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A DICTIONARY OF ARTS, SCIENCES, LITERATURE AND GENERAL INFORMATION

ELEVENTH EDITION

VOLUME XVI SLICE IV

Lefebvre, Tanneguy to Letronne, Jean Antoine

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LEFEBVRE, TANNEGUY (Tanaquillus Faber) (1615-1672), French classical scholar, was born at Caen. After completing his studies in Paris, he was appointed by Cardinal Richelieu inspector of the printing-press at the Louvre. After Richelieu's death he left Paris, joined the Reformed Church, and in 1651 obtained a professorship at the academy of Saumur, which he filled with great success for nearly twenty years. His increasing ill-health and a certain moral laxity (as shown in his judgment on Sappho) led to a quarrel with the consistory, as a result of which he resigned his professorship. Several universities were eager to obtain his services, and he had accepted a post offered him by the elector palatine at Heidelberg, when he died suddenly on the 12th of September, 1672. One of his children was the famous Madame Dacier. Lefebvre, who was by no means a typical student in dress or manners, was a highly cultivated man and a thorough classical scholar. He brought out editions of various Greek and Latin authors—Longinus, Anacreon and Sappho, Virgil, Horace, Lucretius and many others. His most important original works are: *Les Vies des poètes Grecs* (1665); *Méthode pour commencer les humanités Grecques et Latines* (2nd ed., 1731), of which several English adaptations have appeared; *Epistolae Criticae* (1659).

In addition to the *Mémoires pour ... la vie de Tanneguy Lefebvre*, by F. Graverol (1686), see the article in the *Nouvelle biographie générale*, based partly on the MS. registers of the Saumur Académie.

LEFEBVRE-DESNOËTTES, CHARLES, Comte (1773-1822), French cavalry general, joined the army in 1792 and served with the armies of the North, of the Sambre-and-Meuse and Rhine-and-Moselle in the various campaigns of the Revolution. Six years later he had become captain and aide-de-camp to General Bonaparte. At Marengo he won further promotion, and at Austerlitz became colonel, serving also in the Prussian campaigns of 1806-1807. In 1808 he was made general of brigade and created a count of the Empire. Sent with the army into Spain, he conducted the first and unsuccessful siege of Saragossa. The battlefield of Tudela showed his talents to better advantage, but towards the end of 1808 he was taken prisoner in the action of Benavente by the British cavalry under Paget (later Lord Uxbridge, and subsequently Marquis of Anglesey). For over two years he remained a prisoner in England, living on parole at Cheltenham. In 1811 he escaped, and in the invasion of Russia in 1812 was again at the head of his cavalry. In 1813 and 1814 his men distinguished themselves in most of the great battles, especially La Rothière and Montmirail. He joined Napoleon in the Hundred Days and was wounded at Waterloo. For his part in these events he was condemned to death, but he escaped to the United States, and spent the next few years farming in Louisiana. His frequent appeals to Louis XVIII. eventually obtained his permission to return, but the "Albion," the vessel on which he was returning to France, went down off the coast of Ireland with all on board on the 22nd of May 1822.

LE FÈVRE, JEAN (*c.* 1395-1468), Burgundian chronicler and seigneur of Saint Remy, is also known as Toison d'or from his long connexion with the order of the Golden Fleece. Of noble birth, he adopted the profession of arms and with other Burgundians fought in the English ranks at Agincourt. In 1430, on the foundation of the order of the Golden Fleece by Philip III. the Good, duke of Burgundy, Le Fèvre was appointed its king of arms and he soon became a very influential person at the Burgundian court. He frequently assisted Philip in conducting negotiations with foreign powers, and he was an arbiter in tournaments and on all questions of chivalry, where his wide knowledge of heraldry was highly useful. He died at Bruges on the 16th of June 1468.

Le Fèvre wrote a *Chronique*, or *Histoire de Charles VI., roy de France*. The greater part of this chronicle is merely a copy of the work of Enguerrand de Monstrelet, but Le Fèvre is an original authority for the years between 1428 and 1436 and makes some valuable additions to our knowledge, especially about the chivalry of the Burgundian court. He is more concise than Monstrelet, but is equally partial to the dukes of Burgundy. The *Chronique* has been edited by F. Morand for the Société de l'histoire de France (Paris, 1876). Le Fèvre is usually regarded as the author of the *Livre des faites de Jacques de Lalaing*.

LEG (a word of Scandinavian origin, from the Old Norwegian *leggr*, cf. Swed. *lägg*, Dan. *laég*; the O. Eng. word was *sceanca*, shank), the general name for those limbs in animals which support and move the body, and in man for the lower limbs of the body (see Anatomy, *Superficial and Artistic*; Skeleton, *Appendicular*; Muscular System). The word is in common use for many objects which resemble the leg in shape or function. As a slang term, "leg," a shortened form of "blackleg," has been in use since the end of the 18th century for a swindler, especially in connexion with racing or gambling. The term "blackleg" is now also applied by trade-unionists to a workman who, during a strike or lockout, continues working or is brought to take the place of the withdrawn workers.

LEGACY (Lat. *legatum*), in English law, some particular thing or things given or left by a testator in his will, to be paid or performed by his executor or administrator. The word is primarily applicable to gifts of personalty or gifts charged upon real estate; but if there is nothing else to which it can refer it may refer to realty; the proper word, however, for gifts of realty is *devise*.

Legacies may be either specific, general or demonstrative. A *specific legacy* is "something which a testator, identifying it by a sufficient description and manifesting an intention that it should be enjoyed in the state and condition indicated by that description, separates in favour of a particular legatee from the general mass of his personal estate," *e.g.* a gift of "my portrait by X," naming the artist. A *general legacy* is a gift not so distinguished from the general mass of the personal estate, *e.g.* a gift of £100 or of a gold ring. A *demonstrative legacy* partakes of the nature of both the preceding kinds of legacies, *e.g.* a gift of £100 payable out of a named fund is a specific legacy so far as the fund named is available to pay the legacy; after the fund is exhausted the balance of the legacy is a general legacy and recourse must be had to the general estate to satisfy such balance. Sometimes a testator bequeaths two or more legacies to the same person; in such a case it is a question whether the later legacies are in substitution for, or in addition to, the earlier ones. In the latter case they are known as *cumulative*. In each case the intention of the testator is the rule of construction; this can often be gathered from the terms of the will or codicil, but in the absence of such evidence the following rules are followed by the courts. Where the same specific thing is bequeathed twice to the same legatee or where two legacies of equal amount are bequeathed by the same instrument the second bequest is mere repetition; but where legacies of equal amounts are bequeathed by different instruments or of unequal amounts by the same instruments they are considered to be cumulative.

If the estate of the testator is insufficient to satisfy all the legacies these must abate, *i.e.* be reduced rateably; as to this it should be noticed that specific and demonstrative legacies have a prior claim to be paid in full out of the specific fund before general legacies, and that general legacies abate rateably *inter se* in the absence of any provision to the contrary by the testator. Specific legacies are liable to ademption where the specific thing perishes or ceases to belong to the testator, *e.g.* in the instance given above if the testator sells the portrait the legatee will get nothing by virtue of the legacy. As a general rule, legacies given to persons who predecease the testator do not take effect; they are said to lapse. This is so even if the gift be to A and his executors, administrators and assigns, but this is not so if the testator has shown a contrary intention, thus, a gift to A *or* his personal representative will be effective even though A predecease the testator; further, by the Wills Act 1837, devises of estates tail and gifts to a child or other issue of the testator will not lapse if any issue of the legatee survive the testator. Lapsed legacies fall into and form part of the residuary estate. In the absence of any indication to the contrary a legacy becomes due on the day of the death of the testator, though for the convenience of the executor it is not payable till a year after that date; this delay does not prevent the legacy vesting on the testator's death. It frequently happens, however, that a legacy is given payable at a future date; in such a case, if the legatee dies after the testator but prior to the date when the legacy is payable it is necessary to

discover whether the legacy was vested or contingent, as in the former case it becomes payable to the legatee's representative; in the latter, it lapses. In this, as in other cases, the test is the intention of the testator as expressed in the will; generally it may be said that a gift "payable" or "to be paid" at a certain fixed time confers a vested interest on the legatee, while a gift to A "at" a fixed time, *e.g.* twenty-one years of age, only confers on A an interest contingent on his attaining the age of twenty-one.

Legacy Duty is a duty charged by the state upon personal property devolving upon the legatees or next of kin of a dead person, either by virtue of his will or upon his intestacy. The duty was first imposed in England in 1780, but the principal act dealing with the subject is the Legacy Duty Act 1796. The principal points as to the duty are these. The duty is charged on personalty only. It is payable only where the person on whose death the property passes was domiciled in the United Kingdom. The rate of duty varies from 1 to 10% according to the relationship between the testator and legatee. As between husband and wife no duty is payable. The duty is payable by the executors and deducted from the legacy unless the testator directs otherwise. Special provisions as to valuation are in force where the gift is of an annuity or is settled on various persons in succession, or the legacy is given in joint tenancy and other cases. In some cases the duty is payable by instalments which carry interest at 3%. In various cases legacies are exempt from duty—the more important are gifts to a member of the royal family, specific legacies under £20 (pecuniary legacies under £20 pay duty), legacies of books, prints, &c., given to a body corporate for preservation, not for sale, and legacies given out of an estate the principal value of which is less than £100. Further, by the Finance Act 1894, payment of the estate duty thereby created absorbs the 1% duty paid by lineal ancestors or descendants of the deceased[1] and the duty on a settled legacy, and, lastly, in the event of estate duty being paid on an estate the total value of which is under £1000, no legacy duty is payable. The legacy duty payable in Ireland is now for all practical purposes assimilated to that in Great Britain. The principal statute in that country is an act of 1814.

1 The Finance Bill 1909-1910 re-imposed this duty, and extended it to husbands and wives as well as descendants and ancestors.

LE GALLIENNE, RICHARD (1866-), English poet and critic, was born in Liverpool on the 20th of January 1866. He started life in a business office in Liverpool, but abandoned this to turn author. *My Lady's Sonnets* appeared at Liverpool in 1887, and in 1889 he became for a short time literary secretary to Wilson Barrett. In the same year he published *Volumes in Folio*, *The Book Bills* of Narcissus and *George Meredith: some Characteristics* (new ed., 1900). He joined the staff of the *Star* in 1891, and wrote for various papers over the signature of "Logroller." *English Poems* (1892), *R. L. Stevenson and other Poems* (1895), a paraphrase (1897) of the *Rubáiyát* of Omar Khayyám, and *Odes from the Divan of Hafiz* (1903), contained some light, graceful verse, but he is best known by the fantastic prose essays and sketches of *Prose Fancies* (2 series, 1894-1896), *Sleeping Beauty and other Prose Fancies* (1900), *The Religion of a Literary Man* (1893), *The Quest of the Golden Girl* (1897), *The Life Romantic* (1901), &c. His first wife, Mildred Lee, died in 1894, and in 1897 he married Julie Norregard, subsequently taking up his residence in the United States. In 1906 he translated, from the Danish, Peter Nansen's *Love's Trilogy*.

LEGARÉ, HUGH SWINTON (1797-1843), American lawyer and statesman, was born in Charleston, South Carolina, on the 2nd of January 1797, of Huguenot and Scotch stock. Partly on account of his inability to share in the amusements of his fellows by reason of a deformity due to vaccine poisoning before he was five (the poison permanently arresting the growth and development of his legs), he was an eager student, and in 1814 he graduated at the College of South Carolina with the highest rank in his class and with a reputation throughout the state for scholarship and eloquence. He studied law for three years in South Carolina, and then spent two years abroad, studying French and Italian in Paris and jurisprudence at Edinburgh. In 1820-1822 and in 1824-1830 he was a member of the South Carolina legislature. In 1827, with Stephen Elliott (1771-1830), the naturalist, he founded the *Southern Review*, of which he was the sole editor after Elliott's death until 1834, when it was discontinued, and to which he contributed articles on law, travel, and modern and classical literature. In 1830-1832 he was attorney-general of South Carolina, and, although a State's Rights man, he strongly opposed nullification. During his term of office he appeared in a case before the United States Supreme Court, where his knowledge of civil law so strongly impressed Edward Livingston, the secretary of state, who was himself an admirer of Roman Law, that he urged Legaré to devote himself to the study of this subject with the hope that he might influence American law toward the spirit and philosophy and even the forms and processes of Roman jurisprudence. Through Livingston, Legaré was appointed American *chargé d'affaires* at Brussels, where from 1833 to 1836 he perfected himself in civil law and in the German commentaries on civil law. In 1837-1839, as a Union Democrat, he was a member of the national House of Representatives, and there ably opposed Van Buren's financial policy in spite of the enthusiasm in South Carolina for the sub-treasury project. He supported Harrison in the presidential campaign of 1840, and when the cabinet was reconstructed by Tyler in 1841, Legaré was appointed attorney-general of the United States. On the 9th of May 1843 he was appointed secretary of state *ad interim*, after the resignation of Daniel Webster. On the 20th of June 1843 he died suddenly at Boston. His great work, the forcing into common law of the principles of civil law, was unaccomplished; but Story says "he seemed about to accomplish [it]; for his arguments before the Supreme Court were crowded with the principles of the Roman Law, wrought into the texture of the Common Law with great success." As attorney-general he argued the famous cases, the *United States* v. *Miranda*, *Wood* v. *the United States*, and *Jewell* v. *Jewell*.

See *The Writings of Hugh Swinton Legaré* (2 vols., Charleston, S.C., 1846), edited by his sister, Mrs Mary Bullen, who contributed a biographical sketch; and two articles by B. J. Ramage in *The Sewanee Review*, vol. x. (New York, 1902).

LEGAS, one of the Shangalla group of tribes, regarded as among the purest types of the Galla race. They occupy the upper Yabus valley, S.W. Abyssinia, near the Sudan frontier. The Legas are physically distinct from the Negro Shangalla. They are of very light complexion, tall and thin, with narrow hollow-cheeked faces, small heads and high foreheads. The chiefs' families are of more mixed blood, with perceptible Negro strain. The Legas are estimated to number upwards of a hundred thousand, of whom some 20,000 are warriors. They are, however, a peaceful race, kind to their women and slaves, and energetic agriculturists. Formerly independent, they came about 1900 under the sway of Abyssinia. The Legas are pagans, but Mahommedanism has gained many converts among them.

LEGATE, BARTHOLOMEW (*c.* 1575-1612), English fanatic, was born in Essex and became a dealer in cloth. About the beginning of the 17th century he became a preacher among a sect called the "Seekers," and appears to have held unorthodox opinions about the divinity of Jesus Christ. Together with his brother Thomas he was put in prison for heresy in 1611. Thomas died in Newgate gaol, London, but Bartholomew's imprisonment was not a rigorous one. James I. argued with him, and on several occasions he was brought before the Consistory Court of London, but without any definite result. Eventually, after having threatened to bring an action for wrongful imprisonment, Legate was tried before a full Consistory Court in February 1612, was found guilty of heresy, and was delivered to the secular authorities for punishment. Refusing to retract his opinions he was burned to death at Smithfield on the 18th of March 1612. Legate was the last person burned in London for his religious opinions, and Edward Wightman, who was burned at Lichfield in April 1612, was the last to suffer in this way in England.

See T. Fuller, *Church History of Britain* (1655); and S. R. Gardiner, *History of England*, vol. ii. (London, 1904).

LEGATE (Lat. *legatus*, past part. of *legare*, to send as deputy), a title now generally confined to the highest class of diplomatic representatives of the pope, though still occasionally used, in its original Latin sense, of any ambassador or diplomatic agent. According to the *Nova Compilatio Decretalium* of Gregory IX., under the title "De officio legati" the canon law recognizes two sorts of legate, the *legatus natus* and the *legatus datus* or *missus*. The *legatus datus* (*missus*) may be either (1) *delegatus*, or (2) *nuncius apostolicus*, or (3) *legatus a latere* (*lateralis, collateralis*). The rights of the *legatus natus*, which included concurrent jurisdiction with that of all the bishops within his province, have been much curtailed since the 16th century; they were altogether suspended in presence of the higher claims of a *legatus a latere*, and the title is now almost quite honorary. It was attached to the see of Canterbury till the Reformation and it still attaches to the sees of Seville, Toledo, Aries, Reims, Lyons, Gran, Prague, Gnesen-Posen, Cologne, Salzburg, among others. The commission of the *legatus delegatus* (generally a member of the local clergy) is of a limited nature, and relates only to some definite piece of work. The *nuncius apostolicus* (who has the privilege of red apparel, a white horse and golden spurs) possesses ordinary jurisdiction within the province to which he has been sent, but his powers otherwise are restricted by the terms of his mandate. The *legatus a latere* (almost invariably a cardinal, though the power can be conferred on other prelates) is in the fullest sense the plenipotentiary representative of the pope, and possesses the high prerogative implied in the words of Gregory VII., "nostra vice quae corrigenda sunt corrigat, quae statuend constituat." He has the power of suspending all the bishops in his province, and no judicial cases are reserved from his judgment. Without special mandate, however, he cannot depose bishops or unite or separate bishoprics. At present *legati a latere* are not sent by the holy see, but diplomatic relations, where they exist, are maintained by means of nuncios, internuncios and other agents.

The history of the office of papal legate is closely involved with that of the papacy itself. If it were proved that papal legates exercised the prerogatives of the primacy in the early councils, it would be one of the strongest points for the Roman Catholic view of the papal history. Thus it is claimed that Hosius of Cordova presided over the council of Nicaea (325) in the name of the pope. But the claim rests on slender evidence, since the first source in which Hosius is referred to as representative of the pope is Gelasius of Cyzicus in the Propontis, who wrote toward the end of the 5th century. It is even open to dispute whether Hosius was president at Nicaea, and though he certainly presided over the council of Sardica in 343, it was probably as representative of the emperors Constans and Constantius, who had summoned the council. Pope Julius I. was represented at Sardica by two presbyters. Yet the fifth canon, which provides for appeal by a bishop to Rome, sanctions the use of embassies *a latere*. If the appellant wishes the pope to send priests from his own household, the pope shall be free to do so, and to furnish them with full authority from himself ("ut de latere suo presbyteros mittat ... habentes ejus auctoritatem a quo destinati sunt"). The decrees of Sardica, an obscure council, were later confused with those of

Nicaea and thus gained weight. In the synod of Ephesus in 431, Pope Celestine I. instructed his representatives to conduct themselves not as disputants but as judges, and Cyril of Alexandria presided not only in his own name but in that of the pope (and of the bishop of Jerusalem). Instances of delegation of the papal authority in various degrees become numerous in the 5th century, especially during the pontificate of Leo I. Thus Leo writes in 444 (*Ep.* 6) to Anastasius of Thessalonica, appointing him his vicar for the province of Illyria; the same arrangement, he informs us, had been made by Pope Siricius in favour of Anysius, the predecessor of Anastasius. Similar vicarial or legatine powers had been conferred in 418 by Zosimus upon Patroclus, bishop of Arles. In 449 Leo was represented at the "Robber Synod," from which his legates hardly escaped with life; at Chalcedon, in 451, they were treated with singular honour, though the imperial commissioners presided. Again, in 453 the same pope writes to the empress Pulcheria, naming Julianus of Cos as his representative in the defence of the interests of orthodoxy and ecclesiastical discipline at Constantinople (*Ep.* 112); the instructions to Julianus are given in *Ep.* 113 ("hanc specialem curam vice mea functus assumas"). The designation of Anastasius as vicar apostolic over Illyria may be said to mark the beginning of the custom of conferring, *ex officio*, the title of *legatus* upon the holders of important sees, who ultimately came to be known as *legati nati*, with the rank of primate; the appointment of Julianus at Constantinople gradually developed into the long permanent office of *apocrisiarius* or *responsalis*. Another sort of delegation is exemplified in Leo's letter to the African bishops (*Ep.* 12), in which he sends Potentius, with instructions to inquire in his name, and to report ("vicem curae nostrae fratri et consacerdoti nostro Potentio delegantes qui de episcopis, quorum culpabilis ferebatur electio, quid veritas haberet inquireret, nobisque omnia fideliter indicaret"). Passing on to the time of Gregory the Great, we find him sending two representatives to Gaul in 599, to suppress simony, and one to Spain in 603. Augustine of Canterbury is sometimes spoken of as legate, but it does not appear that in his case this title was used in any strictly technical sense, although the archbishop of Canterbury afterwards attained the permanent dignity of a *legatus natus*. Boniface, the apostle of Germany, was in like manner constituted, according to Hincmar (*Ep.* 30), a legate of the apostolic see by Popes Gregory II. and Gregory III. According to Hefele (*Conc.* iv. 239), Rodoald of Porto and Zecharias of Anagni, who were sent by Pope Nicolas to Constantinople in 860, were the first actually called *legati a latere*. The policy of Gregory VII. naturally led to a great development of the legatine as distinguished from the ordinary episcopal function. From the creation of the medieval papal monarchy until the close of the middle ages, the papal legate played a most important rôle in national as well as church history. The further definition of his powers proceeded throughout the 12th and 13th centuries. From the 16th century legates a latere give way almost entirely to nuncios (*q.v.*).

See P. Hinschius, *Kirchenrecht*, i. 498 ff.; G. Phillips, *Kirchenrecht*, vol. vi. 680 ff.

LEGATION (Lat. *legatio*, a sending or mission), a diplomatic mission of the second rank. The term is also applied to the building in which the minister resides and to the area round it covered by his diplomatic immunities. See DIPLOMACY.

LEGEND (through the French from the med. Lat. *legenda*, things to be read, from *legere*, to read), in its primary meaning the history or life-story of a saint, and so applied to portions of Scripture and selections from the lives of the saints as read at divine service. The statute of 3 and 4 Edward VI. dealing with the abolition of certain books and images (1549), cap. 10, sect. 1, says that "all bookes ... called processionalles, manuelles, *legends* ... shall be ... abolished." The "Golden Legend," or *Aurea Legenda*, was the name given to a book containing lives of the saints and descriptions of festivals, written by Jacobus de Voragine, archbishop of Genoa, in the 13th century. From the original application of the word to stories of the saints containing wonders and miracles, the word came to be applied to a story handed down without any foundation in history, but popularly believed to be true. "Legend" is also used of a writing, inscription, or motto on coins or medals, and in connexion with coats of arms, shields, monuments, &c.

LEGENDRE, ADRIEN MARIE (1752-1833), French mathematician, was born at Paris (or, according to some accounts, at Toulouse) in 1752. He was brought up at Paris, where he completed his studies at the *Collège Mazarin*. His first published writings consist of articles forming part of the *Traité de mécanique* (1774) of the Abbé Marie, who was his professor; Legendre's name, however, is not mentioned. Soon afterwards he was appointed professor of mathematics in the *École Militaire* at Paris, and he was afterwards professor in the *École Normale*. In 1782 he received the prize from the Berlin Academy for his "Dissertation sur la question de balistique," a memoir relating to the paths of projectiles in resisting media. He also, about this time, wrote his "Recherches sur la figure des planètes," published in the *Mémoires* of the French Academy, of which he was elected a member in succession to J. le Rond d'Alembert in 1783. He was also appointed a commissioner for connecting geodetically Paris and Greenwich, his colleagues being P. F. A. Méchain and C. F. Cassini de Thury; General William Roy conducted the operations on behalf of England. The French observations were published in

1792 (*Exposé des opérations faites en France in 1787 pour la jonction des observatoires de Paris et de Greenwich*). During the Revolution, he was one of the three members of the council established to introduce the decimal system, and he was also a member of the commission appointed to determine the length of the metre, for which purpose the calculations, &c., connected with the arc of the meridian from Barcelona to Dunkirk were revised. He was also associated with G. C. F. M. Prony (1755-1839) in the formation of the great French tables of logarithms of numbers, sines, and tangents, and natural sines, called the *Tables du Cadastre*, in which the quadrant was divided centesimally; these tables have never been published (see Logarithms). He was examiner in the *École Polytechnique*, but held few important state offices. He died at Paris on the 10th of January 1833, and the discourse at his grave was pronounced by S. D. Poisson. The last of the three supplements to his *Traité des fonctions elliptiques* was published in 1832, and Poisson in his funeral oration remarked: "M. Legendre a eu cela de commun avec la plupart des géomètres qui l'ont précédé, que ses travaux n'ont fini qu'avec sa vie. Le dernier volume de nos mémoires renferme encore un mémoire de lui, sur une question difficile de la théorie des nombres; et peu de temps avant la maladie qui l'a conduit au tombeau, il se procura les observations les plus récentes des comètes à courtes périodes, dont il allait se servir pour appliquer et perfectionner ses méthodes."

It will be convenient, in giving an account of his writings, to consider them under the different subjects which are especially associated with his name.

Elliptic Functions.—This is the subject with which Legendre's name will always be most closely connected, and his researches upon it extend over a period of more than forty years. His first published writings upon the subject consist of two papers in the *Mémoires de l'Académie Française* for 1786 upon elliptic arcs. In 1792 he presented to the Academy a memoir on elliptic transcendents. The contents of these memoirs are included in the first volume of his *Exercices de calcul intégral* (1811). The third volume (1816) contains the very elaborate and now well-known tables of the elliptic integrals which were calculated by Legendre himself, with an account of the mode of their construction. In 1827 appeared the *Traité des fonctions elliptiques* (2 vols., the first dated 1825, the second 1826), a great part of the first volume agrees very closely with the contents of the *Exercices*; the tables, &c., are given in the second volume. Three supplements, relating to the researches of N. H. Abel and C. G. J. Jacobi, were published in 1828-1832, and form a third volume. Legendre had pursued the subject which would now be called elliptic integrals alone from 1786 to 1827, the results of his labours having been almost entirely neglected by his contemporaries, but his work had scarcely appeared in 1827 when the discoveries which were independently made by the two young and as yet unknown mathematicians Abel and Jacobi placed the subject on a new basis, and revolutionized it completely. The readiness with which Legendre, who was then seventy-six years of age, welcomed these important researches, that quite overshadowed his own, and included them in successive supplements to his work, does the highest honour to him (see Function).

