, protrusion of the eyeball, a weak frequent pulse, dyspnoës, hoarsenes, and cough. The days taken place.

The duration of the disease varies from one to two days to months, and a great deal of it remains behind for many weeks, and in some epidemics relapses have been frequent.

Several epidemics of influenza have been remarkable for affecting the mucous membranes of the alimentary canal as well as that of the organs of respiration. The progress towards the subsidence of the epidemic is generally less severe than that at its commencement.

The history of this disease is curious. When once it has made its appearance, it pursues a route which takes it from one country to another, from continent to continent, across seas and over mountains; but this course, although regular as regards each epidemic, yet varies somewhat with each. In 1819 its course was in a north-western direction: in 1637 due west, attacking whole populations almost on the same day; in 1580 from east and south to west and north, and was complicated with plague, but France was the only European country infected, and with the latter. That of 1729 was very fatal in London; Lowe says more persons died of it than at any one time since the plague of 1665. In the month of September, 1729, 1000 weekly were carried off in the metropolis. The epidemic of 1603 travelled from south to north.

These epidemic visitations have taken place most frequently in the spring and autumn, but have seldom recurred in the same place longer than six years.

On the contrary, courses of this, as of all other epidemics, we must confess our ignorance. Some have attributed it to the sudden changes of weather; others to a particular moral principle, different from but resident in and conveyed by the air; and others again to contagion. The first of these hypotheses is evidently untenable, for atmospheric changes as great and sudden have taken place as some of those observed to precede the breaking out of the epidemic, as it has been described; and a change of temperature without being preceded by any apparent atmospheric peculiarity; the sensible state of the air too preceding and accompanying the same epidemic has been different in different cases. In the latter, if coupled with others had more advocates than either of the former hypotheses, does not appear to us to rest upon any better foundation; the instances of isolated individuals and districts, together with the suddenness and rapidity of the effects, and the very sudden and almost instantaneous manner in which whole populations have been seized, which was particularly remarkable in the epidemic of 1557, seem to set at nought all idea of the being the cause, not to mention the insufficient of this view to explain, viz., the existence of a moral principle resident in and conveyed by the air. Now the very doubts on any subject which give rise to theories for explaining the phenomena connected with such subjects presuppose the want of any direct proofs or evidence of a tangible shape; and if putting aside the idea of the epidemic we are speaking of being caused by any deleterious or unwholesome quality of our food, we allow the atmosphere to be the medium of conveyance of the morbid principle, we must admit that all epidemics hitherto made with the view of demonstrating such principle have only afforded negative results; neither does it appear that there is any one spot on the earth wherein it has been traced:—a want of evidence of opinion on the cause of this malady, all physicians of eminence have agreed remarkably in their testimony as to the general rules and principles of practice. Notwithstanding the inflammability of this subject, as the history of its occurrence rarely be employed with safety, much loss with benefit; and persons who have been subjected to this operation recover more slowly than others, and remain in a debilitated condition much longer. In severe cases, emetics at the commencement have been found useful, either in cutting short the disease or in modifying its violence. Mild aperients administered with caution, the exhibition of antimonial and salicylate mixtures, and a cool temperature, constitute the means which experience has found to be most efficacious.

INFORMATION, an accusation or complaint exhibited against a person for some criminal offence. It differs from an indictment [INDICTMENT] principally in this, that an information is an application to the court in a common law cause, whereas an information is simply the allegation of the officer who exhibits it. Informations are of two sorts: those which are, or may be, at the suit of the king, and, or may be, at the suit of the king only. The former are exhibited for numerous offences inferior to felony, as wilful and corrupt oppression by a justice of the peace, libels, conspiracies, &c., and are tried by the master of the crown office. The latter are filed by the attorney-general at his own discretion, and are called offical informations. The former kind, which are called criminal informations, can only be tried by leave of the court of King's Bench, and the application for leave must be made by the attorney-general. The officer who has an opportunity of answering. When an information of either kind is filed, it must be tried in the usual way by a petty jury in the county in which the offence was committed (4 Bl. Com. 307; 4 and 5 Will. and Mary, Cap. 18.)

When it is necessary for the court of chancery to interfere with the regulation or management of any charity, the attorney-general, or the relation of some informant (who is called the relator), files an information in the court of chancery for the purpose of bringing the case before the court.

If the office of attorney-general is vacant, the solicitor-general has power to file informations.

INFUSIONS are solutions of some of the principles of vegetables, generally in water, but occasionally in other vehicles. When water is employed, it may either be hot or cold. It is customary to use warm water, but in many instances cold is preferable. When cold water is insufficient, it is necessary to continue the digestion longer than when it is warm. The vegetable substances may either be fresh or dried; when the former, they are to be cut into pieces; when the latter, bruised or very coarsely powdered, never reduced into a fine powder. The water being poured on the substance employed, is to be allowed to stand in a covered vessel for a space of time varying with the nature of the article employed; and is then transferred to the recipient, in which it is to be used. Infusions generally spoil soon, more particularly if warm water be employed, or if the substance contain starch or other fermentable ingredients. Sometimes alcohol is added to the infusion, or the infusion is steeped, and although it is often said to increase its powers. Hard water should if possible be avoided in the preparation of infusions.

INFUSORIA. This term has been applied to the numerous animals which are found in water, which are commonly called animaleculae. The invention of the microscope by Hooke revealed the existence of myriads of living creatures whose presence was before unknown; and this instrument has shown that a drop of water of any river contains, in its first inspection, perfectly clear, is perhaps swarming with living beings. Ehrenberg (whose labours have principally contributed to the knowledge of the true nature and structure of the infusor animaleculae) has described species which are not larger than from one-thousandth to one-two-thousandth of a
in diameter, and which are separated from one another by intervals not greater than their own size. A cubic inch of water may thus contain more than 60,000 millions of these beings, estimating them only to occupy one-fourth of its space; and a single drop (measuring not more than a line in diameter) placed under the microscope will be seen to hold 10,000,000 millions of these animals, nearly equal to the whole number of human beings on the surface of our globe.

If a single drop of water thus swarms with life, what circulation of water may thus contain more than 60,000,000,000 millions of these beings, estimating them only to occupy one-fourth of its space; and a single drop (measuring not more than a line in diameter) placed under the microscope will be seen to hold 10,000,000 millions of these animals, nearly equal to the whole number of human beings on the surface of our globe.

If a single drop of water thus swarms with life, what circulation of water may thus contain more than 60,000,000,000 millions of these beings, estimating them only to occupy one-fourth of its space; and a single drop (measuring not more than a line in diameter) placed under the microscope will be seen to hold 10,000,000 millions of these animals, nearly equal to the whole number of human beings on the surface of our globe.

If a single drop of water thus swarms with life, what circulation of water may thus contain more than 60,000,000,000 millions of these beings, estimating them only to occupy one-fourth of its space; and a single drop (measuring not more than a line in diameter) placed under the microscope will be seen to hold 10,000,000 millions of these animals, nearly equal to the whole number of human beings on the surface of our globe.

If a single drop of water thus swarms with life, what circulation of water may thus contain more than 60,000,000,000 millions of these beings, estimating them only to occupy one-fourth of its space; and a single drop (measuring not more than a line in diameter) placed under the microscope will be seen to hold 10,000,000 millions of these animals, nearly equal to the whole number of human beings on the surface of our globe.

If a single drop of water thus swarms with life, what circulation of water may thus contain more than 60,000,000,000 millions of these beings, estimating them only to occupy one-fourth of its space; and a single drop (measuring not more than a line in diameter) placed under the microscope will be seen to hold 10,000,000 millions of these animals, nearly equal to the whole number of human beings on the surface of our globe.
suspended to the long nervous filaments which communicate with their oral and sub-oral glands. These bodies are very delicate and simple, and give rise to other minute filaments; they are always free and unattached, and placed in the same spot; and they have distinctly the form of ganglions and nerves, and move in a passive manner, as the result of the motion of the mouth.

The eyes of the Rotifer appear as one, two, or even several spots, generally of a red colour, placed on the fore part of the animal, either before the rotatory organs or behind them. They are immediately connected with the alimentary system, Ehrenberg having detected a direct communication between the red points and the coelophagel ganglia. The Infusoria show that they possess the sense of vision, as the mode in which they pursue and capture their prey.

Classification.—Ehrenberg has separated from what he calls the true Infusoria several families of animalcules which were formerly included in the same class. The principal genera thus separated are Spermatozoa, Cercaria, and Vibri, which are now considered by some as part of the class Entozoa, and are divided into two families, named Cercariidae and Vibriidae. In the article Entozoa, we briefly mentioned the Spermatozoa, or Seminal Cercaria, which are the only species of this group of animalcules that can properly be classed among the internal parasites, as they alone are completely found in the bodies of other animals.

The Cercariae found in vegetable infusions have an ovoid or cylindrical body, furnished with a tail, which is not so long as in the Zoospemna; and in some of the species a mouth, and a few cilia, have been observed on the anterior part of the body; but in none of them has the polygastric structure been seen, though the Cercaria Leuca is stated to have a simple alimentary canal. The whites of the white egg, the Vibri, as named from their darting or quivering motion, includes the eel-like microscopic animalcules which abound in stale paste, vinegar, &c., together with others which are parasitic on living vegetables, where they have excited particular attention, from the damage which they have done to Vibri Tribe, which infests the grains of wheat, and occasion the destructive disease called ear-cockle, or purples. The Vibri, as well as the Cercariae, differ from the true Infusoria not only in the absence of internal stomachs, but also of external cilia, which prevents them from exciting any currents when placed in coloured water.

The true Infusoria have been separated into two distinct divisions; the Polygastrics, which have numerous internal stomachs and a very simple structure (no vascular or nervous systems having been yet detected), and the Rotifer, Rotatoria, or wheel animalcules, named from the singular rotation of their organs which make the mouth. These organs are formed of one or more eiles of cilia, which, when in motion, have the appearance of toothed wheels turning round on their axes, first in one direction, then in the opposite. The true Rotifer, besides being more highly organized than the polygastric, have more perfect external forms, a separation into head, trunk, and tail being distinguishable in many species.

On account of the difference in the perfection of structure between the two groups of infusory animals, they have been separated and placed in distinct divisions of the animal kingdom by some naturalists. Mr. Owen makes the polygastrics the lowest class of the sub-kingdom Acrina, and the rotifers the highest in the division Infusoria. The Grant (Cycl. of Anat.) separates them in the same manner, placing the polygastrics in his lowest group Cyclo- nura, and the radiata among the Diplonura. Ehren- berg, who retains both forms of infusoria, subdivides the sections polygastric and rotiferina into many minor groups, which are founded upon the modifications of different organs: first as to the form of the intestine, whether complete or imperfect; secondly, he considers the varieties of the cilia and the structure of the dental apparatus; thirdly, many of the infusoria have the integuments naked; others are furnished with a crustaceous or bony covering; but both among the rotifer and polygastric the naked and coated species are intimately connected together, and very often entirely agree with one another in internal and external structure, with the single exception of the consistency of their covering. These characters however, though not separating the animals into distinct divisions, are used as subordinate means of classification; and Ehrenberg has formed two parallel series, named Nuda and Loricata; which correspond to certain of the Gymnoder and Cretodas of Bory St. Vincent. The number of loricated polygastrics is very small, but among the rotatoria there are a larger number, and some bear a nearer resemblance to certain naked species. For the details of classification and the enumeration and description of the numerous genera and species of infusory animalcules, we must refer to Ehrenberg's work on the Infusoria.

Fossil Infusoria.—These animalcules are not only met with in water containing large quantities of organic matter in solution, but in common sea-water, stagnant fresh water, and well water which has been exposed for a short time to the air. Ehrenberg has also found a few species in the water of mines: he met with several in silver mines in Russia at the depth of 36 fathoms below the surface; but he never succeeded in detecting any in atmospheric waters, having many times carefully examined the dew-drops, which are so plentifully deposited during the night in hot climates. With respect to the origin of these beings, it has been thought that they are generated spontaneously; but as they never make their appearance in fluids secluded from the atmosphere of the air, it is supposed that ovula of exceeding number are always floating in the air, and only require to meet with a proper medium to develop themselves. It is an argument however against the theory of spontaneous production, that none of these have ever been found in the subterranean waters: they are the products of the organisms alive for a fortnight: the existence of these animalcules cannot therefore be so ephemeral as some have supposed. Their rate of increase is favoured by powerful and sudden heat or warmth. These animals live on fine particles of animal or vegetable matter in solution in water, and the larger species devour the smaller animalcules.

**Fossil Infusoria**

Ehrenberg has detected an immense number of fossil animalcules, principally in silicious deposits near Berlin. Most of the species are so well preserved that they can be minutely investigated. Some specimens of silicious rock brought from the Isle of France, which he examined, were found to consist almost entirely of the shells of infusory ani- mals chiefly belonging to species still living; those from the Isle of France were remarkable, as the number of remains found near Berlin belonged to recent fresh-water species. The slaty Tripoli of commerce and some other forms of slate, as the polishing slate of Bilin in Bohemia and the Nuith slate of France, are almost entirely of the remains of minute infusory animals.

**INGA**

A genus of plants of the natural family of Legumi- nes, which, though it has been separated from Mimosas, yet contains upwards of one hundred species. They are found in the tropical parts of Asia, Africa, and America. They are distinguished by their legumes being broadly linear, compressed, and one-celled. The seeds are usually covered with pulp, more rarely with farinaceous matter or a pellicle. The species form shrubs or trees, and are com- monly unarmed. The flowers are in spikes, or are capitulate, and of a red or white colour. From the number of species in this genus, as well as in Acacia and Mimosa, and from the different names that have been given them in the same period, and from some confusion in the synonyms. A few of the useful species have been further separated into the genus Parkia; but many still remain which are important in the country, and which the botanists of different nations call by different names, like many Mimoses and Acacias, or for the edible nature of the fucca or pulp which surrounds their seeds. Thus, *I. coelochrycos* has bitter and astrignent bark, which is much prized in tanning and also medicine. It is taken to Portugal and its mastication called *Goma* and used even as a substitute for that of the Cinchona. Martius distinguishes from this species, which he calls *I. aurea*, another which he has named *I. austrenac*, and of which the bark has been extensively collected in the Dutch possessions. The bark of these trees is considered by some authors to be the Cortex *Astrignenis Brazilianis* of old pharmacopoeias. *I. salutaris* is another astringent species, a native of New Granada, of which the bark is much used in the form of decoction for...
various complaints in which astringents are indicated, and for the same purposes as ratany root. Some of the species, as before mentioned, are esteemed for the sweetish edible pulp with which their seeds are surrounded, as _I. dulcis_ in India, and _I. stagnina_ in the province of Quito, where it is called _Guabo_ or _Guabas_, but _Pacoes_ in Peru. _S. I. Camat- chili_, according to Perrotet, is similarly esteemed in Manilla, and _I. Faroba_ in Western Africa, in the neighbourhood of the Senegal. Several other species, though less conspicuous, possess important properties as have been shown to characterize the foregoing.

INGATESTONE. [Essex.]

INGOLSTADT, a town and fortress of Bavaria, the history of which is traced on the work of Ingulphus, who, as we have seen, was the most important fortress in Bavaria till the fortifications were destroyed by the French in the year 1806. As the situation of this place renders it of peculiar importance for the defence of the country, many thousand have been spent for some years past employed in erecting works which when completed will make it a fortress of the first class. The town is well built, with long broad streets, situated in a fertile country on the Donauhe, over which there is a stone bridge. It is a dull place, without any trade. It has nine churches and two nunneries. The principal buildings are the chief parish church, the magnificent edifice formerly the Jesuits' college, and the anti-university church, which was founded in 1473 and dedicated in 1500. It has 6000 inhabitants. 48° 45' 50'' N. lat., 11° 25' 31'' E. long.

INGROSSING is an offence at the common law against trade. It is described by the statute 5 and 6 Ed. VI., c. 14, to be getting into their hands, by buying, &c. (except in the ways mentioned in the statute), corn or other deal vicitals with intent to sell them again. The punishment for it is in the building the houses in which the goods were or are, and he who is convicted of it, dergone with respect to it, are stated in the article Fox- Stalling.

INGULPHUS, the author, or pretended author, of a work entitled _The History of the Monastery of Croyland_ (or, History of the Monastery of Croyland, or Croyland, in Lincolnshire), which has usually been considered one of the most valuable of our ancient historical monuments. The face of this of Ingulphus, as it has been traced in the edition of his _De Redemptoribus_ by Peter of Blois, according to the account there given, Ingulphus was the son of English parents, was born in London about the year 1030, and was educated, first at Westminster, and afterwards at Oxford, where he speaks of having imbued himself especially in the study of the philosophy of Aristotle and the rhetorical books of Tully. It was apparently before he went to Oxford that he obtained the notice of Edithgulph, or, as he is sometimes called, Edithgulph's son, when she, as the story goes, having heard him speak of her, and of his situation, and of his future prospects, and of his logic, and never dismissed him without some pecuniary mark of her favour or ordering him to be taken to have something in the library. His proper introduction to court however did not take place till some years after that.

When,' he says, in another place, 'I had become a young man (adolescens), disdaining the poverty (exiguitatem) of my parents, I became every day more and more impatient to leave my paternal lares, and, affecting the palace of kings, I suffered myself to be signified as 'a splendid rainment.' He accordingly contrived to get himself introduced to Duke William of Normandy when that prince visited the court of the Confessor in 1051, and he made himself acquainted with the prince, that he took him with him on his return to the Continent, and made him his prime-minister, with unbounded power, which Ingulphus confesses that he did not exercise with much discretion. He accompanied the military master, accompanying Sigfried, duke of Ments, on a pilgrimage to the Holy Land, which turned out a very disastrous adventure. On his return, Ingulphus became a monk in the abbey of Pontmain, and on a festival, was sent to the Holy Land, when he came over to England on the invitation of his old master, now seated on the throne of that country, and was appointed abbot of Croyland. Through the favour of the king, he contrived to have a shop, Lannefranck, with a great service to this, the volume which was indebted to him both for the re-edification of its buildings, destroyed two centuries before by the Danes, and for a great extension of its privileges and immunities. Here he resided till his death, on the 17th of December, 1109. A tract on the miracles of St. Guthlac (the patron of Croyland) is attributed to Ingulphus; but the only work claiming to be that which is now extant is his History already mentioned. This production was first printed in an imperfect form in Sir Henry Savile's _Quarta Anglica Scriptores post Bedam Principul_, fol., Oxon., 1601, and the volume 5, in 1601, it was printed entire, along with the compositions of Peter of Blois, in the _Quarta Anglica Scriptorum_ of _Vetor Tomus Primus_, fol., Oxon., 1604 (commonly called Fell's, or the first volume of Gole's Collection). In this last the _De Redemptoribus_ of Ingulphus, which is a history of the kingdom as well as of the monastery of Croy- land, and extends from the year 664 to 1089, fills 110 pages; and the continuation, extending to 1117, twenty-five more. Scarcely any of our early histories contains so many curious incidents and notices as are found in this work; and until very lately its authenticity does not appear to have been suspected. A very formidable attack however has recently been made upon its claims to be regarded as anything better than 'an historical novel,' a mere monkish invention or forgery of a later age, by Sir Francis Palgrave, in an article in the _Quarterly Review_ for June, 1826 (No. 67, pp. 289-308).

INJUNCTION. An injunction is a writ issuing by the order and under the seal of a court of equity, and is of two kinds, remedial and judicial.

The remedial writ is used for the following purposes among many others: to restrain parties from procuring or using, in other courts, from negotiating notes or bills of exchange, to prevent the sailing of a ship, the alienation of a specific chattel, to prevent waste by burning timber or pulling down buildings, to prevent the use of water, or to make an injunction to press nuisances, and to put an end to vexatious litigation. It is impossible here to enumerate the variety of cases in which a plaintiff in equity is entitled to the relief afforded by the writ of injunction.

The remedial writ of injunction is again distinguished as of two kinds, the common and the special injunction, both of which are obtained on motion.

The common injunction is generally obtained by the defendant not appearing after being served with a subpoena, or not answering in due time. The special injunction is commonly obtained _ex parte_, and behind the back of the defendant (as the phrase is), without any service of subpoena. But either kind of injunction may be moved for after the defendant has answered the plaintiff's bill, and on the merits of the case as appearing from the defendant's answer; and if a special injunction has been obtained _ex parte_, the defendant may in the answer set up the fact of the injunction granted him, and overrule it, or make an objection to it, or direct the court to put the defendant from committing or continuing acts injurious to him.

As a general rule, no injunction will be granted except where there is a bill already filed, though there have been cases specially circumstanced where this rule has been dispensed with; but it is scarcely going too far to say that these precedents would not now be followed.

A court of equity frequently refuses an injunction where it acknowledges a right, as when the conduct and laches of a party complaining has led to the state of things that occasions the application.

Special injunctions, as already observed, are usually obtained before appearance upon motion in court supported by a certificate of the bill having been filed, and an affi- davit verifying the material circumstances alleged in the bill of complaint; but in pressing cases, where the court is not sitting, the process will be granted upon petition supported in like manner.

If the defendant has not entered his appearance to the bill, notice of the application for a special injunction need not be given to the defendant, unless the court directs a notice to be given when the motion is made.

Special injunctions, as above observed, are also obtained upon the merits disclosed by the answer in those cases which do not appear to be of so urgent a nature that mischief may ensue if the plaintiff were to wait until the bill was answered. The defendant may, in the case of an answer, continue, and the merits after answer continue until the hearing of the cause.
The method of writing ink only stays proceedings at common law, and in the first instance it only stays execution, and does not stay trial if issue be joined; but it may by affidavit be immediately extended to a stay of trial.

The common injunctive and the injunction extended to stay trial continues in force until the defendant has fully answered the plaintiff's bill, and the court has made an order accordingly. The defendant must therefore care to apply to dissolve this injunction until he has put in a full answer; but the special injunction before answer continues until answer or further order, and consequently the defendant may move upon notice to dissolve a special injunction by putting in his answer.

It would be useless, in an article of this description, to state the various rules which govern the practice of the courts as to granting, extending, continuing, or dissolving injunctions. They may be laid down at length in the various books of practice, and do not admit of compression.

The judicial writ of injunction issues subsequently to a decree, and is a direction to yield up, to quit, or to continue the possession of lands, and is described as being in the nature of an execution. This writ however is virtually abolished by the statute 11 Geo. IV. and 1 Wm. IV. c. 36, sec. 11, rule 19, which gives the writ of assistance at once, in giving the intermediate steps by injunction, attachment, &c. necessary.

The Roman Interdict was in many respects similar to the injunction. [Interdict.]

Ink, for the various purposes to which it is applied, is composed of various ingredients. It may be treated of under the heads of Writing Ink, Printers' Ink, Indian Ink, Marking Ink, and Sympathetic Ink.

Writing Ink.—The writing ink of the ancients was essential, and was of a black color. Its basis was finely-divided charcoal, mixed with some mucilaginous or adhesive fluid: it was much less destructible than modern writing ink, and more resembled printers' ink, both in the nature of its colouring ingredient and indestructibility.

Writing ink is now a chemical compound, and not a mere mechanical mixture. Its basis is proto-gallate and per-pentannate; what prepares the colour, and becomes per-gallate and per-pentannate; and it is owing to the oxygen of the air effecting this change gradually that recent writing is of a comparatively light colour, and that subsequent writing is washed out by blotting.

Many processes have been given for preparing writing ink: the common ingredients are galls and sulphate of iron; in fact, while printers' ink may be considered as a black paint, writing ink may be regarded as a black dye. Various processes have been adopted. The following, which is recommended by Mr. Brande, gives, he says, an excellent ink, and it possesses the merit of greater simplicity than most others:—Aleppo galls, boiled in a solution of iron, a little gum, sugar of alum, water; 6 pints. Boil the galls in the water, then add the other ingredients, and keep the whole in a well-stopped bottle, occasionally shaking it. In two months strain and pour off the ink into glass bottles, to be well corked. To prevent mould, add one grain of corrosive sublimate, or three drops of cresate, to each pint of ink.