Eulerian Integrals and Integral Calculus.—The *Exercices de calcul intégral* consist of three volumes, a great portion of the first and the whole of the third being devoted to elliptic functions. The remainder of the first volume relates to the Eulerian integrals and to quadratures. The second volume (1817) relates to the Eulerian integrals, and to various integrals and series, developments, mechanical problems, &c., connected with the integral calculus; this volume contains also a numerical table of the values of the gamma function. The latter portion of the second volume of the *Traité des fonctions elliptiques* (1826) is also devoted to the Eulerian integrals, the table being reproduced. Legendre's researches connected with the "gamma function" are of importance, and are well known; the subject was also treated by K. F. Gauss in his memoir *Disquisitiones generales circa series infinitas* (1816), but in a very different manner. The results given in the second volume of the *Exercices* are of too miscellaneous a character to admit of being briefly described. In 1788 Legendre published a memoir on double integrals, and in 1809 one on definite integrals.

Theory of Numbers.—Legendre's *Théorie des nombres* and Gauss's *Disquisitiones arithmeticae* (1801) are still standard works upon this subject. The first edition of the former appeared in 1798 under the title *Essai sur la théorie des nombres*; there was a second edition in 1808; a first supplement was published in 1816, and a second in 1825. The third edition, under the title *Théorie des nombres*, appeared in 1830 in two volumes. The fourth edition appeared in 1900. To Legendre is due the theorem known as the law of quadratic reciprocity, the most important general result in the science of numbers which has been discovered since the time of P. de Fermat, and which was called by Gauss the "gem of arithmetic." It was first given by Legendre in the *Mémoires* of the Academy for 1785, but the demonstration that accompanied it was incomplete. The symbol (a/p) which is known as Legendre's symbol, and denotes the positive or negative unit which is the remainder when $a^{1/2p(-1)}$ is divided by a prime number p, does not appear in this memoir, but was first used in the *Essai sur la théorie des nombres*. Legendre's formula x: (log x−1.08366) for the approximate number of forms inferior to a given number x was first given by him also in this work (2nd ed., p. 394) (see Number).

Attractions of Ellipsoids.—Legendre was the author of four important memoirs on this subject. In the first of these, entitled "Recherches sur l'attraction des sphéroides homogènes," published in the *Mémoires* of the Academy for 1785, but communicated to it at an earlier period, Legendre introduces the celebrated expressions which, though frequently called Laplace's coefficients, are more correctly named after Legendre. The definition of the coefficients is that if $(1 - 2h \cos \varphi + h^2)^{-1/2}$ be expanded in ascending powers of h, and if the general term be denoted by $P_n h^n$, then P_n is of the Legendrian coefficient of the *n*th order. In this memoir also the function which is now called the potential was, at the suggestion of Laplace, first introduced. Legendre shows that Maclaurin's theorem with respect to confocal ellipsoids is true for any position of the external point when the ellipsoids are solids of revolution. Of this memoir Isaac Todhunter writes: "We may affirm that no single memoir in the history of our subject can rival this in interest and importance. During forty years the resources of analysis, even in the hands of d'Alembert, Lagrange and Laplace, had not carried the theory of the attraction of ellipsoids beyond the point which the geometry of Maclaurin had reached. The introduction of the coefficients now called Laplace's, and their application, commence a new era in mathematical physics." Legendre's second memoir was communicated to the *Académie* in 1784, and relates to the conditions of equilibrium of a mass of rotating fluid in the form of a figure of revolution which does not deviate much from a sphere. The third memoir relates to Laplace's theorem respecting confocal ellipsoids. Of the fourth memoir Todhunter writes: "It occupies an important position in the history of our subject. The most striking addition which is here made to previous researches consists in the treatment of a planet supposed entirely fluid; the general equation for the form of a stratum is given for the first time and discussed. For the first time we have a correct and convenient expression for Laplace's *n*th coefficient." (See Todhunter's *History of the Mathematical Theories of Attraction and the Figure of the Earth* (1873), the twentieth, twenty-second, twenty-fourth, and twenty-fifth chapters of which contain a full and complete account of Legendre's four memoirs. See also Spherical Harmonics.)

Geodesy.—Besides the work upon the geodetical operations connecting Paris and Greenwich, of which Legendre was one of the authors, he published in the *Mémoires de l'Académie* for 1787 two papers on trigonometrical

operations depending upon the figure of the earth, containing many theorems relating to this subject. The best known of these, which is called Legendre's theorem, is usually given in treatises on spherical trigonometry; by means of it a small spherical triangle may be treated as a plane triangle, certain corrections being applied to the angles. Legendre was also the author of a memoir upon triangles drawn upon a spheroid. Legendre's theorem is a fundamental one in geodesy, and his contributions to the subject are of the greatest importance.

Method of Least Squares.—In 1806 appeared Legendre's *Nouvelles Méthodes pour la détermination des orbites des comètes*, which is memorable as containing the first published suggestion of the method of least squares (see PROBABILITY). In the preface Legendre remarks: "La méthode qui me paroît la plus simple et la plus générale consiste à rendre minimum la somme des quarrés des erreurs, ... et que j'appelle méthode des moindres quarrés"; and in an appendix in which the application of the method is explained his words are: "De tous les principes qu'on peut proposer pour cet objet, je pense qu'il n'en est pas de plus général, de plus exact, ni d'une application plus facile que celui dont nous avons fait usage dans les recherches précédentes, et qui consiste à rendre minimum la somme des quarrés des erreurs." The method was proposed by Legendre only as a convenient process for treating observations, without reference to the theory of probability. It had, however, been applied by Gauss as early as 1795, and the method was fully explained, and the law of facility for the first time given by him in 1809. Laplace also justified the method by means of the principles of the theory of probability; and this led Legendre to republish the part of his *Nouvelles Méthodes* which related to it in the *Mémoires de l'Académie* for 1810. Thus, although the method of least squares was first formally proposed by Legendre, the theory and algorithm and mathematical foundation of the process are due to Gauss and Laplace. Legendre published two supplements to his *Nouvelles Méthodes* in 1806 and 1820.

The Elements of Geometry.—Legendre's name is most widely known on account of his *Eléments de géométrie*, the most successful of the numerous attempts that have been made to supersede Euclid as a text-book on geometry. It first appeared in 1794, and went through very many editions, and has been translated into almost all languages. An English translation, by Sir David Brewster, from the eleventh French edition, was published in 1823, and is well known in England. The earlier editions did not contain the trigonometry. In one of the notes Legendre gives a proof of the irrationality of π. This had been first proved by J. H. Lambert in the Berlin *Memoirs* for 1768. Legendre's proof is similar in principle to Lambert's, but much simpler. On account of the objections urged against the treatment of parallels in this work, Legendre was induced to publish in 1803 his *Nouvelle Théorie des parallèles*. His *Géométrie* gave rise in England also to a lengthened discussion on the difficult question of the treatment of the theory of parallels.

It will thus be seen that Legendre's works have placed him in the very foremost rank in the widely distinct subjects of elliptic functions, theory of numbers, attractions, and geodesy, and have given him a conspicuous position in connexion with the integral calculus and other branches of mathematics. He published a memoir on the integration of partial differential equations and a few others which have not been noticed above, but they relate to subjects with which his name is not especially associated. A good account of the principal works of Legendre is given in the *Bibliothèque universelle de Genève* for 1833, pp. 45-82.

See Élie de Beaumont, "Memoir de Legendre," translated by C. A. Alexander, *Smithsonian Report* (1874).

(J. W. L. G.)

LEGENDRE, LOUIS (1752-1797), French revolutionist, was born at Versailles on the 22nd of May 1752. When the Revolution broke out, he kept a butcher's shop in Paris, in the rue des Boucheries St Germain. He was an ardent supporter of the ideas of the Revolution, a member of the Jacobin Club, and one of the founders of the club of the Cordeliers. In spite of the incorrectness of his diction, he was gifted with a genuine eloquence, and well knew how to carry the populace with him. He was a prominent actor in the taking of the Bastille (14th of July 1789), in the massacre of the Champ de Mars (July 1791), and in the attack on the Tuileries (10th of August 1792). Deputy from Paris to the Convention, he voted for the death of Louis XVI., and was sent on mission to Lyons (27th of February 1793) before the revolt of that town, and was on mission from August to October 1793 in Seine-Inférieure. He was a member of the *Comité de Sûreté Générale*, and contributed to the downfall of the Girondists. When Danton was arrested, Legendre at first defended him, but was soon cowed and withdrew his defence. After the fall of Robespierre, Legendre took part in the reactionary movement, undertook the closing of the Jacobin Club, was elected president of the Convention, and helped to bring about the impeachment of J. B. Carrier, the perpetrator of the *noyades* of Nantes. He was subsequently elected a member of the Council of Ancients, and died on the 13th of December 1797.

See F. A. Aulard, *Les Orateurs de la Législative et de la Convention* (2nd ed., Paris, 1906, 2 vols.); "Correspondance de Legendre" in the *Révolution française* (vol. xl., 1901).

LEGERDEMAIN (Fr. *léger-de-main*, *i.e.* light or sleight of hand), the name given specifically to that form of conjuring in which the performer relies on dexterity of manipulation rather than on mechanical apparatus. See CONJURING.

LEGGE, afterwards Bilson-Legge, HENRY (1708-1764), English statesman, fourth son of William Legge, 1st earl of Dartmouth (1672-1750), was born on the 29th of May 1708. Educated at Christ Church, Oxford, he became private secretary to Sir Robert Walpole, and in 1739 was appointed secretary of Ireland by the lord-lieutenant, the 3rd duke of Devonshire; being chosen member of parliament for the borough of East Looe in 1740, and for Orford, Suffolk, at the general election in the succeeding year. Legge only shared temporarily in the downfall of Walpole, and became in quick succession surveyor-general of woods and forests, a lord of the admiralty, and a lord of the treasury. In 1748 he was sent as envoy extraordinary to Frederick the Great, and although his conduct in Berlin was sharply censured by George II., he became treasurer of the navy soon after his return to England. In April 1754 he joined the ministry of the duke of Newcastle as chancellor of the exchequer, the king consenting to this appointment although refusing to hold any intercourse with the minister; but Legge shared the elder Pitt's dislike of the policy of paying subsidies to the landgrave of Hesse, and was dismissed from office in November 1755. Twelve months later he returned to his post at the exchequer in the administration of Pitt and the 4th duke of Devonshire, retaining office until April 1757 when he shared both the dismissal and the ensuing popularity of Pitt. When in conjunction with the duke of Newcastle Pitt returned to power in the following July, Legge became chancellor of the exchequer for the third time. He imposed new taxes upon houses and windows, and he appears to have lost to some extent the friendship of Pitt, while the king refused to make him a peer. In 1759 he obtained the sinecure position of surveyor of the petty customs and subsidies in the port of London, and having in consequence to resign his seat in parliament he was chosen one of the members for Hampshire, a proceeding which greatly incensed the earl of Bute, who desired this seat for one of his friends. Having thus incurred Bute's displeasure Legge was again dismissed from the exchequer in March 1761, but he continued to take part in parliamentary debates until his death at Tunbridge Wells on the 23rd of August 1764. Legge appears to have been a capable financier, but the position of chancellor of the exchequer was not at that time a cabinet office. He took the additional name of Bilson on succeeding to the estates of a relative, Thomas Bettersworth Bilson, in 1754. Pitt called Legge, "the child, and deservedly the favourite child, of the Whigs." Horace Walpole said he was "of a creeping, underhand nature, and aspired to the lion's place by the manœuvre of the mole," but afterwards he spoke in high terms of his talents. Legge married Mary, daughter and heiress of Edward, 4th and last Baron Stawel (d. 1755). This lady, who in 1760 was created Baroness Stawel of Somerton, bore him an only child, Henry Stawel Bilson-Legge (1757-1820), who became Baron Stawel on his mother's death in 1780. When Stawel died without sons his title became extinct. His only daughter, Mary (d. 1864), married John Dutton, 2nd Baron Sherborne.

See John Butier, bishop of Hereford, *Some Account of the Character of the late Rt. Hon. H. Bilson-Legge* (1765); Horace Walpole, *Memoirs of the Reign of George II.* (London, 1847); and *Memoirs of the Reign of George III.*, edited by G. F. R. Barker (London, 1894); W. E. H. Lecky, *History of England*, vol. ii. (London, 1892); and the memoirs and collections of correspondence of the time.

LEGGE, JAMES (1815-1897), British Chinese scholar, was born at Huntly, Aberdeenshire, in 1815, and educated at King's College, Aberdeen. After studying at the Highbury Theological College, London, he went in 1839 as a missionary to the Chinese, but, as China was not yet open to Europeans, he remained at Malacca three years, in charge of the Anglo-Chinese College there. The College was subsequently moved to Hong-Kong, where Legge lived for thirty years. Impressed with the necessity of missionaries being able to comprehend the ideas and culture of the Chinese, he began in 1841 a translation in many volumes of the Chinese classics, a monumental task admirably executed and completed a few years before his death. In 1870 he was made an LL.D. of Aberdeen and in 1884 of Edinburgh University. In 1875 several gentlemen connected with the China trade suggested to the university of Oxford a Chair of Chinese Language and Literature to be occupied by Dr Legge. The university responded liberally, Corpus Christi College contributed the emoluments of a fellowship, and the chair was constituted in 1876. In addition to his other work Legge wrote *The Life and Teaching of Confucius* (1867); *The Life and Teaching of Mencius* (1875); *The Religions of China* (1880); and other books on Chinese literature and religion. He died at Oxford on the 29th of November 1897.

LEGHORN (Ital. *Livorno*, Fr. *Livourne*), a city of Tuscany, Italy, chief town of the province of the same name, which consists of the commune of Leghorn and the islands of Elba and Gorgona. The town is the seat of a bishopric and of a large naval academy—the only one in Italy—and the third largest commercial port in the kingdom, situated on the west coast, 12 m. S.W. of Pisa by rail, 10 ft. above sea-level. Pop. (1901) 78,308 (town), 96,528 (commune). It is built along the seashore upon a healthy and fertile tract of land, which forms, as it were, an oasis in a zone of Maremma. Behind is a range of hills, the most conspicuous of which, the Monte Nero, is crowned by a frequented pilgrimage church and also by villas and hotels, to which a funicular railway runs. The town itself is almost entirely modern. The 16th-century Fortezza Vecchia, guarding the harbour, is picturesque, and there is a good bronze statue of the grand duke Ferdinand I. by Pietro Tacca (1577-1640), a pupil of Giovanni da Bologna. The lofty Torre del Marzocco, erected in 1423 by the Florentines, is fine. The façade of the cathedral was designed by Inigo Jones. The old Protestant cemetery contains the tombs of Tobias Smollett (d. 1771) and Francis Horner (d. 1817). There is also a large synagogue founded in 1581. The exchange, the chamber of commerce and the clearing-house (one of the oldest in the world, dating from 1764) are united under one roof in the Palazzo del Commercio, opened in 1907. Several improvements have been carried out in the city and port, and the place is developing rapidly as an industrial centre. The naval academy, formerly established partly at

Naples and partly at Genoa, has been transferred to Leghorn. Some of the navigable canals which connected the harbour with the interior of the city have been either modified or filled up. Several streets have been widened, and a road along the shore has been transformed into a fine and shady promenade. Leghorn is the principal sea-bathing resort in this part of Italy, the season lasting from the end of June to the end of August. A spa for the use of the Acque della Salute has been constructed. Leghorn is on the main line from Pisa to Rome; another line runs to Colle Salvetti. A considerable number of important steamship lines call here. The new rectilinear mole, sanctioned in 1881, has been built out into the sea for a distance of 600 yds. from the old Vegliaia lighthouse, and the docking basin has been lengthened to 490 ft. Inside the breakwater the depth varies from 10 to 26 ft. The total trade of the port increased from £3,853,593 in 1897 to £5,675,285 in 1905 and £7,009,758 in 1906 (the large increase being mainly due to a rise of over £1,000,000 in imports—mainly of coal, building materials and machinery), the average ratio of imports to exports being as three to two. The imports consist principally of machinery, coal, grain, dried fish, tobacco and hides, and the exports of hemp, hides, olive oil, soap, coral, candied fruit, wine, straw hats, boracic acid, mercury, and marble and alabaster. In 1885 the total number of vessels that entered the port was 4281 of 1,434,000 tons; of these, 1251 of 750,000 tons were foreign; 688,000 tons of merchandise were loaded and unloaded. In 1906, after considerable fluctuations during the interval, the total number that entered was 4623 vessels of 2,372,551 tons; of these, 935 of 1,002,119 tons were foreign; British ships representing about half this tonnage. In 1906 the total imports and exports amounted to 1,470,000 tons including coasting trade. A great obstacle to the development of the port is the absence of modern mechanical appliances for loading and unloading vessels, and of quay space and dock accommodation. The older shipyards have been considerably extended, and shipbuilding is actively carried on, especially by the Orlando yard which builds large ships for the Italian navy, while new industries—namely, glass-making and copper and brass-founding, electric power works, a cement factory, porcelain factories, flour-mills, oil-mills, a cotton yarn spinning factory, electric plant works, a ship-breaking yard, a motor-boat yard, &c.—have been established. Other important firms, Tuscan wine-growers, oil-growers, timber traders, colour manufacturers, &c., have their head offices and stores at Leghorn, with a view to export. The former British “factory” here was of great importance for the trade with the Levant, but was closed in 1825. The two villages of Ardenza and Antignano, which form part of the commune, have acquired considerable importance, the former in part for sea-bathing.

The earliest mention of Leghorn occurs in a document of 891, relating to the first church here; in 1017 it is called a castle. In the 13th century the Pisans tried to attract a population to the spot, but it was not till the 14th that Leghorn became a rival of Porto Pisano at the mouth of the Arno, which it was destined ultimately to supplant. It was at Leghorn that Urban V. and Gregory XI. landed on their return from Avignon. When in 1405 the king of France sold Pisa to the Florentines he kept possession of Leghorn; but he afterwards (1407) sold it for 26,000 ducats to the Genoese, and from the Genoese the Florentines purchased it in 1421. In 1496 the city showed its devotion to its new masters by a successful defence against Maximilian and his allies, but it was still a small place; in 1551 there were only 749 inhabitants. With the rise of the Medici came a rapid increase of prosperity; Cosmo, Francis and Ferdinand erected fortifications and harbour works, warehouses and churches, with equal liberality, and the last especially gave a stimulus to trade by inviting “men of the East and the West, Spanish and Portuguese, Greeks, Germans, Italians, Hebrews, Turks, Moors, Armenians, Persians and others,” to settle and traffic in the city, as it became in 1606. Declared free and neutral in 1691, Leghorn was permanently invested with these privileges by the Quadruple Alliance in 1718; but in 1796 Napoleon seized all the hostile vessels in its port. It ceased to be a free city by the law of 1867.

(T. As.)

LEGION (Lat. *legio*), in early Rome, the levy of citizens marching out *en masse* to war, like the citizen-army of any other primitive state. As Rome came to need more than one army at once and warfare grew more complex, *legio* came to denote a unit of 4000-6000 heavy infantry (including, however, at first some light infantry and at various times a handful of cavalry) who were by political status Roman citizens and were distinct from the “allies,” *auxilia*, and other troops of the second class. The legionaries were regarded as the best and most characteristic Roman soldiers, the most trustworthy and truly Roman; they enjoyed better pay and conditions of service than the “auxiliaries.” In A.D. 14 (death of Augustus) there were 25 such legions: later, the number was slightly increased; finally about A.D. 290 Diocletian reduced the size and greatly increased the number of the legions. Throughout, the dominant features of the legions were heavy infantry and Roman citizenship. They lost their importance when the Barbarian invasions altered the character of ancient warfare and made cavalry a more important arm than infantry, in the late 3rd and 4th centuries A.D. In the middle ages the word “legion” seems not to have been used as a technical term. In modern times it has been employed for organizations of an unusual or exceptional character, such as a corps of foreign volunteers or mercenaries. See further ROMAN ARMY.

(F. J. H.)

The term legion has been used to designate regiments or corps of all arms in modern times, perhaps the earliest example of this being the Provincial Legions formed in France by Francis I. (see INFANTRY). Napoleon, in accordance with this precedent, employed the word to designate the second-line formations which he maintained in France and which supplied the Grande Armée with drafts. The term “Foreign Legion” is often used for irregular volunteer corps of foreign sympathizers raised by states at war, often by smaller states fighting for independence. Unlike most foreign legions the “British Legion” which, raised in Great Britain and commanded by Sir de Lacy Evans (*q.v.*), fought in the Carlist wars, was a regularly enlisted and paid force. The term “foreign legion” is colloquially but incorrectly applied to-day to the *Régiments étrangers* in the French service, which are composed of adventurous spirits of all nationalities and have been employed in many arduous colonial campaigns.

The most famous of the corps that have borne the name of legion in modern times was the King’s German Legion (see Beamish’s history of the corps). The electorate of Hanover being in 1805 threatened by the French, and no effective resistance being considered possible, the British government wished to take the greater part of the Hanoverian army into its service. But the acceptance by the Hanoverian government of this offer was delayed until too late, and it was only after the French had entered the country and the army as a unit had been disbanded that the formation of the “King’s German Regiment,” as it was at first called, was begun in England. This enlisted not only ex-Hanoverian soldiers, but other Germans as well, as individuals. Lieut.-Colonel von der Decken and

Major Colin Halkett were the officers entrusted with the formation of the new corps, which in January 1805 had become a corps of all arms with the title of King's German Legion. It then consisted of a dragoon and a hussar regiment, five batteries, two light and four line battalions and an engineer section, all these being afterwards increased. Its services included the abortive German expedition of November 1805, the expedition to Copenhagen in 1807, the minor sieges and combats in Sicily 1808-14, the Walcheren expedition of 1809, the expedition to Sweden under Sir John Moore in 1808, and the campaign of 1813 in north Germany. But its title to fame is its part in the Peninsular War, in which from first to last it was an acknowledged *corps d'élite*—its cavalry especially, whose services both on reconnaissance and in battle were of the highest value. The exploit of the two dragoon regiments of the Legion at Garcia Hernandez after the battle of Salamanca, where they charged and broke up two French infantry squares and captured some 1400 prisoners, is one of the most notable incidents in the history of the cavalry arm (see Sir E. Wood's *Achievements of Cavalry)*. A general officer of the Legion, Charles Alten (*q.v.*), commanded the British Light Division in the latter part of the war. It should be said that the Legion was rarely engaged as a unit. It was considered rather as a small army of the British type, most of which served abroad by regiments and battalions while a small portion and depot units were at home, the total numbers under arms being about 25,000. In 1815 the period of service of the corps had almost expired when Napoleon returned from Elba, but its members voluntarily offered to prolong their service. It lost heavily at Waterloo, in which Baring's battalion of the light infantry distinguished itself by its gallant defence of La Haye Sainte. The strength of the Legion at the time of its disbandment was 1100 officers and 23,500 men. A short-lived "King's German Legion" was raised by the British government for service in the Crimean War. Certain Hanoverian regiments of the German army to-day represent the units of the Legion and carry Peninsular battle-honours on their standards and colours.

LEGITIM, or Bairn's Part, in Scots law, the legal share of the movable property of a father due on his death to his children. If a father dies leaving a widow and children, the movable property is divided into three equal parts; one-third part is divided equally among all the children who survive, although they may be of different marriages (the issue of predeceased children do not share); another third goes to the widow as her *jus relictae*, and the remaining third, called "dead's part," may be disposed of by the father by will as he pleases. If the father die intestate the dead's part goes to the children as next of kin. Should the father leave no widow, one-half of the movable estate is legitim and one-half dead's part. In claiming legitim, however, credit must be given for any advance made by the father out of his movable estate during his lifetime.

LEGITIMACY, and LEGITIMATION, the status derived by individuals in consequence of being born in legal wedlock, and the means by which the same status is given to persons not so born. Under the Roman or civil law a child born before the marriage of the parents was made legitimate by their subsequent marriage. This method of legitimation was accepted by the canon law, by the legal systems of the continent of Europe, of Scotland and of some of the states of the United States. The early Germanic codes, however, did not recognize such legitimation, nor among the Anglo-Saxons had the natural-born child any rights of inheritance, or possibly any right other than that of protection, even when acknowledged by its father. The principle of the civil and canon law was at one time advocated by the clergy of England, but was summarily rejected by the barons at the parliament of Merton in 1236, when they replied *Nolumus leges Angliae mutare*.

English law takes account solely of the fact that marriage precedes the birth of the child; at whatever period the birth happens after the marriage, the offspring is prima facie legitimate. The presumption of law is always in favour of the legitimacy of the child of a married woman, and at one time it was so strong that Sir Edward Coke held that "if the husband be within the four seas, *i.e.* within the jurisdiction of the king of England, and the wife hath issue, no proof shall be admitted to prove the child a bastard unless the husband hath an apparent impossibility of procreation." It is now settled, however, that the presumption of legitimacy may be rebutted by evidence showing non-access on the part of the husband, or any other circumstance showing that the husband could not in the course of nature have been the father of his wife's child. If the husband had access, or the access be not clearly negatived, even though others at the same time were carrying on an illicit intercourse with the wife, a child born under such circumstances is legitimate. If the husband had access intercourse must be presumed, unless there is irresistible evidence to the contrary. Neither husband or wife will be permitted to prove the non-access directly or indirectly. Children born after a divorce *a mensa et thoro* will, however, be presumed to be bastards unless access be proved. A child born so long after the death of a husband that he could not in the ordinary course of nature have been the father is illegitimate. The period of gestation is presumed to be *about* nine calendar months; and if there were any circumstances from which an unusually long or short period of gestation could be inferred, special medical testimony would be required.