Mr. Brande observes, that, "In making good writing ink the great object is to regulate the proportion of sulphate of iron to the galls; if it be in excess, although the ink may at first appear black, it becomes subsequently brown and yellow. Hence some time should elapse before ink is used after the ingredients are put together, in order to be tested from time to time, and the combinations perfectly regulated. Gum is added to retain the colouring matter in suspension, to prevent too great fluidity in the writing, and to protect the vegetable matter from decomposition. Logwood and other vegetable astrignents have been tried, but do not yield a permanent ink.

When writing has through age become yellow and very indistinct, it is because the vegetable matter has decayed, and the ink itself or peridote of iron, is left. By carefully applying infusion of galls the writing may be rendered blacker and more legible. This method was successfully adopted in deciphering the MS. of Gains. [Gains.]

Modern writing ink, unlike the ancient, is readily detachable; it is made by dissolving in alcohol, and therefore it can be removed by boiling or washing. Indeed, according to Mr. Brande, if paper has been made from inferior rags bleached by excess of chlorine, the ink, however good, will be ultimately discoloured.

Sulphate of copper is occasionally added to ink, and some direct it to be prepared with the addition of vine-

vinegar; but these substances are rather injurious than otherwise.

A blue writing ink has lately introduced: its exact composition we are unacquainted with; but the basis appears to be an alumina simple, white of the same quality as lead white. It is used in China, for writing and for painting upon paper of Chinese manufacture. It is also used in Europe for designs in black and white, in which it possesses the advantage of affording various depths of shade, according to the degree of dilution with water. The common lamp-black of the shops is not sufficiently fine for the purpose; it requires to be made with peculiar care.

Printers' Ink is of two kinds: for letter-press printing and for copper-plate printing. Printers' ink is prepared by boiling linseed or nut oil in iron pot; and if it does not take fire of itself, it is kindled, and suffered to burn for about half an hour; the flame is then extinguished by covering over the vessel, and the oil is by this operation reduced to a fluid; it is then heated to the necessary drying quality, after being again boiled. It is then mixed with a proper quantity of lamp black, when black ink is required; if red ink be required, the colouring matter employed is vermilion, for finer works.

Sympathetic Inks are such as are invisible until heat is applied, and then, by the chemical change induced, the writing becomes visible. The most remarkable of these is that in which printers' ink is made with oil which is less boiled, and the charcoal used is stated to be Frankfort black, made from vine twigs.

Marking Ink is employed for marking linen: it is a solution of nitrate of silver, written with a pen upon the fabric is to be marked; and it has been much used for marking various articles, as corduroy, &c. for making water marks by boiling with some soda. By this process oxide of silver is precipitated upon and combines with the cloth so as to be scarcely removable by any reagent which does not also destroy its texture.

Sympathetic Inks are such as are invisible until heat is applied, and then, by the chemical change induced, the writing becomes visible. The most remarkable of these is that in which printers' ink is made with oil which is less boiled, and the charcoal used is stated to be Frankfort black, made from vine twigs.

Marking Ink is employed for marking linen: it is a solution of nitrate of silver, written with a pen upon the fabric is to be marked; and it has been much used for marking various articles, as corduroy, &c. for making water marks by boiling with some soda. By this process oxide of silver is precipitated upon and combines with the cloth so as to be scarcely removable by any reagent which does not also destroy its texture.

Sympathetic Inks are such as are invisible until heat is applied, and then, by the chemical change induced, the writing becomes visible. The most remarkable of these is that in which printers' ink is made with oil which is less boiled, and the charcoal used is stated to be Frankfort black, made from vine twigs.

Marking Ink is employed for marking linen: it is a solution of nitrate of silver, written with a pen upon the fabric is to be marked; and it has been much used for marking various articles, as corduroy, &c. for making water marks by boiling with some soda. By this process oxide of silver is precipitated upon and combines with the cloth so as to be scarcely removable by any reagent which does not also destroy its texture.

Sympathetic Inks are such as are invisible until heat is applied, and then, by the chemical change induced, the writing becomes visible. The most remarkable of these is that in which printers' ink is made with oil which is less boiled, and the charcoal used is stated to be Frankfort black, made from vine twigs.

Marking Ink is employed for marking linen: it is a solution of nitrate of silver, written with a pen upon the fabric is to be marked; and it has been much used for marking various articles, as corduroy, &c. for making water marks by boiling with some soda. By this process oxide of silver is precipitated upon and combines with the cloth so as to be scarcely removable by any reagent which does not also destroy its texture.

Sympathetic Inks are such as are invisible until heat is applied, and then, by the chemical change induced, the writing becomes visible. The most remarkable of these is that in which printers' ink is made with oil which is less boiled, and the charcoal used is stated to be Frankfort black, made from vine twigs.

Marking Ink is employed for marking linen: it is a solution of nitrate of silver, written with a pen upon the fabric is to be marked; and it has been much used for marking various articles, as corduroy, &c. for making water marks by boiling with some soda. By this process oxide of silver is precipitated upon and combines with the cloth so as to be scarcely removable by any reagent which does not also destroy its texture.

Sympathetic Inks are such as are invisible until heat is applied, and then, by the chemical change induced, the writing becomes visible. The most remarkable of these is that in which printers' ink is made with oil which is less boiled, and the charcoal used is stated to be Frankfort black, made from vine twigs.

Marking Ink is employed for marking linen: it is a solution of nitrate of silver, written with a pen upon the fabric is to be marked; and it has been much used for marking various articles, as corduroy, &c. for making water marks by boiling with some soda. By this process oxide of silver is precipitated upon and combines with the cloth so as to be scarcely removable by any reagent which does not also destroy its texture.

Sympathetic Inks are such as are invisible until heat is applied, and then, by the chemical change induced, the writing becomes visible. The most remarkable of these is that in which printers' ink is made with oil which is less boiled, and the charcoal used is stated to be Frankfort black, made from vine twigs.

Marking Ink is employed for marking linen: it is a solution of nitrate of silver, written with a pen upon the fabric is to be marked; and it has been much used for marking various articles, as corduroy, &c. for making water marks by boiling with some soda. By this process oxide of silver is precipitated upon and combines with the cloth so as to be scarcely removable by any reagent which does not also destroy its texture.

Sympathetic Inks are such as are invisible until heat is applied, and then, by the chemical change induced, the writing becomes visible. The most remarkable of these is that in which printers' ink is made with oil which is less boiled, and the charcoal used is stated to be Frankfort black, made from vine twigs.
and in which Anceletus and his partisans were excommunicated. In September, 1136, Lotharius marched again into Italy with numerous troops, followed by a number of German bishops and archbishops, and after having hold his court in the plains of Ronceglio, where he published a law concerning the tenure of fiefs, he fought his way in the following September to Rome, where, after the death of the latter, supported by Roger, elected another antipope styled Victor IV., who was soon after persuaded by St. Bernard to resign his claims, and thus restore peace to the church. Roger however continued hostile to Innocent, by which he was expelled from the council of the Lateran, but Innocent, having gone as far as San Germano with a body of troops to meet Roger, was surprised and taken prisoner by him. This led to a peace, by which Innocent acknowledged Roger as king and his son as duke of Apulia.

It was then that the city of Naples first acknowledged Roger as its sovereign. In 1139 Arnaldo da Brescia began to preach at Rome, but being banished from that city, he repaired to France. [ARNALDO DA BRESACA.] The remaining years of Innocent's pontificate were disturbed by a war between the Romans and the people of Tibur, and by a revolt in Rome itself, when the people, excited perhaps by the passions kindled by the dissensions which arose between the pope and the senate, and asserted their independence. In the midst of these troubles Innocent died, in September, 1143, and was succeeded by Celestine II. (208)

Innocent II., or Urbanus II., son of Transmuid, count of Segni and of Cenatio, a noble family of Rome, was unanimously elected in 1198, after the death of Celestine III. He ascended the papal throne at the vigorous age of thirty-seven, possessed of very great abilities, indefatigable industry, and a firm resolve to raise the papal power, both temporal and spiritual, above all the churches, principalties, and powers of the earth; and he very nearly accomplished his purpose during the eighteen years of his pontificate. He was the first of the popes to consider the Universities of Paris and Bologna in the studies of philosophy, theology, and the canon law, and also by several written compositions, especially by his treatise 'De Miseria Conditionis Humanae,' the gloomy acetic view of which he took in this work of the world and of human nature show a mind filled with contempt for all worldly motives of action, and not likely to be restrained in forwarding what he esteemed to be his paramount duty by any of the common feelings of leniency, conciliation, or concession, which to a man in his situation must have appeared sinful weaknesses. His ambition and haughtiness were evidently not personal, he was interested more in his interests than in his interests, Gregory VII. His interest was totally merged in what he considered the sacred right of his son, 'universal supremacy,' and the sincerity of his conviction is shown by the steady uncompromising tenacity of his conduct, and by a like uniformity of sentiments and tone throughout his writings, and especially his numerous letters. (Innocenti III. Opera, and his Epistles and Decretals, published separately by Baluzius, in 2 vols. fol., Paris, 1682, with a fairly written biography of Innocent by an anonymous contemporary.)

External circumstances favoured Innocent's views. The emperor Henry VI., king of Italy, and also of Sicily, had last year, the year before the death of his father, the emperor Frederick I., of Germany; whilst Constance of Sicily, Henry's widow, was left regent of Sicily and Apulia in the name of her infant son Frederick II. Innocent, asserting his claim of suzerain power over the See of Rome in the name of the Southern part of Italy, wrote a letter to Constance, and then himself assumed the regency during Frederick's minority.

At Rome, availing himself of the vacancy of the imperial throne, he besought the investiture on the prefect of Rome, whereupon he obtained, by threats, promises, and by an end to the former, though often eluded, claim of the Imperial authority over that city. In like manner, being favoured by the people, ever jealous of the dominion of foreigners, he drove away the Imperial feudatories, such as Conrad duke of Spoleto and count of Avers, and Marcolfino marquis of Ancona, and took possession of those provinces in the name of the Roman see. He likewise claimed the exarchate of Ravenna, but the archbishop of that city asserted his own prior rights, and 'Innocent,' says the anonymous biographer, 'prudently deferred the enforcement of his claims to a more fitting opportunity.' The towns of Tuscany, with the help of these powers, declared allegiance to the Empire, and formed a league with Innocent for their mutual support. It was on this occasion that Innocent wrote that famous letter, in which he asserts that 'as God created two luminaries, and placed one of them farther off for another inferior for the night, which last owes its splendour entirely to the first, so he has disposed that the regal dignity should be but a reflection of the splendour of the papal authority and entirely subordinate to it.'

In Germany, Innocent, acting as supreme arbiter between the rival aspirants to the Imperial crown, decided at first in favour of Otho, a Welf, on condition of his giving up to the Roman see the disputed succession of the counts Mathilda; but some time after he agreed to an arrangement between Otho and his rival Philip, whom he acknowledged as emperor. Philip being murdered in 1128, Otho resumed his claims, and was crowned by the pope at Rome, but having displeased Innocent in the business of the countess Mathilda's succession, the pope quarrelled with him, and Otho having invaded part of Apulia and of the Papal territory, Innocent excommunicated and deposed him, and procured the election of a regent, whose name was Robert of Sicily, who repaired to Germany, and after a gallant struggle obtained the crown shortly before the death of his late guardian the pope.

Innocent, at the beginning of his pontificate, wrote a long epistle (209 of B. 11) to the patriarch of Constantinople, and other letters to the emperor Alexius, with the view of inducing the former to acknowledge the supremacy of the see of Rome, and although he failed in this, he had soon after, by an unexpected turn of events, the power of concentrating the prelates of the Western church as patriarch of Constantinople.

The Crusaders, whom Innocent had sent forth, as he had the other of the Holy Land, after taking Zara from the king of Hungary, for which they were severely censured by the pope, proceeded to attack Constantinople, and overthrew the Greek empire. [BALDWIN I., EMPEROR.] All this was done without Innocent's sanction, but when Baldwin wrote to him acquainting him with the full success of the expedition, Innocent, in his answer to the marquis of Montferrat, forgave the Crusaders in consideration of their having brought about the trial that threw Sicily over the Eastern empire. Innocent sent also legates to Calo Johannes, prince of the Bulgarians, who acknowledged his allegiance to the Roman see. (Innocenti III. Epist.)

Leo king of Armenia received likewise Innocent's legates, who bestowed upon him the investiture of his kingdom. Innocent also excommunicated Sverecum, who had usurped the kingdom of Armenia.

Innocent was very strict and uncompromising in his notions of morality and discipline. He reproved vileness and irregularity wherever he discovered them. He excommunicated Philippe Auguste of France because he had purchased the right of Ingerburga of Denmark, and had married Agnés de Marnie; and after a long controversy the pope obliged the king to dismiss Agnés and to take Ingerburga back. The king of Leon, having married his cousin, the daughter of the king of Aragon, was excommunicated, and as he would not submit, and was supported in his resolution by his father-in-law, Innocent, by means of his legates, laid both kingdoms under an interdict.

John of England having appointed John de Gray, bishop of Norwich, to the vacant see of Canterbury, Innocent would not approve of him, and bestowed the canonical investiture upon Stephen Langton. After the death of Canterbury would receive no other archbishop. In a fit of rage John drove away the monks and seized their property, for which the whole kingdom was laid under an interdict; and as John continued to persevere in the imposition, released his vassals from their oath of allegiance, and called upon all Christian princes and barons to invade England and depose the impious tyrant, promising them the remission of their sins. In 1151 Philippe Auguste prepared an army for the purpose; John however had also
and marriage to Rome, 1354.

He undertook to forbid Philip of France attempting anything against a faithful vassal of the church. He prevented his adherents from the body of the Roman church, Innocent was stern and uncompromising. He considered heresy as the deadliest of sins, and its extirpation as the first of his duties. He sent two legates, with the object of establishing a particular heresy in France, against of them, Castelnaud, having become odious by his severities, was murdered near Toulouse, upon which Innocent prescribed a crusade against the Albigensians, communicated Raymond count of Toulouse for abetting them, and bestowed his domains on Simon count of Montfort. He addressed himself to all the faithful, exhorting them 'to fight strenuously against the ministers of the old serpent,' and promising them the kingdom of heaven in reward. He sent two legates to atone for this crusade, and all the letters or reports to him are contained in the collection of his Epistles; especially Epistola 108 of B. xii., in which the legate Arnaldus relates the taking of Beziers and the massacre of 9,000 individuals of every age, sex, and condition. [Albigensians] Innocent however did not live to see the end of the confabulation he had kindled. He held a general council at the Lateran in 1215, in which he inculcated the necessity of a new crusade, launched fresh anathemas against heretics, determined several points of doctrine and discipline, especially concerning the curricular confession, and sanctioned the establishment of the two great mendicant orders, the Dominicans and Franciscans, the former to extirpate heresy, and the latter to preach sound doctrines and to assist the parochial clergy in the execution of their duties. In the same year he caused his legate in Germany to crown Frederick the third. At his chapels of Hildesheim and Fulda, Innocent, in his fall ill at Perugia, and died in the month of July, at the early age of fifty-six. He was an extraordinary character, and in several respects the most illustrious among the many distinguished men who have filled the papal chair. His pontificate must be considered as the period of the highest power of the Roman See.

Innocent IV. Sinibaldo de' Fieschi, of Genoa, succeeded Celestine IV. in the year 1243. In the preceding bitter quarrels between Gregory IX. and the emperor Frederick II., Cardinal Sinibaldo had shown himself rather friendly towards the emperor; and the imperial contractors, on receiving the news of his excommunication, were rejoicing at it; but the death of Frederick checked the proceedings. I have now lost a friendly cardinal, to find another hostile pope. No pope can be a Guilelines.' Anxious however to be relieved from excommunication, Frederic made advances to the new pope, and offered comfort and advantages to convert the Roman see; but Innocent remained inflexible, and suddenly leaving Rome, embarked for Genoa, whence he went to Lyon, where he summoned a council in 1245, to which he invited Emperor Theodoric before the council to answer to the charges brought by the pope against Frederic; and after much wrangling, Innocent would listen to no terms, but excommunicated and deposed Frederic, and created the German emperor to be the new emperor, and reserved the disposal of the kingdom of Sicily to himself. In Italy the only consequence was that the war which already raged between the Guelphs and Guillemes continued fiercer than before; but in Germany some of the electors raised a contemptible rival to Frederic in the person of Henry, landgrave of Thuringia, who was defeated by Conrad, Frederic's son. At last Frederic died in Apulia, A.D. 1249; and Innocent, having returned to Italy, began to offer the crown of Sicily to several princes, one of whom, Richard of Cornwall, observed that the pope's offer was 'much like making him a present of the moon.' The pope therefore promised to give to the eldest son of Frederic, who however came into Italy in 1252, took possession of Apulia and Sicily; and he dying two years after, his brother Manfred became regent, and balled both the intrigues and the open attack of Innocent. The last crusade took place at the end of 1254, at Rome, leaving Italy and Germany in the greatest confusion in consequence of his unbending hostility to the whole house of Swabia. He was succeeded by Alexander IV. (Ramsay's Geschichte der Hofstaaten, and the numerous historians of the popes.)

Innocent V. Peter of Tarantasia, succeeded Gregory X. in 1276, and died the same year, after a pontificate of five months.

Innocent VI. Etienne d'Albert, a Frenchman, succeeded Clement VI. in 1322. He resided at Avignon, like his immediate predecessors; but, unlike them, he put a stop to the dissensions of the cardinals. He has been more basely and odiously ensnared by the venom of false writers. He reformed the abuses of the reservations of benefices, and he enforced the residence of the bishops in the places of their titular benefices. He obtained the favour of Cardinal Albormos, who, by skill as well as force, reduced the various provinces of the papal state, which had been occupied by petty tyrants. He sent back to Rome the former demagogues Cola di Rienzo, who, being still dear to the people, represented the independence of the papal crown; but becoming himself intoxicated with his power, committed acts of wanton cruelty, upon which the people rose and murdered him in 1354. In 1358 the emperor Charles IV. had crowned by his pontificate, and for the purpose. Innocent died at Avignon, at an advanced age, in 1362.

Innocent VII. Cardinal Cosmo de' Migliorati, of Sullivan, was elected at Rome, after the death of Boniface IX., in 1403. This was the period of what is called 'the Great Western Schism,' when there were two and sometimes three rival popes, each acknowledged by a part of Europe. Innocent's rival was Benedict XIII., who held his court at Avignon. [Benedict, Antipope.] After the election of Innocent a tumult broke out in Rome, excited by the Colonna and by Ladislaus, king of Naples, which obliged the pope to go to Viterbo. Ladislaus however failed in his attempt upon Rome; and the Colonna, led by his adherents to his capital, excommunicated him. Innocent died at the end of 1406, after having made his peace with Ladislaus.

Innocent VIII. Cardinal Giovanni Battista Cibo, of Genoa, was elected in 1484. He involved Neapolitan barons against Ferdinand I. of Naples, in consequence of which the troops of Ferdinand ravaged the territory of Rome, but through the mediation of Lorenzo de' Medici and of the duke Sforza of Milan, peace was re-established between the two parties. Pierre d'Aubusson, grand-master of the order of St. John of Rhodes, having sent to Rome Zizim, brother of Bayzid sultan of the Turks, who had run away from his brother, and who was considered as an important hostage, the pope received him with great honour, but took care to secure his person. It was also during this pontificate that Giovanni de' Medici, the future Leo X., was elected at Rome. Innocent died in 1491, and was succeeded by Alexander VI. He enriched his natural sons; and the family of Cibo, which was already possessed of many territories in the kingdom of Sicily, and in alliance with the family of Malaspina possessed also of that of Carrara, which their descendants have retained till within our own times. [Carrara.]

Innocent IX. Giovanni Sessa appointed, of Bologna, a man of learning and piety, was elected after the death of Gregory XIV., in October, 1591. He died two months after his election, and was succeeded by Clement VII.
been in great measure ruled by his sister-in-law Donna Olimpia Matthiini Farnese. Farnese, who had assumed in England a vast fortune of money, and of aggravating her relations. Innocent however displayed in several instances much firmness and justice, and prudence, and a wish to protect the humble and poor against the oppression of the wealthy; but his passion for luxury, and his fondness for the fine arts, made him no less a lover of elegance than of freedom. He remained着实 the same time embossed in Rome. The people of Fermo on the Adriatic revolted against their governor, being excited by the local nobility and landholders, who were irritated at the restraint imposed by the foreign annexation of the Adriatic coast. By 1676. the former pronounced themselves for the expulsion of the Castros and Roniccios, near Rome, was still in possession of the Farnese dukes of Parma, notwithstanding the efforts of Urban VIII. to wrest it from them. Innocent resolved to effect what his predecessor had failed in. Disputes about jurisdiction were continually taking place between the officers of the duke and those of the pope. Innocent having consecrated a new bishop of Castro who was not acceptable to the duke, the latter forbade him entering his territories, and as the bishop elected persisted, he was murdered on the road. The pope immediately sent troops to attack Castro, which being taken, he ordered the town to be destroyed to the foundations; three pillars erected on the site, with the inscription 'Qui fà Castor.' The town was removed to Acquapendente, and the duchy was reunited to the papal state. Innocent died in 1655, and was succeeded by Benedict XIV.

INNOCENT XI. Cardinal Benedetto Odescalchi, of Cono, succeeded Clement X. in 1676. It is said that he had been a soldier in his younger years, though this has been denied by others. (Count Torre Rezzonico, De Supportis Militibus Sapienter Ben. Odescalchi.) He was a man of great firmness and courage, austere in his morals, and inflexible in his resolutions. He took pains to reduce the pomp and luxury of his court, and to suppress abuse and corruption in the police and penitentiary. Taking his own nephew lived at Rome under his pontificate, in a private condition. But his austerity made him many enemies, and his dislike of the then very powerful Jesusis still more. The principal event of this pontificate was his quarrel with the imperious Louis XIV. of France, on the subject of the immunities enjoyed by the foreign ambassadors at Rome. As this incident exhibits in a singular light the character of the man, it may deserve a few words of explanation. By an old usage of the Curia, the foreign ambassadors at Rome had the right of asylum, not only in their own palaces, but also in a certain district or boundary around them, including sometimes a whole street or square, within which the officers could not enter, and where consequently malfeators and disolute persons found a ready shelter. These 'quarteries,' or free districts, were likewise places for the sale of contraband articles, and for defects of all sorts, such as was the case of the scene of papal jurisdiction. Several of the Roman princes and cardinals claimed and enforced the same rights and immunities, so that only a small part of the town was left under the sway of the magistrates. The classical advocates for this absurd custom quoted the example of Romulus, who made his new town a place of refuge for all the lawless persons of the neighbourhood. Innocent determined to put an end to the abuse, and to be master in his own capital; he however proceeded at first calmly and with sufficient caution. He would not disturb the present possessors of those immunities, but he declared and made it officially known that in future they could plead only the immunity of Louis XIV., who did not renounce for himself and his successors all claim to the district immunities. Spain, Venice, and other states demurred at this very reasonable determination, but the death of the March d'Estrees, ambassador of France, brought the question to a crisis. Innocent repeated in a bull, dated May, 1687, his previous resolve. Louis XIV. appointed to the embassy the marquis of Lavardin, and told him to demand that Rome should have the rights and the dignity of France; and in order to obtain the former, he gave him a numerous retinue of military and naval officers, who were to frighten the pope in his own capital. Lavardin's entrance into Rome under such an escort resembled that of a great ambassador. This had also been preceded by several hundred reduced French officers, who had enlisted Rome as private travellers, but who took their quarters near the ambassador's palace, ready for any mischief. Innocent however relieved his new ambassador, and all the anger of Louis, who seized upon Avignon, and threatened to send a fleet with troops on the Roman coast, had no effect upon him. Lavardin, having received the commission from the French at the same time that the decree of the Holy Office, by which it was determined that the pope, was obliged to return to France with his credentials unopened. The quarrel was not made up till the following pontificate. But the district immunities of France at Rome continued, without any serious disturbances, till the nineteenth century. The Piazza di Spagna and some of the adjacent streets were under the protection of the Spanish ambassador. Innocent died in August, 1689, and was succeeded by Alexander VIII. (Bottis, Storia d'Italia.)

INNOCENT XII. Cardinal Antonio Pignatelli, of Naples, succeeded Alexander VIII. in July, 1691. He had a serious dispute with the Emperor Leopold I., who attempting to revive in Italy the rights of the Empire over the former imperial fiefs, which had, during the wars and vicissitudes of ages, become emancipated, published an edict, which was fixed up at Rome in June, 1697, enjoining all the possessors of such territories to apply to the emperor for his investiture within a fixed time, or they would be considered as usurpers and rebels. This measure, if enforced, would have affected the greatest part of the property of Italy, by setting up of its governments, and of the Roman see among the rest. The pope protested against the edict, and advised the other Italian powers to resist such absolute pretensions, and, being supported by the council of France, he succeeded in obtaining from Leopold to desist from them. Innocent built the harbour of Porto d'Anzo, on the ruins of the ancient Antium; he constructed the aqueduct of Civitavecchia, the palace of the collegiata de Monte Citeria at Rome for the use of the court, and the fine line of buildings at Ripagrande, on the north bank of the Tiber, below the town, where vessels which ascend the river load and unload. He also built the asylum, schools, and other buildings, necessary to the comfort of Rome. Innocent was of regular habits, attentive to business, a lover of justice, and averse from nepotism. He died in September, 1700, at the age of eighty-six, and was succeeded by Clement XI.

INNOS OF COURT AND OF CHANCERY. When the houses of law were first established seems very doubtful; but the fixing of the Court of Common Pleas at the palace at Westminster appears greatly to have contributed to their origin. This brought together a number of persons who (as Spegelius says) added their selves wholly to the study of the laws of the land, and no longer considering it as a more subordinate science, soon raised those laws to that pitch of perfection which they suddenly attained under the auspices of King Edward I. They purchased at various times certain houses between the city of London and the palace of Westminster, for the combined advantage of ready access to the latter and of obtaining provisions from the former. 'For their liberties and privileges' (observes Mr. Agard, in an essay written in the end of the seventeenth century), 'I never read of any granted to them or their houses: for having the law in their bands, I doubt not but they could please any party to obtain their ends (and that rightly), that it is not convenient that a judge should seek his lodging where he cometh to serve his prince and his country.' In Fortescue's time there were four inns of court and ten inns of chancery, the former being frequented by the sons of the nobility and wealthy gentry, and the latter by merchants and others who had not the means of paying the greater expenses (such as to mount a retinue). The first were called appren- tici nobiliores, the latter appren- tici only. On the working days, says Fortescue, in his 'De Laudibus Legum Angliae,' most of them apply themselves to the study of law; and on the holy days to the study of Holy Scripture. But it appears that they did not entirely neglect Vol. XII.—3 Q
lighter pursuits, for, says the same learned author, they learn to sing and to exercise themselves in all kind of harmony, and they also practise dancing and other noblemen's pastimes. He says they did every thing in peace and amity, and although the only punishment that could be inflicted (as in the case now) was expulsion, they dreaded that more than other criminal offenders fear imprisonment and prisons.

The inns of court, formerly called "hostels," are Lincoln's Inn, the Inner Temple, the Middle Temple, and Gray's Inn.

Lincoln's Inn was formerly the mansion of one William de Haverbury, treasurer of King Henry III, and subsequently passed into the hands of the Knights of Chichester from whom the students rented it. It appears to have taken its present name from Henry Lucy, earl of Lincoln, whose house near Holborn had been for some time inhabited by students of law. In 1671 the society of Lincoln's Inn were honoured by the presence of his Majesty Charles II., who, together with the Duke of York, Prince Rupert, and many of the principal nobles of the land, was entertained in the hall of the inn, and subsequently they all became members of the society. The hall, four, containing 71 feet long by 32 feet wide, was built in the reign of Henry VII.; on the windows and panelling are painted the arms of various dignitaries of the law, who have been members of the society. At one end of the hall is a coat of arms, formerly representing St. Paul before Peter, and at the other a marble statue of Lord Erskine by Westmacott. The hall is used as a dining-hall for the benchers, scholars, and students in term-time, and as the lord chancellor's residence on occasion. There is an old chapel, a Gothic building, by Inigo Jones; the exterior has nothing to recommend it, but the interior is very striking, and the handsome carved oak, of which the screen and pews are formed, and the dark panelling in the windows, give a sombre solemn appearance. Service is now performed here every morning at eight o'clock. A course of lectures was founded in 1768 by Dr. Warburton, bishop of Gloucester, for proving the truth of the Christian religion from the common evidences in the laws and apostles of the New Testament: these lectures are delivered three times a year. A studentship, worth about £100 a year, to be held for eight years, was founded by Christopher Tanser, Esq., for four students, to be educated in the study of the law at Lincoln's Inn. They are elected by the trustees for the time being of the Tanserian Charities. A preacher and a chaplain are appointed by the benchers of the society. The library, which is open from 8 a.m. till 5 p.m., contains about 25,000 printed volumes, besides a great many very valuable MSS., amongst others those of Sir Mathew Hale. It looks out on the garden, which still forms a pleasant lounge, but it is strongly urged that some much greater curiosity in the reign of Henry VII. and Henry VIII., when, according to Mr. Lane, special enactments were made to prevent the students from hunting the rabbits in it.

Temple-Inn—This inn, as well as the Middle Temple, owes its name to the Knights Templars, who appear to have established themselves here about the year 1183, and called their house the New Temple. After the dissolution of that order it was granted to the Knights of St. John of Jerusalem by King Edward III., and was soon after, according to Dugdale, demised by them to "divers professors of the common law that came from Thavies Inn in Holburne." The Temple was plundered in the rebellion of the north, and much, and nearly all, the property of the professors and students, including their books and records, was carried away or destroyed. This accounts for our having very little authentic information of the early proceedings of the bar. However certain it is that in the reign of Henry VIII. the members of the Temple had divided into two societies known by the names of the Inner and Middle Temple, which they then held by the custom that the same yearly rent they had formerly paid to the Knights of St. John. The Inner and Middle Temple have each a hall and a library. The hall of the Inner Temple is a fine room; it has lately been renovated and in good repair. It contains a few curious paintings. The new library forms the first floor of a building erected in 1819, and forms a sort of continuation of the hall. The rooms are handsome and very conveniently fitted up, and look out on the Temple garden and the river. The collection of books, especially of law books, is very valuable. The library of the society of the Middle Temple is much inferior to that of the other societies; but the hall greatly surpasses the others both in size and splendour. It was begun in 1652, and finished about ten years afterwards; it is 100 feet long, 40 feet wide, and upwards of 60 feet in height. The roof and panelling are finely decorated, and the screen at the tower and is beautifully carved. The windows are of stained glass, representing the armorial bearings of different members of the society; the one at the east end representing the first appearance when the sun shines. There are a few good pictures; amongst others, one of Charles I., by Van-dyke.

The church, which is common to both societies, was founded by the Templars, upon the model of that of the Holy Sepulchre at Jerusalem, and was consecrated in 1185, and dedicated to the Virgin Mary. It is a beautiful specimen of Gothic architecture, consisting of a round tower at the western entrance, and three aisles running east and west, and two cross aisles. The tower is supported by six pointed arches, resting on four round pillars. The interior of the choir is fitted up with pews, which are equally divided between the members of the inner and middle inns. The roof is supported by pillars, which are striking for their simplicity and elegance. In the tower are tombs of eleven of the Knights Templars, but with the exception of one, Geoffrey de Mag-noville, of St. Mary-le-Temple, they are nothing remarkable as effigies represent. The organ is one of the finest toned in Europe.

The principal clergyman of the Temple is called 'The Master of the Rolls.' This is a house of the Benchers, and the letters patent, without institution or induction. There are also a reader, who likewise holds the office of librarian, and a lecturer. The offices of preacher of Lincoln's Inn and Master of the Temple are almost synonymous, and are generally considered as stepping-stones to the bar.

The gardens of the Inner Temple are small, but from their situation on the banks of the river form a delightful promenade, to which the public are admitted in summer after service, and which are free to the members of the houses. Gray's Inn is on the north side of Holborn. It takes its name from the Lords Gray of Wilton. Dugdale says that it was purchased from the Gray family by the prior and convent of St. Alban's, in Surrey, and demised by them to the students in law, until their dissolution, when it was granted to the latter by the crown, at a fee-farm rent of 6l. 13s. 4d. The hall is very antient, and has a fine wooden roof. It is used in vacation as a hall for the chief baron sitting in equity. The chapel is a neat little building; and the garden forms, with the exception of the parks, one of the fairest walks in London.

At Lincoln's Inn, there are fourteen inns of chancery, which are a sort of daughter inns to the inns of court. They are now only used as chambers, and are principally inhabited by solicitors and attorneys. Two belong to the Inner Temple, namely, Furnivall's Inn and Temple's Inn; the former of these two inns is not rebuilt, but has a handsome front towards Holborn; it comprises upwards of 100 sets of chambers. Four belong to the Temple, Clifford's Inn, Clement's Inn, New Inn, and Lyon's Inn. All these are outside Temple Bar, near the Strand. The remaining two, Staple Inn and Bernard's Inn, belong to Gray's Inn. Most of the inns of chancery have a hall, some of which dinners are provided and terms kept, as in the inns of court. But these terms do not qualify the student to be called to the bar.

Each inn of court is governed by its own benchers, or "anteants," as they were formerly called, who fill up the same office. Here there are two shall only refer to an antiquarian reader to Sir William Dugdale's work, to which we are indebted for much of our information. There is one or two more modern works on this subject, but they are more or less abridgments of Dugdale.

INOCERAMUS (Sowerby; Goldfus), a remarkable
All buds have their origin in the medullary sheath, and are situated in the internodes of the shoots of the preceding or that have existed; but when a bud has developed itself beyond the external bark, it begins to produce and send down layers of fiber, and its connection with the medullary sheath is at that time destroyed. If the bud so detached be placed in a favourable circumstance of position and moisture, it will, by the action of the albumen and heraldis, will derive moisture from the cambium, and continue to vegetate till the granulations of cellular matter resulting from the effort of the stock to cover with fresh matter the place of the interrupted living tissue; it may thus meet with the albumen elaborated by the inserted bud; the similar substances then coalesce, and the union may be termed complete. It may be observed that the operation of inoculation is a very rapid one, too large, for the smaller the portion of bark raised the sooner it will become covered with fresh matter, and meet with that which is forming at the base of the bud.

The season for performing the operation is, generally speaking, from the beginning of July to the middle of August, the particular time varying according to the season. The best criterion is the state of the buds and the degree of cohesion between the bark and albumen of the stock. If the buds on the young shoots have become so far perfectly formed outside as to bear separation from the branch, and if the bark of the stock can be freely raised, and exhibits an abundance of cambium in a fluid state, the operation may be practised with certainty, and the bark adheres rigidly to the albumen, or is set, as it is technically expressed, there is little chance of success.

In the selection of buds it is necessary to distinguish those that are for inoculating from those which are for being cut off for the blossom, or which would produce shoots in the following season. For example, in the case of peach-trees trained against walls, no buds with only a single leaf at their base should be taken, for such, if the trees are in a bearing state, would be of no service, but the bud would produce shoots in the following spring, in the form of two blossom-buds and a wood-bud in the centre of the stock, which become detached.

The operation of hudding, or inoculation, is performed in various ways; but the best and most general is that called shield-budding or T budding, from the resemblance of the instrument to the shield or letter T. The two cuts made in the bark are the same as those for the proper method, as in the cases of the apricot and peach, which expand their leaves early in the spring, long before growth has commenced in the plum stock, on which they are grafted. The advantage of the bud, or inoculum, of trees are generally found to be exhausted before the stocks can contribute a sufficient quantity of fresh organized matter for completing the union. It is therefore found most advantageous to let the general union of the lattershoots in the spring, when the scion and stock are in a state of equal vegetation.

Buds, like grafts, may remain alive for some time after having been inserted on their stock, and may even effect a sort of adhesion to it; but it is only when the albumen of the two parts in a nason state, come in contact, that a permanently vital union is accomplished. Unless this be previously understood, the best instructions with regard to the performance of the operation will be liable to misapplication.
section on the bark of the stock; the lips of the perpendicular incision are closed, or at least brought down upon the shield of the hind; and the whole is bound down with a strip of pliable matting, the point of the bud only being missed by the bandage. The latter must be untied and slightly re-tied, when the swelling of the stock indicates the necessity of its being removed.

INOCULATION. [Grass Lanx.] INQUEST. [Coroner.]

INQUISITION. [Office, Holy.]

The following note, on remonstrance, lunacy, 'folie' of Esquirol, &c. Of the various ill to which man is subject none are more dreaded, and few so little understood, as that which involves the loss of his intellect. Nor can we wonder at our ignorance of the subject as the time when we remember what mystery hangs over the workings of the mind in its healthy state. But even while our knowledge of the nature of the mind and its operations, and therefore of the exact condition on which insanity depends, remains so limited, measures the feelings with which the insane are regarded, the miseries which mental disease induces, by investigating the causes which influence its prevalence, by inquiring into the best mode of restoring the mind to its healthy condition and by learning to distinguish those slight forms of mental disorder which amount to scarcely more than eccentricity or hypochondriacal fancies, and the more important states of disturbance of the intellect which render us aware of them dangerous to themselves or others, and justify their seclusion from society and confinement in a lunatic asylum.

After a few words relative to the history of insanity, we shall proceed to some of the symptoms and the circumstances which each presents, its causes, nature, and the definitions proposed to characterize it, the means of recognizing it, and lastly, the mode of treatment. To have seen that many of the unfortunate persons who are described in the Old and the New Testament as possessed by evil spirits were the subjects of insanity. The same may also be said of the soothsayers and ecstatic priests of Egypt and Greece. In ancient times, the dependence of mental illness on a diseased state of the mind, or rather of its seat and instrument, the brain, has been generally recognized, but the sense of horror originally excited by the idea of the possession by a demon still influences to some degree the description of mental derangement. This explanation is still well by the thaumaturgy of Jesus and his disciples, and whose keeper made it a constant practice to put into some corner within his reach various articles intended for his sustenance, in order that he might take them furtively.

This propensity to theft also sometimes constitutes a marked feature of insanity. Dr. Pinkard mentions having known a case of insanity in which only two objects,—one a pliable needle and the other a garter, were carefully placed, and whose owner kept them, by the use of a constant practice to put into some corner within his reach various articles intended for his sustenance, in order that he might take them furtively.

This propensity to theft also sometimes constitutes a marked feature of insanity. Dr. Pinkard mentions having known a case of insanity in which only two objects,—one a pliable needle and the other a garter, were carefully placed, and whose owner kept them, by the use of a constant practice to put into some corner within his reach various articles intended for his sustenance, in order that he might take them furtively.

This propensity to theft also sometimes constitutes a marked feature of insanity. Dr. Pinkard mentions having known a case of insanity in which only two objects,—one a pliable needle and the other a garter, were carefully placed, and whose owner kept them, by the use of a constant practice to put into some corner within his reach various articles intended for his sustenance, in order that he might take them furtively.
they have the devil or some animal within them, that they are dead, or that they are changed to some other form. So Manomoniasces are the last delusion by Pope—

* Unnumbered thoughts on every side are seen.
* Bodies changed to rats by persons.
* Here living tigers, storks, one arm held out.
* Two heads, and they talk to each other.
* A pisghe there, like Homer's tripod walks.
* Horse and a pig, and there a gabled house.

It is probable that the condition as the name signifies more of delusion regarding the body there is some morbid state of the nerves, causing a sensation which excites in a mind prone to insanity an idea which the reason is unable to correct. Another kind of delusion is that which characterizes the monomania, generally a species of delusion in the presence of invisible beings whom the lunatic sees, hears, and converses with. Religious delusions are frequently of this character: the maniac sees and communes with angels when they believe them. Such ideas, being very often combined with despondency, lead to suicide.

Others who are subjects of such delusions fancy themselves constantly followed by some person who has the purpose of injuries and depredations. A As an instance of such events which the individuals believe to have occurred, or consists in a belief in some absurdity which has no foundation except in the patient's imagination. Such a monomania is that described under the fiftieth year by the patient, who had been confined in a castle, and corresponded with a princess by writing letters in cherry juice. The delusions which most frequently take possession of the thoughts of the proud or vain maniac are of the kind of those which arise from abstract ideas conceived in the mind being mistaken for realities. An ambitious dreamer may for a moment imagine himself a king, but it is only a lunatic who fails soon to recall the pretensions which has only in his own thought.

There is generally some connexion to be traced between the nature of the illusion and the former occupation of the monomanic or the ideas which have chiefly engaged his mind. Thus a butcher is said to have fancied that he had a leg of mutton hanging for his notion a with, or, on the contrary, of an attorney, fancied himself suspected of a horrible crime, and that the officers of justice were following him; persons who have had their thoughts much directed to religious subjects imagine when they become insane that they have received a charge from the Almighty; that they are persecuted by the devil. &c. &c.

3. General derangement of the intellect presents many varieties and degrees. It is generally attended with some events which the faculties of the mind generally are disorder'd; the patient will not speak on any subject long without betraying the defect of his reasoning power. This will in one person manifest itself after the period of eight, or ten years; in another it will appear after a greater period. The necessary consequences; in another it will be attended with loud and violent raving (mania); in a third there will be singing, and a gay cheerful air; while a fourth case will be characterized by care and dread. The general degree of insanity is most frequently attended with disturbance of the bodily health. The symptoms of mental excitement frequently increase in violence for a short time, then gradually subsides into a more quiet state, which too often terminates in mental insanity.

4. The mixed forms of madness are by far the most frequent. Moral insanity, the disturbance of the moral feelings and proprieties, is generally attended with some degree of weakness of the reasoning powers, or with some delusion. The general derangement of intellect has combined with it an excited state of some of the feelings; and manomania in the pure form, a mental delusion without further disorder of intellect very rare.

5. The duration of insanity has no certain limits; the attack may last but a few weeks, or it may continue many years; it is not uncommon to meet in lunatic asylums with persons who began about thirty years.

When the disordered state of the mind is thus protracted, it usually terminates in loss of the intellectual faculties. The state of imbecility, dementia, or fooltry, which then succeeds has many degrees. It commences by the loss of memory, particularly for more recent events; the mind receives impressions and perceives them, but the faculty of retaining them seems to be lost. It is this state which so frequently appears to those who have been long acquainted with the patient, as approaching decay, when the mind is otherwise sane. In the latter instance the faculties are exercised in a sound man ner when the attention is roused, but frequently the words which were spoken but a few minutes previously are forgotten, though the memory for the events of youth is quite distinct. In a second degree of imbecility the power of directing the thoughts is lost; ideas come and go without order and indulgence of the wishes are quite lost, and heard and attempts are made to reply to them, but before the answer is half completed the train of thought is lost, and the mind and tongue wander to other subjects. In a third degree, the mind and reason are are more weakened the external senses also become deadened; there is a careless ness of all that is going on around; life is reduced to the state of that of brute animals; the instincts alone guide the actions. The features are void of expression, the countenance vacant. The patient is prostrate and in a state of weakness, miserable, and unconscious of life; careless of the calls and wants of nature, they sit or lie motionless in one position, and frequently lose even convulsions from temporary cerebral excitement, is very fatal disease. Of the lunatics at the asylum Bicêtre in the year 1822, one patient had been there 56 years; three had been confined upwards of 40 years; twenty-one more were there 8 years; 20 years; 20 years; 20 years; 20 years; and seven more than 10 years. Of those in Salpêtrière seven cases had been admitted from 50 to 57 years. It is difficult to ascertain the proportion of recoveries from insanity, the disease having been treated by different writers. While some authors have reported the cure of nearly 5 in 6 cases, others have estimated the proportion cured as less than 5 in 10; some have stated it to be as low as 5 in 100. The accompanying cure varies very much according as the insanity is complicated or not with other disease; it is also influenced by the form of the disease, the period of its course, the age, sex, and constitution of the patient. Of the diseases which occasionally follow, melancholy is the most important. Whether paralysis affect the motion of the limbs or the speech only, the case is generally considered hopeless. The complication with true epilepsy, not mere convulsions, from temporary cerebral excitement, is nearly equally unfavourable. It appears that the general derangement of the intellect is more curable than monomania, more especially in men. The state of imbecility is almost certainly incurable. The period of the disease at which it is brought under treatment has a very important influence on the chance of recovery. Of those who enter asylums soon after the commencement of the malady seven out of ten are cured; of those who enter in the third year the probable proportion of cured is not more than one in thirty. The mean duration of cases terminating favourably seems to be from five to ten months. The age most favourable towards recovery from mental derangement is from the twentieth to the thirtieth year; few recover after the fiftieth. Insanity is generally more curable in women than men. There is more hope of recovery when some secession of the body is suspended which may be caused by medicine, or when a critical period, such as that of the appearance or cessation of the catatonia in women, is at hand; at such periods as those last referred to insanity has ceased after having persisted for many years.

During the period of convalescence there is great liability to relapse, but this diminishes with the increasing length of time during which the patient manifests no symptoms of unsoundness of mind. The more complete the recovery the more likely it is to be permanent; if the judgment is strong and the feelings neither depressed nor irritable, relapse is much less to be feared. 

Causes.—Some individuals appear to be so prone to insanity that very trifling circumstances are sufficient to induce it in them; or it is probable indeed that there is always some peculiarity in the constitution predisposing to it, since the apparent causes do not differ from those which, acting on other persons, produce other diseases and not insanity. In this as it may, a tendency to mental and other cerebral affections is often observed to prevail in families, and to be transmitted from parents to offspring. An attack of insanity not only leaves a mark on the character, but is often rendered it more prone to the disease than before, but the condition of the body, or rather of the brain, thus induced
may be transmitted to the children. This fact is so well known that it is unnecessary to insist further upon it. The hereditary predisposition is said to be stronger when both parents have been insane. A remarkable circumstance relating to the hereditary transmission of insanity is that the form of the disease which affects different individuals of a family is often the same, and that it attacks the male and female members of it. It is universally admitted that intermarriage in families gives rise to the predisposition to mental disorder, as it certainly does to weakness of body and mind. Intermarriage must tend to strengthen or maintain the hereditary predisposition, and therefore to produce any predisposition to disease which may exist. It is almost impossible to ascertain the proportion of cases connected with hereditary predisposition, so much is it the desired interest of families to conceal such a circumstance.

The proportion in which the sexes are affected with insanity varies very much in different parts of the world. In Great Britain and Ireland the proportion of males to females insane is stated to be as 13 to 12. In Italy also the number of male lunatics is greater than that of the females. But in France there are more females than males insane, in the proportion of 14 to 11. Calculating from statistical accounts derived from partly different parts of the world, M. Esquirol found that the proportion of men to women insane is nearly as 37 to 38. The concurrent testimony of French and English physicians tends to show that the number of women affected with lunacy, as compared with the male sex, is greater in the higher than in the lower ranks of society.

Insanity is rare, though it sometimes occurs, before the period of maturity, more frequently in males than females. In France, in the reign of Louis XIV, it was estimated that a great change is taking place in the system, and when the passions begin to be more active and more liable to excitement, that insanity becomes frequent. The liability to the disease increases to the age of 60; and although an absolute number of persons in lunatic asylums of different ages from 40 upwards becomes less and less, yet if we take into consideration that the number of persons living at the more advanced ages is also much less, we shall be led to infer, not that the habit of insanity is more prevalent in that age, but, on the contrary, that it rapidly increases. An excellent paper by M. Esquirol on the statistics of insanity, in which the number of insane persons at the different ages is compared with the population of the same ages, shows this in a very striking manner.