A marriage between persons within the prohibited degrees of affinity was before 1835 not void, but only voidable, and the ecclesiastical courts were restrained from bastardizing the issue after the death of either of the parents. Lord Lyndhurst's act (1835) declared all such existing marriages valid, but all subsequent marriages between persons within the prohibited degrees of consanguinity or affinity were made null and void and the issue illegitimate (see Marriage). By the Legitimacy Declaration Act 1858, application may be made to the Probate, Divorce and Admiralty Court (in Scotland, to the Court of Session by action of declarator) for a declaration of legitimacy and of the validity of a marriage. The status of legitimacy in any country depending upon the fact of the child having been born in wedlock, it may be concluded that any question as to the legitimacy of a child turns either on the validity of the marriage or on whether the child has been born in wedlock.

Legitimation effected by the subsequent marriage of the parents of the illegitimate child is technically known as

legitimation *per subsequens matrimonium*. This adoption of the Roman law principle is followed by most of the states of the continent of Europe (with distinctions, of course, as to *certain* illegitimate children, or as to the forms of acknowledgment by the parent or parents), in the Isle of Man, Guernsey, Jersey, Lower Canada, St Lucia, Trinidad, Demerara, Berbice, Cape Colony, Ceylon, Mauritius; it has been adopted in New Zealand (Legitimation Act 1894), South Australia (Legitimation Act 1898, amended 1902), Queensland (Legitimation Act 1899), New South Wales (Legitimation Act 1902), and Victoria (Registration of Births, Deaths and Marriages Act 1903). It is to be noted, however, that in these states the mere fact of the parents marrying does not legitimate the child; indeed, the parents may marry, yet the child remain illegitimate. In order to legitimate the child it is necessary for the father to make application for its registration; in South Australia, the application must be made by both parents; so also in Victoria, if the mother is living, if not, application by the father will suffice. In New Zealand, Queensland and New South Wales, registration may be made at any time after the marriage; in Victoria, within six months from the date of the marriage; in South Australia, by the act of 1898, registration was permissible only within thirty days before or after the marriage, but by the amending act of 1902 it is allowed at any time more than thirty days after the marriage, provided the applicants prove before a magistrate that they are the parents of the child. In all cases the legitimation is retrospective, taking effect from the birth of the child. Legitimation by subsequent marriage exists also in the following states of the American Union: Maine, Pennsylvania, Illinois, Michigan, Iowa, Minnesota, California, Oregon, Nevada, Washington, N. and S. Dakota, Idaho, Montana and New Mexico. In Massachusetts, Vermont, Illinois, Indiana, Wisconsin, Nebraska, Maryland, Virginia, West Virginia, Kentucky, Missouri, Arkansas, Texas, Colorado, Idaho, Wyoming, Georgia, Alabama, Mississippi and Arizona, in addition to the marriage the father must recognize or acknowledge the illegitimate child as his. In New Hampshire, Connecticut and Louisiana both parents must acknowledge the child, either by an authentic act before marriage or by the contract of marriage. In some states (California, Nevada, N. and S. Dakota and Idaho) if the father of an illegitimate child receives it into his house (with the consent of his wife, if married), and treats it as if it were legitimate, it becomes legitimate for all purposes. In other states (N. Carolina, Tennessee, Georgia and New Mexico) the putative father can legitimize the child by process in court. Those states of the United States which have not been mentioned follow the English common law, which also prevails in Ireland, some of the West Indies and part of Canada. In Scotland, on the other hand, the principle of the civil law is followed. In Scotland, bastards could be legitimized in two ways: either by the subsequent intermarriage of the mother of the child with the father, or by letters of legitimation from the sovereign. With respect to the last, however, it is to be observed that letters of legitimation, be their clauses ever so strong, could not enable the bastard to succeed to his natural father; for the sovereign could not, by any prerogative, cut off the private right of third parties. But by a special clause in the letters of legitimation, the sovereign could renounce his right to the bastard's succession, failing legitimate descendants, in favour of him who would have been the bastard's heir had he been born in lawful wedlock, such renunciation encroaching upon no right competent to any third person.

The question remains, how far, if at all, English law recognizes the legitimacy of a person born out of wedlock. Strictly speaking, English law does not recognize any such person as legitimate (though the supreme power of an act of parliament can, of course, confer the rights of legitimacy), but under certain circumstances it will recognize, for purposes of succession to property, a legitimated person as legitimate. The general maxim of law is that the status of legitimacy must be tried by the law of the country where it originates, and where the law of the father's domicile at the time of the child's birth, and of the father's domicile at the time of the subsequent marriage, taken together, legitimize the child, English law will recognize the legitimacy. For purposes of succession to real property, however, legitimacy must be determined by the *lex loci rei sitae*; so that, for example, a legitimized Scotsman would be recognized as legitimate in England, but not legitimate so far as to take lands as heir (*Birtwhistle* v. *Vardill*, 1840). The conflict of laws on the subject yields some curious results. Thus, a domiciled Scotsman had a son born in Scotland and then married the mother in Scotland. The son died possessed of land in England, and it was held that the father could not inherit from the son. On the other hand, where an unmarried woman, domiciled in England died intestate there, it was held that her brother's daughter, born before marriage, but whilst the father was domiciled in Holland, and legitimized by the parents' marriage while they were still domiciled in Holland, was entitled to succeed to the personal property of her aunt (*In re Goodman's Trusts*, 1880). *In re Grey's Trusts* (1892) decided that, where *real estate* was bequeathed to the children of a person domiciled in a foreign country and these children were legitimized by the subsequent marriage in that country of their father with their mother, that they were entitled to share as legitimate children in a devise of English realty. It is to be noted that this decision does not clash with that of *Birtwhistle* v. *Vardill*.

See J. A. Foote, *Private International Law*; A. V. Dicey, *Conflict of Laws*; L. von Bar, *Private International Law*; Story, *Conflict of Laws*; J. Westlake, *International Law*.

LEGITIMISTS (Fr. *légitimistes*, from *légitime*, lawful, legitimate), the name of the party in France which after the revolution of 1830 continued to support the claims of the elder line of the house of Bourbon as the legitimate sovereigns "by divine right." The death of the comte de Chambord in 1883 dissolved the *parti légitimiste*, only an insignificant remnant, known as the *Blancs d'Espagne*, repudiating the act of renunciation of Philip V. of Spain and upholding the rights of the Bourbons of the line of Anjou. The word *légitimiste* was not admitted by the French Academy until 1878; but meanwhile it had spread beyond France, and the English word legitimist is now applied to any supporter of monarchy by hereditary right as against a parliamentary or other title.

LEGNAGO, a fortified town of Venetia, Italy, in the province of Verona, on the Adige, 29 m. by rail E. of Mantua, 52 ft. above sea-level. Pop. (1906) 2731 (town), 17,000 (commune). Legnago is one of the famous Quadrilateral fortresses. The present fortifications were planned and made in 1815, the older defences having been destroyed by Napoleon I. in 1801. The situation is low and unhealthy, but the territory is fertile, rice, cereals and sugar being grown. Legnago is the birthplace of G. B. Cavalcaselle, the art historian (1827-1897). A branch line runs hence to Rovigo.

LEGNANO, a town of Lombardy, Italy, in the province of Milan, 17 m. N.W. of that city by rail, 682 ft. above sea-level. Pop. (1881) 7153, (1901) 18,285. The church of S. Magno, built in the style of Bramante by G. Lampugnano (1504-1529), contains an altar-piece considered one of Luini's best works. There are also remains of a castle of the Visconti. Legnano is the seat of important cotton and silk industries, with machine-shops, boiler-works, and dyeing and printing of woven goods, and thread. Close by, the Lombard League defeated Frederick Barbarossa in 1176; a monument in commemoration of the battle was erected on the field in 1876, while there is another by Butti erected in 1900 in the Piazza Federico Barbarossa.

LEGOUVÉ, GABRIEL JEAN BAPTISTE ERNEST WILFRID (1807-1903), French dramatist, son of the poet Gabriel Legouvé (1764-1812), who wrote a pastoral *La Mort d'Abel* (1793) and a tragedy of *Epicharis et Néron*, was born in Paris on the 5th of February 1807. His mother died in 1810, and almost immediately afterwards his father was removed to a lunatic asylum. The child, however, inherited a considerable fortune, and was carefully educated. Jean Nicolas Bouilly (1763-1842) was his tutor, and early instilled into the young Legouvé a passion for literature, to which the example of his father and of his grandfather, J. B. Legouvé (1729-1783), predisposed him. As early as 1829 he carried away a prize of the French Academy for a poem on the discovery of printing; and in 1832 he published a curious little volume of verses, entitled *Les Morts Bizarres*. In those early days Legouvé brought out a succession of novels, of which *Edith de Falsen* enjoyed a considerable success. In 1847 he began the work by which he is best remembered, his contributions to the development and education of the female mind, by lecturing at the College of France on the moral history of women: these discourses were collected into a volume in 1848, and enjoyed a great success. Legouvé wrote considerably for the stage, and in 1849 he collaborated with A. E. Scribe in *Adrienne Lecouvreur*. In 1855 he brought out his tragedy of *Médée*, the success of which had much to do with his election to the French Academy. He succeeded to the fauteuil of J. A. Ancelot, and was received by Flourens, who dwelt on the plays of Legouvé as his principal claim to consideration. As time passed on, however, he became less prominent as a playwright, and more so as a lecturer and propagandist on woman's rights and the advanced education of children, in both of which directions he was a pioneer in French society. His *La Femme en France au XIX^me^ siècle* (1864), reissued, much enlarged, in 1878; his *Messieurs les enfants* (1868), his *Conférences Parisiennes* (1872), his *Nos filles et nos fils* (1877), and his *Une Éducation de jeune fille* (1884) were works of wide-reaching influence in the moral order. In 1886-1887 he published, in two volumes, his *Soixante ans de souvenirs*, an excellent specimen of autobiography. He was raised in 1887 to the highest grade of the Legion of Honour, and held for many years the post of inspector-general of female education in the national schools. Legouvé was always an advocate of physical training. He was long accounted one of the best shots in France, and although, from a conscientious objection, he never fought a duel, he made the art of fencing his life-long hobby. After the death of Désiré Nisard in 1888, Legouvé became the "father" of the French Academy. He died on the 14th of March 1903.

LEGROS, ALPHONSE (1837-), painter and etcher, was born at Dijon on the 8th of May 1837. His father was an accountant, and came from the neighbouring village of Veronnes. Young Legros frequently visited the farms of his relatives, and the peasants and landscapes of that part of France are the subjects of many of his pictures and etchings. He was sent to the art school at Dijon with a view to qualifying for a trade, and was apprenticed to Maître Nicolardo, house decorator and painter of images. In 1851 Legros left for Paris to take another situation; but passing through Lyons he worked for six months as journeyman wall-painter under the decorator Beuchot, who was painting the chapel of Cardinal Bonald in the cathedral. In Paris he studied with Cambon, scene-painter and decorator of theatres, an experience which developed a breadth of touch such as Stanfield and Cox picked up in similar circumstances. At this time he attended the drawing-school of Lecoq de Boisbaudran. In 1855 Legros attended the evening classes of the École des Beaux Arts, and perhaps gained there his love of drawing from the antique, some of the results of which may be seen in the Print Room of the British Museum. He sent two portraits to the Salon of 1857: one was rejected, and formed part of the exhibition of protest organized by Bonvin in his studio; the other, which was accepted, was a profile portrait of his father. This work was presented to the museum at Tours by the artist when his friend Cazin was curator. Champfleury saw the work in the Salon, and sought out the artist to enlist him in the small army of so-called "Realists," comprising (round the noisy glory of Courbet) all those who raised protest against the academical trifles of the degenerate

Romantics. In 1859 Legros's "Angelus" was exhibited, the first of those quiet church interiors, with kneeling figures of patient women, by which he is best known as a painter. "Ex Voto," a work of great power and insight, painted in 1861, now in the museum at Dijon, was received by his friends with enthusiasm, but it only obtained a mention at the Salon. Legros came to England in 1863, and in 1864 married Miss Frances Rosetta Hodgson. At first he lived by his etching and teaching. He then became teacher of etching at the South Kensington School of Art, and in 1876 Slade Professor at University College, London. He was naturalized as an Englishman in 1881, and remained at University College seventeen years. His influence there was exerted to encourage a certain distinction, severity and truth of character in the work of his pupils, with a simple technique and a respect for the traditions of the old masters, until then somewhat foreign to English art. He would draw or paint a torso or a head before the students in an hour or even less, so that the attention of the pupils might not be dulled. As students had been known to take weeks and even months over a single drawing, Legros ordered the positions of the casts in the Antique School to be changed once every week. In the painting school he insisted upon a good outline, preserved by a thin rub in of umber, and then the work was to be finished in a single painting, "*premier coup*." Experiments in all varieties of art work were practised; whenever the professor saw a fine example in the museum, or when a process interested him in a workshop, he never rested until he had mastered the technique and his students were trying their 'prentice hands at it. As he had casually picked up the art of etching by watching a comrade in Paris working at a commercial engraving, so he began the making of medals after a walk in the British Museum, studying the masterpieces of Pisanello, and a visit to the Cabinet des Médailles in Paris. Legros considered the traditional journey to Italy a very important part of artistic training, and in order that his students should have the benefit of such study he devoted a part of his salary to augment the income available for a travelling studentship. His later works, after he resigned his professorship in 1892, were more in the free and ardent manner of his early days—imaginative landscapes, castles in Spain, and farms in Burgundy, etchings like the series of "The Triumph of Death," and the sculptured fountains for the gardens of the duke of Portland at Welbeck.

Pictures and drawings by Legros, besides those already mentioned, may be seen in the following galleries and museums: "Amende Honorable," "Dead Christ," bronzes, medals and twenty-two drawings, in the Luxembourg, Paris; "Landscape," "Study of a Head," and portraits of Browning, Burne-Jones, Cassel, Huxley and Marshall, at the Victoria and Albert Museum, Kensington; "Femmes en prière," National Gallery of British Art; "The Tinker," and six other works from the Ionides Collection, bequeathed to South Kensington; "Christening," "Barricade," "The Poor at Meat," two portraits and several drawings and etchings, collection of Lord Carlisle; "Two Priests at the Organ," "Landscape" and etchings, collection of Rev. Stopford Brooke; "Head of a Priest," collection of Mr Vereker Hamilton; "The Weed-burner," some sculpture and a large collection of etchings and drawings, Mr Guy Knowles; "Psyche," collection of Mr L. W. Hodson; "Snow Scene," collection of Mr G. F. Watts, R.A.; thirty-five drawings and etchings, the Print Room, British Museum; "Jacob's Dream" and twelve drawings of the antique, Cambridge; "Saint Jerome," two studies of heads and some drawings, Manchester; "The Pilgrimage" and "Study made before the Class," Liverpool Walker Art Gallery; "Study of Heads," Peel Park Museum, Salford.

See Dr Hans W. Singer, "Alphonse Legros," *Die graphischen Künste* (1898); Léonce Bénédite, "Alphonse Legros," *Revue de l'art* (Paris, 1900); Cosmo Monkhouse, "Professor Legros," *Magazine of Art* (1882).

(C. H.*)

LEGUMINOSAE, the second largest family of seed-plants, containing about 430 genera with 7000 species. It belongs to the series Rosales of the Dicotyledons, and contains three well-marked suborders, Papilionatae, Mimosoideae and Caesalpinioideae. The plants are trees, shrubs or herbs of very various habit. The British representatives, all of which belong to the suborder Papilionatae, include a few shrubs, such as *Ulex* (gorse, furze), *Cytisus* (broom) and *Genista*, but the majority, and this applies to the suborder as a whole, are herbs, such as the clovers, *Medicago*, *Melilotus*, &c., sometimes climbing by aid of tendrils which are modified leaf-structures, as in *Lathyrus* and the vetches (*Vicia*). Scarlet runner (*Phaseolus multiflorus*) has a herbaceous twining stem. Woody climbers (lianes) are represented by species of *Bauhinia* (Caesalpinioideae), which with their curiously flattened twisted stems are characteristic features of tropical forests, and *Entada scandens* (Mimosoideae) also common in the tropics; these two suborders, which are confined to the warmer parts of the earth, consist chiefly of trees and shrubs such as *Acacia* and *Mimosa* belonging to the Mimosoideae, and the Judas tree of southern Europe (*Cercis*) and tamarind belonging to the Caesalpinioideae. The so-called acacia of European gardens (*Robinia Pseudacacia*) and laburnum are examples of the tree habit in the Papilionatae. Water plants are rare, but are represented by *Aeschynomene* and *Neptunia*, tropical genera. The roots of many species bear nodular swellings (tubercles), the cells of which contain bacterium-like bodies which have the power of fixing the nitrogen of the atmosphere in such a form as to make it available for plant food. Hence the value of these plants as a crop on poor soil or as a member of a series of rotation of crops, since they enrich the soil by the nitrogen liberated by the decay of their roots or of the whole plant if ploughed in as green manure.

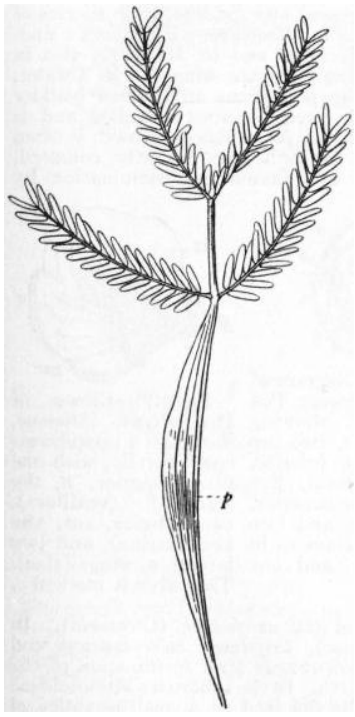
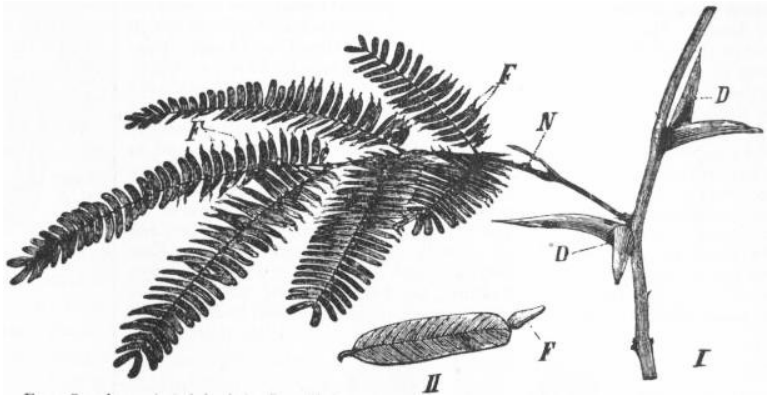


FIG. 1.—Leaf of an Acacia (*A. heterophylla*) showing flattened leaf-like petiole (phyllode), *p*, and bipinnate blade.

The leaves are alternate in arrangement and generally compound and stipulate. A common form is illustrated by the trefoil or clovers, which have three leaflets springing from a common point (digitately trifoliate); pinnate leaves are also frequent as in laburnum and *Robinia*. In Mimosoideae the leaves are generally bipinnate

(figs. 1, 2, 3). Rarely are the leaves simple as in *Bauhinia*. Various departures from the usual leaf-type occur in association with adaptations to different functions or environments. In leaf-climbers, such as pea or vetch, the end of the rachis and one or more pairs of leaflets are changed into tendrils. In gorse the leaf is reduced to a slender spine-like structure, though the leaves of the seedling have one to three leaflets. In many Australian acacias the leaf surface in the adult plant is much reduced, the petiole being at the same time flattened and enlarged (fig. 1), frequently the leaf is reduced to a petiole flattened in the vertical plane; by this means a minimum surface is exposed to the intense sunlight. In the garden pea the stipules are large and foliaceous, replacing the leaflets, which are tendrils; in *Robinia* the stipules are spiny and persist after leaf-fall. In some acacias (*q.v.*) the thorns are hollow, and inhabited by ants as in *A. sphaerocephala*, a central American plant (fig. 2) and others. In some species of *Astragalus*, *Onobrychis* and others, the leaf-stalk persists after the fall of the leaf and becomes hard and spiny.



From Strasburger's *Lehrbuch der Botanik*, by permission of Gustav Fischer.

FIG. 2.—*Acacia sphaerocephala.*

I, Leaf and part of stem; *D*, hollow thorns in which the ants live; *F*, food bodies at the apices of the lower pinnules; *N*, nectary on the petiole. (Reduced.)

II, Single pinnule with food-body, *F*. (Somewhat enlarged.)

Leaf-movements occur in many of the genera. Such are the sleep-movement in the clovers, runner bean (*Phaseolus*), *Robinia* and acacia, where the leaflets assume a vertical position at nightfall. Spontaneous movements are exemplified in the telegraph-plant (*Desmodium gyrans*), native of tropical Asia, where the small lateral leaflets move up and down every few minutes. The sensitive plant (*Mimosa pudica*) is an example of movement in response to contact, the leaves assuming a sleep-position if touched. The seat of the movement is the swollen base of the leaf-stalk, the so-called pulvinus (fig. 3).

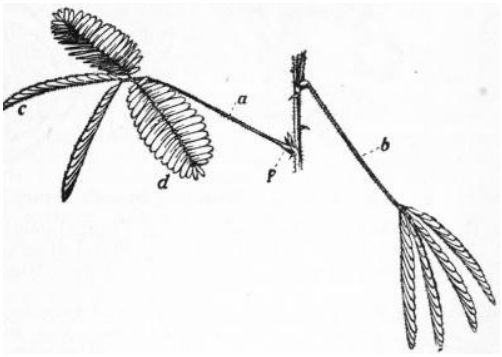


FIG. 3.—Branch with two leaves of the Sensitive Plant (*Mimosa pudica*), showing the petiole in its erect state, *a*, and in its depressed state, *b*; also the leaflets closed, *c*, and the leaflets expanded, *d*; *p*, pulvinus, the seat of the movement of the petiole.

The stem of the lianes shows some remarkable deviations from the normal in form and structure. In Papilionatae anomalous secondary thickening arises from the production of new cambium zones outside the original ring (*Mucuna*, *Wistaria*) forming concentric rings or transverse or broader strands; where, as in *Rhyncosia* the successive cambiums are active only at two opposite points, a flat ribbon-like stem is produced. The climbing *Bauhinias* (Caesalpinioideae) have a flattened stem with basin-like undulations; in some growth in thickness is normal, in others new cambium-zones are found concentrically, while in others new and distinct growth-centres, each with its cambium-zone, arise outside the primary zone. The climbing Mimosoideae show no anomalous growth in thickness, but in some cases the stem becomes strongly winged. Gum passages in the pith and medullary rays occur, especially in species of acacia and *Astragalus*; gum-arabic is an exudation from the branches of *Acacia Senegal*, gum-tragacanth from *Astragalus gummifer* and other species. Logwood is the coloured heartwood of *Haematoxylon campechianum*; red sandalwood of *Pterocarpus santalinus*.

The flowers are arranged in racemose inflorescences, such as the simple raceme (*Laburnum*, *Robinia*), which is condensed to a head in *Trifolium*; in *Acacia* and *Mimosa* the flowers are densely crowded (fig. 4). The flower is characterized by a hypogynous or slightly perigynous arrangement of parts, the anterior position of the odd sepal, the free petals, and the single median carpel with a terminal style, simple stigma and two alternating rows of ovules on the ventral suture of the ovary which faces the back of the flower.

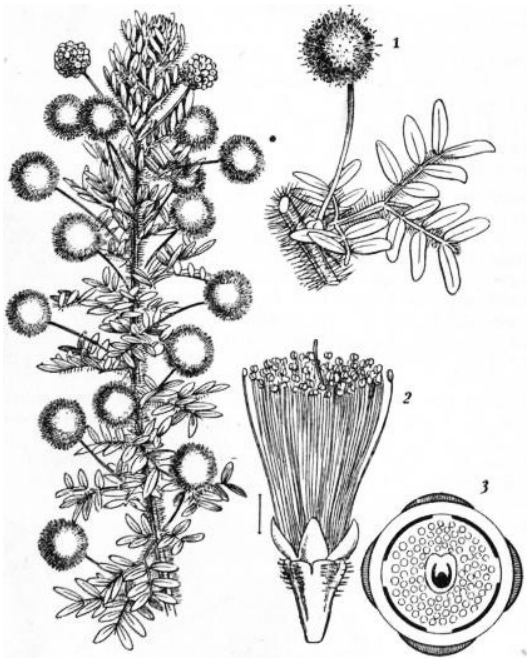


FIG. 4.—*Acacia obscura*, flowering branch about ⅓ natural size.

1, Part of stem with leaf and its subtended inflorescence, about natural size.
2, Flower, much enlarged.
3, Floral diagram of *Acacia latifolia*. (After Eichler.)