Of the causes which excite the development of insanity in individuals predisposed to it, those which act on the mind are the most important. It will merely be remarked that immediately before the attack the patient has suffered some severe vexation or disappointment from family troubles, pecuniary embarrassment, &c. We have seen that unstable courage is an opposition to the outside, in which the mind is susceptible of strong feelings, and in which the passions are excited by strong interests. A calculation made by M. Pinel represented the proportion of cases produced by moral causes, as compared with those due to physical causes, to be, in a space of five years, as 664 to 215. In one of the largest of our English asylums the proportion of cases ascertained to have been excited by moral causes has been, during the years 1831 to 1836 inclusive, 431; those ascribed to physical causes, 281. The proportion of moral to physical causes is however probably much greater than is here indicated; for in 454 cases admitted into the asylum to which we refer during the six years, no cause was assigned, and it is probable that a large number of these cases were due to mental influence. It is the slow and constant action of the depressing passions that is most instrumental in disordering the mental faculties; the violent and sudden passing away of the mind, which have this effect. Of the 431 cases produced by moral causes in the asylum from which we derive these facts, 289 were ascribed to trouble of mind from pecuniary distress or family disasters, grief, jealousy, disappoin-tement, violence, crime, ambition, and frequently insanity forming an important mental in exciting complete derangement of the intellect in minds already sensitive and weak; 43 cases out of the 431 were traced to religious excitement. The other causes acting directly on the mind, which have this effect, is of which we can find some explanation in the hardships to which the poor of those mountainous and partly barren countries are exposed; idiocy being a disease dependent on a particular state of health, and generally attended with many of the ill-developed organization. The greater liability of the agricultural population of England to insanity is less easily accounted for. The much greater degree in which insanity presses on the lower than on the higher classes of society, is another consideration. One cause of this is undoubtedly the much less check which is put upon the spreading of the disease by marriage with individuals whose families have the preda-

live source of mental alienation in France; but cases from that cause are now comparatively rare even in that country, and of upward of 1200 cases of derangement that occurred during 6 years in an English asylum, 2 only were traced to political causes.

Of the physical causes of insanity those connected with circumstances which affect females only afford the greatest number of cases. Of 431 cases in the asylum from physical causes were connected with parturition or nursing. Insanity occurring under such circumstances is termed puerperal mania, the frequency of which is not easily explained. Retardation of the appearance of the puerperal insanity, as well as the severity of the disease, the frequency of insanity in females. The frequent dependence of mental disorder on intemperance, particularly in men, is a fact demanding much attention. Drunkenness is unfortunately the most prevalent of all, not only in England, and there a much larger number of insane from that cause in the pauper lunatic asylums of this country than in those of France, where the abuse of intoxicating liquors is less general. Next to intemperance, the causes which act more directly on the brain itself, and give rise to inflammation or disturbance of the circulation in it, are the most influential in producing the predisposition to insanity, or in exciting it; such causes are blows on the head, fever, cough, delirium, &c. Epilepsy and, less frequently, apoplexy also lead to insanity. Lastly, any influences acting prejudicially on other parts of the body may indirectly affect the mental organ and disorder its operation.

Close connected with the subject of the causes of insanity, and of equal importance, are the statistics of the disease. If we could ascertain all the important circumstances which accompany its greater or less prevalence in different countries and different races, we should be able to some measure the evil, by adopting preventive measures. A general result, which appears to rest on correct information, is, that insanity is extremely rare in uncivilized nations, as among the natives of Africa and America. This cannot arise solely from passion less frequently disturbing their moral feelings and affections, though this is undoubtedly an influential circumstance. There seems to be an absence of the predisposition to many diseases among the uncivilized races. A less highly developed and less active condition of the brain may render it less prone to disease.

In Turkey, Spain, and Italy, insanity is comparatively less prevalent; if we may judge from the imperfect returns obtained from those countries, than in the more northern European nations and the United States of America. The proportion of lunatics to the population in England and France is about as 1 to 2000; in Italy, about as 1 to 1800; and M. Esquirol, about 1 to 1000. In Prussia the proportion, as stated by M. Jacob is, about the same. But in Wales the proportion of insane to the population was estimated at 1 to 500, and in Scotland 1 to 574. In Norway too, a country somewhat similar in its physical character and in the condition of its inhabitants to Scotland, the estimate of the proportion of lunatics is at 1 to 521. A great and surprising difference is found to exist in the proportion of insane in manufacturing and agricultural districts of England; the number being greater in the agricultural counties. This is an analogous fact to the prevalence of the disease in Wales and Scotland. There is certainly less call for the exertion of the intellectual faculties in the agricultural than in the manufacturing counties, and in Wales than in England; an explanation of the facts must therefore be sought in other causes. Of the various causes by which the mental disturbances are included not merely the insane, but the idiotic from birth, and the excess in the number of unsound in mind in Wales, Scotland, and Norway, as compared with England, France, and Germany, or in the prevalence of diseases of which we can find some explanation in the hardships to which the poor of those mountainous and partly barren countries are exposed; idiocy being a disease dependent on a particular state of health, and generally attended with many of the ill-developed organization. The greater liability of the agricultural population of England to insanity is less easily accounted for. The much greater degree in which insanity presses on the lower than on the higher classes of society, is another consideration. One cause of this is undoubtedly the much less check which is put upon the spreading of the disease by marriage with individuals whose families have the pred
position in the lower than in the higher classes. Another
may be the depravations to which parents, and particularly
pregnant females, are exposed. A third is the prevalence of
intemperance among the poor. The opinion has previ-
ously prevailed in France as well as in England, that insanity is on
the increase, but the data on which this supposition is found
cannot be implicitly trusted, for the greater num-
er and improvement of the poor, which has brought
sent day cause many more persons to be conveyed to
them, and thus placed within the reach of statistical re-
search; while formerly many lunatics were allowed to
were kept in ignorance of the horrors of the asylums, were concealed in private families;
and some, from ignorance, were punished as criminals.
The principal means of checking insanity, which the facts allude
afford some of the most fruitful causes, for the
delusions or not, there is a defect of the reasoning
power, the degrees of which vary from the state of the persons who
are regarded merely as somewhat silly, to that of the imbe-
cence or foolish, or for that of the insane, who may be
in some form of insanity, which depends neither on reasoning from
erroneous premises nor on defect of the reasoning faculties; we
allude to the state in which the moral feelings are so
erroneous, to the saner classes which may seduce
insane, since the will has no longer the power of regulating
them, and the individual cannot be looked upon as
an accountable being. The definition adopted by Dr. Spurz-
heim and the phrenologists include this last form of
insanity. Insanity is by them stated to be 'an aberration
of any mental power (an intellectual faculty, a moral
feeling, or a propensity), from the healthy state, with an
ability on the part of the individual to discern its
unhealthiness or to resist it.'

In deciding what is and what is not insanity there will be
not much difficulty if any illusion exist in the patient's
mind, and its nature be known to the examining
writer; and

so when there is no difficulty it is apparent

to the patient to be corrected or removed. But it is
most important, as the honour or life of the individual
depends upon it. No rules can be laid down for deter-
mining whether eccentric acts, or the commission of homicide,
be the effect of the patient's insanity is clear. In many cases
however, the history, the dress, gestures, and manner
of speaking, and the expression of the features of the
individual, should be carefully attended to. In almost all
insula persons from mental disease is generally accompanied
sympathies of mental excitement about the head, or an unhealth-
state of the skin and of the different secretions.

There are however, as Dr. Conolly observes, two questions
to be decided in every inquiry relative to this last form of
insanity. The first relates to the existence of unsound-
ness of mind; the second regards the treatment required,
and especially the necessity of restraint, and the degree
of 

duration of the patient; for the second question, the circumstances to be considered whether the
patient be likely to injure his own person or that of others,
or his own property or that of others. Medical treatment
may be required in many cases of insane, in which the decision of the
second question above indicated depends whether the
patient shall be confined and deprived of controul over his
property. It is from confounding the question of the
existence of madness with that of the necessity of confine-
ment that so much injustice has been committed; to prove
a man insane has been synonymous with condemning him
to imprisonment. But though a man believe his legs are
not his own, or that he was present at the destruction of
Jerusalem, he may be a perfectly harmless and even useful
member of society: shall he therefore be deprived of his
liberty and of the management of his property merely on ac-
count of a single delusion? [Lunacy.]

The treatment of insanity resolves itself into the medical
and the moral. The medical treatment indicated and
required at the commencement of the disease consists
chiefly in the attempt to reduce increased vascular exalte-
ment. In the majority of cases any violent antiphlogistic measures are required.

The treatment may be called for during the course of the
disease if the symptoms of cerebral excitement or inflammation return.
Sometimes want of sleep is the most marked
symptom, and opiates are recommended. It is seldom that
chronic conditions of the disease the medical treatment is
chiefly directed to the restoration and maintenance of a
healthy state of all the functions of the body, particularly
of the secretions. A strong and nutritious diet is requisite in many
cases; cleanliness, fresh air, and exercise in all. The best
asylums afford the means of employment for the insane in
the open air; but this important requisite is still neglected
in some large public institutions.
The mental treatment is now recognised as an important part of the management of the insane. Formerly a lunatic was regarded with horror, as a being who had lost all relation to society, and was to be treated as a wild beast; he was confined in a gloomy filthy cell, was loaded with chains, and shut out from all influences which could cheer his mind or lead to the subject of his delusion. The first step in the great amelioration which has taken place was effected by the efforts of M. Pinel in France and the Quakers in England. The insane are now treated with humanity. The power of moral influence is restored. The healthy tone of the mind has been recognised as a principle, in carrying out which the chief means adopted are the following:—1. In many cases seclusion from society, chiefly with a view to remove the patient from the influence of circumstances which produced the disorder, or which might keep up unhealthy trains of thought; but when the insanity is partial, consisting in a single delusion, this measure can scarcely be recommended, as it might, by depressing the mind, increase the malady. 2. Occupation and amusement of the mind in various ways, so as to divert the thoughts; this is an important circumstance in the treatment, and has been only recently received. Everything calculated to remind the patient of his state should be avoided; the apparatus of confinement kept from his sight, and the appearance of all objects rendered as cheerful as possible. 3. The most important influence on the physician has been the powerful effect on the mind of the insane; kindness will gain their confidence, while a firm though mild manner is often sufficient to restrain the most violent outbreaks of rage, and render other means of restraint unnecessary. Chains are now regarded as a general evil. 4. It is observed from the appearance of the lunatic asylum, and even strait waistcoats and straps are seldom required. But while measures of bodily restraint should be avoided as much as possible, it is a safe and imperative rule to remove harmful weapons and means of mischief from the reach of the insane. All irritation of mind by threats, &c., should be avoided. 4. The contagious should be separated from the other patients in the asylum. 5. The insane should be classified, so as to separate the quiet and timid from the noisy and violent.

In the preceding portion of this article we have not made idiocy the subject of separate consideration. It is scarcely necessary to say that while idiocy, in the state of delirium intelect produced by disease late in life, idiocy is the original, want or deficiency of mental power, just as the imbecility of old age has various degrees, so there are various degrees of idiocy. One of the worst forms is that presented by the Cretins, the deformed and imperfectly organized idiots met with in the valleys of Switzerland. Idiocy generally depends on congenital disease, but sometimes on diseases in the brain in early infancy. The more remote causes are probably imperfect nourishment of the parents, or some noxious influences acting on the mother during pregnancy; the same hereditary predisposition which gives rise to insanity seems also sometimes to be productive of idiots. The form and size of the head in idiots may be quite natural; in many cases however it is large and deformed; in others remarkably small, particularly in the region of the forehead. The bones of the head are sometimes very thick; the brain itself disorganized, or its cavities distended with fluid. [Hedrocephalus]

*Pichard, Conolly, Burrows, and Haslam, On Insanity; Pinel, Sur l'Attention mentale; Esquirol, Sur les Maladies mentales; Georget, Sur la Police; Heinrotch, Die Störungen der Seeleleben; and Jacobi, Sammungen für die Heil- kunde der Gemütherskrankheiten.)

The Latin term insecta, like the Greek entoma, which has been applied to these animals, has reference to the insected, or divided, appearance of the body; hence the English name insect, the French insecte, and the German instinct. Invertebrate animals are divided by Lamarck into two groups, which he calls 'animaux sapitiques,' and 'animaux sensibles.' The latter, or the sensitive animals, contain those which insects are the first. According to Latreille's arrangement, the Rane Animal, the Insecta, and the Echinodermata forms the third great division of articulated animals.

True insects may be thus defined. - Articulated animals possessing six legs, two antennae, two compound eyes; a small brain at the anterior extremity of a double medullary chord. Circulation effected by a pulsating dorsal vessel provided with numerous valves. Respiration by trachea, which form two lateral trunks, and ramify through the body; generation cephaloparous; two distinct sexes; adult state attained through a series of metamorphoses.

Insects generally possess two pairs of wings; the trunk in the adult animal is usually composed of three chief parts, the head (capsul), thorax, and abdomen; or the trunk of an insect may be described as consisting of thirteen segments, of which one constitutes the head, three form the thorax, and the remaining nine compose the abdomen. The head includes the organs of sensation and manipulation, and its principal parts have received the following names:—the clypeus, vertex, occiput, genus, canthus, gula, oculi, stemmata, antennae, and the trophi.

The clypeus is that part of the upper surface of the head which joins the labrum. It is called by Kirby Nasus, and in the Lamellicornes it is usually the foremost part of the head when viewed from above. The vertex is the summit of the head.

The occiput is the hinder portion of the head, or that adjoining the thorax.

Genus (the cheeks). Those parts which lie on the outer side of the anterior half of the eyes, and intervene also between them and the mandibles. —Kirby.

Canthus, a name applied by Kirby to a process of the head which encroaches upon the eyes.

The eye in certain insects is encroached upon by a narrow process of the head in such a manner as to render it kidney-shaped, instead of its ordinary round form, and in some instances this organ is divided by the canthus into two parts. Gula, the hindermost portion of the head beneath. Oculi (the eyes). These are almost invariably two in number, placed one on each side of the head, and composed of hexagonal lenses. Stemmata (the eyelets). Minute simple eyes. They may be seen in the orders Hymenoptera, Orthoptera, and Hemiptera, and are generally placed vertically on the head. The larvae of Coleopterous insects generally possess them, and they are usually placed on each side of the head close to the antennae.

Antenna. Jointed organs, two in number, most commonly springing from the upper surface, or side of the head near the eyes. These organs vary much in every way, not only in the various species of insects, but in the sexes of the same species they often differ.
There is much difference of opinion as regards the use of these organs. Some have come to the conclusion, from anatomical researches, that they are organs of hearing, whilst others maintain they are organs of touch or smell. When however we see so much difference in the structure of the antennæ in insects, and perceive that some use them in touching surrounding objects, as is the case in many of the Hymenoptera (particularly the Ichneumonidae, Bees and Ants), whilst others carefully avoid so doing, we are naturally led to the conclusion that they are used for different purposes in different insects. It is certain that insects possess the sense of smell, but in those insects which possess it apparently in the highest degree we can trace no similarity in the structure of the antennæ. A Silpia, a Staphylinus, and a common fly, appear to be equally attracted by the scent of a piece of putrid flesh, and yet their antennæ bear no resemblance. The same remark will apply to the antennæ of those insects which emit sound; the Grasshopper, the Sphinx, many of the Cerambicydæ, and numerous other insects might be enumerated which emit voluntary sound, but their antennæ do not differ from those of the species to which they are most closely allied, and which emit no sound that we can perceive. As regards touch, there can be no doubt that the antennæ of many insects are used as organs of touch, and it appears highly probable that, through the means of the antennæ, some insects can perceive the state of the atmosphere. The delicately plumèd antennæ of the gnat, and of the nocturnal

In describing the species of the Curculionidae, the term *Punicus* is often used to designate that portion of the antenna between the long basal joint, or scapus, and the club (called *capitulum* or *clava*), which in these insects usually terminates the antenna.

The principal modifications in the form of antennæ are figured and described in the article Coleoptera.

The *trophi*, or parts of the mouth (called by Fabricius *Instrumenta Cibaria*), consist of six principal portions:—

The Labrum, Labium, Mandibles, and Maxilla.

The Labrum, or upper-lip, is a conic plate, which terminates the head anteriorly, and covers the mouth above; its posterior margin is united by a membranous hinge to the Clypeus.

The most common form of the labrum is represented in fig. 8: it is however very variable in shape, and in the Lamellicornæ, a tribe of Beetles which feed upon vegetable substances, instead of being of the ordinary horny texture, it is soft and membranous, and hidden beneath the clypeus (fig. 9, a). In some of the Cécindelidæ (predaceous insects) it is more or less elongated and notched at the sides and apex (see fig. 10). In the genus *Cicindela* a small projecting tubercle may be observed on the anterior margin of

---

*Fig. 10.* Labrum, or Upper Lip, of various Insects.
of the labrum. In the Hornet (Vespa crabo) the labrum is produced in front into an elongated pointed process (fig. 11). In the Lepidoptera it is extremely minute, and the Hornet is a long, slender, and pointed labrum.

The labium, or under lip, is opposed to the labrum, and generally serves to close the mouth beneath.

The labium is a very complicated organ, consisting of several parts which are variously developed in the different tribes of insects. There is considerable confusion in the nomenclature of these parts, especially as regards the portion which is to be considered the true labium; for although the whole apparatus is often called the labium, yet when treated of in detail most authors have separated this term from some particular portion, but differ as to which particular portion the term shall be applied, and consequently the neighbouring parts are differently named. The confusion has arisen from the circumstance that entomologists having the name labium to the whole apparatus, and likewise to a particular part of it. We shall therefore use the term labium to express the whole apparatus, and describe the several parts under the three heads Palpiger, Mentum, and Stipes.

Palpiger, or palpi-bearer. This name was first applied by Mr. Newman* to a portion of the part called Lingua by Kirby, and Labium by MacLeay and others. It will be used in the name of the whole apparatus, which the labial-palpi are attached, including the lingua, paraglossae, and palpi-labiales.

The several parts of the labium therefore will be thus divided:

<table>
<thead>
<tr>
<th>Labium</th>
<th>Mentum</th>
<th>Stipes</th>
</tr>
</thead>
<tbody>
<tr>
<td>*palpiger (b)</td>
<td>*mentum (f)</td>
<td>*stipes (c)</td>
</tr>
<tr>
<td>lingua (c)</td>
<td>paraglossa (d)</td>
<td>palpi-labiales (e)</td>
</tr>
</tbody>
</table>

If we examine the underside of the head of any insect in which the various parts of the mouth are well developed, the palpi will be readily distinguished from the other two portions of the labium by their bearing a pair of palpi, the palpiger. *Dytiscus marginalis* is the common water-beetle, the palpiger is of a square form, or nearly so. The broad piece furnished with bristly hairs along its anterior extremity is the lingua. On each side of this piece there is a small plate (apparently divided), which has its posterior margin recurved, so as to lie close to the underside of the lingua, and furnished with a fringe of hairs. These small pieces we conceive to be the analogue of the parts called by Kirby paraglossae, and which are distinct in the bees, wasps, &c. They also appear to represent the two leaf-like appendages at the apex of the palpiger in Cerambyx, the lingua here being nearly obliterated, and consisting only of an extremely minute divided process furnished with hairs.

The palpiger is not very distinct in the Hymenoptera, its appendages however are often greatly developed. In the hornet the lingua is very large, broad, and divided at the extremity; the paraglossae are also large. The labial palpi are long, and composed of four joints. The lingua in many bees is of great length, and the paraglossae are often long. The labial-palpi in the typical bees are flattened, and have the basal joint long.

Orthopterous insects have a well-developed palpiger: the lingua, paraglossa, and palpi are distinct. 

Mentum, or chin, by which we mean the part so called by MacLeay, Westwood, and indeed most modern authors, but which is the Labium of Kirby and Newman. 

The *mentum* is the piece between the palpiger, and generally articulated to the stipes by a membranous hinge. This part is very variable in shape, and is consequently often referred to in the descriptions of insects, or rather the definitions of the genera. It is generally distinct in Mandibulata insects.

In Dytiscus marginalis it is of a transverse form, and emarginated on the fore part. In the hornet, as well as in the bees, the mentum is long, and nearly cylindrical in the anterolateral view. Stipes. This name is applied by MacLeay to that piece which is below the labium, and generally articulated to the stipes by a membranous hinge. This part is very variable in shape, and is consequently often referred to in the descriptions of insects, or rather the definitions of the genera.

The stipes is generally sordid to the jugum, so that its boundaries cannot be detected. Such is the case in the water-beetle, the head of which is selected to illustrate this article. Its lower boundary is indicated in the figure by a dotted line. In the common cockchafer (Melolontha vulgaris) however it forms a well-defined piece. In Amphi- pylus* scutellatus (fig. 7), a coiled insect, it is also distinct. In the Hymenoptera the stipes is small, and generally of a triangular shape.

Tio Mandibulates the mandibles are next under consideration. These, the representatives of jaws, are situated immediately behind the labrum. They are two in number, and have a vertical motion.

In the Mandibulates the mandibles are almost invariably of a hard horny nature, often of a triangular form, or nearly so, and furnished with acute processes. Wood-boring insects, such as the Cerambycidae, have short stout mandibles, and in those insects which feed upon vegetable substances (the Phyllophaga, &c.) the mandibles often present a broad grinding surface on their inner side near the base.

**Fig. 18.**

**Fig. 19.**

**Fig. 20.**

The Maxillae, or feeder-jaws, like the mandibles on which they are placed, are opposed to each other horizontally. They are inserted at their base to the labium, and distinguished by their giving attachment to the maxillary palp, on which account Mr. Newman has applied to the name of *Feeder-jaws*. The maxillae are variable in form, and being the characters of general utility, are of important account. The larger groups are not unfrequently derived from them. A perfect maxilla presents five distinct portions: the Cardo, Stipes, Palpifer, Labium, and Palpi-maxillaries.

Cardo (the hinge) is a small piece, often of a triangular form, upon which the maxilla sits. It is the inserion of Newman. 

Stipes (the stalk). Kirby applies this name to the *concentrical base of the maxilla, below the palpifer, and in his detailed account of this part refers both to the palpifer and another portion which is generally situated within the palpifer. We shall confine the name stipes to that part of the maxilla which is joined to the cardo, and is either within or below the palpifer. It is the maxilla, or disc, of Mr. Newman.

Palpifer. This part, to the summit of which the maxillary palp are always attached, is usually a narrow piece running parallel with and joined to the outer side of the maxilla at the base.

Labium (the blade). This is the chief part of the maxilla. It is situated above the stipes, is usually of an elongated twisted form, and furnished with bristle hairs along its inner margin, and generally has one or more pointed claws at the extremity—these claws are called the Ungues. The name labium is applied to this part by Mr. MacLeay, and according to his detailed account this part refers both to the palpifer and another portion which is generally situated within the palpifer.

Labium (the helmet), or the Lobus superior of Kirby, is a lobe which is attached to the palpifer, and lies between the galea and the maxillary-palpi. It is jointed in the preoral boundary, and resembles a palpi.

Palpi-Maxillaries (the maxillary-palpi), joined organs, two in number, one to each maxilla, situated on the outer side of the maxilla and springs from the palpifer.

In the order Hybomitra the maxillae are not developed, and pointed. In the Hemiptera they are still more slender, resembling bristles. The long slender proboscis of the Lepidoptera consists of the maxillae. In the order Hymenoptera the maxillae is more or less attached to the labium.

* * * 

* See *Entomological Magazine*, vol. ii., p. 71.

† By the sound of this name, we do not apply the name labium both to the whole labial apparatus and at the same time to part, we reject the name maxillae as applied to a part of the maxillary apparatus.
nptera the maxillae are usually large, and when closed form a sheath which covers the various parts of the labium.

The ovum apparatus, or trophi, of the various Haustellate orders of insects have each received names from Mr. Kirby.

In the order Hemiptera the ovum instrument is termed the Prothorax or the Prothorax. The same part is termed the Protococcus in the Diptera, Anthis in the Lepidoptera, and Rostulum in the Aphaniptera. The several parts representing the Mandibles, Maxille, Labium, &c. have also received additional names in each of these orders, but we have already sufficient.

The term Thorax is applied to all that part of an insect which lies between the head and the abdomen, and to which the legs and wings are attached.

We have before said that the thorax is composed of three segments; these are generally distinct in those larvae which do not resemble the perfect insect and which possess legs—such as the larvae of the Lepidoptera, Coleoptera, and certain Hymenoptera (the Tenthredinidae): here each of the segments in question possesses a pair of legs.