The arrangement of the petals and the number and cohesion of the stamens vary in the three suborders. In Mimosoideae, the smallest of the three, the flower is regular (fig. 4 [3]), and the sepals and petals have a valvate aestivation, and are generally pentamerous, but 3-6-merous flowers also occur. The sepals are more or less united into a cup (fig. 4 [2]), and the petals sometimes cohere at the base. The stamens vary widely in number and cohesion; in *Acacia* (fig. 4) they are indefinite and free, in the tribe *Ingeae*, indefinite and monadelphous, in other tribes as many or twice as many as the petals. Frequently, as in *Mimosa*, the long yellow stamens are the most conspicuous feature of the flower. In Caesalpinioideae (fig. 5) the flowers are zygomorphic in a median plane and generally pentamerous. The sepals are free, or the two upper ones united as in tamarind, and imbricate in aestivation, rarely as in the Judas-tree (fig. 5 [2]), valvate. The corolla shows great variety in form; it is imbricate in aestivation, the posterior petal being innermost. In *Cercis* (fig. 5) it clearly resembles the papilionaceous type; the odd petal stands erect, the median pair are reflexed and wing-like, and the lower pair enclose the essential organs. In *Cassia* all five petals are subequal and spreading; in *Amherstia* the anterior pair are small or absent while the three upper ones are large; in *Krameria*, the anterior pair are represented by glandular scales, and in *Tamarindus* are suppressed. Apetalous flowers occur in *Copaifera* and *Ceratonia*. The stamens, generally ten in number, are free, as in *Cercis* (fig. 5) or more or less united as in *Amherstia*, where the posterior one is free and the rest are united. In tamarind only three stamens are fertile. The largest suborder, Papilionatae, has a flower zygomorphic in the median plane (figs. 6, 7). The five sepals are generally united (figs. 7, 9), and have an ascending imbricate arrangement (fig. 6); the calyx is often two-lipped (fig. 9 [1]). The corolla has five unequal petals with a descending imbricate arrangement; the upper and largest, the standard (*vexillum*), stands erect, the lateral pair, the wings or *alae*, are long-clawed, while the anterior pair cohere to form the keel or *carina*, in which are enclosed the stamens and pistil. The ten stamens are monadelphous as in gorse or broom (fig. 9), or diadelphous as in sweet pea (fig. 8) (the posterior one being free), or almost or quite free; these differences are associated with differences in the methods of pollination. The ten stamens here, as in the last suborder, though arranged in a single whorl, arise in two series, the five opposite the sepals arising first.

The carpel is sometimes stalked and often surrounded at the base by a honey-secreting disk; the style is terminal and in the zygomorphic flowers is often curved and somewhat flattened with a definite back and front. Sometimes as in species of *Trifolium* and *Medicago* the ovules are reduced to one. The pod or legume splits along both sutures (fig. 10) into a pair of membranous, leathery or sometimes fleshy valves, bearing the seeds on the ventral suture. Dehiscence is often explosive, the valves separating elastically and twisting spirally, thus shooting out the seeds, as in gorse, broom and others. In *Desmodium*, *Entada* and others the pod is constricted between each seed, and breaks up into indehiscent one-seeded parts; it is then called a lomentum (fig. 11); in *Astragalus* it is divided by a longitudinal septum.

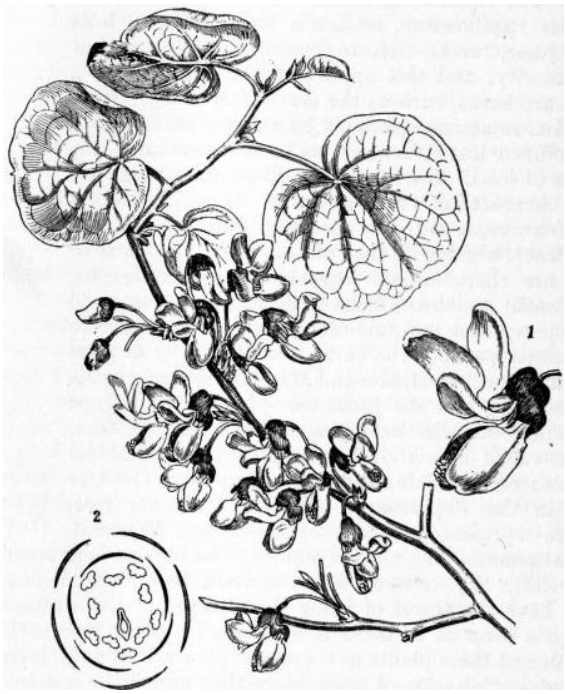


FIG. 5.—Flowering branch of Judas-tree (*Cercis siliquastrum*) reduced. 1, Flower, natural size. 2, Floral diagram.

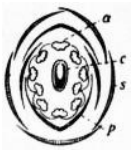


FIG. 6.—Diagram of Flower of Sweet Pea (*Lathyrus*), showing five sepals, *s*, two are superior, one inferior, and two lateral; five petals, *p*, one superior, two inferior, and two lateral; ten stamens in two rows, *a*, and one carpel, *c*.

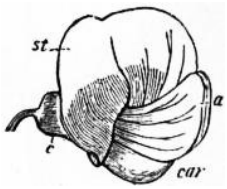


FIG. 7.—Flower of Pea (*Pisum sativum*), showing a papilionaceous corolla, with one petal superior, *st*, the standard (vexillum), two inferior, *car*, the keel (carina), and two lateral, *a*, wings (alae). The calyx is marked *c*.

The pods show a very great variety in form and size. Thus in the clovers they are a small fraction of an inch, while in the common tropical climber *Entada scandens* they are woody structures more than a yard long and several inches wide. They are generally more or less flattened, but sometimes round and rod-like, as in species of *Cassia*, or are spirally coiled as in *Medicago*. Indehiscent one-seeded pods occur in species of clover and in *Medicago*, also in *Dalbergia* and allied genera, where they are winged. In *Colutea*, the bladder-senna of gardens, the pod forms an inflated bladder which bursts under pressure; it often becomes detached and is blown some distance before bursting. An arillar outgrowth is often developed on the funicle, and is sometimes brightly coloured, rendering the seed conspicuous and favouring dissemination by birds; in such cases the seed-coat is hard. In other cases the hard seed-coat itself is bright-coloured as in the scarlet seeds of *Abrus precatorius*, the so-called weather-plant. Animals also act as the agents of distribution in the case of fleshy edible pods containing seeds with a hard smooth testa, which will pass uninjured through the body, as in tamarind and the fruit of the carob-tree (*Ceratonia*). In the ground-nut (*Arachis hypogaea*), *Trifolium subterraneum* and others, the flower-stalks grow downwards after fertilization of the ovules and bury the fruit in the earth. In the suborders Mimosoideae and Papilionatae the embryo fills the seed or a small quantity of endosperm occurs, chiefly round the radicle. In Caesalpinioideae endosperm is absent, or present forming a thin layer round the embryo as in the tribe *Bauhinieae*, or copious and cartilaginous as in the *Cassieae*. The embryo has generally flat leaf-like or fleshy cotyledons with a short radicle.

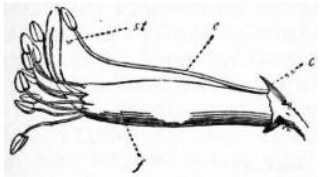


FIG. 8.—Stamens and Pistil of Sweet Pea (*Lathyrus*). The stamens are diadelphous, nine of them being united by their filaments *f*, while the uppermost one (*e*) is free; *st*, stigma, *c*, calyx.

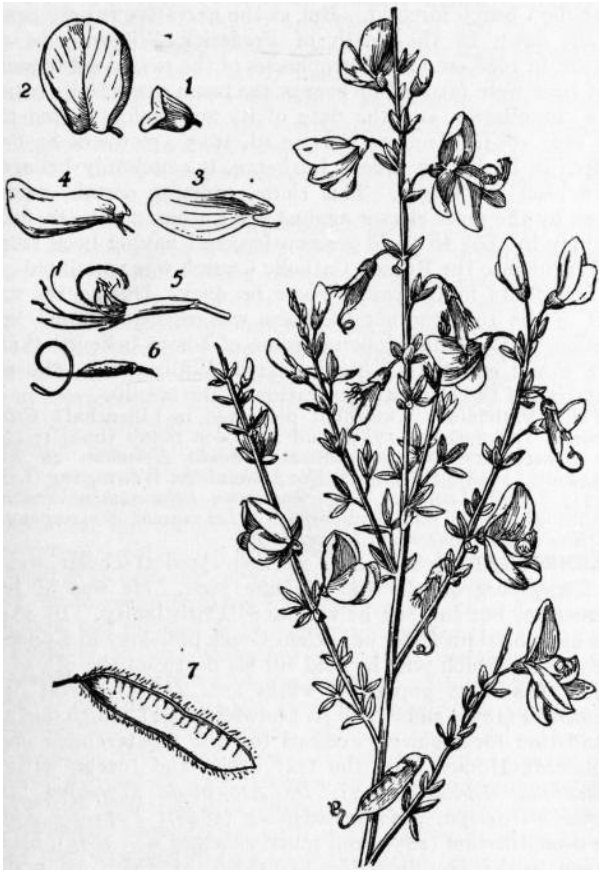
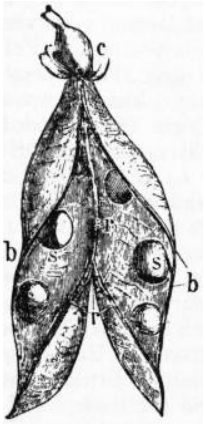


Fig. 9.—Broom (*Cytisus scoparius*). (2-7 slightly reduced.)

1, Calyx.
2, Standard.
3, Wing.
4, Keel.
5, Monadelphous stamens and style.
6, Pistil.
7, Pod.

Insects play an important part in the pollination of the flowers. In the two smaller suborders the stamens and stigma are freely exposed and the conspicuous coloured stamens serve as well as the petals to attract insects; in *Mimosa* and *Acacia* the flowers are crowded in conspicuous heads or spikes. The relation of insects to the flower has been carefully studied in the Papilionatae, chiefly in European species. Where honey is present it is secreted on the inside of the base of the stamens and accumulated in the base of the tube formed by the united filaments round the ovary. It is accessible only to insects with long probosces, such as bees. In these cases the posterior stamen is free, allowing access to the honey. The flowers stand more or less horizontally; the large erect white or coloured standard renders them conspicuous, the wings form a platform on which the insect rests and the keel encloses the stamens and pistil, protecting them from rain and the attacks of unbidden pollen-eating insects. In his book on the fertilization of flowers, Hermann Müller distinguishes four types of papilionaceous flowers according to the way in which the pollen is applied to the bee:

(1) Those in which the stamens and stigma return within the carina and thus admit of repeated visits, such are the clovers, *Melilotus* and laburnum. (2) Explosive flowers where stamens and style are confined within the keel under tension and the pressure of the insect causes their sudden release and the scattering of the pollen, as in broom and *Genista*; these contain no honey but are visited for the sake of the pollen. (3) The piston-mechanism as in bird's-foot trefoil (*Lotus corniculatus*), *Anthyllis*, *Ononis* and *Lupinus*, where the pressure of the bee upon the carina while probing for honey squeezes a narrow ribbon of pollen through the opening at the tip. The pollen has been shed into the cone-like tip of the carina, and the heads of the five outer stamens form a piston beneath it, pushing it out at the tip when pressure is exerted on the keel; a further pressure causes the protrusion of the stigma, which is thus brought in contact with the insect's belly. (4) The style bears a brush of hairs which sweeps small quantities of pollen out of the tip of the carina, as in *Lathyrus*, *Pisum*, *Vicia* and *Phaseolus*.



From Vines's *Students' Text-Book of Botany*, by permission of Swan, Sonnenschein & Co.

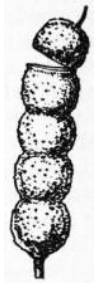


Fig. 11.—Lomentum or lomentaceous legume of a species of *Desmodium*. Each seed is contained in a separate cavity by the

Fig. 10.—Dry dehiscent Fruit. The pod (legume) of the Pea. *r*, The dorsal suture; *b*, the ventral; *c*, calyx; *s*, seeds.

folding inwards of the walls of the legume at equal intervals; the legume, when ripe, separates transversely into single-seeded portions or mericarps.

Leguminosae is a cosmopolitan order, and often affords a characteristic feature of the vegetation. Mimosoideae and Caesalpinioideae are richly developed in the tropical rain forests, where Papilionatae are less conspicuous and mostly herbaceous; in subtropical forests arborescent forms of all three suborders occur. In the temperate regions, tree-forms are rare—thus Mimosoideae are unrepresented in Europe; Caesalpinioideae are represented by species of *Cercis*, *Gymnocladus* and *Gleditschia*; Papilionatae by *Robinia*; but herbaceous Papilionatae abound and penetrate to the limit of growth of seed-plants in arctic and high alpine regions. Shrubs and undershrubs, such as *Ulex*, *Genista*, *Cytisus* are a characteristic feature in Europe and the Mediterranean area. Acacias are an important component of the evergreen bush-vegetation of Australia, together with genera of the tribe *Podalyrieae* of Papilionatae (*Chorizema*, *Oxylobium*, &c.). *Astragalus*, *Oxytropis*, *Hedysarum*, *Onobrychis*, and others are characteristic of the steppe-formations of eastern Europe and western Asia.

The order is a most important one economically. The seeds, which are rich in starch and proteids, form valuable foods, as in pea, the various beans, vetch, lentil, ground-nut (*Arachis*) and others; seeds of *Arachis* and others yield oils; those of *Physostigma venenosum*, the Calabar ordeal bean, contain a strong poison. Many are useful fodder-plants, as the clovers (*Trifolium*) (*q.v.*), Medicago (*e.g. M. sativa*, lucerne (*q.v.*), or alfalfa); *Melilotus*, *Vicia*, *Onobrychis* (*O. sativa* is sainfoin, *q.v.*); species of *Trifolium*, lupine and others are used as green manure. Many of the tropical trees afford useful timber; *Crotalaria*, *Sesbania*, *Aeschynomene* and others yield fibre; species of *Acacia* and *Astragalus* yield gum; *Copaifera*, *Hymenaea* and others balsams and resins; dyes are obtained from *Genista* (yellow), *Indigofera* (blue) and others; *Haematoxylon campechianum* is logwood; of medicinal value are species of *Cassia* (senna leaves) and *Astragalus*; *Tamarindus indica* is tamarind, *Glycyrrhiza glabra* yields liquorice root. Well-known ornamental trees and shrubs are *Cercis* (*C. siliquastrum* is the Judas-tree), *Gleditschia*, *Genista*, *Cytisus* (broom), *Colutea* (*C. arborescens* is bladder-senna), *Robinia* and *Acacia*; *Wisteria sinensis*, a native of China, is a well-known climbing shrub; *Phaseolus multiflorus* is the scarlet runner; *Lathyrus* (sweet and everlasting peas), *Lupinus*, *Galega* (goat's-rue) and others are herbaceous garden plants. *Ceratonia Siliqua* is the carob-tree of the Mediterranean, the pods of which (algaroba or St John's bread) contain a sweet juicy pulp and are largely used for feeding stock.

The order is well represented in Britain. Thus *Genista tinctoria* is dyers' greenweed, yielding a yellow dye; *G. anglica* is needle furze; other shrubs are *Ulex* (*U. europaeus*, gorse, furze or whin, *U. nanus*, a dwarf species) and *Cytisus scoparius*, broom. Herbaceous plants are *Ononis spinosa* (rest-harrow), *Medicago* (medick), *Melilotus* (melilot), *Trifolium* (the clovers), *Anthyllis Vulneraria* (kidney-vetch), *Lotus corniculatus* (bird's-foot trefoil), *Astragalus* (milk-vetch), *Vicia* (vetch, tare) and *Lathyrus*.

LÈGYA, called by the Shans Lai-Hka, a state in the central division of the southern Shan States of Burma, lying approximately between 20° 15′ and 21° 30′ N. and 97° 50′ and 98° 30′ E., with an area of 1433 sq. m. The population was estimated at 30,000 in 1881. On the downfall of King Thibaw civil war broke out, and reduced the population to a few hundreds. In 1901 it had risen again to 25,811. About seven-ninths of the land under cultivation consists of wet rice cultivation. A certain amount of upland rice is also cultivated, and cotton, sugar-cane and garden produce make up the rest; recently large orange groves have been planted in the west of the state. Laihka, the capital, is noted for its iron-work, both the iron and the implements made being produced at Pang Lōng in the west of the state. This and lacquer-ware are the chief exports, as also a considerable amount of pottery. The imports are chiefly cotton piece-goods and salt. The general character of the state is that of an undulating plateau, with a broad plain near the capital and along the Nam Tēng, which is the chief river, with a general altitude of a little under 3000 ft.

LEH, the capital of Ladakh, India, situated 4 m. from the right bank of the upper Indus 11,500 ft. above the sea, 243 m. from Srinagar and 482 m. from Yarkand. It is the great emporium of the trade which passes between India, Chinese Turkestan and Tibet. Here meet the routes leading from the central Asian khanates, Kashgar, Yarkand, Khotan and Lhasa. The two chief roads from Leh to India pass via Srinagar and through the Kulu valley respectively. Under a commercial treaty with the maharaja of Kashmir, a British officer is deputed to Leh to regulate and control the traders and the traffic, conjointly with the governor appointed by the Kashmir state. Lying upon the western border of Tibet, Leh has formed the starting-point of many an adventurous journey into that country, the best-known route being that called the Janglam, the great trade route to Lhasa and China, passing by the Manasarowar lakes and the Mariam La pass into the valley of the Tsanpo. Pop. (1901) 2079. A Moravian mission has long been established here, with an efficient little hospital. There is also a meteorological observatory, the most elevated in Asia, where the average mean temperature ranges from 19.3° in January to 64.4° in July. The annual rainfall is only 3 in.

LEHMANN, JOHANN GOTTLOB (?-1767), German mineralogist and geologist, was educated at Berlin where he took his degree of doctor of medicine. He became a teacher of mineralogy and mining in that city, and was afterwards (1761) appointed professor of chemistry and director of the imperial museum at St Petersburg. While distinguished for his chemical and mineralogical researches, he may also be regarded as one of the pioneers in geological investigation. Although he accepted the view of a universal deluge, he gave in 1756 careful descriptions of the rocks and stratified formations in Prussia, and introduced the now familiar terms Zechstein and Rothes Todtliegendes (Rothliegende) for subdivisions of the strata since grouped as Permian. His chief observations were published in *Versuch einer Geschichte von Flötz-Gebürgen, betreffend deren Entstehung, Lage, darinne befindliche Metallen, Mineralien und Fossilien* (1756). He died at St Petersburg on the 22nd of January 1767.

LEHMANN, PETER MARTIN ORLA (1810-1870), Danish statesman, was born at Copenhagen on the 15th of May 1810. Although of German extraction his sympathies were with the Danish national party and he contributed to the liberal journal the *Kjöbenhavnsposten* while he was a student of law at the university of Copenhagen, and from 1839 to 1842 edited, with Christian N. David, the *Fädrelandet*. In 1842 he was condemned to three months' imprisonment for a radical speech. He took a considerable part in the demonstrations of 1848, and was regarded as the leader of the "Eiderdänen," that is, of the party which regarded the Eider as the boundary of Denmark, and the duchy of Schleswig as an integral part of the kingdom. He entered the cabinet of Count A. W. Moltke in March 1848, and was employed on diplomatic missions to London and Berlin in connexion with the Schleswig-Holstein question. He was for some months in 1849 a prisoner of the Schleswig-Holsteiners at Gottorp. A member of the Folkething from 1851 to 1853, of the Landsthing from 1854 to 1870, and from 1856 to 1866 of the Reichsrat, he became minister of the interior in 1861 in the cabinet of K. C. Hall, retiring with him in 1863. He died at Copenhagen on the 13th of September 1870. His book *On the Causes of the Misfortunes of Denmark* (1864) went through many editions, and his posthumous works were published in 4 vols., 1872-1874.

See Reinhardt, *Orla Lehmann og hans samtid* (Copenhagen, 1871); J. Clausen, *Af O. Lehmanns Papirer* (Copenhagen, 1903).

LEHNIN, a village and health resort of Germany, in the Prussian province of Brandenburg, situated between two lakes, which are connected by the navigable Emster with the Havel, 12 m. S.W. from Potsdam, and with a station on the main line Berlin-Magdeburg, and a branch line to Grosskreuz. Pop. (1900) 2379. It contains the ruins of a Cistercian monastery called Himmelpfort am See, founded in 1180 and dissolved in 1542; a handsome parish church, formerly the monasterial chapel, restored in 1872-1877; and a fine statue of the emperor Frederick III. Boat-building and saw-milling are the chief industries.

See Heffter, *Geschichte des Klosters Lehnin* (Brandenburg, 1851); and Sello, *Lehnin, Beiträge zur Geschichte von Kloster und Amt* (Berlin, 1881).

The LEHNIN PROPHECY (*Lehninsche Weissagung, Vaticinium Lehninense*), a poem in 100 Leonine verses, reputed to be from the pen of a monk, Hermann of Lehnin, who lived about the year 1300, made its appearance about 1690 and caused much controversy. This so-called prophecy bewails the extinction of the Ascanian rulers of Brandenburg and the rise of the Hohenzollern dynasty to power; each successive ruler of the latter house down to the eleventh generation is described, the date of the extinction of the race fixed, and the restoration of the Roman Catholic Church foretold. But as the narrative is only exact in details down to the death of Frederick William, the great elector, in 1688, and as all prophecies of the period subsequent to that time were falsified by events, the poem came to be regarded as a compilation and the date of its authorship placed about the year 1684. Andreas Fromm (d. 1685), rector of St Peter's church in Berlin, an ardent Lutheran, is commonly believed to have been the forger. This cleric, resisting certain measures taken by the great elector against the Lutheran pastors, fled the country in 1668 to avoid prosecution, and having been received at Prague into the Roman Catholic Church was appointed canon of Leitmeritz in Bohemia, where he died. During the earlier part of the 19th century the poem was eagerly scanned by the enemies of the Hohenzollerns, some of whom believed that the race would end with King Frederick William III., the representative of the eleventh generation of the family.

The "Vaticinium" was first published in Lilienthal's *Gelehrtes Preussen* (Königsberg, 1723), and has been many times reprinted. See Boost, *Die Weissagungen des Mönchs Hermann zu Lehnin* (Augsburg, 1848); Hilgenfeld, *Die Lehninische Weissagung* (Leipzig, 1875); Sabell, *Literatur der sogenannten Lehninschen Weissagung* (Heilbronn, 1879) and Kampers, *Die Lehninsche Weissagung über das Haus Hohenzollern* (Münster, 1897).

LEHRS, KARL (1802-1878), German classical scholar, was born at Königsberg on the 2nd of June 1802. He

was of Jewish extraction, but in 1822 he embraced Christianity. In 1845 he was appointed professor of ancient Greek philology in Königsberg University, which post he held till his death on the 9th of June 1878. His most important works are: *De Aristarchi Studiis Homericis* (1833, 2nd ed. by A. Ludwich, 1882), which laid a new foundation for Homeric exegesis (on the Aristarchean lines of explaining Homer from the text itself) and textual criticism; *Quaestiones Epicae* (1837); *De Asclepiade Myrleano* (1845); *Herodiani Scripta Tria emendatiora* (1848); *Populäre Aufsätze aus dem Altertum* (1856, 2nd much enlarged ed., 1875), his best-known work; *Horatius Flaccus* (1869), in which, on aesthetic grounds, he rejected many of the odes as spurious; *Die Pindarscholien* (1873). Lehrs was a man of very decided opinions, "one of the most masculine of German scholars"; his enthusiasm for everything Greek led him to adhere firmly to the undivided authorship of the *Iliad*; comparative mythology and the symbolical interpretation of myths he regarded as a species of sacrilege.

See the exhaustive article by L. Friedländer in *Allgemeine Deutsche Biographie*, xviii.; E. Kammer in C. Bursian's *Jahresbericht* (1879); A. Jung, *Zur Erinnerung an Karl Lehrs* (progr. Meseritz, 1880); A. Ludwich edited Lehrs' select correspondence (1894) and his *Kleine Schriften* (1902).

LEIBNITZ (Leibniz), GOTTFRIED WILHELM (1646-1716), German philosopher, mathematician and man of affairs, was born on the 1st of July 1646 at Leipzig, where his father was professor of moral philosophy. Though the name Leibniz, Leibnitz or Lubeniecz was originally Slavonic, his ancestors were German, and for three generations had been in the employment of the Saxon government. Young Leibnitz was sent to the Nicolai school at Leipzig, but, from 1652 when his father died, seems to have been for the most part his own teacher. From his father he had acquired a love of historical study. The German books at his command were soon read through, and with the help of two Latin books—the *Thesaurus Chronologicus* of Calvisius and an illustrated edition of Livy—he learned Latin at the age of eight. His father's library was now thrown open to him, to his great joy, with the permission, "Tolle, lege." Before he was twelve he could read Latin easily and had begun Greek; he had also remarkable facility in writing Latin verse. He next turned to the study of logic, attempting already to reform its doctrines, and zealously reading the scholastics and some of the Protestant theologians.

At the age of fifteen, he entered the university of Leipzig as a law student. His first two years were devoted to philosophy under Jakob Thomasius, a Neo-Aristotelian, who is looked upon as having founded the scientific study of the history of philosophy in Germany. It was at this time probably that he first made acquaintance with the modern thinkers who had already revolutionized science and philosophy, Francis Bacon, Cardan and Campanella, Kepler, Galileo and Descartes; and he began to consider the difference between the old and new ways of regarding nature. He resolved to study mathematics. It was not, however, till the summer of 1663, which he spent at Jena under E. Weigel, that he obtained the instructions of a mathematician of repute; nor was the deeper study of mathematics entered upon till his visit to Paris and acquaintance with Huygens many years later.