The term Prothorax is applied to the foremost of the thoracic segments, Mesothorax to the next, and Metathorax to the hinder one, or that which joins the abdomen. In the perfect insect we find the three simple thoracic-rings of the larva replaced by the same number of segments, but each divided into several distinct parts; these three segments however are never uniformly developed, but generally two of them are more or less perfected and exert an inverse influence on the third, and sometimes one of the segments is greatly developed at the expense of the remaining portions.

The Prothorax bears the anterior pair of legs and is articulated to the head. It is large in the Coleoptera, and is the part called thorax in descriptions of insects of this tribe; it is likewise well developed in the Orthoptera and Hemiptera. In the Lepidoptera it forms a narrow ring, which is easily distinguished by the scales with which it is covered being erect, those on the next segment being depressed. In the Hymenoptera the prothorax sometimes forms a distinct neck, but generally it is a narrow plate and extends back on each side to the base of the anterior wings.

The upper surface of this segment in termed by Burmeister the Protococcus, and by Audouin and MacLay the Tergum of the Prothorax. The latter authors state that the tergum, when perfect, is composed of four parts, to which M. Audouin gives the names Presectum, Scutum, Scutellum, and Postscutellum, so named according to their succession, commencing at that nearest the head of the insect. These parts however are seldom to be seen, unless it be in certain Orthopterous insects.

The underside of the Prothorax is called by Burmeister and Kirby the Prosternum, and by Audouin the Pectus or the Prothorax. To the Prosternum the legs are attached, and hence this part is always tolerably well developed.

Besides the above parts there is an internal piece called the Metasternum.

The Mesothorax, or middle segment of the thorax, is more complicated than the Prothorax, owing to its giving attachment to the anterior pair of wings in addition to a pair of legs. The mesothorax is well developed in nearly all insects, and in the order Diptera attains a large size, and indeed forms the principal part of the thorax. Its upper surface is termed by Burmeister the Metaventum (Tergum of Audouin), and the under part the Metasternum (Pectus, Audouin).

The Metathorax, or hindmost segment of the thorax, is not more highly developed than the mesothorax, in the other insects, and in the order Diptera attains a large size, and indeed forms the principal part of the thorax. Its upper surface is termed by Burmeister the Metaventum (Tergum of Audouin), and the under part the Metasternum (Pectus, Audouin).

The lower surface of the Metathorax is termed by Burmeister the Metaventum (Tergum of Audouin), and the under part the Metasternum (Pectus, Audouin).
At its maximum of development it consists of four pieces above and eight below, to which Audouin applies the names Proscutum, Scutum, Scutellum, and Postscutellum, to the upper pieces, or Tergum; and for the Sternum, Episterna, Epimeras, and Medifurca, to the Mesosternum. The Metathorax, as it bears the posterior wings, is well developed in those insects which possess them, but when they are wanting, as in the order Holometabola, it is of small size. Its upper surface is called Metanotum, and the under surface Metasternum. When perfect it contains the same number of parts as the Mesothorax. To this segment are attached the posterior pair of legs.

The various parts of the thorax will perhaps be better understood by their being placed in a tabular form, thus:

<table>
<thead>
<tr>
<th>Segment</th>
<th>Parts</th>
</tr>
</thead>
</table>

From the thorax we are naturally led to the wings and legs of insects.

The greater portion of the insect tribe possesses four wings, some however possess only two, and others are quite destitute. These organs consist of two membranes* applied closely together, and enclosing numerous nerves or hollow tubes which contain the trachea. The various descriptions of wings may be described under the following heads:—Elytra, Tegmina, Hemelytra, and Halteres. The term Elytra is applied to the anterior wings. When they are without nerves or uniformly of a thicker and harder substance than membranes, they are peculiar to the Coleoptera. [COLEOPTERA.]

Tegmina is the name applied to the upper organs of flight when of a uniform conaceous texture, and furnished with nerves as in the Orthoptera. [ORTHOPTERA.]

Hemelytra, the upper organs of flight when they are coriaceous at the base and membranous at the apex, as in the Hemiptera. [HEMIPTERA.]

The Halteres are two minute organs situated behind the wings of Diptera, insects, and supposed to represent the posterior wings; they consist of a slender stalk with a round or oval knob at the extremity. [DIPTERA.]

The legs in true insects are invariably six in number, but in certain butterflies the anterior pair are minute. Each leg consists of a Coxa, Trochanter, Femur, Tarsus, and Tarsus, all of which parts are figured and described in the articles COLEOPTERA. CECIDIOPTERA. LEPIDOPTERA.

The Abdomen.—Although the nine segments which compose the abdomen are generally distinct in larvae, we seldom find more than seven or eight visible joints in the perfect insect; the remaining one or two being generally hidden, and in fact converted into parts of the organs of generation. The number of segments to the abdomen sometimes differs in the males and females of the same insect, as in the Anolea or Hymenoptera. As these segments in the perfect insect bear no organs of locomotion, they are of a more simple structure than those of the thorax, consisting chiefly of an upper plate called the dorsum, and an under plate called the venter.

The substance of the abdominal segments is almost invariably less hard and more flexible than that of the head and thorax.

In the Coleoptera and Hemiptera where the upper parts are protected by Elytra or Hemelytra, they are softer than on the under surface which is exposed. In certain species however where the elytra do not cover the abdomen they are of the same substance throughout, as for instance, in the Staphylinids and several minor groups of Coleopterous insects. The articulation of the abdomen to the thorax offers some curious modifications, some of which are constant throughout whole groups, and hence afford distinguishing characters. When the abdomen is closely applied to the thorax it is termed sessile; and when the first segment, or more, is narrow and elongated, and forms a kind of stalk, it is termed petiolate.

The abdomen is often furnished with appendages at its extremity; thus in the earwig (in which Mr. Westwood discovered one more than the usual number of segments) there is a pair of forceps which serve as weapons of defence, and in the male sex of Panorpa, where the apex of the abdomen is considerably elongated, there is also a pair of forceps. In the Dragon-flies there are small flattened appendages, and likewise in the Staphylinids, which are called styliets. Indeed the various kinds of appendages are too numerous to be here described, but are noticed in the accounts of the various groups of insects contained in this work. The modifications of the ovipositor are likewise noticed where they occur in the different groups. When it is of a long and compressed form, it is termed ensate; and when it consists of several tubes retractable with each other, like the pins of a telescope, it is called teleotiform. The term aculeiform is applied to this organ in the Hymenopterous insects.

We now come to the internal anatomy of insects.

First in importance is the nervous system. The nervous system in insects consists of a double nervous chord, which is situated in the ventral portion of the body (being the reverse in this respect to the vertebrate animals). This double chord is joined at intervals by ganglia, which in larva correspond in number to the joints of the body, i.e. thirteen. As the larva is about to assume the pupa state, the abdominal ganglia gradually approach the thorax, and consequently are nearer to each other, a circumstance owing to the longitudinal contraction of the segments at this time, at least such is the case in Lepidopterous larvae. In the pupa state the ganglia are still more applied to each other, and the nervous chords are curved and distorted: the same number of ganglia however are generally to be found; but in the imago state of Coleopterous insects several of the ganglia have become confluent, so that the

* Immediately after it has left the pupa case the two membranes of the wings are distinct.

* See 'Transactions of the Entomological Society,' vol. i, p. 187.
number is considerably reduced. In the common cockroach (*Melolontha vulgaris*), which may be taken as an illustration of the general character of the nervous system in insects, there is one large transverse ganglion in the head, consisting of two chief portions joined laterally, and which are expanded on their outer side to form the optic lobe. From this large transverse ganglion the two nervous cords extend downwards and backwards, and form a ring which encircles the esophagus, beneath which they are united by the second ganglion. These two ganglia together send off the nerves which supply the various parts of the head and its appendages, the trophi, antennæ, &c. From the lower part of the second ganglion the nervous cords are continued to the thorax, where we find three large ganglionic masses, from which all the nerves which supply the thorax and abdomen have their origin.

For a detailed account of the nervous system the student must refer to the works of Lyonnaert, Strass-Durchheim, L. Dubois, Burmeister, M. Herold, in the common white butterfly (*Poncia brassica*), and Newport. "On the Anatomy of Sphinx ligustri."

The muscular system. To enter into a detailed account of the muscles of insects would of itself require a long article; we will only observe at present, that the muscles in these animals, as in the higher orders, consist of a contractile portion and tendon.

The digestive system of insects is well developed, and consists of an intestinal canal, in which a crop, gizzard, stomach, and small intestine are generally distinct; but, as in the higher orders of animals, these parts vary according to the nature of the food.

The next subject connected with the definition of an insect is the transformations which it undergoes before arriving at maturity.

All insects are true oviparous animals, with the exception of a few instances where the egg is hatched in the body of the parent, and again where they are hatched in the pupa state, both of which cases occur in certain species of the order Diptera.

From the egg the larva is hatched; this of necessity casts its skin several times during its progress to maturity, since this part never grows. See article Bombyx, where an account of the transformation of the silkworm is given.

When fully grown the larva casts its skin for the last time, and in so doing comes forth in the pupa state; and after a time the skin of the pupa is burst by the animal within, which is now in what is termed the imago or perfect state.

The eggs of insects are extremely variable in shape: the more common form is oval; they are however often round, sometimes cylindrical. Those of the common white butterfly are conical. In many moths they are lenticular. The eggs of Hemerobius and several other insects are placed upon footstalks.

The surface of eggs is generally smooth or nearly so, but it not unfrequently happens that they are uneven, and display a great variety of sculpture.

White, yellow, and green are the predominant colours of the eggs of insects: they are deposited in various situations, but always where the young larva may find appropriate food when hatched. Thus we often find them attached to the leaves or stems of plants. The Ichneumonidae deposit their eggs in or on the bodies of caterpillars, and their larva when hatched feed upon these animals.

The principal variations in the larva of insects have been arranged in the following tabular form by Messrs. Kirby and Spence.

I. Larva without legs.

i. With a conical head of determinate shape. Coleopterous and Hymenopterous *Apoda—Culicidae*. Some *Ceratidae*, &c., and the **Diptera**, &c.,

ii. With a membranous head of indeterminate shape (Musci, Siphidae, and other Diptera.)

"A most splendid work, in which the anatomy of this insect is shown for illustration is published by Strass-Durchheim, and entitled "Considérations Générales sur l'Anatomie Comparée des Insectes Arachnids," a work which almost equals in elaborate detail the wonderful production of Lyonnaert, "On the Anatomy of the Larva of Cossus."

*See* Introduction to Entomology, vol. iii., p. 144.
Insects are divided by Fabricius into—

I.—Insects with Biting Mouths.

1. ELEUTHERATA.—Maxilla free, uncovered, and palpi pectinate. (Coleoptera.)

2. ULONATA.—Maxilla covered by an obtuse galea or lobe. (Orthoptera.)

3. SYNISTATA.—Maxilla gesticulate at the base, and com- nate with the labium. (Neuroptera, &c.)

4. PIEZATA.—Maxilla cornes, compressed, often elongate. (Hymenoptera.)

5. ODONATA.—Maxilla cornes, toothed, two palpi (Libellulae).

6. MITOSATA.—Maxilla cornes, valuted, not palpigerous. (Myriopoda.)

7. UNGUATA.—Maxilla resembling scissurae. (Arach- nida, part.)

8. POLYPODANATA.—Palpi mostly six; many maxillae within the labium. (Insecta, &c.)

9. KLEISTONATHA.—Many maxillae without the labium, closing the mouth. (Brachyuro Decopod crustacea.)

10. EUCNERNATA.—Maxillae many without the labium, covered by palpi. (Macrurana Decopod crustacea.)

II.—Insects with Suctorid Mouths.

1. GLOSSATA.—Mouth with a spiral tongue between re- flected palpi. (Lepidoptera.)

2. RYINGOATA.—Mouth with a rostrum having a jointed sheath. (Hymenoptera, &c.)

3. ANTLATA.—Mouth with a labellum without joints. (Diptera, Anoplura, and Trachaea Arach- nida, &c.)

Burmeister's System.

I.—Insecta Anatabola.

The larva resembles the perfect insect, yet it wants wings, the perfect insect is winged; the pupa in this case have their rudiments. It runs about and eats.

a. With sucking mouths, which consist of four fine setae lying in a sheath; palpi are wanting; four biliary vessels, and generally a free prothorax.

Order 1.—Hemiptera.

b. With mandibulate mouths; mandibles and maxillae distinct, the latter having palpi, and generally distinct large superior lip.

a. Four unequal wings; the anterior pair leathery, or like parchment, the posterior pair folded longitudinally, and also once transversely; prothorax always free; many biliary vessels.

Order 2.—Orthoptera.

b. Four generally equal and rarely unequal wings, never folded; or sometimes none at all. In the first case the norvures are usually mutilated, and there are generally many biliary vessels; in the latter case there are four biliary vessels attached to the intestines; prothorax sometimes free, sometimes not.

Order 3.—Dictyoptera.

II.—Insecta Metabola.

The larva consists of thirteen segments, either with or without legs; the pupa is inactive, or if it moves, it takes no food.

a. Four equally large or equally long wings with refi- culated norvures; mandibulate mouths; few biliary vessels, rarely more than eight; prothorax always free.

Order 4.—Neuroptera.

b. Wings always unequal, the posterior pair sometimes wanting, rarely all.

a. Mouts adapted to sucking.

a. Instead of posterior wings there are pediculated knobs; yet the wings are sometimes wholly wanting; four biliary vessels; larva without feet; s soft proboscis with several setae and a pair of palpi; prothorax not free.

Order 5.—Diptera.

b. Four wings generally covered with scales; six biliary vessels; larva without feet and a distinct head; maxilla forming a spiral tongue; prothorax not free but small, and closely connected with the metathorax.
The Scenecores consist of the Rhamphastidae, the Petta-
cider, the Psittacidae, the Psittacidae, the Certhiidae, and the 
Cuculidae.
The Tenuirostres were composed of the Nectariniidae, 
Cinnycidae, Trochilidae, Promeropidae, and Melipho-
giidae.
Mr. Vigors finds the following parallel analogies by 
which the tribes of the Insects represent the different orders of 
the class—

<table>
<thead>
<tr>
<th>Denticostres</th>
<th>Coniostres</th>
<th>Scenecores</th>
<th>Tenuirostres</th>
<th>Fissirostres</th>
<th>Nataores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raptores</td>
<td>Insecniores</td>
<td>Raphosa</td>
<td>Natatosides</td>
<td>Nataores</td>
<td></td>
</tr>
</tbody>
</table>

Of these, the Coniostres are considered by Mr. Vigors 
the typical group. (See further, Linn. Trans. xiv. 425.)
The author of Horae Entomologicae conceives it to be 
demonstrated, that so far as relates to the analogies existing 
in nature between the orders of Mammalia and Aves, the 
Primates ought to be placed as analogous to the Insecniores. 
Both are omnivorous. (See the memoir On the Comparative 
Anatomy of certain Birds of Cuba, by W. S. MacLeay, 
Eq. M.A. &c., in Linn. Trans. xvi. 47.)
Mr. Swainson, in accordance with his opinion that the 
primary divisions of every circular group are five 
apparently, but three actually, gives the following table as illustrating 
the Circle of the order Insecniores, or Perchers.

1 Typical Circle.
Bill more or less cone, strong, 
slightly or not at all notched; 
mouth without bristles; feet 
short; walked for perching and 
walking. Omnivorous.

2 Subtypical Circle.
Bill shorter and more compressed, 
with a distinct tooth; 
like notch; mouth generally 
defended by bristles. Insecti-

3 Aberrant Circle.
Bill entire; feet very short, 
adapted for walking; 
position of the toes various.
1. Feet formed for Scam-
2. Bill long; tongue Tenti-
3. Bill broad at the base. Feed upon the 
wing.

The table of analogies set out by the same author is the 
same in substance with that of Mr. Vigors, differing only 
in the order in which the tribes and orders are placed. Mr. 
Swainson, who excludes Man from the Zoological circle, 
considers the Insecniores to be analogous to the Quadrupu-

The Dentirostres, according to the last named author, 
include the families Laniidae, Merulidae, Sylvicidae, Ampel-
tidae, and Muscicapaed, with their subfamilies.
His families of the Coniostres are Corvidae, Sturnidae, 
Prinncilla, Manuphagaed, and Buceridae, with their sub-
families.
Under the Scenecores he comprises the Rhamphastidae, 
the Pettaeidae, the Psittacidae, the Certhiidae, and the 
Cuculidae, with their subfamilies.
The Tenuirostres are made to contain the Melipagidae, 
the Cinnycidae, the Trochilidae, the Promeropidae, and the 
Paradisaeidae, with their subfamilies; 
The Fissirostres, the Meropidae, the Holcognaed, the 
Trogonyidae, the Caprimulgidae, and the Hirundinidae, with their 
subfamilies.

INSOLVENCY. [Bankrupt Laws of Scotland.] We reserved 
to this place an account of the celebrated process of celery 
longum', or surrender of goods by an insolvent 
debtor to his creditors on oath.

This process is mentioned in the earliest records of 
the Scotch law, under the significant name of the bare-man 
process. It was considered in the courts, and the be-

In order 6. Lepidoptera. b. Months with distinct hatching seasons.
1. Four naked wings traced by ramose nerves; 
larvae generally without head and feet, but some-
times with both; many biliary vessels; prothorax 
not free.

Order 7. Hymenoptera. b. Anterior wings in the form of horny elytra; 
larvae with head, with or without feet; four or six 
biliary vessels; prothorax always free.

Order 8. Coleoptera.

The first and second of the above classifications are by no 
means natural, nor were they intended so to be by their 
respective authors. The former was established when entomology was 
comparatively speaking, in its infancy; and although Fabricius possessed a more intimate ac-
quaintance with insects, yet he contended that an artificial 
classification should be adopted till further discoveries had 
cleared the way for their satisfactory development.

We cannot feel surprised therefore that these systems 
should have been superseded by others more modern.

The system of Burmeister is founded upon philosophical 
principles; we are not however prepared to agree with him 
in all more particular to his own Dictyoptera, the species of which we, think, to be 
incorporated with the Orthoptora.

The mutual affinities and likewise the grade of the 
pericardic orders, it appears to us, may be best expressed 
by arranging them in the following succession:—

2. Coleoptera. 6. Homoptera.
3. Orthoptera. 7. Lepidoptera.

Geographical Distribution of Insects.

Guided by animal forms, the globe may be divided into 
five portions: 1st, all that part north of int. 30°; 2ndly, 
Africa and Arabia; 3rdly, India, including Java, Sumatra, 
and Borneo; 4thly, South America; and 5thly, Australia, 
including New Guinea.

In each of these divisions of the globe there is a certain 
series of forms which predominate, and they are of so marked 
peculiarity that an experienced entomologist, upon seeing 
a small collection from any one, would at once be able to 
determine from which they originated, although he might be 
unacquainted with any one of the species it contained.

It must not be imagined however that each of these 
divisions contains forms peculiar to itself only, for there are 
many insects which occur in every country, although these 
species and forms from any of the above-mentioned five divisions are almost 
always distinct. The following may be stated as general 
rules:—Great elevations have an influence on the forms. In-
sects inhabiting the interior of a tropical country, but at a 
great elevation, do not resemble those of the plains below, 
but are of forms common in the first division. Water 
forms are not affected by climate to the same extent as those 
which are not aquatic in the habits. As yet there are 
many forms among the land insects which cannot be 
referred to European forms. Among the very minute insects from various parts of the world, extra-
去掉一些无关紧要的信息，使文本更加简洁。
But on the erection of the court of session in the beginning of the sixteenth century, by which persons was drawn thither, as that it was so, and there, not merely to the exclusion of the local justices, but as an inner-house process, or one to be determined only by the whole judges. It then also got the name of cessio bonorum, and began to be viewed therein, though all dyvours or, and slender from the French dyvour, to squander or con­sumed in the person of the debtor, and his estate was now famous.

In pursuance of these principles the Court of Session passed an act of sederunt in May, 1666, appointing a pillory to be erected near the market-cross of Edinburgh, with a seat of every dyvor, or dyvour. Of this act it is observed that it was made market-day at noon, with a hat or bonnet of yellow to be worn by them constantly under the pain of three months' imprisonment, if apprehended at any time without the same.

This, the dyvour's habit, was by the same authority soon afterwards changed, and appointed to be a coat or upper garment, whereof the one half shall be yellow, and the other half brown, with a cap or hood of the same. (A. S., 26 February, 1655; 23 January, 1673.) It was also enacted that the punishment of every act of cessio bonorum specialty libel and prove how he became bankrupt (A. S., 1 December, 1655); and shortly afterwards, by A. S., 18 July, 1688, that he produce with his process a certificate under the hand of the process, or in the hand of the magistrates of the burgh, that he is imprisoned, bearing that he had been the space of one month in prison, without which certificate the process would not be sustained.

The consequence of such an oppressive course of legislation may be anticipated. Continuance in gaol was better than delivery on such terms; and accordingly the gaols of the kingdom were in course of time filled with miserable objects. This evil an act of 1696, called the Act of Grace, which, on the preamble that "generally the burghs of the kingdom are troubled and overcharged with prisoners thrust into their prisons, much vexing or maintaining themselves, but must of necessity either starve or be a burden on the burgh," declared it lawful to the magistrates of burghs to liberate indigent debtors, if, after notice to them to that effect, the creditor failed to provide them aliment at the rate mentioned in the statute. But so entirely was the true source of the evil overlooked that in the same year an act was passed in parliament expressly forbidding the lords of session to disband the bankruptcy habit in any case of cessio bonorum, unless the bankruptcy order be of no more than six months standing, and the debtor is imprisoned, has been imprisoned, and is imprisoned, for the time being, in order to prevent his discharge, and generally the habit was in later times dispensed with by the court. These notions were unanswerably derived from England; and it is to the House of Lords, in its appellate jurisdiction, and to the British parliament, that the present state of the Scotch insolvent law, its restoration to its ancient condition, is to be traced.

By 6 Geo. IV. c. 62, the Act of Grace, 1696, c. 32, was regulated and amended; and by 6 and 7 Will. IV. c. 56, the like was done with the process of cessio bonorum. The latter statute also abolished the 'bankrupt habit' entirely, and bestowed on the sheriffs a cumulative jurisdiction in cessio with the court of session.

The effect of a decree of cessio is not to discharge the debtor, but merely to relieve him from the operation of personal diligence or attachment of his person. It affords no prerogative to the creditor by whomsoever so, any property which he may subsequently acquire by personal industry or otherwise, if the goods already surrendered fall short of extinguishing his debts.

A person who cannot pay his debts. [Bankrup­ture.] In this country statutes have from time to time passed for the purpose of releasing from prison, and sometimes from their debts, persons whose transactions have not been of such a nature as to subject them to the Bankrupt Law. These statutes have been passed for a limited time only, and have been continued by subsequent enactments.

The Insolvent Law of England was consolidated by the 7 Geo. IV. c. 57, continued by the 1 William IV. c. 38, and since by annual statutes for one year. It is now somewhat modified by 1 and 2 Victoria, c. 110. The law is administered by commissioners appointed by the Crown, in a manner similar to that of other continents, under whose direction the commissioners from time to time make circuits and give their attendance at the assize towns or other places where prisoners may be ordered to appear.

By the 1 & 2 Vict. c. 110, no person shall be arrested upon process of a bankruptcy act. in the civil action, except in certain cases specially provided for by the act. [Arrest.] A person who is in prison charged in execution for any debt or damages, or otherwise committed as mentioned in the act, shall be discharged if the process is a bill of indictment for an insolvent debtor's estates; and if within twenty-one days after the like time he does not make satisfaction to the creditor at whose suit he is so charged or committed, such creditor for other person mentioned in the same may bring the court for an order vesting all the real and personal estate of the prisoner in such provision assignee. When such petition has been filed, and the court has made the order above referred to, all the prisoner's real and personal estate, and everything which he may in any way acquire before his final discharge, is vested in the provision assignee by virtue of such order when recorded, except the wearing apparel, tools, &c. of the debtor, not exceeding in value one hundred pounds; the whole of the insolvent's estate. The court shall also make a schedule of all debts owing by him, and of all his property. The court has power to appoint assignees for the management of the insolvent's estate, and on such assignees' assembling to the appearance, all the estate of the insolvent, which is vested in the provision assignee, becomes immediately vested in such assignee for the payment of the prisoner's debts. After the court shall have adjudged the discharge of the insolvent, he shall be liable to his creditors for all the debt in respect of which the adjudication was made. But any property which he may acquire subsequent to his discharge may be taken in execution, under the provisions of the Act. The act, in respect of such an insolvent property be of such a nature that it cannot be taken in execution, the court may imprison the insolvent till he conveys such property, as the court may direct, for the general benefit of his creditors. It is unnecessary to specify the various provisions of the insolvent laws. Their general object is to release the debtor from prison, to free his person from liability as to debts contracted previous to his discharge, but to make all his present and future acquired property subject to the claims of his creditors. If the creditors have a claim on the insolvent's subsequently acquired property, which is of such a nature that it cannot be taken in execution, it may be necessary to apply to a court of equity, which has power to provide for the maintenance of the debtor, and will pay the creditors subsequent to the insolvency first, and then the creditors prior to the insolvency.