The next three years he devoted to legal studies, and in 1666 applied for the degree of doctor of law, with a view to obtaining the post of assessor. Being refused on the ground of his youth he left his native town for ever. The doctor's degree refused him there was at once (November 5, 1666) conferred on him at Altdorf—the university town of the free city of Nuremberg—where his brilliant dissertation procured him the immediate offer of a professor's chair. This, however, he declined, having, as he said, "very different things in view."

Leibnitz, not yet twenty-one years of age, was already the author of several remarkable essays. In his bachelor's dissertation *De principio individui* (1663), he defended the nominalistic doctrine that individuality is constituted by the whole entity or essence of a thing; his arithmetical tract *De complexionibus*, published in an extended form under the title *De arte combinatoria* (1666), is an essay towards his life-long project of a re-formed symbolism and method of thought; and besides these there are our juridical essays, including the *Nova methodus docendi discendique juris*, written in the intervals of his journey from Leipzig to Altdorf. This last essay is remarkable, not only for the reconstruction it attempted of the *Corpus Juris*, but as containing the first clear recognition of the importance of the historical method in law. Nuremberg was a centre of the Rosicrucians, and Leibnitz, busying himself with writings of the alchemists, soon gained such a knowledge of their tenets that he was supposed to be one of the secret brotherhood, and was even elected their secretary. A more important result of his visit to Nuremberg was his acquaintance with Johann Christian von Boyneburg (1622-1672), formerly first minister to the elector of Mainz, and one of the most distinguished German statesmen of the day. By his advice Leibnitz printed his *Nova methodus* in 1667, dedicated it to the elector, and, going to Mainz, presented it to him in person. It was thus that Leibnitz entered the service of the elector of Mainz, at first as an assistant in the revision of the statute-book, afterwards on more important work.

The policy of the elector, which the pen of Leibnitz was now called upon to promote, was to maintain the security of the German empire, threatened on the west by the aggressive power of France, on the east by Turkey and Russia. Thus when in 1669 the crown of Poland became vacant, it fell to Leibnitz to support the claims of the German candidate, which he did in his first political writing, *Specimen demonstrationum politicarum pro rege Polonorum eligendo*, attempting, under the guise of a Catholic Polish nobleman, to show by mathematical demonstration that it was necessary in the interest of Poland that it should have the count palatine of Neuburg as its king. But neither the diplomatic skill of Boyneburg, who had been sent as plenipotentiary to the election at Warsaw, nor the arguments of Leibnitz were successful, and a Polish prince was elected to fill the vacant throne.

A greater danger threatened Germany in the aggressions of Louis XIV. (see France: *History*). Though Holland was in most immediate danger, the seizure of Lorraine in 1670 showed that Germany too was threatened. It was in this year that Leibnitz wrote his *Thoughts on Public Safety*,[1] in which he urged the formation of a new "Rheinbund" for the protection of Germany, and contended that the states of Europe should employ their power, not against one another, but in the conquest of the non-Christian world, in which Egypt, "one of the best situated lands in the world," would fall to France. The plan thus proposed of averting the threatened attack on Germany by a French expedition to Egypt was discussed with Boyneburg, and obtained the approval of the elector. French relations with Turkey were at the time so strained as to make a breach imminent, and at the close of 1671, about

the time when the war with Holland broke out, Louis himself was approached by a letter from Boyneburg and a short memorial from the pen of Leibnitz, who attempted to show that Holland itself, as a mercantile power trading with the East, might be best attacked through Egypt, while nothing would be easier for France or would more largely increase her power than the conquest of Egypt. On February 12, 1672, a request came from the French secretary of state, Simon Arnauld de Pomponne (1618-1699), that Leibnitz should go to Paris. Louis seems still to have kept the matter in view, but never granted Leibnitz the personal interview he desired, while Pomponne wrote, "I have nothing against the plan of a holy war, but such plans, you know, since the days of St Louis, have ceased to be the fashion." Not yet discouraged, Leibnitz wrote a full account of his project for the king,[2] and a summary of the same[3] evidently intended for Boyneburg. But Boyneburg died in December 1672, before the latter could be sent to him. Nor did the former ever reach its destination. The French quarrel with the Porte was made up, and the plan of a French expedition to Egypt disappeared from practical politics till the time of Napoleon. The history of this scheme, and the reason of Leibnitz's journey to Paris, long remained hidden in the archives of the Hanoverian library. It was on his taking possession of Hanover in 1803 that Napoleon learned, through the *Consilium Aegyptiacum*, that the idea of a French conquest of Egypt had been first put forward by a German philosopher. In the same year there was published in London an account of the *Justa dissertatio*[4] of which the British Government had procured a copy in 1799. But it was only with the appearance of the edition of Leibnitz's works begun by Onno Klopp in 1864 that the full history of the scheme was made known.

Leibnitz had other than political ends in view in his visit to France. It was as the centre of literature and science that Paris chiefly attracted him. Political duties never made him lose sight of his philosophical and scientific interests. At Mainz he was still busied with the question of the relation between the old and new methods in philosophy. In a letter to Jakob Thomasius (1669) he contends that the mechanical explanation of nature by magnitude, figure and motion alone is not inconsistent with the doctrines of Aristotle's *Physics*, in which he finds more truth than in the *Meditations* of Descartes. Yet these qualities of bodies, he argues in 1668 (in an essay published without his knowledge under the title *Confessio naturae contra atheistas*), require an incorporeal principle, or God, for their ultimate explanation. He also wrote at this time a defence of the doctrine of the Trinity against Wissowatius (1669), and an essay on philosophic style, introductory to an edition of the *Anti-barbarus* of Nizolius (1670). Clearness and distinctness alone, he says, are what makes a philosophic style, and no language is better suited for this popular exposition than the German. In 1671 he issued a *Hypothesis physica nova*, in which, agreeing with Descartes that corporeal phenomena should be explained from motion, he carried out the mechanical explanation of nature by contending that the original of this motion is a fine aether, similar to light, or rather constituting it, which, penetrating all bodies in the direction of the earth's axis, produces the phenomena of gravity, elasticity, &c. The first part of the essay, on concrete motion, was dedicated to the Royal Society of London, the second, on abstract motion, to the French Academy.

At Paris Leibnitz met with Arnauld, Malebranche and, more important still, with Christian Huygens. This was pre-eminently the period of his mathematical and physical activity. Before leaving Mainz he was able to announce[5] an imposing list of discoveries, and plans for discoveries, arrived at by means of his new logical art, in natural philosophy, mathematics, mechanics, optics, hydrostatics, pneumatics and nautical science, not to speak of new ideas in law, theology and politics. Chief among these discoveries was that of a calculating machine for performing more complicated operations than that of Pascal—multiplying, dividing and extracting roots, as well as adding and subtracting. This machine was exhibited to the Academy of Paris and to the Royal Society of London, and Leibnitz was elected a fellow of the latter society in April 1673.[6] In January of this year he had gone to London as an attaché on a political mission from the elector of Mainz, returning in March to Paris, and while in London had become personally acquainted with Oldenburg, the secretary of the Royal Society, with whom he had already corresponded, with Boyle the chemist and Pell the mathematician. It is from this period that we must date the impulse that directed him anew to mathematics. By Pell he had been referred to Mercator's *Logarithmotechnica* as already containing some numerical observations which Leibnitz had thought original on his own part; and, on his return to Paris, he devoted himself to the study of higher geometry under Huygens, entering almost at once upon the series of investigations which culminated in his discovery of the differential and integral calculus (see Infinitesimal Calculus).

Shortly after his return to Paris in 1673, Leibnitz ceased to be in the Mainz service any more than in name, but in the same year entered the employment of Duke John Frederick of Brunswick-Lüneburg, with whom he had corresponded for some time. In 1676 he removed at the duke's request to Hanover, travelling thither by way of London and Amsterdam. At Amsterdam he saw and conversed with Spinoza, and carried away with him extracts from the latter's unpublished *Ethica*.

For the next forty years, and under three successive princes, Leibnitz was in the service of the Brunswick family, and his headquarters were at Hanover, where he had charge of the ducal library. Leibnitz thus passed into a political atmosphere formed by the dynastic aims of the typical German state (see Hanover; Brunswick). He supported the claim of Hanover to appoint an ambassador at the congress of Nimeguen (1676)[7] to defend the establishment of primogeniture in the Lüneburg branch of the Brunswick family; and, when the proposal was made to raise the duke of Hanover to the electorate, he had to show that this did not interfere with the rights of the duke of Württemberg. In 1692 the duke of Hanover was made elector. Before, and with a view to this, Leibnitz had been employed by him to write the history of the Brunswick-Lüneburg family, and, to collect material for his history, had undertaken a journey through Germany and Italy in 1687-1690, visiting and examining the records in Marburg, Frankfort-on-the-Main, Munich, Vienna (where he remained nine months), Venice, Modena and Rome. At Rome he was offered the custodianship of the Vatican library on condition of his joining the Catholic Church.

About this time, too, his thoughts and energies were partly taken up with the scheme for the reunion of the Catholic and Protestant Churches. At Mainz he had joined in an attempt made by the elector and Boyneburg to bring about a reconciliation, and now, chiefly through the energy and skill of the Catholic Royas de Spinola, and from the spirit of moderation which prevailed among the theologians he met with at Hanover in 1683, it almost seemed as if some agreement might be arrived at. In 1686 Leibnitz wrote his *Systema theologicum*,[8] in which he strove to find common ground for Protestants and Catholics in the details of their creeds. But the English revolution of 1688 interfered with the scheme in Hanover, and it was soon found that the religious difficulties were greater than had at one time appeared. In the letters to Leibnitz from Bossuet, the landgrave of Hessen-Rheinfels, and Madame de Brinon, the aim is obviously to make converts to Catholicism, not to arrive at a compromise with Protestantism, and when it was found that Leibnitz refused to be converted the correspondence ceased. A further scheme of church union in which Leibnitz was engaged, that between the Reformed and

Lutheran Churches, met with no better success.

Returning from Italy in 1690, Leibnitz was appointed librarian at Wolfenbüttel by Duke Anton of Brunswick-Wolfenbüttel. Some years afterwards began his connexion with Berlin through his friendship with the electress Sophie Charlotte of Brandenburg and her mother the princess Sophie of Hanover. He was invited to Berlin in 1700, and on the 11th July of that year the academy (Akademie der Wissenschaften) he had planned was founded, with himself as its president for life. In the same year he was made a privy councillor of justice by the elector of Brandenburg. Four years before he had received a like honour from the elector of Hanover, and twelve years afterwards the same distinction was conferred upon him by Peter the Great, to whom he gave a plan for an academy at St Petersburg, carried out after the czar's death. After the death of his royal pupil in 1705 his visits to Berlin became less frequent and less welcome, and in 1711 he was there for the last time. In the following year he undertook his fifth and last journey to Vienna, where he stayed till 1714. An attempt to found an academy of science there was defeated by the opposition of the Jesuits, but he now attained the honour he had coveted of an imperial privy councillorship (1712), and, either at this time or on a previous occasion (1709), was made a baron of the empire (*Reichsfreiherr*). Leibnitz returned to Hanover in September 1714, but found the elector George Louis had already gone to assume the crown of England. Leibnitz would gladly have followed him to London, but was bidden to remain at Hanover and finish his history of Brunswick.

During the last thirty years Leibnitz had been busy with many matters. Mathematics, natural science,[9] philosophy, theology, history jurisprudence, politics (particularly the French wars with Germany, and the question of the Spanish succession), economics and philology, all gained a share of his attention; almost all of them he enriched with original observations.

His genealogical researches in Italy—through which he established the common origin of the families of Brunswick and Este—were not only preceded by an immense collection of historical sources, but enabled him to publish materials for a code of international law.[10] The history of Brunswick itself was the last work of his life, and had covered the period from 768 to 1005 when death ended his labours. But the government, in whose service and at whose order the work had been carried out, left it in the archives of the Hanover library till it was published by Pertz in 1843.

It was in the years between 1690 and 1716 that Leibnitz's chief philosophical works were composed, and during the first ten of these years the accounts of his system were, for the most part, preliminary sketches. Indeed, he never gave a full and systematic account of his doctrines. His views have to be gathered from letters to friends, from occasional articles in the *Acta Eruditorum*, the *Journal des Savants*, and other journals, and from one or two more extensive works. It is evident, however, that philosophy had not been entirely neglected in the years in which his pen was almost solely occupied with other matters. A letter to the duke of Brunswick, and another to Arnauld, in 1671, show that he had already reached his new notion of substance; but it is in the correspondence with Antoine Arnauld, between 1686 and 1690, that his fundamental ideas and the reasons for them are for the first time made clear. The appearance of Locke's *Essay* in 1690 induced him (1696) to note down his objections to it, and his own ideas on the same subjects. In 1703-1704 these were worked out in detail and ready for publication, when the death of the author whom they criticized prevented their appearance (first published by Raspe, 1765). In 1710 appeared the only complete and systematic philosophical work of his lifetime, *Essais de Théodicée sur la bonté de Dieu, la liberté de l'homme, et l'origine du mal*, originally undertaken at the request of the late queen of Prussia, who had wished a reply to Bayle's opposition of faith and reason. In 1714 he wrote, for Prince Eugene of Savoy, a sketch of his system under the title of *La Monadologie*, and in the same year appeared his *Principes de la nature et de la grâce*. The last few years of his life were perhaps more occupied with correspondence than any others, and, in a philosophical regard, were chiefly notable for the letters, which, through the desire of the new queen of England, he interchanged with Clarke, *sur Dieu, l'âme, l'espace, la durée*.

Leibnitz died on the 14th of November 1716, his closing years enfeebled by disease, harassed by controversy, embittered by neglect; but to the last he preserved the indomitable energy and power of work to which is largely due the position he holds as, more perhaps than any one in modern times, a man of almost universal attainments and almost universal genius. Neither at Berlin, in the academy which he had founded, nor in London, whither his sovereign had gone to rule, was any notice taken of his death. At Hanover, Eckhart, his secretary, was his only mourner; "he was buried," says an eyewitness, "more like a robber than what he really was, the ornament of his country."[11] Only in the French Academy was the loss recognized, and a worthy eulogium devoted to his memory (November 13, 1717). The 200th anniversary of his birth was celebrated in 1846, and in the same year were opened the Königlichsächsische Gesellschaft der Wissenschaften and the Kaiserliche Akademie der Wissenschaften in Leipzig and Vienna respectively. In 1883, a statue was erected to him at Leipzig.

Leibnitz possessed a wonderful power of rapid and continuous work. Even in travelling his time was employed in solving mathematical problems. He is described as moderate in his habits, quick of temper but easily appeased, charitable in his judgments of others, and tolerant of differences of opinion, though impatient of contradiction on small matters. He is also said to have been fond of money to the point of covetousness; he was certainly desirous of honour, and felt keenly the neglect in which his last years were passed.

Philosophy.—The central point in the philosophy of Leibnitz was only arrived at after many advances and corrections in his opinions. This point is his new doctrine of substance (p. 702),[12] and it is through it that unity is given to the succession of occasional writings, scattered over fifty years, in which he explained his views. More inclined to agree than to differ with what he read (p. 425), and borrowing from almost every philosophical system, his own standpoint is yet most closely related to that of Descartes, partly as consequence, partly by way of opposition. Cartesianism, Leibnitz often asserted, is the ante-room of truth, but the ante-room only. Descartes's separation of things into two heterogeneous substances only connected by the omnipotence of God, and the more logical absorption of both by Spinoza into the one divine substance, followed from an erroneous conception of what the true nature of substance is. Substance, the ultimate reality, can only be conceived as force. Hence Leibnitz's metaphysical view of the monads as simple, percipient, self-active beings, the constituent elements of all things, his physical doctrines of the reality and constancy of force at the same time that space, matter and motion are merely phenomenal, and his psychological conception of the continuity and development of consciousness. In the closest connexion with the same stand his logical principles of consistency and sufficient reason, and the method he developed from them, his ethical end of perfection, and his crowning theological conception of the universe as the best possible world, and of God both as its efficient cause and its final harmony.

The ultimate elements of the universe are, according to Leibnitz, individual centres of force or monads. Why

they should be individual, and not manifestations of one world-force, he never clearly proves.[13] His doctrine of individuality seems to have been arrived at, not by strict deduction from the nature of force, but rather from the empirical observation that it is by the manifestation of its activity that the separate existence of the individual becomes evident; for his system individuality is as fundamental as activity. "The monads," he says, "are the very atoms of nature—in a word, the elements of things," but, as centres of force, they have neither parts, extension nor figure (p. 705). Hence their distinction from the atoms of Democritus and the materialists. They are metaphysical points or rather spiritual beings whose very nature it is to act. As the bent bow springs back of itself, so the monads naturally pass and are always passing into action without any aid but the absence of opposition (p. 122). Nor do they, like the atoms, act upon one another (p. 680); the action of each excludes that of every other. The activity of each is the result of its own past state, the determinator of its own future (pp. 706, 722). "The monads have no windows by which anything may go in or out" (p. 705).

Further, since all substances are of the nature of force, it follows that—"in imitation of the notion which we have of souls"—they must contain something analogous to feeling and appetite. It is the nature of the monad to represent the many in one, and this is perception, by which external events are mirrored internally (p. 438). Through their own activity the monads mirror the universe (p. 725), but each in its own way and from its own point of view, that is, with a more or less perfect perception (p. 127); for the Cartesians were wrong in ignoring the infinite grades of perception, and identifying it with the reflex cognizance of it which may be called apperception. Every monad is thus a microcosm, the universe in little,[14] and according to the degree of its activity is the distinctness of its representation of the universe (p. 709). Thus Leibnitz, borrowing the Aristotelian term, calls the monads *entelechies*, because they have a certain perfection (τὸ ἐντελές) and sufficiency (αὐτάρκεια) which make them sources of their internal actions and, so to speak, incorporeal automata (p. 706). That the monads are not pure entelechies is shown by the differences amongst them. Excluding all external limitation, they are yet limited by their own nature. All created monads contain a passive element or *materia prima* (pp. 440, 687, 725), in virtue of which their perceptions are more or less confused. As the activity of the monad consists in perception, this is inhibited by the passive principle, so that there arises in the monad an appetite or tendency to overcome the inhibition and become more perceptive, whence follows the change from one perception to another (pp. 706, 714). By the proportion of activity to passivity in it one monad is differentiated from another. The greater the amount of activity or of distinct perceptions the more perfect is the monad; the stronger the element of passivity, the more confused its perceptions, the less perfect is it (p. 709). The soul would be a divinity had it nothing but distinct perceptions (p. 520).

The monad is never without a perception; but, when it has a number of little perceptions with no means of distinction, a state similar to that of being stunned ensues, the *monade nue* being perpetually in this state (p. 707). Between this and the most distinct perception there is room for an infinite diversity of nature among the monads themselves. Thus no one monad is exactly the same as another; for, were it possible that there should be two identical, there would be no sufficient reason why God, who brings them into actual existence, should put one of them at one definite time and place, the other at a different time and place. This is Leibnitz's principle of the *identity of indiscernibles* (pp. 277, 755); by it his early problem as to the principle of individuation is solved by the distinction between genus and individual being abolished, and every individual made *sui generis*. The principle thus established is formulated in Leibnitz's law of continuity, founded, he says, on the doctrine of the mathematical infinite, essential to geometry, and of importance in physics (pp. 104, 105), in accordance with which there is neither vacuum nor break in nature, but "everything takes place by degrees" (p. 392), the different species of creatures rising by insensible steps from the lowest to the most perfect form (p. 312).

As in every monad each succeeding state is the consequence of the preceding, and as it is of the nature of every monad to mirror or represent the universe, it follows (p. 774) that the perceptive content of each monad is in "accord" or correspondence with that of every other (cf. p. 127), though this content is represented with infinitely varying degrees of perfection. This is Leibnitz's famous doctrine of pre-established harmony, in virtue of which the infinitely numerous independent substances of which the world is composed are related to each other and form one universe. It is essential to notice that it proceeds from the very nature of the monads as percipient, self-acting beings, and not from an arbitrary determination of the Deity.

From this harmony of self-determining percipient units Leibnitz has to explain the world of nature and mind. As everything that really exists is of the nature of spiritual or metaphysical points (p. 126), it follows that space and matter in the ordinary sense can only have a phenomenal existence (p. 745), being dependent not on the nature of the monads themselves but on the way in which they are perceived. Considering that several things exist at the same time and in a certain order of co-existence, and mistaking this constant relation for something that exists outside of them, the mind forms the confused perception of space (p. 768). But space and time are merely relative, the former an order of coexistences, the latter of successions (pp. 682, 752). Hence not only the secondary qualities of Descartes and Locke, but their so-called primary qualities as well, are merely phenomenal (p. 445). The monads are really without position or distance from each other; but, as we perceive several simple substances, there is for us an aggregate or extended mass. Body is thus active extension (pp. 110, 111). The unity of the aggregate depends entirely on our perceiving the monads composing it together. There is no such thing as an absolute vacuum or empty space, any more than there are indivisible material units or atoms from which all things are built up (pp. 126, 186, 277). Body, corporeal mass, or, as Leibnitz calls it, to distinguish it from the *materia prima* of which every monad partakes (p. 440), *materia secunda*, is thus only a "phenomenon bene fundatum" (p. 436). It is not a *substantia* but *substantiae* or *substantiatum* (p. 745). While this, however, is the only view consistent with Leibnitz's fundamental principles, and is often clearly stated by himself, he also speaks at other times of the *materia secunda* as itself a composite substance, and of a real metaphysical bond between soul and body. But these expressions occur chiefly in the letters to des Bosses, in which Leibnitz is trying to reconcile his views with the doctrines of the Roman Catholic Church, especially with that of the real presence in the Eucharist, and are usually referred to by him as doctrines of faith or as hypothetical (see especially p. 680). The true vinculum *substantiale* is not the *materia secunda*, which a consistent development of Leibnitz's principles can only regard as phenomenal, but the *materia prima*, through which the monads are individualized and distinguished and their connexion rendered possible. And Leibnitz seems to recognize that the opposite assumption is inconsistent with his cardinal metaphysical view of the monads as the only realities.

From Leibnitz's doctrine of force as the ultimate reality it follows that his view of nature must be throughout dynamical. And though his project of a *dynamic*, or theory of natural philosophy, was never carried out, the outlines of his own theory and his criticism of the mechanical physics of Descartes are known to us. The whole distinction between the two lies in the difference between the mechanical and the dynamical views of nature. Descartes started from the reality of extension as constituting the nature of material substance, and found in magnitude, figure and motion the explanation of the material universe. Leibnitz, too, admitted the mechanical view of nature as giving the laws of corporeal phenomena (p. 438), applying also to everything that takes place in

animal organisms,[15] even the human body (p. 777). But, as phenomenal, these laws must find their explanation in metaphysics, and thus in final causes (p. 155). All things, he says (in his *Specimen Dynamicum*), can be explained either by efficient or by final causes. But the latter method is not appropriate to individual occurrences,[16] though it must be applied when the laws of mechanism themselves need explanation (p. 678). For Descartes's doctrine of the constancy of the quantity of motion (*i.e.* momentum) in the world Leibnitz substitutes the principle of the conservation of *vis viva*, and contends that the Cartesian position that motion is measured by velocity should be superseded by the law that moving force (*vis motrix*) is measured by the square of the velocity (pp. 192, 193). The long controversy raised by this criticism was really caused by the ambiguity of the terms employed. The principles held by Descartes and Leibnitz were both correct, though different, and their conflict only apparent. Descartes's principle is now enunciated as the conservation of momentum, that of Leibnitz as the conservation of energy. Leibnitz further criticizes the Cartesian view that the mind can alter the direction of motion though it cannot initiate it, and contends that the quantity of "*vis directiva*," estimated between the same parts, is constant (p. 108) —a position developed in his statical theorem for determining geometrically the resultant of any number of forces acting at a point.

Like the monad, body, which is its analogue, has a passive and an active element. The former is the capacity of resistance, and includes impenetrability and inertia; the latter is active force (pp. 250, 687). Bodies, too, like the monads, are self-contained activities, receiving no impulse from without—it is only by an accommodation to ordinary language that we speak of them as doing so—but moving themselves in harmony with each other (p. 250).

The psychology of Leibnitz is chiefly developed in the *Nouveaux essais sur l'entendement humain*, written in answer to Locke's famous *Essay*, and criticizing it chapter by chapter. In these essays he worked out a theory of the origin and development of knowledge in harmony with his metaphysical views, and thus without Locke's implied assumption of the mutual influence of soul and body. When one monad in an aggregate perceives the others so clearly that they are in comparison with it bare monads (*monades nues*), it is said to be the ruling monad of the aggregate, not because it actually does exert an influence over the rest, but because, being in close correspondence with them, and yet having so much clearer perception, it seems to do so (p. 683). This monad is called the entelechy or soul of the aggregate or body, and as such mirrors the aggregate in the first place and the universe through it (p. 710). Each soul or entelechy is surrounded by an infinite number of monads forming its body (p. 714); soul and body together make a living being, and, as their laws are in perfect harmony—a harmony established between the whole realm of final causes and that of efficient causes (p. 714)—we have the same result as if one influenced the other. This is further explained by Leibnitz in his well-known illustration of the different ways in which two clocks may keep exactly the same time. The machinery of the one may actually move that of the other, or whenever one moves the mechanician may make a similar alteration in the other, or they may have been so perfectly constructed at first as to continue to correspond at every instant without any further influence (pp. 133, 134). The first way represents the common (Locke's) theory of mutual influence, the second the method of the occasionalists, the third that of pre-established harmony. Thus the body does not act on the soul in the production of cognition, nor the soul on the body in the production of motion. The body acts just as if it had no soul, the soul as if it had no body (p. 711). Instead, therefore, of all knowledge coming to us directly or indirectly through the bodily senses, it is all developed by the soul's own activity, and sensuous perception is itself but a confused kind of cognition. Not a certain select class of our ideas only (as Descartes held), but all our ideas, are innate, though only worked up into actual cognition in the development of knowledge (p. 212). To the aphorism made use of by Locke, "Nihil est in intellectu quod non prius fuerit in sensu," must be added the clause, "nisi intellectus ipse" (p. 223). The soul at birth is not comparable to a *tabula rasa*, but rather to an unworked block of marble, the hidden veins of which already determine the form it is to assume in the hands of the sculptor (p. 196). Nor, again, can the soul ever be without perception; for it has no other nature than that of a percipient active being (p. 246). Apparently dreamless sleep is to be accounted for by unconscious perception (p. 223); and it is by such insensible perceptions that Leibnitz explains his doctrine of pre-established harmony (p. 197).

In the human soul perception is developed into thought, and there is thus an infinite though gradual difference between it and the mere monad (p. 464). As all knowledge is implicit in the soul, it follows that its perfection depends on the efficiency of the instrument by which it is developed. Hence the importance, in Leibnitz's system, of the logical principles and method, the consideration of which occupied him at intervals throughout his whole career.

There are two kinds of truths—(1) truths of reasoning, and (2) truths of fact (pp. 83, 99, 707). The former rest on the principle of identity (or contradiction) or of possibility, in virtue of which that is false which contains a contradiction, and that true which is contradictory to the false. The latter rest on the principle of sufficient reason or of reality (*compossibilité*), according to which no fact is true unless there be a sufficient reason why it should be so and not otherwise (agreeing thus with the *principium melioris* or final cause). God alone, the purely active monad, has an *a priori* knowledge of the latter class of truths; they have their source in the human mind only in so far as it mirrors the outer world, *i.e.* in its passivity, whereas the truths of reason have their source in our mind in itself or in its activity.

Both kinds of truths fall into two classes, primitive and derivative. The primitive truths of fact are, as Descartes held, those of internal experience, and the derivative truths are inferred from them in accordance with the principle of sufficient reason, by their agreement with our perception of the world as a whole. They are thus reached by probable arguments—a department of logic which Leibnitz was the first to bring into prominence (pp. 84, 164, 168, 169, 343). The primitive truths of reasoning are identical (in later terminology, analytical) propositions, the derivative truths being deduced from them by the principle of contradiction. The part of his logic on which Leibnitz laid the greatest stress was the separation of these rational cognitions into their simplest elements—for he held that the root-notions (*cogitationes primae*) would be found to be few in number (pp. 92, 93) —and the designation of them by universal characters or symbols,[17] composite notions being denoted by the formulae formed by the union of several definite characters, and judgments by the relation of aequipollence among these formulae, so as to reduce the syllogism to a calculus. This is the main idea of Leibnitz's "universal characteristic," never fully worked out by him, which he regarded as one of the greatest discoveries of the age. An incidental result of its adoption would be the introduction of a universal symbolism of thought comparable to the symbolism of mathematics and intelligible in all languages (cf. p. 356). But the great revolution it would effect would chiefly consist in this, that truth and falsehood would be no longer matters of opinion but of correctness or error in calculation,[18] (pp. 83, 84, 89, 93). The old Aristotelian analytic is not to be superseded; but it is to be supplemented by this new method, for of itself it is but the ABC of logic.

But the logic of Leibnitz is an art of discovery (p. 85) as well as of proof, and, as such, applies both to the sphere of reasoning and to that of fact. In the former it has by attention to render explicit what is otherwise only implicit, and by the intellect to introduce order into the *a priori* truths of reason, so that one may follow from another and

they may constitute together a *monde intellectuel*. To this art of orderly combination Leibnitz attached the greatest importance, and to it one of his earliest writings was devoted. Similarly, in the sphere of experience, it is the business of the art of discovery to find out and classify the primitive facts or data, referring every other fact to them as its sufficient reason, so that new truths of experience may be brought to light.

As the perception of the monad when clarified becomes thought, so the appetite of which all monads partake is raised to will, their spontaneity to freedom, in man (p. 669). The will is an effort or tendency to that which one finds good (p. 251), and is free only in the sense of being exempt from external control[19] (pp. 262, 513, 521), for it must always have a sufficient reason for its action determined by what seems good to it. The end determining the will is pleasure (p. 269), and pleasure is the sense of an increase of perfection (p. 670). A will guided by reason will sacrifice transitory and pursue constant pleasures or happiness, and in this weighing of pleasures consists true wisdom. Leibnitz, like Spinoza, says that freedom consists in following reason, servitude in following the passions (p. 669), and that the passions proceed from confused perceptions (pp. 188, 269). In love one finds joy in the happiness of another; and from love follow justice and law. "Our reason," says Leibnitz,[20] "illumined by the spirit of God, reveals the law of nature," and with it positive law must not conflict. Natural law rises from the strict command to avoid offence, through the maxim of equity which gives to each his due, to that of probity or piety (*honeste vivere*),—the highest ethical perfection,—which presupposes a belief in God, providence and a future life.[21] Moral immortality—not merely the simple continuity which belongs to every monad—comes from God having provided that the changes of matter will not make man lose his individuality (pp. 126, 466).

Leibnitz thus makes the existence of God a postulate of morality as well as necessary for the realization of the monads. It is in the *Théodicée* that his theology is worked out and his view of the universe as the best possible world defended. In it he contends that faith and reason are essentially harmonious (pp. 402, 479), and that nothing can be received as an article of faith which contradicts an eternal truth, though the ordinary physical order may be superseded by a higher.[22]

The ordinary arguments for the being of God are retained by Leibnitz in a modified form (p. 375). Descartes's ontological proof is supplemented by the clause that God as the *ens a se* must either exist or be impossible (pp. 80, 177, 708); in the cosmological proof he passes from the infinite series of finite causes to their sufficient reason which contains all changes in the series necessarily in itself (pp. 147, 708); and he argues teleologically from the existence of harmony among the monads without any mutual influence to God as the author of this harmony (p. 430).

In these proofs Leibnitz seems to have in view an extramundane power to whom the monads owe their reality, though such a conception evidently breaks the continuity and harmony of his system, and can only be externally connected with it. But he also speaks in one place at any rate[23] of God as the "universal harmony"; and the historians Erdmann and Zeller are of opinion that this is the only sense in which his system can be consistently theistic. Yet it would seem that to assume a purely active and therefore perfect monad as the source of all things is in accordance with the principle of continuity and with Leibnitz's conception of the gradation of existences. In this sense he sometimes speaks of God as the first or highest of the monads (p. 678), and of created substances proceeding from Him continually by "fulgurations" (p. 708) or by "a sort of emanation as we produce our thoughts."[24]

The positive properties or perfections of the monads, Leibnitz holds, exist *eminenter*, *i.e.* without the limitation that attaches to created monads (p. 716), in God—their perception as His wisdom or intellect, and their appetite as His absolute will or goodness (p. 654); while the absence of all limitation is the divine independence or power, which again consists in this, that the possibility of things depends on His intellect, their reality on His will (p. 506). The universe in its harmonious order is thus the realization of the divine end, and as such must be the best possible (p. 506). The teleology of Leibnitz becomes necessarily a *Théodicée*. God created a world to manifest and communicate His perfection (p. 524), and, in choosing this world out of the infinite number that exist in the region of ideas (p. 515), was guided by the *principium melioris* (p. 506). With this thorough-going optimism Leibnitz has to reconcile the existence of evil in the best of all possible worlds.[25] With this end in view he distinguishes (p. 655) between (1) metaphysical evil or imperfection, which is unconditionally willed by God as essential to created beings; (2) physical evil, such as pain, which is conditionally willed by God as punishment or as a means to greater good (cf. p. 510); and (3) moral evil, in which the great difficulty lies, and which Leibnitz makes various attempts to explain. He says that it was merely permitted not willed by God (p. 655), and, that being obviously no explanation, adds that it was permitted because it was foreseen that the world with evil would nevertheless be better than any other possible world (p. 350). He also speaks of the evil as a mere set-off to the good in the world, which it increases by contrast (p. 149), and at other times reduces moral to metaphysical evil by giving it a merely negative existence, or says that their evil actions are to be referred to men alone, while it is only the power of action that comes from God, and the power of action is good (p. 658).

The great problem of Leibnitz's *Théodicée* thus remains unsolved. The suggestion that evil consists in a mere imperfection, like his idea of the monads proceeding from God by a continual emanation, was too bold and too inconsistent with his immediate apologetic aim to be carried out by him. Had he done so his theory would have transcended the independence of the monads with which it started, and found a deeper unity in the world than that resulting from the somewhat arbitrary assertion that the monads reflect the universe.

The philosophy of Leibnitz, in the more systematic and abstract form it received at the hands of Wolf, ruled the schools of Germany for nearly a century, and largely determined the character of the critical philosophy by which it was superseded. On it Baumgarten laid the foundations of a science of aesthetic. Its treatment of theological questions heralded the German *Aufklärung*. And on many special points—in its physical doctrine of the conservation of force, its psychological hypothesis of unconscious perception, its attempt at a logical symbolism—it has suggested ideas fruitful for the progress of science.

Bibliography.—(1) Editions: Up to 1900 no attempt had been made to publish the complete works. Several editions existed, but a vast mass of MSS. (letters, &c.) remained only roughly classified in the Hanover library. The chief editions were: (1) L. Dutens (Geneva, 1768), called *Opera Omnia*, but far from complete; (2) G. H. Pertz, *Leibnizens gesammelte Werke* (Berlin, 1843-1863) (1st ser. History, 4 vols.; 2nd ser. Philosophy, vol. i. correspondence with Arnauld, &c., ed. C. L. Grotefend; 3rd ser. Mathematics, 7 vols., ed. C. J. Gerhardt); (3) Foucher de Careil (planned in 20 vols., 7 published, Paris, 1859-1875), the same editor having previously published *Lettres et opuscules inédits de Leibniz* (Paris, 1854-1857); (4) Onno Klopp, *Die Werke von Leibniz gemäss seinem Handschriftlichen Nachlasse in der Königlichen Bibliothek zu Hannover* (1st series, Historico-Political and Political, 10 vols., 1864-1877). The *Œuvres de Leibnitz*, by A. Jacques (2 vols., Paris, 1846) also deserves mention. The philosophical writings had been published by Raspe (Amsterdam and Leipzig, 1765), by J. E. Erdmann, *Leibnitii opera philos. quae extant Latina, Gallica, Germanica, omnia* (Berlin, 1840), by P. Janet (2

vols., Paris, 1866, 2nd ed. 1900), and the fullest by C. J. Gerhardt, *Die Philosophischen Schriften von G. W. Leibniz* (7 vols., 1875-1890); cf. also *Die kleineren philos. wichtigeren Schriften* (trans. with commentary, J. H. von Kirchmann, 1879). The German works had also been partly published separately; G. E. Guhrauer (Berlin, 1838-1840). Of the letters various collections had been published up to 1900, *e.g.*: C. J. Gerhardt (Halle, 1860) and *Der Briefwechsel von G. W. Leibnitz mit Mathematikern* (1899); *Corrispondenza tra L. A. Muratori e G. Leibnitz* (1899); and cf. *Neue Beiträge zum Briefwechsel zwischen D. E. Jablonsky und G. W. Leibnitz* (1899).

In 1900 it was decided by scholars in Berlin and Paris that a really complete edition should be published, and with this object four German and four French critics were entrusted with the preliminary task of correlating the MSS. in the royal library at Hanover. This process resulted in the preparation of the *Kritischer Katalog der Leibnitz-Handschriften zur Vorbereitung der interakademischen Leibnitz-Ausgabe unternommen* (1908), and also in certain other preliminary publications, *e.g.* L. Couturat, *Opuscules et fragments inédits* (1903); E. Gerland, *Leibnizens nachgelassene Schriften physikalischen, mechanischen und technischen Inhalts* (1906); Jean Baruzi, *Leibniz* (1909), containing unedited MSS. and a sketch-biography; cf. the same author's *Leibniz et l'organisation religieuse de la terre* (1907).

Translations.—Of the *Systema Theologicum* (1850, C. W. Russell), of the correspondence with Clarke (1717); *Works*, by G. M. Duncan (New Haven, 1890); of the *Nouveaux Essais*, by A. G. Langley (London, 1894); the *Monadology and other Writings*, by R. Latta (Oxford, 1898).

Biographical.—The materials for the life of Leibnitz, in addition to his own works, are the notes of Eckhart (not published till 1779), the *Éloge* by Fontenelle (read to the French Academy in 1717), the "Eulogium," by Wolf, in the *Acta Eruditorium* for July 1717, and the "Supplementum" to the same by Feller, published in his *Otium Hannoveranum* (Leipzig, 1718). The best biography is that of G. E. Guhrauer, *G. W. Freiherr von Leibnitz* (2 vols., Breslau, 1842; *Nachträge*, Breslau, 1846). A shorter *Life of G. W. von Leibnitz, on the Basis of the German Work of Guhrauer*, has been published by J. M. Mackie (Boston, 1845). More recent works are those of L. Grote, *Leibniz und seine Zeit* (Hanover, 1869); E. Pfleiderer, *Leibniz als Patriot, Staatsmann, und Bildungsträger* (Leipzig, 1870); the slighter volume of F. Kirchner, *G. W. Leibniz: sein Leben und Denken* (Köthen, 1876); Kuno Fischer, vol. iii. in *Gesch. der neuern Philosophie* (4th ed., 1902).

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(W. R. So.)

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1 *Bedenken, welchergestalt securitas publica interna et externa und status praesens jetzigen Umständen nach im Reich auf festen Fuss zu stellen.*

2 *De expeditione Aegyptiaca regi Franciae proponenda justa dissertatio.*

3 *Consilium Aegyptiacum.*

4 *A Summary Account of Leibnitz's Memoir addressed to Lewis the Fourteenth*, &c. [edited by Granville Penn], (London, 1803).

5 In a letter to the duke of Brunswick-Lüneburg (autumn 1671), *Werke*, ed. Klopp, iii. 253 sq.

6 He was made a foreign member of the French Academy in 1700.

7 *Caesarini Furstenerii tractatus de jure suprematus ac legationis principum Germaniae* (Amsterdam, 1677); *Entretiens de Philarète et d'Eugène sur le droit d'ambassade* (Duisb., 1677).

8 Not published till 1819. It is on this work that the assertion has been founded that Leibnitz was at heart a Catholic—a supposition clearly disproved by his correspondence.

9 In his *Protogaea* (1691) he developed the notion of the historical genesis of the present condition of the earth's surface. Cf. O. Peschel, *Gesch. d. Erdkunde* (Munich, 1865), pp. 615 sq.

10 *Codex juris gentium diplomaticus* (1693); *Mantissa codicis juri gentium diplomatici* (1700).

11 *Memoirs of John Ker of Kersland*, by himself (1726), i. 118.

12 When not otherwise stated, the references are to Erdmann's edition of the *Opera philosophica.*

13 See *Considérations sur la doctrine d'un esprit universel* (1702).

14 Cf. *Opera*, ed. Dutens, II. ii. 20.

15 The difference between an organic and an inorganic body consists, he says, in this, that the former is a machine even in its smallest parts.

16 *Opera*, ed. Dutens, iii. 321.

17 Different symbolic systems were proposed by Leibnitz at different periods; cf. Květ, *Leibnitzens Logik* (1857), p. 37.

18 The places at which Leibnitz anticipated the modern theory of logic mainly due to Boole are pointed out in Mr Venn's *Symbolic Logic* (1881).

19 Hence the difference of his determinism from that of Spinoza, though Leibnitz too says in one place that "it is difficult enough to distinguish the actions of God from those of the creatures" (*Werke*, ed. Pertz, 2nd ser. vol. i. p. 160).

20 *Opera omnia*, ed. Dutens, IV. iii. 282.

21 Ibid. IV. iii. 295. Cf. Bluntschli, *Gesch. d. allg. Staatsrechts u. Politik* (1864), pp. 143 sqq.

22 P. 480; cf. *Werke*, ed. Pertz, 2nd ser. vol. i. pp. 158, 159.

23 Werke, ed. Klopp, iii. 259; cf. Op. phil., p. 716.

24 Werke, ed. Pertz, 2nd ser. vol. i. p. 167.

25 "Si c'est ici le meilleur des mondes possibles, que sont donc les autres?"—Voltaire, *Candide*, ch. vi.

LEICESTER, EARLS OF. The first holder of this English earldom belonged to the family of Beaumont, although a certain Saxon named Edgar has been described as the 1st earl of Leicester. Robert de Beaumont (d. 1118) is frequently but erroneously considered to have received the earldom from Henry I., about 1107; he had, however, some authority in the county of Leicester and his son Robert was undoubtedly earl of Leicester in 1131. The 3rd Beaumont earl, another Robert, was also steward of England, a dignity which was attached to the earldom of Leicester from this time until 1399. The earldom reverted to the crown when Robert de Beaumont, the 4th earl, died in January 1204.

In 1207 Simon IV., count of Montfort (*q.v.*), nephew and heir of Earl Robert, was confirmed in the possession of the earldom by King John, but it was forfeited when his son, the famous Simon de Montfort, was attainted and was killed at Evesham in August 1265. Henry III.'s son Edmund, earl of Lancaster, was also earl of Leicester and steward of England, obtaining these offices a few months after Earl Simon's death. Edmund's sons, Thomas and Henry, both earls of Lancaster, and his grandson Henry, duke of Lancaster, in turn held the earldom, which then passed to a son-in-law of Duke Henry, William V., count of Holland (*c.* 1327-1389), and then to another and more celebrated son-in-law, John of Gaunt, duke of Lancaster. When in 1399 Gaunt's son became king as Henry IV. the earldom was merged in the crown.

In 1564 Queen Elizabeth created her favourite, Lord Robert Dudley, earl of Leicester. The new earl was a son of John Dudley, duke of Northumberland; he left no children, or rather none of undoubted legitimacy, and when he died in September 1588 the title became extinct.

In 1618 the earldom of Leicester was revived in favour of Robert Sidney, Viscount Lisle, a nephew of the late earl and a brother of Sir Philip Sidney; it remained in this family until the death of Jocelyn (1682-1743), the 7th earl of this line, in July 1743. Jocelyn left no legitimate children, but a certain John Sidney claimed to be his son and consequently to be 8th earl of Leicester.

In 1744, the year after Jocelyn's death, Thomas Coke, Baron Lovel (*c.* 1695-1759), was made earl of Leicester, but the title became extinct on his death in April 1759. The next family to hold the earldom was that of Townshend, George Townshend (1755-1811) being created earl of Leicester in 1784. In 1807 George succeeded his father as 2nd marquess Townshend, and when his son George Ferrars Townshend, the 3rd marquess (1778-1855), died in December 1855 the earldom again became extinct. Before this date, however, another earldom of Leicester was in existence. This was created in 1837 in favour of Thomas William Coke, who had inherited the estates of his relative Thomas Coke, earl of Leicester. To distinguish his earldom from that held by the Townshends Coke was ennobled as earl of Leicester of Holkham; his son Thomas William Coke (1822-1909) became 2nd earl of Leicester in 1842, and the latter's son Thomas William (b. 1848) became 3rd earl.

See G. E. C(okayne), *Complete Peerage*, vol. v. (1893).

LEICESTER, ROBERT DUDLEY, Earl of (*c.* 1531-1588). This favourite of Queen Elizabeth came of an ambitious family. They were not, indeed, such mere upstarts as their enemies loved to represent them; for Leicester's grandfather—the notorious Edmund Dudley who was one of the chief instruments of Henry VII.'s extortions—was descended from a younger branch of the barons of Dudley. But the love of power was a passion which seems to have increased in them with each succeeding generation, and though the grandfather was beheaded by Henry VIII. for his too devoted services in the preceding reign, the father grew powerful enough in the days of Edward VI. to trouble the succession to the crown. This was that John Dudley, duke of Northumberland, who contrived the marriage of Lady Jane Grey with his own son Guildford Dudley, and involved both her and her husband in a common ruin with himself. Robert Dudley, the subject of this article, was an elder brother of Guildford, and shared at that time in the misfortunes of the whole family. Having taken up arms with them against Queen Mary, he was sent to the Tower, and was sentenced to death; but the queen not only pardoned and restored him to liberty, but appointed him master of the ordnance. On the accession of Elizabeth he was also made master of the horse. He was then, perhaps, about seven-and-twenty, and was evidently rising rapidly in the queen's favour. At an early age he had been married to Amy, daughter of Sir John Robsart. The match had been arranged by his father, who was very studious to provide in this way for the future fortunes of his children, and the wedding was graced by the presence of King Edward. But if it was not a love match, there

seems to have been no positive estrangement between the couple. Amy visited her husband in the Tower during his imprisonment; but afterwards when, under the new queen, he was much at court, she lived a good deal apart from him. He visited her, however, at times, in different parts of the country, and his expenses show that he treated her liberally. In September 1560 she was staying at Cumnor Hall in Berkshire, the house of one Anthony Forster, when she met her death under circumstances which certainly aroused suspicions of foul play. It is quite clear that her death had been surmised some time before as a thing that would remove an obstacle to Dudley's marriage with the queen, with whom he stood in so high favour. We may take it, perhaps, from Venetian sources, that she was then in delicate health, while Spanish state papers show further that there were scandalous rumours of a design to poison her; which were all the more propagated by malice after the event. The occurrence, however, was explained as owing to a fall down stairs in which she broke her neck; and the explanation seems perfectly adequate to account for all we know about it. Certain it is that Dudley continued to rise in the queen's favour. She made him a Knight of the Garter, and bestowed on him the castle of Kenilworth, the lordship of Denbigh and other lands of very great value in Warwickshire and in Wales. In September 1564 she created him baron of Denbigh, and immediately afterwards earl of Leicester. In the preceding month, when she visited Cambridge, she at his request addressed the university in Latin. The honours shown him excited jealousy, especially as it was well known that he entertained still more ambitious hopes, which the queen apparently did not altogether discourage. The earl of Sussex, in opposition to him, strongly favoured a match with the archduke Charles of Austria. The court was divided, and, while arguments were set forth on the one side against the queen's marrying a subject, the other party insisted strongly on the disadvantages of a foreign alliance. The queen, however, was so far from being foolishly in love with him that in 1564 she recommended him as a husband for Mary Queen of Scots. But this, it was believed, was only a blind, and it may be doubted how far the proposal was serious. After his creation as earl of Leicester great attention was paid to him both at home and abroad. The university of Oxford made him their chancellor, and Charles IX. of France sent him the order of St Michael. A few years later he formed an ambiguous connexion with the baroness dowager of Sheffield, which was maintained by the lady, if not with truth at least with great plausibility, to have been a valid marriage, though it was concealed from the queen. Her own subsequent conduct, however, went far to discredit her statements; for she married again during Leicester's life, when he, too, had found a new conjugal partner. Long afterwards, in the days of James I., her son, Sir Robert Dudley, a man of extraordinary talents, sought to establish his legitimacy; but his suit was suddenly brought to a stop, the witnesses discredited and the documents connected with it sealed up by an order of the Star Chamber.

In 1575 Queen Elizabeth visited the earl at Kenilworth, where she was entertained for some days with great magnificence. The picturesque account of the event given by Sir Walter Scott has made every one familiar with the general character of the scene. Next year Walter, earl of Essex, died in Ireland, and Leicester's subsequent marriage with his widow again gave rise to very serious imputations against him. For report said that he had had two children by her during her husband's absence in Ireland, and, as the feud between the two earls was notorious, Leicester's many enemies easily suggested that he had poisoned his rival. This marriage, at all events, tended to Leicester's discredit and was kept secret at first; but it was revealed to the queen in 1579 by Simier, an emissary of the duke of Alençon, to whose projected match with Elizabeth the earl seemed to be the principal obstacle. The queen showed great displeasure at the news, and had some thought, it is said, of committing Leicester to the Tower, but was dissuaded from doing so by his rival the earl of Sussex. He had not, indeed, favoured the Alençon marriage, but otherwise he had sought to promote a league with France against Spain. He and Burleigh had listened to proposals from France for the conquest and division of Flanders, and they were in the secret about the capture of Brill. When Alençon actually arrived, indeed, in August 1579, Dudley being in disgrace, showed himself for a time anti-French; but he soon returned to his former policy. He encouraged Drake's piratical expeditions against the Spaniards and had a share in the booty brought home. In February 1582 he, with a number of other noblemen and gentlemen, escorted the duke of Alençon on his return to Antwerp to be invested with the government of the Low Countries. In 1584 he inaugurated an association for the protection of Queen Elizabeth against conspirators. About this time there issued from the press the famous pamphlet, supposed to have been the work of Parsons the Jesuit, entitled *Leicester's Commonwealth*, which was intended to suggest that the English constitution was subverted and the government handed over to one who was at heart an atheist and a traitor, besides being a man of infamous life and morals. The book was ordered to be suppressed by letters from the privy council, in which it was declared that the charges against the earl were to the queen's certain knowledge untrue; nevertheless they produced a very strong impression, and were believed in by some who had no sympathy with Jesuits long after Leicester's death. In 1585 he was appointed commander of an expedition to the Low Countries in aid of the revolted provinces, and sailed with a fleet of fifty ships to Flushing, where he was received with great enthusiasm. In January following he was invested with the government of the provinces, but immediately received a strong reprimand from the queen for taking upon himself a function which she had not authorized. Both he and the states general were obliged to apologize; but the latter protested that they had no intention of giving him absolute control of their affairs, and that it would be extremely dangerous to them to revoke the appointment. Leicester accordingly was allowed to retain his dignity; but the incident was inauspicious, nor did affairs prosper greatly under his management. The most brilliant achievement of the war was the action at Zutphen, in which his nephew Sir Philip Sidney was slain. But complaints were made by the states general of the conduct of the whole campaign. He returned to England for a time, and went back in 1587, when he made an abortive effort to raise the siege of Sluys. Disagreements increasing between him and the states, he was recalled by the queen, from whom he met with a very good reception; and he continued in such favour that in the following summer (the year being that of the Armada, 1588) he was appointed lieutenant-general of the army mustered at Tilbury to resist Spanish invasion. After the crisis was past he was returning homewards from the court to Kenilworth, when he was attacked by a sudden illness and died at his house at Cornbury in Oxfordshire, on the 4th September.