In cases where it is proved that the insolvent has fraudu­lently made away with his property, or his debts were fraudulently contracted, the court does not discharge his person immediately, but has power to order him to be imprisoned for a period not exceeding three years from the date of his petition to the court for his discharge.

There is another statute in the English law (32 George II. c. 28), generally called the Lords' Act, from its having originated in the House of Lords, also continued and extended, by subsequent enactments, which makes a debtor taken in execution for a debt not exceeding 300l. to obtain his discharge upon surrendering all his effects (except apparel, bedding, and tools of trade, not exceeding 10l. in value) to the creditors.

INSPIRATION. [Revelation.] INSPIRATION. [Respiration.] INNSBRUCK (rather INNSBRUCK, 'bridge over the Inn'), the capital of the principality of Tyrol, at the outlet of the Sill with the Inn, over which the Inn-bridge, is very romantically situated at the broadest part of the beautiful Innthal (Valley of the Inn), which is bounded on the north by a chain of mountains 7000 feet high. It has 10,000 inhabitants, and is a place of great trade. It is the seat of the Austrian government of Tyrol and Vorarlberg, of the Diet, and of a university which was founded in 1672, afterwards abolished, and re­vived in 1826. It has 1100 students. The most remar­
able edifices are the castle, with its garden and statues, the
Franciscan church, containing the celebrated tomb of the
emperor Maximilian, and other tombs of many archdukes.
The grave of Andreas Hofer, and his statue by Scheller,
is in this church. 47° 15' 30" N. Lat., 11° 29' 49" E.

INSTINCT is a natural impulse to certain actions which
animals perform without deliberation, and without having
any end in view, and without knowing why they do it.
(Blumenbach, I. 1. S. 9.)

That the spontaneity of instinct operates unconsciously
is fully established by observation. A calf butts with its
head before its horns are grown; and the hen broods over
the eggs of strange species, and hatches eggs, patiently
over its own. Lastly, children in certain states of
the body are observed to devour eagerly chalk and other
earts which are the proper remedies for the disease,
although they can have no knowledge of their beneficial
effect. Of the latter these are the animal instinctive
animal activity appears to be determined by certain organic
states which give rise to a vague feeling of desire or aversion,
whereby different species of animals are impelled to pursue
or to abstain from certain actions; and which they cannot escape
for the purposes of their existence.

In the civilized state of man it is extremely difficult to
distinguish the effects of habit from the operations of nature,
but many actions of our domestic animals may
serve to distinguish the ordinary instincts of the human species are ap-
apparently few in number. In children the action of sucking
is generally considered instinctive, and, in a barbarous state,
the look of the eye upon a species of being by which the
child has been denied by Hartley, as the former has by Priestley,
who considers it to be purely mechanical, like the action
of breathing, which Reid has incorrectly classified among
instincts. Of the latter these are the animal extraordinary
instincts which are evoked by diseases, in consequence,
it would seem, of a change in the mixture of the
organical elements of the body. It is thus the instinctive
for the performance of the feverish patient, and the ravelling
of children for chalk, &c., which has been already noticed,
is to be explained.

But it is in the brute creation that we meet with the
most numerous examples of this original quality. The
wasp, which, instinctively, confines itself to a piece of
food, which know not that it is a piece to proceed from the egg which
it has deposited in the sand, collects a number of green worms,
and having rolled them up in a circular form, fixes them in
the hole in such a manner that they cannot escape.
The number of the worms so deposited is exactly proportioned
to the time necessary for the growth and transformation of
the wasp-worm into a fly, when it issues from the hole and
is itself imprisoned in a box; and by the time that each
we have termed extraordinary instinct is afforded by the
nymphs of the water-moth, commonly called cod-bait,
which cover themselves by means of gluten with pieces of
wood, in which they have been placed by the mother, and which
they should always be nearly in equilibrium with the
water in which they live. To accomplish this, when their
covering is too heavy they add a piece of wood; when too
light, a bit of grass.

Mr. Smelle, from whose work on the 'Philosophy of
Natural History' our examples have been drawn, distin-
guishes two classes of instincts: those which, independent
of all instruction or experience, instantaneously produce
定 certain actions when particular objects are presented, or
under the influence of peculiar feelings; and those which
possibly accommodate themselves to peculiar circumstances and
situation. The latter, as he gives as an instance the adap-
tive instinct of the oyster, which, in Senegal, neglects her
eggs during the day, but sits upon them in the night;
whereas at the Cape of Good Hope, where the heat is less,
the ostrich, like other birds, sits upon her eggs both day
and night. The distinction however seems unnecessary.
By the uniformity of instinctive operations nothing more is
meant than that the actions of all the individuals of the
species are similar when the circumstances are the same.
Under different circumstances the same species may act
differently, but the correspondence of individual operations
will still continue.

Some writers have gone the length of reducing all
the faculties of the animal mind to certain
principles of action, others have elevated the animal
instincts to a level with rational deliberation. Instinct
however differs from intellect by the unerring certainty
of the means it employs, the uniformity of its results,
and the perfection of its works prior to and independent
of all instruction or experience; and lastly, by the pursuit of
nothing beyond what conduces directly either to the
continuance of the species, or the propagation of the kind.
But the arts of rational creatures proceed slowly through
diversified and off-repeated experiments, while the means
they employ are always various, and seldom the best and
most appropriate for their use. In the organic kingdom
short of perfection in many respects, the difficulty is increased
by a voluntary combination of the beautiful with the merely
useful.

INSTITUT NATIONAL. The various academies
of learning in France having been dispersed during the first
storms of the Revolution, a decree of the Republic, dated
3rd Brumaire of the year IV., established a national aca-
demy, called the Institut, consisting of three classes, namely,
physical and mathematical sciences, chemistry, anatomy,
geography, natural history and navigation, civil and
maritime, botany, rural economy and the veterinary art,
anatomy and pathology, and lastly, medicine and surgery.
This class consisted of 62 resident members, who could appoint 100 cor-
respondents, including four foreigners; 2nd class, French lan-
guage and literature, consisting of 40 members, of the old
Académie française; 3rd class, ancient history and litera-
ture, which corresponded to the old Académie des Inscrip-
tions et Belles Lettres. This class consisted of 40 members
and 8 foreign associates, besides 20 correspondents, native
and foreign; 4th class, fine arts, divided into five sections,
namely, painting, sculpture, architecture, engraving, and
music. This class consisted of 26 members and 8 foreign
associates, and 26 correspondents, native and foreign.
The class of moral and political sciences was suppressed:
Bona-
parte was never partial to those studies. (Thibaudet, His-
toire du Consulat.) The vacancies in the respective classes
were filled up by the admission of additional members.
In 1837, the number of members of each class was limited
subject to the approbation of the first consul. An annual
allowance of 1500 francs was fixed for each resident
member, and a salary of 6000 francs for each of the five
permanently resident secretaries of the three first classes,
and one for each of the other three. Annual prizes
were also awarded. Bonaparte was named member for
the section of mechanics. When he became emperor the
Institut took the name of Imperial.

After the Restoration, Louis XVIII., by an ordinance, 21st
March, 1816, without changing the arrangement of the de-
partments of each class, restored the old names of Académ-
ie de Sciences, Académie Française, Académie des In-
scriptions et Belles Lettres, and Académie des Beaux Arts,
giving to each a more independent organization, but still
keeping them united in one academical body called the In-
situt. Louis Philippe, by a royal ordinance, October 28,
1832, has added a fifth class, or 'Académie de Moral
and Political Sciences,' divided into five sections, and consisting
of thirty resident members and five foreign associates,
besides about thirty correspondents. (Memorial Royal National for 1837.)
These various classes or academies have published many memoirs and reports; those of the Académie des Inscriptions, styled ' Mémoires de l'Institut par la classe
de l'Histoire et de Littérature anciennes,' 4 vols. 4to., Paris, 1818,
contain many valuable papers. See the bulletin, Comple-
ment, 'Annales de l'Institut de France, par la classe de
Sciences, Arts, Lettres et Beaux-Arts,' 4 vols. 4to., Paris 1818,
and other similar publications. (Rendu, on the state of science in France, and the 'Dis-
cours,' or orations pronounced at the reception of every new
member.

INSTITUTION. [BENEFICE, p. 219.]

INSTRUMENTS, ASTRONOMICAL, are described
under several heads.

VOL. XII.—3 S
showing by this general reference that such engraving, or working in intaglio, must have been well known at that time. The Greeks carried this branch of the fine arts to the same perfection which their genius and feeling for the beautiful enabled them to reach in all others to which they devoted their attention; but we do not trace its existence among them to a very remote date. It has been supposed that as Homer does not allude to seals they were not used by him; but we have seen that the device of the ring respecting the process by which the ancient intaglatori (sculptores and colossatores—though the latter term seems to apply more properly to metal-chasers—as they are called in the Latin) were engaged in their art is referred to as the best examples of the art. It has been a question with antiquaries whether the latex was known; but though it is not described by any ancient writer, the works themselves seem to afford evidence of its employment. It refers to the invention of an instrument which he calls 'tornum' (Nat. Hist., lib. vii.), which may fairly be supposed to mean a turning machine or tool. It is certain they were acquainted with the use of diamond-powder.

The modern practice of cutting stones in intaglio is by apparatus similar in principle to the turning lathe, which gives the cutting tool, placed horizontally, a quick rotary motion. The instrument used for cutting, which is brought in contact with the surface, is used to supply the points of the tools with diamond-dust mixed with a little sweet oil. As the work proceeds, the tool is occasionally taken in wax.

Engraving dies is an important branch of the art of intaglio, which requires great care and skill for its perfection. The dies are made of finely prepared and tempered steel. When the first intaglio, or original die, is executed, it forms a matrix (or mould), into which a second die is fixed, and the whole is sunk into a block of steel. A second die is then placed downwards and fixed in position, forming a new surface, and the process is repeated. The fourth die is used for engraving, to supply the points of the tools with diamond-dust mixed with a little sweet oil. As the work proceeds, the tool is occasionally taken in wax.

The tool is sometimes called a punctum. When this is completed, and the files and sawing and re-grinding necessary before it is perfected, the engraver retouches the work, now in relief, and gives it all the delicacy of the original model; the steel is then hardened, and by pressing this pancheon into other steel which is soft (by almost a repetition of the before-mentioned process), it serves for the purpose of making the dies for coining. It has to do with the qualities of steel and the easiness to which dies are liable (in the hardening, in the engraving, and in the press of the dies), which is made on the amount. The finished dies are used to make other dies, and so the process is repeated until the number of dies required is reached. A regular number of dies is required to make a thousand; though, he adds, the average amount is much less.

INTEGER, a whole number, as distinguished from a fraction. The term is commonly employed for a unit in any number, as a broken unit or fraction of a unit. But if the student finds any difficulty in separating the word 'whole' for this purpose from its common meaning, he may consider himself to have the word integer. We are led to this remark by finding in a work of celebrity an attempt to connect the word 'whole,' as used in 'whole number,' with its general meaning, as when we say the whole is greater than its part, as in the phrase 'the sum of a series.' Integer may be considered as numbers which refer to unity, as a whole to a part.

INTEGRATION, INTEGRAL CALCULUS. The integral calculus is the inverse of the differential calculus. It is to say, if A being given, a question of the differential calculus to find A; B being given, it is a question of the integral calculus to find A. The question of finding a differential coefficient requires the attainment of the limit of the ratio of two simultaneously changing increments, y being a function of x: and therefore the fundamental question of the integral calculus is as follows: knowing the limit of the ratio of the increment of y to the increment of x, required to find the integral of the given function of x, required that function of which the given function was the differential coefficient.
But though this view of the fundamental question is sufficient in pure mathematics, it is not calculated to connect the process of integration with those conceptions which the mind employs in application to geometry or mechanics. We are here accustomed to a rough species of integral calculus, with which the preceding seems at first to have no connexion; but we need not exceed that of referring to Appendices &c., or of the ratio of p to A0 or B0, &c. But by diminishing δ without limit, all the preceding ratios are increased without limit; that is, the ratio of the first series to the second series is increased without limit. We have then the following equation:

\[ \phi(a + b - \delta a) = \ln(\gamma, \alpha, \alpha, \ldots) \]

Thus we have the solution of the preceding equation.

\[ \phi(a + b - \delta a) = \int_{a}^{b} \phi(a) \, dx \]

It is common to represent the terminal value of \( x \) by \( x \), itself, as follows:

\[ \phi(x) = \int_{a}^{b} \phi(a) \, dx \]

and when the initial value of \( x \) is left indefinite, then a simple constant is written for \( \phi(a) \), and the symbols of the limits are omitted, as follows:

\[ \phi(x) = \int_{a}^{b} \phi(a) \, dx + C \]

Let us now suppose a given function \( f(a) \), upon which we wish to perform the preceding summation, from \( a \) to \( x \); let \( x + \delta a \); namely, making \( n \Delta x = b, \) we desire to find the limit of

\[ \{ f(a + \alpha) + f(a + \beta) + \ldots \} \Delta x \]

on the supposition that \( n \) is increased, or \( \Delta x \) diminished, without limit. This process can be performed immediately, if we can find a function for which has \( f(a) \) for its differential coefficient. Let \( f(a) \) have the diff. co. \( f(a); \) then, by the preceding theorem, the required limit of the summation is

\[ f(a + b) - f(a) \]

For instance, as soon as we know that \( x \) is the differential coefficient of \( \log x \), we know that \( \log(x + \delta x) - \log x \) is the limit of the following series,

\[ \frac{\Delta x}{x} + \frac{\Delta x}{x + \Delta x} + \frac{\Delta x}{x + 2 \Delta x} + \ldots \]

the number of terms being \( n \), and being inceased without limit.

The process in the article AREA will now easily show that \( y \) being the ordinate of a curve to the abscissa \( x \), the area contained between the ordinates whose abscissas are \( a + n \Delta x \), \( b \), the part of the abscissa \( b \), and the curve, is \( f(x) \) taken from \( x = a \) to \( x = a + b \). Thus if the curve be a part of a rectangular hyperbola, whose equation is

\[ xy = c, \]

the area included between the ordinates, whose abscissas are \( 1 \) and \( 1 + h \), is \( \int_{x=1}^{x=1+h} f(x) \, dx \)

the property of the hyperbola from which the logarithms of Napier were called Hyperbolic.
An integral is said to be definite, when its limits are given; and indefinite when they are not given.

INTEGRATION, FINITE. By this term is meant the summation of any number of terms of a series which follows a regular law; and just as integration was reduced in the last article to the determination of a function from its differential, so finite integration or summation may be reduced to the determination of a function from its difference. [Difference.]

Firstly, let there be a function of \( x, \varphi, \) and let \( x \) succeed in \( \Delta x, \Delta x^2, \Delta x^3, \ldots + (n-1) \Delta x, \) so that \( n \) different values are given to \( x. \) It is required to sum the series

\[
\varphi + \varphi \cdot (x + \Delta x) + \varphi \cdot (x + 2 \Delta x) + \ldots + \varphi \cdot (x + (n-1) \Delta x).
\]

Let \( x = \Delta x \), and let \( \varphi \) be called \( \psi \). Then the series becomes

\[
\psi + \psi \cdot (x + 1) + \psi \cdot (x + 2) + \ldots + \psi \cdot (x + n - 1).
\]

This sum is a function of \( n \), and such that if \( n \) be changed into \( n + 1 \), one more term \( \psi \cdot (n + 1) \) will be added: consequently it must be the function which has \( \psi \cdot (n + 1) \) for its difference. If then we denote the preceding sum by \( \Sigma \psi + (n + 1) \) we find

\[
\Delta (\Sigma \psi + n) = \psi + (n + 1) \]

or \( \Delta \) and \( \Sigma \) express operations which are inverse to one another. Remark that the symbol \( \Sigma \) does not denote the sum of a number of terms up to a inclusive, but up to a exclusive: thus

\[
1 + 2 + 3 + \ldots + (n - 1) = \sum_{n}^{\infty}
\]

All that precedes has no reference to the term with which we begin: thus \( 4 + 5 + 6 + \ldots + n \) and \( 1 + 2 + 3 + 4 + 5 + \ldots + n \) are equally given by \( \Sigma (n + 1) \). This symbol is therefore indefinite, but it will be found that the process by which it is to be determined gives an indefinite result.

Suppose, for instance, we have ascertained that \( \frac{1}{n} \) is the function whose difference is \( n + 1 \), which will be found to be the case; or

\[
\frac{1}{(n + 1)^2} + (n + 1) = \frac{1}{n^2} + n + 1.
\]

It is equally true that \( \frac{1}{n^2} + n + 1 \) has \( n + 1 \) for its difference, where \( C \) may be anything whatever, provided that it do not change when \( n \) changes. Hence

\[
\Sigma (n + 1) = \frac{1}{n^2} + n + 1 + C;
\]

but if a being any whole number less than \( x, \Sigma (n + 1) \) may stand for \( a + (a + 1) + \ldots + x \). Consequently \( C \) in the one must be taken in a manner corresponding to \( a \) in the other. If \( n = n \) were equal to \( a \), the series would be reduced to one term \( a \) and \( \frac{1}{n^2} + n + 1 \) would become \( \frac{1}{a^2} + a + C \). Determine \( C \) so that these shall be equal: we have then to make

\[
a = \frac{1}{a^2} + a + C, \quad C = -\frac{1}{a^2} - a.
\]

The inverse method of differences, or that of finite integration, is founded upon the preceding principles and notation, and is so far as the summation of simple series is concerned, the following rules will be sufficient:

1. Let \( a \) be the first term of a series of \( n \) terms, \( a, b, c, \) &c.
2. Form the successive differences of \( a \) [Difference], which will all vanish after a certain point in every instance to which this rule applies. Then the sum of the terms is

\[
n + a - \frac{n - 1}{2} \Delta a + a - \frac{1}{2} \Delta a + \ldots
\]

EXAMPLE: \( 1 + 8 + 27 + 64 + 125 + \ldots + n^3 \)
First diff. \( 7 
\) Second diff. \( 12 
\) Third diff. \( 18 
\) Fourth diff. \( 24 \)
Here \( a = 1, \Delta a = 7, \Delta a^2 = 12, \Delta a^3 = 6, \Delta a^4 = 0, \Delta a^5 = 0, \) &c.

and the sum required is

\[
n + a - \frac{n - 1}{2} \Delta a + a - \frac{1}{2} \Delta a + \ldots
\]

It may be convenient to give the reduction of the preceding formulæ in the cases where all after the second differences vanish, and the same for the third. Let \( a', a'', a''', \) &c., be the differences of \( a; \) when \( a'' = 0, a'' = 0, \) &c., the sum is one-sixth of

\[
a'^{n} + (a' - a'') 3 n^2 + (6 a - 3 a' + 3 a'') n.
\]
distinguished from senses, the objects of this cognition are inadmissibly vague
or void).

INTERCALARY. [Kalender.]

INTERDICT (Interdictum in the Roman law). The general
distinction between the Roman Interdict and Actio seems clearly pointed out by
Savigny in a few remarks on the
parol interdict, as follows:

"... Interdict is to be distinguished from
Actio, in that in the latter case, the matter
of the interdict. The words of Gaius, which form the ground-
work of the following remarks of Savigny, are: "Certis ex
causis Praetor sui Proconsul principaliter auctoritatem
suum in modello proconsulari interdicto "Unde...", and
thereafter reads, and has remarks reference to the
supposed difficulty of the word principaliter, and to a certain
proposed emendation supported by very indifferent reasons.
The
ration of the Roman
interdict is this: in the actio the pretor does nothing, but
only issues a
judex, whose duty it is to inquire and decide.
When the judex decides, the matter may in general be
considered as at an end, and if the pretor is again called upon
to act in the cause, such must be viewed as an accidental
thing. This appears from the terms of the pretor's order in
matters which belong to the actio: he does not command or
forbid a thing to be done, but he says 'judicium dabo.'
With the interdict, it is just the reverse: the words
judices or recuperatores may be required when the facts are
in dispute; but as a general rule in matters to which the
interdict applies, the case is such that the pretor's order can
in itself effect the object pretended to: accordingly he
ordinarily does not say 'judicium dabo,' but he uses the ordering
words 'restitui, exhiben,' vim fieri veto,' &c.; and this
could not be better expressed, as Savigny remarks, than by the
words 'auctoritatem proconsulari.' The cases we have given
above, the cases of Haudobold observed, can hardly be anything else than this: the
pretor or the procuras at one time gives a definitive judgment,
by which the dispute, at least for the present, is terminated.'

According to Gaius, the general description of the inter-
dictum is this: it ordered something to be done, or forbad
something to be done. The forms of the orders used on
such occasions were called by the general name of inter-
dict, of which there were original forms in writing,
or a restoration (restituetur), the interdicts were
called Decreta. The term Interdictum was used when the
order forbade a certain thing to be done—as to disturb a
man who was in possession, ' sine erro; to prevent any
trespass on sacred ground, &c.

The general process seems to have been by a kind of
hill or petition addressed to the pretor, in which the plain-
tiff stated his grievance and prayed for redress, that is, for
the power of the pretor. Gregory the Great, as is
probable by way of reply to that of the plaintiff. If the case
was clear on the part of the plaintiff, he obtained the
interdict.

Or if the defendant admitted the plaintiff's state-
manship, the question of the interdict out of the spiritus
submitted to its terms, the matter was at an end. If the
defendant denied the plaintiff's case, that is, denied that
there was any ground for the interdict, or maintained that
he had satisfied them in forfait. If no, and if the court, in
accordance with the terms of the interdict, the pretor made
his application to the pretor to refer the matter to judeces or
recuperatores, or to an arbiter. The parties complainant
and defendant went before the judex or arbiter whom the
pretor named, and the process then became the usual process
of the suit. The parties produced their witnesses and proofs,
and the judex or arbiter decided upon them. The terms of
the interdict, in case it was prohibitory, were the formal
words of the edict which determined in what cases such
relief could be given (certis ex causis), only so far varied as
to apply to the parties who were in dispute. In the restric-
tion cases, it continued the same, the conditions necessarily
varying according to circumstances. If the matter
came before a judex, the only question as to the prob-
hibitory interdict which he had to settle was, whether the
defendant had, by his acts, given good ground for his
against him; if not, it must be dissolved. In the case of
the restituto or exhibitory interdict coming before the
arbiter, the matters for inquiry would be—whether the
defendant had, by his acts, given good ground for the
interdict; whether he had satisfied the terms of the inter-
dict; what damages the defendant should pay to the plain-
tiff; in case he had not satisfied the terms of the interdict, or
had paid damnum, with the duration of the damage (detractio
of money by the parties abiding by the result of the inquiry)
had been entered into, and consequently the matter had

come before an arbiter, all these three points had to be

determined, and the arbiter had the discretion of the
arbiter; in case there was a sponso (where in the probi-
hibitory interdict was necessary, but in the other interdicts
not necessarily), the judices or recuperatores had to
determine only the first two points. (Cicero, Pro Ceci-
niae, 5.) In fact, in the case of the arbiter the interdict process did not differ from that of the
ordinary actio, as appears from Cicero's oration Pro Ceci-
niae, in which the plaintiff Cecina had obtained the pretor's
order to the effect of
interdict, and had
habile (or, as the
the person and
the matter had been referred to recuperatores. The defence
of Abhutius before the recuperatores was, that he
had obeyed the interdict and had restored the plaintiff to
the same place as before; if the defendant had not in fact done this; but it appears to have
been sometimes the formal way of raising the question,
whether the act complains of had been committed. If it
was not committed, the defendant had in substance obeyed
the interdict, that is, had not acted contrary to it.