Such are the main facts of Leicester's life. Of his character it is more difficult to speak with confidence, but some features of it are indisputable. Being in person tall and remarkably handsome, he improved these advantages by a very ingratiating manner. A man of no small ability and still more ambition, he was nevertheless vain, and presumed at times upon his influence with the queen to a degree that brought upon him a sharp rebuff. Yet Elizabeth stood by him. That she was ever really in love with him, as modern writers have supposed, is extremely questionable; but she saw in him some valuable qualities which marked him as the fitting recipient of high favours. He was a man of princely tastes, especially in architecture. At court he became latterly the leader of the Puritan party. and his letters were pervaded by expressions of religious feeling which it is hard to believe were insincere. Of the darker suspicions against him it is enough to say that much was certainly reported beyond

the truth; but there remain some facts sufficiently disagreeable, and others, perhaps, sufficiently mysterious, to make a just estimate of the man a rather perplexing problem.

No special biography of Leicester has yet been written except in biographical dictionaries and encyclopaedias. A general account of him will be found in the Memoirs of the Sidneys prefixed to Collins's *Letters and Memorials of State*; but the fullest yet published is Mr Sidney Lee's article in the *Dictionary of National Biography* (London, 1888) where the sources are given. Leicester's career has to be made out from documents and state papers, especially from the Hatfield MSS. and Major Hume's *Calendar* of documents from the Spanish archives bearing on the history of Queen Elizabeth. This last is the most recent source. Of others the principal are Digges's *Compleat Ambassador* (1655), John Nichols's *Progresses of Queen Elizabeth* and the *Leycester Correspondence* edited by J. Bruce for the Camden Society. The death of Dudley's first wife has been a fruitful source of literary controversy. The most recent addition to the evidences, which considerably alters their complexion, will be found in the *English Historical Review*, xiii. 83, giving the full text (in English) of De Quadra's letter of Sept. 11, 1560, on which so much has been built.

(J. Ga.)

LEICESTER, ROBERT SIDNEY, Earl of

(1563-1626), second son of Sir Henry Sidney (*q.v.*), was born on the 19th of November 1563, and was educated at Christ Church, Oxford, afterwards travelling on the Continent for some years between 1578 and 1583. In 1585 he was elected member of parliament for Glamorganshire; and in the same year he went with his elder brother Sir Philip Sidney (*q.v.*) to the Netherlands, where he served in the war against Spain under his uncle Robert Dudley, earl of Leicester. He was present at the engagement where Sir Philip Sidney was mortally wounded, and remained with his brother till the latter's death in October 1586. After visiting Scotland on a diplomatic mission in 1588, and France on a similar errand in 1593, he returned to the Netherlands in 1596, where he rendered distinguished service in the war for the next two years. He had been appointed governor of Flushing in 1588, and he spent much time there till 1603, when, on the accession of James I., he returned to England. James raised him at once to the peerage as Baron Sidney of Penshurst, and he was appointed chamberlain to the queen consort. In 1605 he was created Viscount Lisle, and in 1618 earl of Leicester, the latter title having become extinct in 1588 on the death of his uncle, whose property he had inherited (see Leicester, Earls of). Leicester was a man of taste and a patron of literature, whose cultured mode of life at his country seat, Penshurst, was celebrated in verse by Ben Jonson. The earl died at Penshurst on the 13th of July 1626. He was twice married; first to Barbara, daughter of John Gamage, a Glamorganshire gentleman; and secondly to Sarah, daughter of William Blount, and widow of Sir Thomas Smythe. By his first wife he had a large family. His eldest son having died unmarried in 1613, Robert, the second son (see below), succeeded to the earldom; one of his daughters married Sir John Hobart, ancestor of the earls of Buckinghamshire.

Robert Sidney, 2nd earl of Leicester of the 1618 creation (1595-1677), was born on the 1st of December 1595, and was educated at Christ Church, Oxford; he was called to the bar in in 1618, having already served in the army in the Netherlands during his father's governorship of Flushing, and having entered parliament as member for Wilton in 1614. In 1616 he was given command of an English regiment in the Dutch service; and having succeeded his father as earl of Leicester in 1626, he was employed on diplomatic business in Denmark in 1632, and in France from 1636 to 1641. He was then appointed lord-lieutenant of Ireland in place of the earl of Strafford, but he waited in vain for instructions from the king, and in 1643 he was compelled to resign the office without having set foot in Ireland. He shared the literary and cultivated tastes of his family, without possessing the statesmanship of his uncle Sir Philip Sidney; his character was lacking in decision, and, as commonly befalls men of moderate views in times of acute party strife, he failed to win the confidence of either of the opposing parties. His sincere protestantism offended Laud, without being sufficiently extreme to please the puritans of the parliamentary faction; his fidelity to the king restrained him from any act tainted with rebellion, while his dislike for arbitrary government prevented him giving whole-hearted support to Charles I. When, therefore, the king summoned him to Oxford in November 1642, Leicester's conduct bore the appearance of vacillation, and his loyalty of uncertainty. Accordingly, after his resignation of the lord-lieutenancy of Ireland at the end of 1643, he retired into private life. In 1649 the younger children of the king were for a time committed to his care at Penshurst. He took no part in public affairs during the Commonwealth; and although at the Restoration he took his seat in the House of Lords and was sworn of the privy council, he continued to live for the most part in retirement at Penshurst, where he died on the 2nd of November 1677. Leicester married, in 1616, Dorothy, daughter of Henry Percy, 9th earl of Northumberland, by whom he had fifteen children. Of his nine daughters, the eldest, Dorothy, the "Sacharissa" of the poet Waller, married Robert Spencer, 2nd earl of Sunderland; and Lucy married John Pelham, by whom she was the ancestress of the 18th-century statesmen, Henry Pelham, and Thomas Pelham, duke of Newcastle. Algernon Sidney (*q.v.*), and Henry Sidney, earl of Romney (*q.v.*), were younger sons of the earl.

Leicester's eldest son, Philip, 3rd earl (1619-1698), known for most of his life as Lord Lisle, took a somewhat prominent part during the civil war. Being sent to Ireland in 1642 in command of a regiment of horse, he became lieutenant-general under Ormonde; he strongly favoured the parliamentary cause, and in 1647 he was appointed lord-lieutenant of Ireland by the parliament. Named one of Charles I.'s judges, he refused to take part in the trial; but he afterwards served in Cromwell's Council of State, and sat in the Protector's House of Lords. Lisle stood high in Cromwell's favour, but nevertheless obtained a pardon at the Restoration. He carried on the Sidney family tradition by his patronage of men of letters; and, having succeeded to the earldom on his father's death in 1677, he died in 1698, and was succeeded in the peerage by his son Robert, 4th earl of Leicester (1649-1702), whose mother was Catherine, daughter of William Cecil, 2nd earl of Salisbury.

See *Sydney Papers*, edited by A. Collins (2 vols., London, 1746); *Sydney Papers*, edited by R. W. Blencowe (London, 1825) containing the 2nd earl of Leicester's journal; Lord Clarendon *History of the Rebellion and Civil Wars in England* (8 vols, Oxford, 1826); S. R. Gardiner, *History of the Great Civil War* (3 vols., London, 1886-1891).

(R. J. M.)

LEICESTER, THOMAS WILLIAM COKE, Earl of (1754-1842), English agriculturist, known as Coke of Norfolk, was the eldest son of Wenman Roberts, who assumed the name of Coke in 1750. In 1759 Wenman Coke's maternal uncle Thomas Coke, earl of Leicester, died leaving him his estates, subject, however, to the life-interest of his widow, Margaret, Baroness de Clifford in her own right. This lady's death in 1775 was followed by that of Wenman Coke in 1776, when the latter's son, Thomas William, born on the 6th of May 1754, succeeded to his father's estates at Holkham and elsewhere. From 1776 to 1784, from 1790 to 1806, and again from 1807 to 1832 Coke was member of parliament for Norfolk; he was a friend and supporter of Charles James Fox and a sturdy and aggressive Whig, acting upon the maxim taught him by his father "never to trust a Tory." Coke's chief interests, however, were in the country, and his fame is that of an agriculturist. His land around Holkham in Norfolk was poor and neglected, but he introduced many improvements, obtained the best expert advice, and in a few years wheat was grown upon his farms, and the breed of cattle, sheep and pigs greatly improved. It has been said that "his practice is really the basis of every treatise on modern agriculture." Under his direction the rental of the Holkham estate is said to have increased from £2200 to over £20,000 a year. In 1837 Coke was created earl of Leicester of Holkham. Leicester, who was a strong and handsome man and a fine sportsman, died at Longford Hall in Derbyshire on the 30th of June 1842. He was twice married, and Thomas William, his son by his second marriage, succeeded to his earldom.

See A. M. W. Stirling, *Coke of Norfolk and his Friends* (1907).

LEICESTER, a municipal county and parliamentary borough, and the county town of Leicestershire, England; on the river Soar, a southern tributary of the Trent. Pop. (1891) 174,624, (1901) 211,579. It is 99 m. N.N.W. from London by the Midland railway, and is served by the Great Central and branches of the Great Northern and London and North-Western railways, and by the Leicester canal.

This was the Roman *Ratae* (*Ratae Coritanorum*), and Roman remains of high interest are preserved. They include a portion of Roman masonry known as the Jewry Wall; several pavements have been unearthed; and in the museum, among other remains, is a milestone from the Fosse Way, marking a distance of 2 m. from Ratae. St Nicholas church is a good example of early Norman work, in the building of which Roman bricks are used. St Mary de Castro church, with Norman remains, including sedilia, shows rich Early English work in the tower and elsewhere, and has a Decorated spire and later additions. All Saints church has Norman remains. St Martin's is mainly Early English, a fine cruciform structure. St Margaret's, with Early English nave, has extensive additions of beautiful Perpendicular workmanship. North of the town are slight remains of an abbey of Black Canons founded in 1143. There are a number of modern churches. Of the Castle there are parts of the Norman hall, modernized, two gateways and other remains, together with the artificial Mount on which the keep stood. The following public buildings and institutions may be mentioned—municipal buildings (1876), old town hall, formerly the gild-hall of Corpus Christi; market house, free library, opera house and other theatres and museum. The free library has several branches; there are also a valuable old library founded in the 17th century, a permanent library and a literary and philosophical society. Among several hospitals are Trinity hospital, founded in 1331 by Henry Plantagenet, earl of Lancaster and of Leicester, and Wyggeston's hospital (1513). The Wyggeston schools and Queen Elizabeth's grammar school are amalgamated, and include high schools for boys and girls; there are also Newton's greencoat school for boys, and municipal technical and art schools. A memorial clock tower was erected in 1868 to Simon de Montfort and other historical figures connected with the town. The Abbey Park is a beautiful pleasure ground; there are also Victoria Park, St Margaret's Pasture and other grounds. The staple trade is hosiery, an old-established industry; there are also manufactures of elastic webbing, cotton and lace, iron-works, makings and brick-works. Leicester became a county borough in 1888, and the bounds were extended and constituted one civil parish in 1892. It is a suffragan bishopric in the diocese of Peterborough. The parliamentary borough returns two members. Area, 8586 acres.

The Romano-British town of *Ratae Coritanorum*, on the Fosse Way, was a municipality in A.D. 120-121. Its importance, both commercial and military, was considerable, as is attested by the many remains found here. Leicester (*Ledecestre*, *Legecestria*, *Leyrcestria*) was called a "burh" in 918, and a city in Domesday. Until 874 it was the seat of a bishopric. In 1086 both the king and Hugh de Grantmesnil had much land in Leicester; by 1101 the latter's share had passed to Robert of Meulan, to whom the rest of the town belonged before his death. Leicester thus became the largest mesne borough. Between 1103 and 1118 Robert granted his first charter to the burgesses, confirming their merchant gild. The portmanmote was confirmed by his son. In the 13th century the town developed its own form of government by a mayor and 24 jurats. In 1464 Edward IV. made the mayor and 4 of the council justices of the peace. In 1489 Henry VII. added 48 burgesses to the council for certain purposes, and made it a close body; he granted another charter in 1505. In 1589 Elizabeth incorporated the town, and gave another charter in 1599. James I. granted charters in 1605 and 1610; and Charles I. in 1630. In 1684 the charters were surrendered; a new one granted by James II. was rescinded by proclamation in 1688.

Leicester has been represented in parliament by two members since 1295. It has had a prescriptive market since the 13th century, now held on Wednesday and Saturday. Before 1228-1229 the burgesses had a fair from July 31 to August 14; changes were made in its date, which was fixed in 1360 at September 26 to October 2. It is now held on the second Thursday in October and three following days. In 1473 another fair was granted on April 27 to May 4. It is now held on the second Thursday in May and the three following days. Henry VIII. granted two three-day fairs beginning on December 8 and June 26; the first is now held on the second Friday in December; the

second was held in 1888 on the last Tuesday in June. In 1307 Edward III. granted a fair for seventeen days after the feast of the Holy Trinity. This would fall in May or June, and may have merged in other fairs. In 1794 the corporation sanctioned fairs on January 4, June 1, August 1, September 13 and November 2. Other fairs are now held on the second Fridays in March and July and the Saturdays next before Easter and in Easter week. Leicester has been a centre for brewing and the manufacture of woollen goods since the 13th century. Knitting frames for hosiery were introduced about 1680. Boot manufacture became important in the 19th century.

See *Victoria County History*, Leicester; M. Bateson, *Records of Borough of Leicester* (Cambridge, 1899).

LEICESTERSHIRE,

a midland county of England, bounded N. by Nottinghamshire, E. by Lincolnshire and Rutland, S.E. by Northamptonshire, S.W. by Warwickshire, and N.W. by Derbyshire, also touching Staffordshire on the W. The area is 823.6 sq. m. The surface of the county is an undulating tableland, the highest eminences being the rugged hills of Charnwood Forest (*q.v.*) in the north-west, one of which, Bardon Hill, has an elevation of 912 ft. The county belongs chiefly to the basin of the Trent, which forms for a short distance its boundary with Derbyshire. The principal tributary of the Trent in Leicestershire is the Soar, from whose old designation the *Leire* the county is said to derive its name, and which rises near Hinckley in the S.E., and forms the boundary with Nottinghamshire for some distance above its junction with the Trent. The Wreak, which, under the name of the Eye, rises on the borders of Rutland, flows S.W. to the Soar. Besides the Soar the other tributaries of the Trent are the Anker, touching the boundary with Warwickshire, the Devon and the Mease. A portion of the county in the S. drains to the Avon, which forms part of the boundary with Northamptonshire, and receives the Swift. The Welland forms for some distance the boundary with Northamptonshire.

Geology.—The oldest rocks in the county belong to the Charnian System, a Pre-Cambrian series of volcanic ashes, grits and slates, into which porphyroid and syenite were afterwards intruded. These rocks emerge from the plain formed by the Keuper Marls of the Triassic System as a group of isolated hills and peaks (known as Charnwood Forest); these are the tops of an old mountain-range, the lower slopes of which are still buried under the surrounding Keuper Marls. West of this district lies the Leicestershire coalfield, where the poor state of development of the Carboniferous Limestone shows that the Charnian rocks formed shoals or islands in the Carboniferous Limestone sea. The Millstone Grit just enters the county to the north of the same region, while the Coal Measures occupy a considerable area round Ashby-de-la-Zouch and contain valuable coal-seams. The rest of the county is almost equally divided between the red Keuper Marls of the Trias on the west and the grey limestones and shales of the Lias on the east. The former were deposited in lagoons into which the land was gradually lowered after a prolonged period of desert conditions. The Rhaetic beds which follow the Keuper mark the incoming of the sea and introduce the fossiliferous Liassic deposits. On the eastern margin of the county a few small outliers of the Inferior Oolite sands and limestones are present. The Glacial Period has left boulder-clay, gravel and erratic blocks scattered over the surface, while later gravels, with remains of mammoth, reindeer, &c., border some of the present streams.

Slates, honestones, setts and roadstone from the Charnian rocks, limestone and cement from the Carboniferous and Lias, and coal from the Coal Measures are the chief mineral products.

Agriculture.—The climate is mild, and, on account of the inland position of the county, and the absence of any very high elevations, the rainfall is very moderate. The soil is of a loamy character, the richest district being that east of the Soar, which is occupied by pasture, while the corn crops are grown chiefly on a lighter soil resting above the Red Sandstone formation. About nine-tenths of the total area is under cultivation. The proportion of pasture land is large and increasing. It is especially rich along the river-banks. Dairy-farming is extensively carried on, the famous Stilton cheese being produced near Melton Mowbray. Cattle are reared in large numbers, while of sheep the New Leicester breed is well known. It was introduced by Robert Bakewell the agriculturist, who was born near Loughborough in 1725. He also improved the breed of horses by the importation of mares from Flanders.

The county is especially famed for fox-hunting, Leicester and Melton Mowbray being favourite centres, while the kennels of the Quorn hunt are located at Quorndon near Mount Sorrel. For this reason Leicestershire is rich in good riding horses.

Other Industries.—Coal is worked in the districts about Moira, Coleorton and Coalville. Limestone is worked in various parts, freestone is plentiful, gypsum is found, and a kind of granite, extensively used for paving, is obtained in the Charnwood district, as at Bardon and Mount Sorrel, and at Sapcote and Stoney Stanton in the south-west. Apart from the mining industries, the staple manufacture of Leicestershire is hosiery, for which the wool is obtained principally from home-bred sheep. Its principal seats are Leicester, Loughborough, Hinckley and Castle Donington. Cotton hose are likewise made, and other industries include the manufacture of boots and shoes, as at Market Harborough, elastic webbing, and bricks, also iron founding. Melton Mowbray gives name to a well-known manufacture of pork pies.

Communications.—The main line of the Midland railway serves Market Harborough, Leicester, and Loughborough, having an important junction at Trent (on that river) for Derby and Nottingham. Branches radiate from Leicester to Melton Mowbray, to Coalville, Ashby-de-la-Zouch, Moira and Burton-upon-Trent, with others through the mining district of the N.W., which is also served by the branch of the London & North-Western railway from Nuneaton to Market Bosworth, Coalville and Loughborough. This company serves Market Harborough from Rugby, and branches of the Great Northern serve Market Harborough, Leicester and Melton Mowbray. The main line of the Great Central railway passes through Lutterworth, Leicester and Loughborough. The principal canals are the Union and Grand Union, with which various branches are connected with the Grand Junction, and the Ashby-de-la-Zouch canal, which joins the Coventry canal at Nuneaton. The Loughborough canal serves that town, connecting with the river Soar.

Population and Administration.—The area of the ancient county is 527,123 acres; pop. (1891) 373,584, (1901) 434,019. The area of the administrative county is 532,788 acres. The county contains six hundreds. The municipal boroughs are: Leicester, the county town and a county borough (pop. 211,579), Loughborough (21,508). The urban districts are: Ashby-de-la-Zouch (4726), Ashby Woulds (2799), Coalville (15,281), Hinckley (11,304), Market

Harborough (7735), Melton Mowbray (7454), Quorndon (2173), Shepshed (5293). Thurmaston (1732), Wigston Magna (8404). The county is in the Midland circuit, has one court of quarter sessions, and is divided into 9 petty sessional divisions. The county borough of Leicester has a separate court of quarter sessions and a separate commission of the peace. There are 327 civil parishes. The county is divided into four parliamentary divisions (Eastern or Melton, Mid or Loughborough, Western or Bosworth, Southern or Harborough), each returning one member; and the parliamentary borough of Leicester returns 2 members. The county is in the diocese of Peterborough, with the exception of small parts in those of Southwell and Worcester; and contains 255 ecclesiastical parishes or districts, wholly or in part.

History.—The district which is now Leicestershire was reached in the 6th century by Anglian invaders who, making their way across the Trent, penetrated Charnwood Forest as far as Leicester, the fall of which may be dated at about 556. In 679 the district formed the kingdom of the Middle Angles within the kingdom of Mercia, and on the subdivision of the Mercian see in that year was formed into a separate bishopric having its see at Leicester. In the 9th century the district was subjugated by the Danes, and Leicester became one of the five Danish boroughs. It was recovered by Æthelflaed in 918, but the Northmen regained their supremacy shortly after, and the prevalence of Scandinavian place-names in the county bears evidence of the extent of their settlement.

Leicestershire probably originated as a shire in the 10th century, and at the time of the Domesday Survey was divided into the four wapentakes of Guthlaxton, Framland, Goscote and Gartree. The Leicestershire Survey of the 12th century shows an additional grouping of the vills into small local hundreds, manorial rather than administrative divisions, which have completely disappeared. In the reign of Edward I. the divisions appear as hundreds, and in the reign of Edward III. the additional hundred of Sparkenhoe was formed out of Guthlaxton. Before the 17th century Goscote was divided into East and West Goscote, and since then the hundreds have undergone little change. Until 1566 Leicestershire and Warwickshire had a common sheriff, the shire-court for the former being held at Leicester.

Leicestershire constituted an archdeaconry within the diocese of Lincoln from 1092 until its transference to Peterborough in 1837. In 1291 it comprised the deaneries of Akeley, Leicester (now Christianity), Framland, Gartree, Goscote, Guthlaxton and Sparkenhoe. The deaneries remained unaltered until 1865. Since 1894 they have been as follows: East, South and West Akeley, Christianity, Framland (3 portions), Sparkenhoe (2 portions), Gartree (3 portions), Goscote (2 portions), Guthlaxton (3 portions).

Among the earliest historical events connected with the county were the siege and capture of Leicester by Henry II. in 1173 on the rebellion of the earl of Leicester; the surrender of Leicester to Prince Edward in 1264; and the parliament held at Leicester in 1414. During the Wars of the Roses Leicester was a great Lancastrian stronghold. In 1485 the battle of Bosworth was fought in the county. In the Civil War of the 17th century the greater part of the county favoured the parliament, though the mayor and some members of the corporation of Leicester sided with the king, and in 1642 the citizens of Leicester on a summons from Prince Rupert lent Charles £500. In 1645 Leicester was twice captured by the Royalist forces.

Before the Conquest large estates in Leicestershire were held by Earls Ralf, Morcar, Waltheof and Harold, but the Domesday Survey of 1086 reveals an almost total displacement of English by Norman landholders, only a few estates being retained by Englishmen as under-tenants. The first lay-tenant mentioned in the survey is Robert, count of Meulan, ancestor of the Beaumont family and afterwards earl of Leicester, to whose fief was afterwards annexed the vast holding of Hugh de Grantmesnil, lord high steward of England. Robert de Toeni, another Domesday tenant, founded Belvoir Castle and Priory. The fief of Robert de Buci was bestowed on Richard Basset, founder of Laund Abbey, in the reign of Henry I. Loughborough was an ancient seat of the Despenser family, and Brookesby was the seat of the Villiers and the birthplace of George Villiers, the famous duke of Buckingham. Melton Mowbray was named from its former lords, the Mowbrays, descendants of Nigel de Albini, the founder of Axholme Priory. Lady Jane Grey was born at Bradgate near Leicester, and Bishop Latimer was born at Thurcaston.

The woollen industry flourished in Leicestershire in Norman times, and in 1343 Leicestershire wool was rated at a higher value than that of most other counties. Coal was worked at Coleorton in the early 15th century and at Measham in the 17th century. The famous blue slate of Swithland has been quarried from time immemorial, and the limestone quarry at Barrow-on-Soar is also of very ancient repute, the monks of the abbey of St Mary de Pré formerly enjoying the tithe of its produce. The staple manufacture of the county, that of hosiery, originated in the 17th century, the chief centres being Leicester, Hinckley and Loughborough, and before the development of steam-driven frames in the 19th century hand framework knitting of hose and gloves was carried on in about a hundred villages. Wool-carding was also an extensive industry before 1840.

In 1290 Leicestershire returned two members to parliament, and in 1295 Leicester was also represented by two members. Under the Reform Act of 1832 the county returned four members in two divisions until the Redistribution of Seats Act of 1885, under which it returned four members in four divisions.