The authorities for what is above stated are: Haubold,
Ueber die Stelle von den Interdient in den Verwaltungen,
and Savigny, Nachtrage zu den Schriftsetzen, in the Zeitschrift fur geschichtl.
nach. 3rd hand. For the application of the interdict to the
the case of possession, Savigny, Das Recht des Besitzes, 4th
Abhandlung, should be consulted, and his remarks on the
questions of Cecina's case (for a story of this kind, viz.,
the recovery of church rights is the same) with
Hincmar, bishop of Lyon in France, laid a pariah of his
diocese under an interdict in the year 870. (Moreni's Dic-
tionary, art. ' Interdict.' In the middle ages this measure
was often resorted to, at the demand of some
serious dispute with the sovereigns of particular countries,
and it had the effect of throwing whole kingdoms into con-
sequence, and even into a state of rebellion, by which the
refractory sovereigns were obliged to sue for pardon from the
emperor, as is the case with the
interdict. Adrian IV. laid Rome itself under an inter-
dict for the purpose of driving away Armando da Brescia
and his followers. Some popes mitigated the rigour of the
power by a kind of spiritus, an order to the
who could not be justly punished for the guilt of their
rulers. Gregory IX., during the interdict against Frederic II.,
allowed mass to be said on Sunday. On some occasion
he dissolved the interdict, he called it a
and the
infants were allowed to be administered. (See Lyndwood.)

The frequent abuse of the interdict has been censured
even by Catholic writers. In course of time the measure
was found no longer to answer its object, and it became
rare occurrence. Paul V., in April, 1606, laid the republic
of Venice under an interdict, because the senate had
decided that no more convets should be founded, and
no more property should be hequestrated to monastic orders
without permission from the government. The senate
forbade the
of the interdict to be published in the
teritories of the republic, and ordered the parochial clergy
not to assist or legitimize their services.

The Jesuits, Francisans, and other monks pleaded their
duty of obedience to the pope, and the senate told
them that they might depart, which they did. At last, in 1607,
through the intervention of Henry IV. of France, the
interdict was removed. The pope removed the interdict, which had produced little or
no effect on the minds of the Venetian people.

INTEREST, money which is paid for the use of other
money, the lender stipulating for a fixed sum to be paid
yearly, half-yearly, or quarterly, out of the principal, and
when the money is returned. When this is not the case, and
when the money paid for the loan depends upon the
success of an undertaking, or any casually not connected
interest, such as the interest of the exchange at home and
abroad, is mean to be included. When the
money and its interest are to be returned by yearly instal-
ments, and paid off in a certain fixed number of years, it is
called an annuity certain: but when the payment is to depend upon the life of any person or persons, it is called a life annuity. [Ann. xv.] But by whatever name the proceeds of money may be called, the rules of calculation are the same in every case but that of life-contingency.

A simple rule for converting shillings, pence, and farthings into the decimal of a pound, and for the converse case, is contained in the article Annexures, might be made of such frequent use in calculations connected with interest, that we begin with it. The rule is founded upon the circumstance of one farthing being very little more than the hundredth part of a pound.

To convert any number of shillings, pence, and farthings to the decimal of £1, as far as three places.

Rule.—Allow 100 for every two shillings, and 50 for the odd shilling, 2½ for the penny, and a unit for every farthing, and add if the sum of pence and farthings be sixpence or upwards. Then make three decimal places of the result.

Thus 1s. 7d. give 50 and 31 and 1, or 82, which, converted into a decimal of three places, is 0.825, or 1s. 7d. is 0.825, nearly very nearly.

To convert any decimal of a pound into shillings, pence, and farthings, take away the decimal point, and make a whole number of the three places; for every hundred of this whole number allow two shillings, and another shilling to the remaining 50, if so much remains, and, at last, an amount of the remaining shilling, or farthing, or pence, and add if the sum of pence and farthings be sixpence or upwards. Thus 973s. gives 18s. and 10d. and 23 farthings, or 19s. 10d.; but 147s. gives 22s. 4d. and 46 farthings, or 23s. 11d. The following are examples of both rules:

<table>
<thead>
<tr>
<th>Shillings</th>
<th>Pence</th>
<th>Farthings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6d.</td>
<td>3rd</td>
<td></td>
<td>0.09</td>
</tr>
<tr>
<td>3s. 2d.</td>
<td>1s. 6d.</td>
<td></td>
<td>0.29</td>
</tr>
<tr>
<td>4s. 3d.</td>
<td>1s. 6d.</td>
<td>2s. 3d.</td>
<td>0.76</td>
</tr>
</tbody>
</table>

The preceding rule is sufficiently accurate for common purposes: but by allowing 1 0'4 instead of 1 for every farthing, and neglecting the contingent addition, the result may be made nearly true to five places. And by allowing 10,000 for every 2 shillings, 5000 for 1 shilling, 2500 for sixpence, and 104 for every farthing, any number of shillings, pence, and farthings is accurately multiplied by a hundred thousand. Thus to multiply 15s. 9d. by 100,000—

1d. gives 7000
1e. " 500
6d. " 2500
5s. 3d. " 1250
4s. 3d. " 3125
15s. 9d. " £79062.5

from which we immediately find that 15s. 9d. is exactly £79062.5.

Interest is usually reckoned by the sum paid yearly for each 100l.; thus 4 per centum, abbreviated into 4 per cent., means that 4 pounds is paid yearly for 100l., or that one-twenty-five of the whole sum is paid yearly for its use. In some cases, as in the dividend of a bankrupt's estate, a part is compared with the whole by stating how much of each pound is paid. The preceding rule gives the means of reducing one to the other instantaneously; thus since 4e. 9d. is 28d., a bankrupt who pays the former sum per pound, or 237½ for 1l., pays 28d. for each 100l., or 2½ per cent. Similarly 37½ per cent., or 37½ for 100l., is 37.2l. for 1l., or 5½ per cent. in the pound.

Interest is calculated when it is paid as soon as due, or when, if deferred, interest is not charged upon interest. But when the latter charge is made, the interest is called compound. In simple interest it makes no difference whether the payments be yearly or at shorter terms; but this is not the case in compound interest; the sum lent is called the principal; and the principal, together with the interest, the amount: also the principal is called the present cash of the amount.

A common objection of simple interest requires merely the process of taking a given fractional part of a sum of money, and need not be explained at length in a work of reference. One example however will serve to show the facility with which the preceding rule is applied.

What is the interest upon 697l. 13s. 4d. at 4 per cent. for 7 years?

To find this we must take the hundredth part of the sum 4d. for one year's interest, which we must then repeat 72 times.

£597 13s. 4d. is £597.868

Answer £697 8s. 9d. or £101 1s. 5d.

When interest is to be taken for a number of days, a person who is often required to perform the operation will provide himself with a set of tables, several of which are published. Those who do not often meet with the operation must take such a fraction of a year's interest as the number of days in the question is of a year. The following rule will facilitate the introduction of the arithmetical rule of practice. Rule.—Whenever the portion of an amount per annum is to be taken corresponding to a number of days, calculate as if the year had only 360 days, and from the result subtract its 72nd part, or one farthing in eighteenscore, or 3f. on each guinea. This falls short of the truth by about one penny in 26l. Thus suppose the yearly interest is 2£81 16s. 4d. and that for 54 days one is required.

288 8s. 6d.
180 10s. 6d. 141 9s. 3d.
60 11s. 10d. 47 3s. 1d.
12 13s. 6d. 9 4s. 6d.
5 15s. 10d. 1 17s.
5 15s. 10d. 1 17s.
27 12s. 2d. 20 9s. 3d.
9 11d. 6s. 3d.
2 2s. 6d. 1 1s. 9d.
197 5s. 1d.

Answer, 197 10s.; or, adding id. for each 26l., about 197 16s. 10d., which is within one halfpenny of the truth.

It is sometimes necessary to express the interest by the day, in which the following rule will be convenient.

To turn a given amount per day into the corresponding amount per year, to the number of pence per day add its half, and take as many pounds as there are now pence: this is the amount in 360 days, and five days' allowance added gives the result.

To find out how much a sum per annum yields per day, subtract one-third from the pounds, and take as many pence as there are in the result. The answer is the preceding result diminished by one farthing in eighteenscore, or its 72nd part.

Thus 3d. per day, or 7½ pence, gives 37½ + 18s. 7½, or 40½ per 360 days, which is 1£2. 6d. To this add five times 3½d. or 1£2. 6d., which gives 1£4. 6d. per annum.

Again 5£1. 14s. 7d. per annum, (or nearly enough) 26½l. gives 26½ - 8½ pence per day nearly; that is, 17½d. Diminish this by one farthing, and 17½d. is the answer within a farthing.

All persons who attempt for the first time to use decimal fractions in money computations imagine that they gain nothing, but a little practice soon convinces them of the contrary.

We now proceed to the subject of compound interest, which cannot be satisfactorily treated without algebra.

Let r be the interest of 1l. for one year, or 100 the rate per cent. as follows:

At 3 per cent. r = .03
At 4 per cent. r = .04
At 10 per cent. r = .10
At 15 per cent. r = .15
At 16 per cent. r = .16
At 10 per cent. r = .10
At 15 per cent. r = .15
At 16 per cent. r = .16
At 3 per cent. r = .03
At 4 per cent. r = .04
At 10 per cent. r = .10
At 15 per cent. r = .15
At 16 per cent. r = .16
At 3 per cent. r = .03
At 4 per cent. r = .04
At 10 per cent. r = .10
At 15 per cent. r = .15
At 16 per cent. r = .16

It is not usual in treating of compound interest to separate that part of the amount which is interest from the whole. We shall therefore speak only of principal and amount, or, when the latter is the given sum, of present value and deferred principal. Hence p = r is the amount of one pound in one year, or 1 + r is that of two pounds in one year, and, generally, a sum which is a pounds at the beginning of any year becomes (1 + r) pounds at the end. Consequently the amounts of £1, at the end of one, two, three, &c., years are 1 + r, (1 + r)², (1 + r)³, &c., pounds; and £1 at the end of n years becomes (1 + r)ⁿ pounds. I then £1 becomes £1.5 in 5 years, at r per pound, we have
A = a (1 + r)^n
r = \sqrt[n]{\frac{A}{a} - 1} = \frac{\log A - \log a}{\log (1 + r)}

from one of which forms of the equation, either of the four, $a$, $r$, $n$, or $A$, can be found, when the other three are known.

From the second form it appears that the fraction of $\frac{1}{r}$, which will in a year amount to a pound, is $1 + r$.

Let this be called $v$; we have then

$$v = \frac{1}{1 + r}$$

Hence it is easily seen, that according as a pound is to be the amount at the end of one, two, three, etc., years, the principal now necessary to produce that amount is $v$, $v^2$, $v^3$, or $v^n$ expresses the present value of $\frac{1}{r}$ to be received at the end of n years. Here are no less than fifteen words necessary to express a fundamental result; and when we speak of $(1 + r)$ it must be as the amount of £1 in n years. To shorten these phrases, the former might be advantageously called the nth present value, and the latter the nth amount.

The sum which yields £1 every year is called the value of a perpetuity, or simply the perpetuity of £1.  If it be £P, we have

$$Pr = 1, \quad P = \frac{1}{1 - r}$$

The reader will find an arithmetical account of ANNUITIES under that word; we now proceed to the algebrical formu-

La an annuity, and also a perpetuity, is always said to be created a year before any payment is made: thus an immediate grant of an annuity payable yearly implies that the first payment is made a year hence; and similarly of a perpetuity. But in cases where we have to speak of an annuity or perpetuity, of which one payment is to be made now, we propose to call them an annuity due, and a perpetuity due. Again, an annuity or perpetuity deferred for, say 10 years, makes its first payment in 11 years; but a perpetuity due in 10 years, makes the first payment at the end of 10 years. An

Annuity of 20 years makes 20 payments; an annuity due of 20 years makes 21 payments.

Let all annuities mentioned be of £1, unless otherwise specified.

The present value of an annuity for n years is evidently

$$v + v^2 + v^3 + \ldots + v^n = \frac{1}{1 - v}$$

for $v$ in one year becomes $\frac{1}{r}$, and provides for the first payment; $v^2$ for the second, and so on. The preceding is equivalent to

$$v = \frac{1 - v^n}{1 - v}$$

Similarly the present value of an annuity due for n years is £1 more than the preceding, or

$$v = \frac{1}{1 - v^n}$$

An annuity of n years deferred for k years is now worth

$$v + v^2 + v^3 + \ldots + v^n$$

or $v = \frac{1 + v^n}{v}$ for $v$ in one year becomes $\frac{1}{r}$, and provides for the first payment; $v^2$ for the second, and so on. The preceding is equivalent to

$$v = \frac{1}{1 - v^n}$$

A perpetuity deferred for k years is worth $v^k$ or $v^k p$;

but a perpetuity due in k years is the same a perpetuity deferred for k-1 years, and $k - 1$ must be written for k in the preceding gives $v^k$.

If the proceeds of an annuity for n years be put out to interest as fast as they become due, then at the instant after the last payment is made the first payment will have improved for $v^n$, the second for $v^{n-1}$, the third for $v^{n-2}$, etc., and the last payment will have improved nothing: whence the whole amount of the annuity at the moment of expiration is

$$\frac{(1 + r)^n - 1}{r}$$

which is $\frac{1}{1 - \frac{1}{(1 + r)^n}}$ or $\frac{1}{r}$

The annuity of n years, which £1 will buy, makes at each payment $\frac{1}{r}$ less, and so on: that is, the following are methods of restoring £1 now lent:

1. By annuity for n years

$\frac{1}{(1 + r)^n}$

2. By annuity for n years, deferred k years

$\frac{1}{r}$
I N T

By taking the first nine multiples of any one of these logarithms, a table of seven places might be formed, which should be correct in every figure. The following, for instance, is the table for per cent. per quarter, or 4 per cent. per annum, payable quarterly:—

1 0'043214 10 0'0432137 100 0'4321374
2 0'0664427 20 0'0664275 200 0'6642748
3 0'0967240 30 0'0967240 300 0'9672404
4 0'1279552 40 0'1279550 400 1'2795504
5 0'1624099 50 0'1624098 500 1'6240979
6 0'2002982 60 0'2002982 600 2'0029834
7 0'2405744 70 0'2405746 700 2'4057491
8 0'2835262 80 0'2835262 800 2'8352607
9 0'3292100 90 0'3292100 900 3'2921009
0 0'3782648 100 0'3782648 1000 3'7826480

For instance, suppose it required to find out in how many years money will increase tenfold at 4 per cent. payable quarterly: or to solve the equation (1 + i) = 10.

Log. 10 = 1'0000000

— 0'645768

Thus 10 = 1'0000000

Table I. The Present Value of £1, due at the end of any number of Years.

<table>
<thead>
<tr>
<th>Years</th>
<th>2d. Pr. Cl.</th>
<th>2d. Pr. Cts.</th>
<th>3d. Pr.</th>
<th>4d. Pr.</th>
<th>£1.</th>
<th>£1.</th>
<th>6d. Pr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>97561</td>
<td>97561</td>
<td>96184</td>
<td>95054</td>
<td>95286</td>
<td>94900</td>
<td>94450</td>
</tr>
<tr>
<td>2</td>
<td>94209</td>
<td>94209</td>
<td>92357</td>
<td>92030</td>
<td>92265</td>
<td>91850</td>
<td>91425</td>
</tr>
<tr>
<td>3</td>
<td>90630</td>
<td>90630</td>
<td>88714</td>
<td>88368</td>
<td>88620</td>
<td>88175</td>
<td>87750</td>
</tr>
<tr>
<td>4</td>
<td>86859</td>
<td>86859</td>
<td>84887</td>
<td>84530</td>
<td>84790</td>
<td>84345</td>
<td>83930</td>
</tr>
<tr>
<td>5</td>
<td>82850</td>
<td>82850</td>
<td>80784</td>
<td>80430</td>
<td>80690</td>
<td>80245</td>
<td>79850</td>
</tr>
<tr>
<td>6</td>
<td>78582</td>
<td>78582</td>
<td>76347</td>
<td>75990</td>
<td>76260</td>
<td>75815</td>
<td>75430</td>
</tr>
<tr>
<td>7</td>
<td>73973</td>
<td>73973</td>
<td>71445</td>
<td>71090</td>
<td>71400</td>
<td>70955</td>
<td>70530</td>
</tr>
<tr>
<td>8</td>
<td>69038</td>
<td>69038</td>
<td>66339</td>
<td>65990</td>
<td>66339</td>
<td>65990</td>
<td>65590</td>
</tr>
<tr>
<td>9</td>
<td>64697</td>
<td>64697</td>
<td>61739</td>
<td>61400</td>
<td>61739</td>
<td>61400</td>
<td>61000</td>
</tr>
<tr>
<td>10</td>
<td>60042</td>
<td>60042</td>
<td>56129</td>
<td>55800</td>
<td>56129</td>
<td>55800</td>
<td>55400</td>
</tr>
</tbody>
</table>

The Present Value of £1, to be received at the end of the several years marked. Thus, in the column of 4 per cent. opposite to 15 years, we find 0'55296, which is the sum that will in fifteen years, at 4 per cent. amount to £1. The present value of 100l., similarly circumstances, is 55'262, or 55l. 10s. 6d.

Table II. The present value of an annuity of £1. Thus opposite to 20 years in the column of 5 per cent. is 12'46521, meaning that £1, to be paid at the end of every year from this time for 20 years, is now worth 12'46521l., if money will make 5 per cent.

Table III. shows the annuity which £1 will buy for any number of years. Thus in the column of 4 per cent., opposite to 7 years, we find 16661. If then 100l., now lent, were to be repaid by instalments in seven years, the first instalment a year hence, so as to allow compound interest at 4 per cent., then each instalment should be 16'641.

Table IV. gives the amount of £1 returned at compound interest during a number of years. Thus opposite to 11 years in the column of 3 per cent. is found 1'36423, meaning that £1 in 11 years, at 3 per cent., amounts to 1'36423l., and 100l. to 13'82521.

Table V. gives the amount of an annuity of £1, as it will be the moment after the last payment has been made, if the preceding payments have been allowed to accumulate. Thus in the column of 4 per cent., under 27 years, we find 43'75906, so that the proceeds of an annuity of 100l. for 27 years, allowed to accumulate at 4 per cent., will at the last payment have realized 43'75906.

Table I. The Present Value of £1 per annum for any number of Years.

<table>
<thead>
<tr>
<th>Years</th>
<th>2d. Pr. Cl.</th>
<th>2d. Pr. Cts.</th>
<th>3d. Pr.</th>
<th>4d. Pr.</th>
<th>£1.</th>
<th>£1.</th>
<th>6d. Pr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>97561</td>
<td>97561</td>
<td>96184</td>
<td>95054</td>
<td>95286</td>
<td>94900</td>
<td>94450</td>
</tr>
<tr>
<td>2</td>
<td>94209</td>
<td>94209</td>
<td>92357</td>
<td>92030</td>
<td>92265</td>
<td>91850</td>
<td>91425</td>
</tr>
<tr>
<td>3</td>
<td>90630</td>
<td>90630</td>
<td>88714</td>
<td>88368</td>
<td>88620</td>
<td>88175</td>
<td>87750</td>
</tr>
</tbody>
</table>

Table II. The Present Value of £1 per annum for any number of Years.

<table>
<thead>
<tr>
<th>Years</th>
<th>2d. Pr. Cl.</th>
<th>2d. Pr. Cts.</th>
<th>3d. Pr.</th>
<th>4d. Pr.</th>
<th>£1.</th>
<th>£1.</th>
<th>6d. Pr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>97561</td>
<td>97561</td>
<td>96184</td>
<td>95054</td>
<td>95286</td>
<td>94900</td>
<td>94450</td>
</tr>
<tr>
<td>2</td>
<td>94209</td>
<td>94209</td>
<td>92357</td>
<td>92030</td>
<td>92265</td>
<td>91850</td>
<td>91425</td>
</tr>
<tr>
<td>3</td>
<td>90630</td>
<td>90630</td>
<td>88714</td>
<td>88368</td>
<td>88620</td>
<td>88175</td>
<td>87750</td>
</tr>
</tbody>
</table>

Answer.—The amount of £1, in 232 quarters, or 58 years, will be little more than 10l.
### Table III

The Annuity which £1 will purchase for any number of Years.

<table>
<thead>
<tr>
<th>Years</th>
<th>2 per Ct.</th>
<th>3 per Ct.</th>
<th>4 per Ct.</th>
<th>5 per Ct.</th>
<th>6 per Ct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
</tr>
<tr>
<td>2</td>
<td>0.90796</td>
<td>0.90796</td>
<td>0.90796</td>
<td>0.90796</td>
<td>0.90796</td>
</tr>
<tr>
<td>3</td>
<td>0.81246</td>
<td>0.81246</td>
<td>0.81246</td>
<td>0.81246</td>
<td>0.81246</td>
</tr>
<tr>
<td>4</td>
<td>0.71887</td>
<td>0.71887</td>
<td>0.71887</td>
<td>0.71887</td>
<td>0.71887</td>
</tr>
<tr>
<td>5</td>
<td>0.62740</td>
<td>0.62740</td>
<td>0.62740</td>
<td>0.62740</td>
<td>0.62740</td>
</tr>
</tbody>
</table>

### Table IV

The Amount of £1 in any number of Years.

<table>
<thead>
<tr>
<th>Years</th>
<th>1 per Ct.</th>
<th>2 per Ct.</th>
<th>3 per Ct.</th>
<th>4 per Ct.</th>
<th>5 per Ct.</th>
<th>6 per Ct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
</tr>
<tr>
<td>2</td>
<td>0.90456</td>
<td>0.90456</td>
<td>0.90456</td>
<td>0.90456</td>
<td>0.90456</td>
<td>0.90456</td>
</tr>
<tr>
<td>3</td>
<td>0.81068</td>
<td>0.81068</td>
<td>0.81068</td>
<td>0.81068</td>
<td>0.81068</td>
<td>0.81068</td>
</tr>
<tr>
<td>4</td>
<td>0.71759</td>
<td>0.71759</td>
<td>0.71759</td>
<td>0.71759</td>
<td>0.71759</td>
<td>0.71759</td>
</tr>
<tr>
<td>5</td>
<td>0.62556</td>
<td>0.62556</td>
<td>0.62556</td>
<td>0.62556</td>
<td>0.62556</td>
<td>0.62556</td>
</tr>
</tbody>
</table>

### Table V

The Amount of £1 per annum in any number of Years.

<table>
<thead>
<tr>
<th>Years</th>
<th>2 per Cent.</th>
<th>3 per Cent.</th>
<th>4 per Cent.</th>
<th>5 per Cent.</th>
<th>6 per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
<td>1.00000</td>
</tr>
<tr>
<td>2</td>
<td>2.00000</td>
<td>2.00000</td>
<td>2.00000</td>
<td>2.00000</td>
<td>2.00000</td>
</tr>
<tr>
<td>3</td>
<td>3.00000</td>
<td>3.00000</td>
<td>3.00000</td>
<td>3.00000</td>
<td>3.00000</td>
</tr>
<tr>
<td>4</td>
<td>4.00000</td>
<td>4.00000</td>
<td>4.00000</td>
<td>4.00000</td>
<td>4.00000</td>
</tr>
</tbody>
</table>

---

**P.C., No. 787**

**Vol. XII—3 T**

*Digitized by Google*
The amount of money which persons are willing to pay for the temporary use of money depends upon a variety of circumstances. When profits are high the rate of interest will also be high. When, on the contrary, money is abundant, in proportion to the calls for its employment, the competition of those persons who possess money, and who derive an income from it, will cause them to underbid each other in the money-market. They will lend money at a low rate of interest to traders, who again will meet each other in competition in their various occupations, and must be content with such a rate of profit as will repay the low rate of interest for which they have borne the risk of loss and as a compensation for their risk, skill, and trouble in its management as the degree of competition at the time will allow. If some new channel for the employment of money should be opened holding out the promise of larger profits, a new demand will ensue which will enable the effect of which will be to raise the rate of interest until it assumes its due proportion to the rate of profits; and as there never can, generally speaking, be two rates of profits at the same time (at least for any long period), in the same market, the effect of the additional call for capital to supply the partial demand that has been supposed, will be to raise profits and interest generally. An increase of money capital, either absolutely, or relatively to the means for its employment, will obviously have the contrary effect of lowering its value in use, that is, reducing the rate of interest and profits.

It would be difficult to imagine any circumstances bearing upon this subject which must introduce themselves into the conditions here proposed, and it is therefore difficult to see wherein consists the wisdom on the part of governments of limiting the rate of interest; and yet the fact is, the law has usually been the rule, and the absence of restriction as to the rate of the interest the exception. The circumstance of the laws which regulate and limit the rate of interest in this country having been made by those who were among the class of borrowers rather than that of lenders, may perhaps afford some explanation of the views of the legislature in putting restrictions on the trade in money. That these restrictions however were, and so far as they exist still are, unfavourable both to lenders and borrowers; and more unfavourable to the borrowers than to the lenders, may easily be demonstrated. In the year 1787 Mr. Bentham wrote his 'Defence of Usury,' and showed, in a manner which one would have thought adapted to produce general conviction of the mischief of the laws of restraint, as far as the law was operative, and the inefficiency of the law to prevent altogether what are denominated usurious transactions. But the minds of those who in this country have the functions of publick justice are in close disfavor to considering a prejudice or a false judgment to the attacks of true principles, and for many years the efforts of Mr. Bentham and others remained fruitless. The system of restriction has however much of late been removed, and in some important particulars, so that within certain limits, as regards time, the rate of interest among the mercantile classes may now be said to depend upon what may be considered the market value of money, which is determined to be borne due proportion to the current and usual rate of profits. A statute passed in 1845 limited the rate of interest to 10 per cent. per annum; in 1824 the rate was lowered to 8 per cent., in 1850 to 6 per cent., and by the statute 12 An. c. 16 (1713), it was further reduced to 5 per cent., beyond which it is not probable that an exception above referred to, it has been illegal to charge since that time, under the penalty of forfeiting for every offence three times the amount of the money lent.

During the late war, when the rate of profit was high and when the government was an habitual borrower of enormous sums, the system of restriction was not adhered to in the negotiation of its loans, the interest upon which was necessarily regulated by the market value of money; and at times necesous borrowers and those who have a doubtful or insufficient security to offer to lenders have always found means to evade the statute by granting annuities [Amer. note] and annuities on annuities; or two or three momentary occasions of commercial difficulty or panic the market rate of interest in this country has not been higher, since the peace in 1815, than the legal rate.

The law does not recognise the charge of interest upon interest, or, as it is called, compound interest, and yet it is only equitable that where money which is due for interest is not settled, it should be considered a fresh loan, for the use of which interest should be paid. This however is a rule so easily evaded by the borrower granting a further acknowledgment of the interest as though it were principal, that it does not amount to a practical hardship; such new contract, in fact, changes the interest already due to a new contract, and as such is recognised in mercantile and banking accounts, in which interest is charged upon a former ascertained balance. Such balances may, and in fact often does, include interest already due; and thus the person really receives interest upon interest, or compound interest.

Debits do not as an invariable rule carry even simple interest from the time when the money becomes due to the creditor; in such case payment of interest is rather the exception than the rule. Unless the debt be such a debt as carries interest by the custom of merchants or traders, or unless there is an express agreement to such effect between the parties, or unless such agreement can be inferred from the custom of dealing, or unless there are some very special circumstances, debts do not necessarily carry interest from the time when due. But now, by 3 and 4 Will. IV, c. 42, a jury may, if they think fit, upon all debts or sums certain, whether due in cash or in goods or provisions, the current rate of interest, from the time when such debts or sums were payable, if payable by virtue of a written instrument at a certain time; or if payable otherwise, then from the time so easily evaded by the borrower, and not exceeding the current rate of interest, from the time when such debts or sums were payable, if payable by virtue of a written instrument at a certain time; or if payable otherwise, then from the time as such demand give notice that interest will be claimed from the date of such demand. This statute also empowers juries to give damages, in the nature of interest, in respect of the demand, in actions for the recovery of debts and rents due, and in 2 Vict. c. 118, all judgment-debts are to carry interest at the rate of 4 per cent. per annum; unless the testator has made special provisions in his will as to the time of payment.
and the rate of interest. As to interest money lent on ships or their cargo see Bottomry.

The rate mentioned as having been made as to the rate of interest formed part of the arrangement made in 1833, at the last renewal of the charter of the Bank of England. It consisted in excerpting from the operation of the statutes of 1543 and 1616, the provision which made the customary rate of 5 per cent. a fixed rate. This provision was extended to all such mercantile instruments not having more than twelve months to run before they are due.

INTERJECTIONS have been defined to be 'words used to express something or even with a kind of mind,' as except; with grief, astonishment, &c. Interjections however can hardly be considered as a distinct part of speech, but are more properly natural sounds common to all men when laughing, in pain, &c. Many words, such as non, against, the noxious effects, and adieu, seem, in English, which have been considered as interjections by grammarians, ought to be regarded as verbs, substantives, adjectives, or adverbs.

II. The term of a deposition of money in the body of the earth. All nations have felt the necessity of disposing, in some manner, of their dead, both to avoid the disagreeable sensation which the sight of a dead body occasions, to prevent it from being devoured by wild beasts, and to guard against the noxious effects which arise from the putrefaction of dead animal matter when exposed to the atmosphere. Among some of the nations of antiquity we find that a superstitious veneration for the dead, the necessity of the sites in order to secure the fancy, the necessity of the deceased, and the crime attached to the violation of the tomb, formed a part both of their civil and religious code. The manner of disposing of the bodies of the dead body in which these sentiments were embodied, and the manner in which the death of the body was interred in the earth and burning on a funeral pile. The practice of burying is probably the oldest as it is the simplest mode, and with most nations has always been the ordinary mode of destruction. It is the custom of burying the body, and afterwards collecting the ashes and depositing them in a tomb or urn, became very general, and was the common practice of the Greeks and Romans, so far as we know their history. The Egyptians do not seem to have ever adopted the practice of burning the dead; and though, as we have observed, burning was common among the ancient Greeks and Romans, it seems likely that interment was always practised by the lower orders. At Rome bodies were sometimes burned in pits (puticuli), or thrown to decay in certain unfrequented places. (Varro, De Ling. Lat. 4.) The practice of burning seems to have gradually centred in Rome under the empire. (Pliny, H. N. 36.) The Egyptians are supposed to have adopted the custom of building and preserving of Poppea as a deviation from the general practice. For other particulars the reader is referred to the Townley Gallery, 'Library of Entertaining Knowledge,' and the article COLOMBOriter in this work. Everyone is prone to respect the dead, and the memory of their dead in the earth, and the ceremony of burning is extinct in Europe. It was proposed indeed to revive it during the French revolution, but the idea was never adopted. In the early ages of the world, the dead were probably only deposed in holes in the ground, which were filled up with earth; but this would scarcely be found a sufficient protection against wild beasts, and heaps of stones or mounds of earth were accordingly added. Respect for the memory of the dead, the fear of their being forgotten or confounded with the vulgar, have given rise in all ages to the erection of sepulchres, tombs, and monuments of all kinds, to perpetuate the remembrance of those whom the survivors loved or honoured.

The places set apart for the burial of the dead are generally called cemeteries, which is a Greek term signifying a place of rest. It was applied to the sites of interment by the early Christians. It is a matter of great importance to determine what are the best situations for cemeteries. Among the Greeks we find that they were usually situated without cities, and that the Romans the tombs were generally placed by the sides of the public roads.

The early Christians followed the custom of the Romans, but they afterwards transferred their burial-places to the vicinity of the city, within towns, where they have continued to be generally situated. Up to a given time, the churchyard being the usual place of interment, though, when the church is surrounded by houses, it is by no means a fit situation; for the putrid exhalations of the decomposition of bodies are highly injurious to health, and capable of giving rise to, or at least of encouraging, the progress of various pestilential diseases, of which the most common in this country are low remittent fever and phthisis. The arrangement of cemeteries becomes an important consideration, in connexion with public hygiene, or medical police. The advantage, in point of salubrity, of having burial-places removed from the town is manifest; for it is to be seen, and it is to be hoped that in a few years the practice of burying the dead in the midst of crowded cities, and in churches will entirely cease. Cemeteries should be removed, and placed on higher ground, where the winds, it is to be hoped, will blow away the putrid exhalations; low wet places should be avoided, and care should be taken that bodies are not exposed to the wind and rain, or to the dust of the streets.

The subject of interment possesses considerable interest in a medico-legal point of view, for it is often of great importance in criminal cases. According to a respected authority, the decomposition of a body is the result of its remaining in an interred state, in a position similar to that of the corpse, and its decomposition is the result of decomposition, and the remains of injuries inflicted during the decomposition.

The chemical constitution of the soil seems to have little influence either in hastening or retarding decomposition; the two most active agents in accelerating this process are air and moisture. According to Oebel, in the depth from the surface at which a body is interred, the longer it resists putrefaction, and it will remain uncharged for a considerable period if enclosed in a leaden coffin so as to exclude air and moisture. The remains of the body, and the depth, in a great extent, on its power of absorbing and retaining moisture; thus in sandy soils through which the water drains quickly, decomposition goes on slowly, and is sometimes altogether prevented, as in cases where the body have perished in deserts, and have been overwhelmed by the drifting sands, in which their bodies have been found long after, dry and shrivelled, but without any sign of having undergone putrefaction. In clayey soils, which retain water, putrefaction readily takes place, and quickly proceeds to the destruction of all the soft parts, unless transformation into adipocere is effected, which stops decomposition. (Anatomy.) Bodies removed in the situation of the result of decomposition: first, the putrefactive process may go on uninterrupted till the soft parts are entirely destroyed, and only the skeleton remains; secondly, the flesh may be converted into adipocere; thirdly, the body may become a mummy and preserve its form, and be converted into a sort of natural mummy. This last change sometimes takes place in the ground in very dry and elevated situations, but more frequently in dry vaults and cellars. With this body the new putrefactive changes begin and goes in its progress to complete decomposition, it has been found that every portion of the face is generally destroyed between the third and fourth months; the thorax rarely undergoes any change for three months; nor the abdomen, except in the colour of its integuments, but after that period it collapses and its parts become very thin. For an accurate knowledge of this subject we are principally indebted to the labours of Orfila, to whose 'Examenments Juridiques' we refer for further information.
INTERMITTENT. [Text.]

INTERNAL and EXTERNAL, geometrical terms applied to the angles made by the sides of a bounded figure. The angle made by two sides is an internal angle; that made by a side and a side produced is an external angle.

INTERPLEADER, or ENTER PLAIDER, the name of a suit or action at law, or in equity. When a person holding goods, or owing a debt or duty, is sued by two or more claimants, the court will order them to interplead upon the application of the party sued, and upon his delivering up or offering to deliver up the matter in dispute, and disclaiming all interest therein. Antiently this doctrine formed a great title in the law, but from the number of exceptions and technical nicleies admitted by courts of law, parties sued or liable to be sued by two or more persons in respect of one matter were able to obtain relief in courts of equity only, which disregarded mere formal objections, and interfered upon the filing of what is called a Bill of Interpleader. The legislature, upon the recommendation of the late Common Law Commissioners, by the statute 1 and 2 Wm. IV. c. 55, has rendered this mode of relief more easy of attainment in the courts of law.

INTERPOLATION. Every mathematicial table consists of a series of values of some algebraical expression corresponding to equidistant values of the letter on which it depends. Thus, the most extensive table of logarithms in common use is a succession of values of \( x \), answering to \( x = 10,000, x = 10,001, x = 10,002, \) and so on up to \( x = 99,999 \). The process of interpolation is that of inserting in a table values of the tabulated function intermediate to those given in the table. For example, suppose that \( g, r, s, \) &c., are written in a table opposite to \( a, a + b, a + 2b, a + 3b, \) &c., and it is demanded what is the value of the function corresponding to \( a + \frac{1}{2} b \); this is a question of interpolation.

Such a question can only be solved approximately, but, generally speaking, the values in the table are themselves but approximations, and the interpolated values are as correct as the tabular ones. Strictly speaking, the question itself is indeterminate, for no function can be determined by means of any finite number of values, however great. The question is precisely analogous to that of drawing a curve through a given number of points, which may be done in an infinite number of ways, how many points soever there may be. But if the points be gradually increasing in distance from a given line, and if it be a condition that the intermediate points must do the same, then if the points be near together, any two curves which satisfy the conditions must very nearly coincide. If equidistant absceusses of such a curve be tabulated with their ordinates, then the ordinates corresponding to intermediate absceusses will be very nearly the same for any curve which can pass through the points which belong to the tabulated ordinates.

The method of interpolation consists entirely in the application of the following theorem. [DIFFERENCE.] Let \( p, q, r, s, \) &c., be terms of a series corresponding to \( a + b, a + 2b, a + 3b, \) &c., and let the successive differences be formed, as in the following table:

\[
\begin{array}{cccccc}
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
p & \Delta p & \Delta^2 p & \Delta^3 p & \vdots & \vdots \\
a & q & \Delta q & \Delta^2 q & \Delta^3 q & \vdots \\
a + b & r & \Delta r & \vdots & \vdots & \vdots \\
a + 2b & s & \Delta s & \vdots & \vdots & \vdots \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
\end{array}
\]

where \( \Delta p = q - p, \) &c., \( \Delta^2 p = q - \Delta p, \) &c., Then the \( n \)th term reckoned from \( p \) exclusive is

\[
p + n \Delta p + \frac{n(n-1)}{2} \Delta^2 p + \frac{n(n-1)(n-2)}{3} \Delta^3 p + \text{&c.} \quad (A).
\]

Thus \( q = p + \Delta p, r = p + 2\Delta p + \Delta^2 p, \) and so on. This series, which gives the rest of the table accurately, will give the intermediate values approximately, if \( p, \Delta p, \Delta^2 p, \) &c., diminish and vanish. Thus, by making \( n = 9, \) we find the term which should stand opposite to \( a + 1 \cdot b, \) if the table were made twice as minute as it now is, or, as we may say,}

<table>
<thead>
<tr>
<th>( n )</th>
<th>( p )</th>
<th>( \Delta p )</th>
<th>( \Delta^2 p )</th>
<th>( \Delta^3 p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>672971</td>
<td>-216584</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>466387</td>
<td>144852 + 72008</td>
<td>24677</td>
<td>8705</td>
</tr>
<tr>
<td>6</td>
<td>311805</td>
<td>47323 + 15972</td>
<td>31355</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>214548</td>
<td>+ 6504</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>146564</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{Given the present value of } 1,000,000, 20 \text{ years hence, at } 2, 4, 6, 8, 10 \text{ per cent. to deduce from there an approximation at the rate of } 4 \text{ per cent. Let it be observed, that from } 2 \text{ to } 4 \text{ is one interval and a quarter of the tables, or } n = 12.
\]

\[
p = 672971, \quad \Delta p = -216584, \quad \Delta^2 p = 144677, \quad \Delta^3 p = 8705
\]

\[
n = 9, \quad \frac{n(n-1)}{2} = \frac{9 

\[
= 24677, \quad \frac{n(n-1)(n-2)}{3} = \frac{9 

\[
= 31355, \quad \text{Answer 414644, Correct Answer 414643.}
\]

The smaller the tabular interval, the more correctly will a given number of differences serve to make the interpolation. Let us take the preceding question on the supposition that the rates are 2, 3, 4, 5, and 6 per cent, in which from 2 to \( \frac{1}{4} \) is 24 intervals, or \( n = 24. \)

\[
2 | 672971 | -119205 |
| 4 | 555376 | + 22006 |
| 6 | 454837 | + 17791 |
| 8 | 375689 | + 14414 |
| 10 | 311805 | + 6504 |

\[
n = 5, \quad \frac{n(n-1)(n-2)(n-3)}{4} = \frac{5 

\[
= 5, \quad \text{Answer 414644, Correct Answer 414643.}
\]

The most simple interpolation is that which takes first differences only into account, and is perfectly well known.
to every one who can use a table of logarithms, or interpose arithmetical means.

We now give some instances in which the intermediate terms are expressed by means, not of the differences of given terms, but of the terms themselves. The case which most often occurs is that in which it is required to bisect the interval of two numbers, and in this case a rule may be given which amounts to using the third differences, and is extremely simple. Let \( p, q, r, \) and \( s \) be successive terms of a table, and let it be required to find the intermediate term between \( q \) and \( r \), that is, if \( q \) and \( r \) stand opposite to \( x \) and \( x + y \), required the term answering to \( x + iy \). The following formula shows the process:

\[
\frac{q + r}{2} + \frac{(q + r) - (p + s)}{2} \quad \ldots \quad \text{(B)}.
\]

Thus in the preceding instance:

\[
\begin{align*}
p &= 553676 \\
q &= 456357 \\
r &= 376889 \\
s &= 311805
\end{align*}
\]

Then \( p + q = 1010453 \) and \( r + s = 688294 \), and the mean of these is \( \frac{1010453 + 688294}{2} = 849373.5 \). Thus the value required is 849373.5, which is identical with the value given by the formula of the present work.

This more simple rule is equivalent to the use of the preceding method with \( p \) and its first three differences. It requires that two terms should lie on each side of the term sought; but if it were required to bisect the interval between \( p \) and \( q \) by means of \( p, q, r, \) and \( s \), the formula is as follows:

\[
\frac{q - r}{2} + \frac{(q - r) + (r - p)}{2} + \ldots \quad \ldots \quad (C).
\]

Thus, to find the value at \( 2 \) per cent. from the preceding data, we have

\[
\begin{align*}
p &= -176787 \\
q &= -853935 \\
r &= 148822 \\
s &= 753333 \quad 4) - 184838 \\
s &= 46210 \\
r &= 456357
\end{align*}
\]

Answer 5023597

Correct Answer 5023566

The formula for the bisection of the interval of \( r \) and \( s \) by means of \( p, q, r, \) and \( s, \) is

\[
r + \frac{5(r - p) - (s - q)}{16} \quad \ldots \quad \text{(D)}.
\]

Where extreme accuracy of bisection is required, the following rule will be equivalent to going as far as five differences, and taking from the table three terms on each side of the intermediate term required. Let the terms of the table be \( p, q, r, s, \) and \( t \), and let \( p, q, r, s, \) and \( t \), be the intermediate terms of \( r \) and \( s \) being required.

\[
p = \frac{u + p}{2} + \frac{u + p + x}{2} + \frac{u + p + x + y}{2} + \ldots \quad \text{(E)}.
\]

Intermid. term. \( \frac{x}{2} + \frac{25(z - y) + 3(z - x)}{256} \quad \text{E}\)

As an instance, take from the article Interest (p. 503) the logarithms to ten places of \( 1.01, 1.02, 1.03, 1.04, 1.05, \) and \( 1.06, \) for \( p, q, r, s, \) and \( t, \) neglecting decimal points and preliminary ciphers.

\[
\begin{align*}
43213738 & \quad 8601178 \quad 23872247 \\
25326583 & \quad 21192901 \quad 17033383 \\
x & = 298672921 \\
y & = 2978704709 \\
z & = 2986705400 \\
297894079 & \quad 297894079 \\
-2439249 & = x - z \\
2432949 & = z - y \quad 491093100 \quad 207293753 \\
729974 & = 207293753 \\
61257325 & = 207293753 \\
x & = 140295920 \\
50678 & = 140295920 \\
4) \quad 207293753 & = 5067779
\end{align*}
\]

Ans. \( \log 1.035 \quad \log 1.035 \quad \log 1.035 \quad \log 1.035 \quad \log 1.035 \quad \log 1.035 \)
Examples are found in all works which explain the principles of algebra. The rule always is, let the interpreted meaning of the new symbols be such as will make the whole of the process true by which they were obtained. Now as they must have been obtained by the application of those formulae which are true of the intelligible results of the definition, the rule just mentioned leads to the following: let the meaning of the intelligible results be such as will make the formulae of the intelligible ones true of them. Thus, in the preceding instance, the fundamental formula which connects the terms of the series $a, a^2, a^3, \&c.,$ is

$$a^n \times a^m = a^{n+m}$$

which is intelligible when $m$ and $n$ are positive whole numbers. Suppose it now required to interpret $a^\frac{1}{n}$: that is, to give it a meaning which shall make the preceding formula true of it. Write $0$ instead of $m$ and we have

$$a^\frac{1}{n} \times a^\frac{1}{n} = a^\frac{1}{n+n} = a^\frac{1}{2},$$

or $a^\frac{1}{2}$ must stand for $\sqrt{a}$. Again, suppose it required to interpret $a^\frac{1}{3}$. In order that the preceding formula may be true of the meaning of $a^\frac{1}{3}$, we must have

$$a^\frac{1}{3} \times a^\frac{1}{3} = a^\frac{1}{3+1} = a$$

whence $a^\frac{1}{3}$ must stand for $\sqrt[3]{a}$. And similarly for other cases.

It is interpretation which creates the distinction between algebra, as now known, and arithmetic with general symbols of number, or universal arithmetic. This we shall see in the article Negative and Impossible Quantities. INTERVAL. [Scale.]

INTERVAL, in Music, is described by Dr. Robert Smith, in his Harmonies, as 'a quantity of a certain kind, terminated by a graver and an acuter sound.' Brossard had said the same thing in other words: — 'C'est la difference, ou distance, qu'il y a d'un son grave a un son aigu.' Agreeing in this definition, from $c$ to $f$ is an interval of a $2d$; from $c$ to $e$ an interval of a $5th$; from $c$ to $g$ an interval of a $3rd$, &c.

Intervals are Simple when confined within the octave. Compound when they exceed it, and are named according to the distance of the two boundary notes. Thus the interval of a whole tone ($c-d$) is called a $2d$; of a whole tone and a semitone ($c-e$), a minor $3rd$, &c. Intervals therefore are considered as sounds, and hence are either consonant or dissonant; i.e. concords or discords. [Concord; Discord.]

Examples of Simple Intervals.

<table>
<thead>
<tr>
<th>Of a $3rd$</th>
<th>Of a $4th$</th>
<th>Of a $5th$</th>
<th>Of a $6th$</th>
<th>Of an $8th$</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Simple Intervals" /></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Examples of Compound Intervals.

<table>
<thead>
<tr>
<th>Of a $9th$, or of an $8th$ and a $9th$</th>
<th>Of a $12th$, or of two octaves</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Compound Intervals" /></td>
<td></td>
</tr>
</tbody>
</table>

INTESTACY: is either the dying without a will, or after having made a will which does not dispose of the whole of the real or personal estate to which the deceased was entitled, and therefore there may be either general or partial intestacy. Real estate, in all cases where it is not disposed of by will, descends to the heir. [HEIR; DESCENT.] Personal estate which is not disposed of by will goes to the administrator, to be by him applied in payment of the debts of the deceased, and to be distributed among his next of kin. [EXECUTOR; ADMINISTRATOR.]

INTESTINA (Intestinaux), the second class of the Radiata, or fourth division of the animal kingdom, according to the classification of Cuvier. In the 'Regne Animal' this class is divided into two orders, Cavitaria and Parenchymata, which include all the Entozoa of Rudolphi; but the term Intestina, if retained at all, should be applied only to the true intestinal worms, or those parasites which live in the intestines of other animals, and should exclude the Entozoa which are found in the cellular tissue and substance of the different viscera of the body.

The order Cavitaria ('vers intestinaux cavitaires') of Cuvier corresponds to the fifth order Nematoidea of Rudolfi, and the group Camelinthina of Owen. The Parenchymata ('vers intestinaux parenchymateaux') includes the other four orders of Rudolfi, Acanthocephyla, Trematoda, Caenoteida, and Cystica, and corresponds to Mr. Owen's group of Stercominthia.

The principal species of worms infesting the stomach and intestines of man are enumerated under Anthelmintics; and for further details see Entozoa.