Antiquities.—Remains of monastic foundations are slight, though there were a considerable number of these. There are traces of Leicester Abbey and of Gracedieu near Coalville, while at Ulverscroft in Charnwood, where there was an Augustinian priory of the 12th century, there are fine Decorated remains, including a tower. The most noteworthy churches are found in the towns, as at Ashby-de-la-Zouch, Hinckley, Leicester, Loughborough, Lutterworth, Market Bosworth, Market Harborough, and Melton Mowbray (*qq.v.*). The principal old castle is that of Ashby-de-la-Zouch, while at Kirby Muxloe there is a picturesque fortified mansion of Tudor date. There are several good Elizabethan mansions, as that at Laund in the E. of the county. Among modern mansions that of the dukes of Rutland, Belvoir Castle in the extreme N.E., is a massive mansion of the early 19th century, finely placed on the summit of a hill.

See *Victoria County History, Leicestershire*; W. Burton, *Description of Leicestershire* (London, 1622; 2nd ed., Lynn, 1777); John Nicholls, *History and Antiquities of The County of Leicester* (4 vols., London, 1795-1815); John Curtis, *A Topographical History of the County of Leicester* (Ashby-de-la-Zouch, 1831).

LEIDEN or Leyden, a city in the province of South Holland, the kingdom of the Netherlands, on the Old Rhine, and a junction station 18 m. by rail S.S.W. of Haarlem. It is connected by steam tramway with Haarlem and The Hague respectively, and with the seaside resorts of Katwyk and Noordwyk. There is also regular steamboat connexion with Katwyk, Noordwyk, Amsterdam and Gouda. The population of Leiden which, it is estimated, reached 100,000 in 1640, had sunk to 30,000 between 1796 and 1811, and in 1904 was 56,044. The two branches of the Rhine which enter Leiden on the east unite in the centre of the town, which is further intersected by numerous small and sombre canals, with tree-bordered quays and old houses. On the south side of the town pleasant gardens extend along the old Singel, or outer canal, and there is a large open space, the Van der Werf Park, named after the burgomaster, Pieter Andriaanszoon van der Werf, who defended the town against the Spaniards in 1574. This open space was formed by the accidental explosion of a powdership in 1807, hundreds of houses being demolished, including that of the Elzevir family of printers. At the junction of the two arms of the Rhine stands the old castle (De Burcht), a circular tower built on an earthen mound. Its origin is unknown, but some connect it with Roman days and others with the Saxon Hengist. Of Leiden's old gateways only two—both dating from the end of the 17th century—are standing. Of the numerous churches the chief are the Hooglandsche Kerk, or the church of St Pancras, built in the 15th century and restored in 1885-1902, containing the monument of Pieter Andriaanszoon van der Werf, and the Pieterskerk (1315) with monuments to Scaliger, Boerhaave and other famous scholars. The most interesting buildings are the town hall (Stadhuis), a fine example of 16th-century Dutch building; the Gemeenlandshuis van Rynland (1596, restored 1878); the weight-house built by Pieter Post (1658); the former court-house, now a military storehouse; and the ancient gymnasium (1599) and the so-called city timber-house (Stads Timmerhuis) (1612), both built by Lieven de Key (*c.* 1560-1627).

In spite of a certain industrial activity and the periodical bustle of its cattle and dairy markets, Leiden remains essentially an academic city. The university is a flourishing institution. It was founded by William of Orange in 1575 as a reward for the heroic defence of the previous year, the tradition being that the citizens were offered the choice between a university and a certain exemption from taxes. Originally located in the convent of St Barbara, the university was removed in 1581 to the convent of the White Nuns, the site of which it still occupies, though that building was destroyed in 1616. The presence within half a century of the date of its foundation of such scholars as Justus Lipsius, Joseph Scaliger, Francis Gomarus, Hugo Grotius, Jacobus Arminius, Daniel Heinsius and Guardas Johannes Vossius at once raised Leiden university to the highest European fame, a position which the learning and reputation of Jacobus Gronovius, Hermann Boerhaave, Tiberius Hemsterhuis and David Ruhnken, among others, enabled it to maintain down to the end of the 18th century. The portraits of many famous professors since the earliest days hang in the university *aula*, one of the most memorable places, as Niebuhr called it, in the history of science. The university library contains upwards of 190,000 volumes and 6000 MSS. and pamphlet portfolios, and is very rich in Oriental and Greek MSS. and old Dutch travels. Among the institutions connected with the university are the national institution for East Indian languages, ethnology and geography; the fine botanical gardens, founded in 1587; the observatory (1860); the natural history museum, with a very complete anatomical cabinet; the museum of antiquities (Museum van Oudheden), with specially valuable Egyptian and Indian departments; a museum of Dutch antiquities from the earliest times; and three ethnographical museums, of which the nucleus was P. F. von Siebold's Japanese collections. The anatomical and pathological laboratories of the university are modern, and the museums of geology and mineralogy have been restored. The university has now five faculties, of which those of law and medicine are the most celebrated, and is attended by about 1200 students.

The municipal museum, founded in 1869 and located in the old cloth-hall (Laeckenhalle) (1640), contains a varied collection of antiquities connected with Leiden, as well as some paintings including works by the elder van Swanenburgh, Cornelius Engelbrechtszoon, Lucas van Leiden and Jan Steen, who were all natives of Leiden. Jan van Goyen, Gabriel Metsu, Gerard Dou and Rembrandt were also natives of this town. There is also a small collection of paintings in the Meermansburg. The Thysian library occupies an old Renaissance building of the year 1655, and is especially rich in legal works and native chronicles. Noteworthy also are the collection of the Society of Dutch Literature (1766); the collections of casts and of engravings; the seamen's training school; the Remonstrant seminary, transferred hither from Amsterdam in 1873; the two hospitals (one of which is private); the house of correction; and the court-house.

Leiden is an ancient town, although it is not the *Lugdunum Batavorum* of the Romans. Its early name was Leithen, and it was governed until 1420 by burgraves, the representatives of the courts of Holland. The most celebrated event in its history is its siege by the Spaniards in 1574. Besieged from May until October, it was at length relieved by the cutting of the dikes, thus enabling ships to carry provisions to the inhabitants of the flooded town. The weaving establishments (mainly broadcloth) of Leiden at the close of the 15th century were very important, and after the expulsion of the Spaniards Leiden cloth, Leiden baize and Leiden camlet were familiar terms. These industries afterwards declined, and in the beginning of the 19th century the baize manufacture was altogether given up. Linen and woollen manufactures are now the most important industries, while there is a considerable transit trade in butter and cheese.

Katwyk, or Katwijk, 6 m. N.W. of Leiden, is a popular seaside resort and fishing village. Close by are the great locks constructed in 1807 by the engineer, F. W. Conrad (d. 1808), through which the Rhine (here called the Katwyk canal) is admitted into the sea at low tide. The shore and the entrance to the canal are strengthened by huge dikes. In 1520 an ancient Roman camp known as the Brittenburg was discovered here. It was square in shape, each side measuring 82 yds., and the remains stood about 10 ft. high. By the middle of the 18th century it had been destroyed and covered by the sea.

See P. J. Blok, *Eine hollandsche stad in de middeleeuwen* (The Hague, 1883); and for the siege see J. L. Motley, *The Rise of the Dutch Republic* (1896).

LEIDY, JOSEPH (1823-1891), American naturalist and palaeontologist, was born in Philadelphia on the 9th of September 1823. He studied mineralogy and botany without an instructor, and graduated in medicine at the university of Pennsylvania in 1844. Continuing his work in anatomy and physiology, he visited Europe in 1848, but both before and after this period of foreign study lectured and taught in American medical colleges. In 1853 he was appointed professor of anatomy in the university of Pennsylvania, paying special attention to comparative anatomy. In 1884 he promoted the establishment in the same institution of the department of biology, of which he became director, and meanwhile taught natural history in Swarthmore College, near Philadelphia. His papers on biology and palaeontology were very numerous, covering both fauna and flora, and ranging from microscopic forms of animal life to the higher vertebrates. He wrote also occasional papers on minerals. He was an active member of the Boston Society of Natural History and of the American Philosophical Society; and was the recipient of various American and foreign degrees and honours. His *Cretaceous Reptiles of the United States* (1865) and *Contributions to the Extinct Vertebrate Fauna of the Western Territories* (1873) were the most important of his larger works; the best known and most widely circulated was an *Elementary Treatise on Human Anatomy* (1860, afterwards revised in new editions). He died in Philadelphia on the 30th of April 1891.

See Memoir and portrait in *Amer. Geologist*, vol. ix. (Jan. 1892) and Bibliography in vol. viii. (Nov. 1891) and Memoir by H. C. Chapman in *Proc. Acad. Nat. Sc.* (Philadelphia, 1891), p. 342.

LEIF ERICSSON [Leifr Eiriksson] (fl. 999-1000), Scandinavian explorer, of Icelandic family, the first known European discoverer of "Vinland," "Vineland" or "Wineland, the Good," in North America. He was a son of Eric the Red (Eirikr hinn raudi Thorvaldsson), the founder of the earliest Scandinavian settlements—from Iceland—in Greenland (985). In 999 he went from Greenland to the court of King Olaf Tryggvason in Norway, stopping in the Hebrides on the way. On his departure from Norway in 1000, the king commissioned him to proclaim Christianity in Greenland. As on his outward voyage, Leif was again driven far out of his course by contrary weather—this time to lands (in America) "of which he had previously had no knowledge," where "self-sown" wheat grew, and vines, and "mösur" (maple?) wood. Leif took specimens of all these, and sailing away came home safely to his father's home in Brattahlid on Ericsfiord in Greenland. On his voyage from this Vineland to Greenland, Leif rescued some shipwrecked men, and from this, and his discoveries, gained his name of "The Lucky" (*hinn heppni*). On the subsequent expedition of Thorfinn Karlsefni for the further exploration and settlement of the Far Western vine-country, it is recorded that certain Gaels, incredibly fleet of foot, who had been given to Leif by Olaf Tryggvason, and whom Leif had offered to Thorfinn, were put on shore to scout.

Such is the account of the *Saga of Eric the Red*, supported by a number of briefer references in early Icelandic and other literature. The less trustworthy history of the *Flatey Book* makes Biarni Heriulfsson in 985 discover Helluland (Labrador?) as well as other western lands which he does not explore, not even permitting his men to land; while Leif Ericsson follows up Biarni's discoveries, begins the exploration of Helluland, Markland and Vinland, and realizes some of the charms of the last named, where he winters. But this secondary authority (the *Flatey Book* narrative), which till lately formed the basis of all general knowledge as to Vinland, abounds in contradictions and difficulties from which *Eric the Red Saga* is comparatively free. Thus (in *Flatey*) the grapes of Vinland are found in winter and gathered in spring; the man who first finds them, Leif's foster-father Tyrker the German, gets drunk from eating the fruit; and the vines themselves are spoken of as big trees affording timber. Looking at the record in *Eric the Red Saga*, it would seem probable that Leif's Vinland answers to some part of southern Nova Scotia. See Vinland. (As to Helluland and Markland see Thorfinn Karlsefni.)

The MSS. of *Eric the Red's Saga* are Nos. 544 and 557 of the Arne-Magnaean collection in Copenhagen; the MS. of the *Flatey Book*, so called because it was long the property of a family living on Flat Island in Broad Firth (Flatey in Breiðafjord [B-eidafj-d]), on the north-west coast of Iceland, was presented in 1662 to the Royal Library of Denmark, of which it is still one of the chief treasures. These leading narratives are supplemented by Adam of Bremen, *Gesta Hammaburgensis ecclesiae pontificum*, chap. 38 (247 Lappenberg) of book iv. (often separately entitled *Descriptio Insularum Aquilonis*; Adam's is the earliest extant reference to Vinland, *c.* 1070): we have also notices of Vinland in the *Libellus Islandorum* of Ari Frodi (*c.* 1120), the oldest Icelandic historian; in the *Kristni Saga* (repeated in Snorri Sturlason's *Heimskringla*); in *Eyrbyggia Saga* (*c.* 1250); in *Gretti Saga* (*c.* 1290); and in an Icelandic chorography of the 14th century, or earlier, partly derived from the famous traveller Abbot Nicolas of Thing-eyrar (†1159).

See Gustav Storm, "Studies on the Vineland Voyages," in the *Mémoires de la Société royale des Antiquaires du Nord* (Copenhagen, 1888); and *Eiriks Saga Raudha* (Copenhagen, 1891); A. M. Reeves, *Finding of Wineland the Good: the History of the Icelandic Discovery of America* (London, 1890); in this work the original authorities are given in full, with photographic facsimiles, English translations and adequate commentary; Rafn's *Antiquitates Americanae* (Copenhagen, 1837) contains all the sources, but the editor's personal views have in many cases failed to satisfy criticism; the *Flatey* text is printed also by Vigfusson and Unger in *Flateyjar-bok*, vol. i. (Christiania, 1860). There are also translations of *Flatey* and *Red Eric Saga* in Beamish, *Discovery of North America, by the Northmen* (Lond., 1841); E. F. Slafter, *Voyages of the Northmen* (Boston, 1877); B. F. de Costa, *Pre-Columbian Discovery of America by the Northmen* (Albany, 1901); and *Original Narratives of Early American History; The Northmen, Columbus and Cabot*, pp. 1-66 (New York, 1906). See also C. Raymond Beazley, *Dawn of Modern Geography* ii. 48-83 (London, 1901); Josef Fischer, *Die Entdeckungen der Normannen in Amerika* (Freiburg i. B., 1902); John Fiske, *Discovery of America*, vol. i.; Juul Dieserud, "Norse Discoveries in America," in the *Bulletin of the American Geographical Society* (February, 1901); G. Vigfusson, *Origines Islandicae* (1905), which strangely expresses a preference for the *Flatey Book* "account of the first sighting of the American continent" by the Norsemen.

(C. R. B.)

LEIGH, EDWARD (1602-1671), English Puritan and theologian, was born at Shawell, Leicestershire. He was educated at Magdalen Hall, Oxford, from 1616, and subsequently became a member of the Middle Temple. In 1636 he entered parliament as member for Stafford, and during the Civil War held a colonelcy in the parliamentary army. He has sometimes been confounded with John Ley (1583-1662), and so represented as having sat in the Westminster Assembly. The public career of Leigh terminated with his expulsion from parliament with the rest of the Presbyterian party in 1648. From an early age he had studied theology and produced numerous compilations, the most important being the *Critica Sacra, containing Observations on all the Radices of the Hebrew Words of the Old and the Greek of the New Testament* (1639-1644; new ed., with supplement, 1662), for which the author received the thanks of the Westminster Assembly, to whom it was dedicated. His other works include *Select and Choice Observations concerning the First Twelve Caesars* (1635); *A Treatise of Divinity* (1646-1651); *Annotations upon the New Testament* (1650), of which a Latin translation by Arnold was published at Leipzig in 1732; *A Body of Divinity* (1654); *A Treatise of Religion and Learning* (1656); *Annotations of the Five Poetical Books of the Old Testament* (1657). Leigh died in Staffordshire in June 1671.

LEIGH, a market town and municipal borough in the Leigh parliamentary division of Lancashire, England, 11 m. W. by N. from Manchester by the London & North-Western railway. Pop. (1891) 30,882, (1901) 40,001. The ancient parish church of St Mary the Virgin was, with the exception of the tower, rebuilt in 1873 in the Perpendicular style. The grammar school, the date of whose foundation is unknown, received its principal endowments in 1655, 1662 and 1681. The staple manufactures are silk and cotton; there are also glass works, foundries, breweries, and flour mills, with extensive collieries. Though the neighbourhood is principally an industrial district, several fine old houses are left near Leigh. The town was incorporated in 1899, and the corporation consists of a mayor, 8 aldermen and 24 councillors. Area, 6358 acres.

LEIGHTON, FREDERICK LEIGHTON, Baron (1830-1896), English painter and sculptor, the son of a physician, was born at Scarborough on the 3rd of December 1830. His grandfather, Sir James Leighton, also a physician, was long resident at the court of St Petersburg. Frederick Leighton was taken abroad at a very early age. In 1840 he learnt drawing at Rome under Signor Meli. The family moved to Dresden and Berlin, where he attended classes at the Academy. In 1843 he was sent to school at Frankfort, and in the winter of 1844 accompanied his family to Florence, where his future career as an artist was decided. There he studied under Bezzuoli and Segnolini at the Accademia delle Belle Arti, and attended anatomy classes under Zanetti; but he soon returned to complete his general education at Frankfort, receiving no further direct instruction in art for five years. He went to Brussels in 1848, where he met Wiertz and Gallait, and painted some pictures, including "Cimabue finding Giotto," and a portrait of himself. In 1849 he studied for a few months in Paris, where he copied Titian and Correggio in the Louvre, and then returned to Frankfort, where he settled down to serious art work under Edward Steinle, whose pupil he declared he was "in the fullest sense of the term." Though his artistic training was mainly German, and his master belonged to the same school as Cornelius and Overbeck, he loved Italian art and Italy and the first picture by which he became known to the British public was "Cimabue's Madonna carried in Procession through the Streets of Florence," which appeared at the Royal Academy in 1855. At this time the works of the Pre-Raphaelites almost absorbed public interest in art—it was the year of Holman Hunt's "Light of the World," and the "Rescue," by Millais. Yet Leighton's picture, painted in quite a different style, created a sensation, and was purchased by Queen Victoria. Although, since his infancy, he had only visited England once (in 1851, when he came to see the Great Exhibition), he was not quite unknown in the cultured and artistic world of London, as he had made many friends during a residence in Rome of some two years or more after he left Frankfort in 1852. Amongst these were Giovanni Costa, Robert Browning, James Knowles, George Mason and Sir Edward Poynter, then a youth, whom he allowed to work in his studio. He also met Thackeray, who wrote from Rome to the young Millais: "Here is a versatile young dog, who will run you close for the presidentship one of these days." During these years he painted several Florentine subjects—"Tybalt and Romeo," "The Death of Brunelleschi," a cartoon of "The Pest in Florence according to Boccaccio," and "The Reconciliation of the Montagues and the Capulets." He now turned his attention to themes of classic legend, which at first he treated in a "Romantic spirit." His next picture, exhibited in 1856, was "The Triumph of Music: Orpheus by the Power of his Art redeems his Wife from Hades." It was not a success, and he did not again exhibit till 1858, when he sent a little picture of "The Fisherman and the Syren" to the Royal Academy, and "Samson and Delilah" to the Society of British Artists in Suffolk Street. In 1858 he visited London and made the acquaintance of the leading Pre-Raphaelites—Rossetti, Holman Hunt and Millais. In the spring of 1859 he was at Capri, always a favourite resort of his, and made many studies from nature, including a very famous drawing of a lemon tree. It was not till 1860 that he settled in London, when he took up his quarters at 2 Orme Square, Bayswater, where he stayed till, in 1860, he moved to his celebrated house in Holland Park Road, with its Arab hall decorated with Damascus tiles. There he lived till his death. He now began to fulfil the promise of his "Cimabue," and by such pictures as "Paolo e Francesca," "The Star of Bethlehem," "Jezebel and Ahab taking Possession of Naboth's Vineyard," "Michael Angelo musing over his Dying Servant," "A Girl feeding Peacocks," and "The Odalisque," all exhibited in 1861-1863, rose rapidly to the head of his profession. The two latter pictures were marked by the rhythm of line and luxury of colour which are among the most constant attributes of his art, and may be regarded as his first dreams of Oriental beauty, with which he afterwards showed so great a sympathy. In 1864 he exhibited "Dante in

Exile" (the greatest of his Italian pictures), "Orpheus and Eurydice" and "Golden Hours." In the winter of the same year he was elected an Associate of the Royal Academy. After this the main effort of his life was to realize visions of beauty suggested by classic myth and history. If we add to pictures of this class a few Scriptural subjects, a few Oriental dreams, one or two of tender sentiment like "Wedded" (one of the most popular of his pictures, and well known by not only an engraving, but a statuette modelled by an Italian sculptor), a number of studies of very various types of female beauty, "Teresina," "Biondina," "Bianca," "Moretta," &c., and an occasional portrait, we shall nearly exhaust the two classes into which Lord Leighton's work (as a painter) can be divided.

Amongst the finest of his classical pictures were—"Syracusan Bride leading Wild Beasts in Procession to the Temple of Diana" (1866), "Venus disrobing for the Bath" (1867), "Electra at the Tomb of Agamemnon," and "Helios and Rhodos" (1869), "Hercules wrestling with Death for the Body of Alcestis" (1871), "Clytemnestra" (1874), "The Daphnephoria" (1876), "Nausicaa" (1878), "An Idyll" (1881), two lovers under a spreading oak listening to the piping of a shepherd and gazing on the rich plain below; "Phryne" (1882), a nude figure standing in the sun; "Cymon and Iphigenia" (1884), "Captive Andromache" (1888), now in the Manchester Art Gallery; with the "Last Watch of Hero" (1887), "The Bath of Psyche" (1890), now in the Chantrey Bequest collection; "The Garden of the Hesperides" (1892), "Perseus and Andromeda" and "The Return of Persephone," now in the Leeds Gallery (1891); and "Clytie," his last work (1896). All these pictures are characterized by nobility of conception, by almost perfect draughtsmanship, by colour which, if not of the highest quality, is always original, choice and effective. They often reach distinction and dignity of attitude and gesture, and occasionally, as in the "Hercules and Death," the "Electra" and the "Clytemnestra," a noble intensity of feeling. Perhaps, amidst the great variety of qualities which they possess, none is more universal and more characteristic than a rich elegance, combined with an almost fastidious selection of beautiful forms. It is the super-eminence of these qualities, associated with great decorative skill, that make the splendid pageant of the "Daphnephoria" the most perfect expression of his individual genius. Here we have his composition, his colour, his sense of the joy and movement of life, his love of art and nature at their purest and most spontaneous, and the result is a work without a rival of its kind in the British School.

Leighton was one of the most thorough draughtsmen of his day. His sketches and studies for his pictures are numerous and very highly esteemed. They contain the essence of his conceptions, and much of their spiritual beauty and subtlety of expression was often lost in the elaboration of the finished picture. He seldom succeeded in retaining the freshness of his first idea more completely than in his last picture—"Clytie"—which was left unfinished on his easel. He rarely painted sacred subjects. The most beautiful of his few pictures of this kind was the "David musing on the Housetop" (1865). Others were "Elijah in the Wilderness" (1879), "Elisha raising the Son of the Shunammite" (1881) and a design intended for the decoration of the dome of St Paul's Cathedral, "And the Sea gave up the Dead which were in it" (1892), now in the Tate Gallery, and the terrible "Rizpah" of 1893. His diploma picture was "St Jerome," exhibited in 1869. Besides these pictures of sacred subjects, he made some designs for Dalziel's Bible, which for force of imagination excel the paintings. The finest of these are "Cain and Abel," and "Samson with the Gates of Gaza."

Not so easily to be classed, but among the most individual and beautiful of his pictures, are a few of which the motive was purely aesthetic. Amongst these may specially be noted "The Summer Moon," two Greek girls sleeping on a marble bench, and "The Music Lesson," in which a lovely little girl is seated on her lovely young mother's lap learning to play the lute. With these, as a work produced without any literary suggestion, though very different in feeling, may be associated the "Eastern Slinger scaring Birds in the Harvest-time: Moon-rise" (1875), a nude figure standing on a raised platform in a field of wheat.

Leighton also painted a few portraits, including those of Signor Costa, the Italian landscape painter, Mr F. P. Cockerell, Mrs Sutherland Orr (his sister), Amy, Lady Coleridge, Mrs Stephen Ralli and (the finest of all) Sir Richard Burton, the traveller and Eastern scholar, which was exhibited in 1876 and is now in the National Portrait Gallery.

Like other painters of the day, notably G. F. Watts, Lord Leighton executed a few pieces of sculpture. His "Athlete struggling with a Python" was exhibited at the Royal Academy in 1877, and was purchased for the Chantrey Bequest collection. Another statue, "The Sluggard," of equal merit, was exhibited in 1886; and a charming statuette of a nude figure of a girl looking over her shoulder at a frog, called "Needless Alarms," was completed in the same year, and presented by the artist to Sir John Millais in acknowledgment of the gift by the latter of his picture, "Shelling Peas." He made the beautiful design for the reverse of the Jubilee Medal of 1887. It was also his habit to make sketch models in wax for the figures in his pictures, many of which are in the possession of the Royal Academy. As an illustrator in black and white he also deserves to be remembered, especially for the cuts to Dalziel's Bible, already mentioned, and his illustrations to George Eliot's *Romola*, which appeared in the *Cornhill Magazine*. The latter are full of the spirit of Florence and the Florentines, and show a keen sense of humour, elsewhere excluded from his work. Of his decorative paintings, the best known are the elegant compositions (in spirit fresco) on the walls of the Victoria and Albert Museum, representing "The Industrial Arts of War and Peace." There, also, is the refined and spirited figure of "Cimabue" in mosaic. In Lyndhurst church are mural decorations to the memory of Mr Pepys Cockerell, illustrating "The Parable of the Wise and Foolish Virgins."

Leighton's life was throughout marked by distinction, artistic and social. Though not tall, he had a fine presence and manners, at once genial and courtly. He was welcomed in all societies, from the palace to the studio. He spoke German, Italian and French, as well as English. He had much taste and love for music, and considerable gifts as an orator of a florid type. His Presidential Discourses (published, London, 1896) were full of elegance and culture. For seven years (1876-1883) he commanded the 20th Middlesex (Artists) Rifle Volunteers, retiring with the rank of honorary colonel, and subsequently receiving the Volunteer Decoration. Yet no social attractions or successes diverted him from his devotion to his profession, the welfare of his brethren in art or of the Royal Academy. As president he was punctilious in the discharge of his duties, ready to give help and encouragement to artists young and old, and his tenure of the office was marked by some wise and liberal reforms. He frequently went abroad, generally to Italy, where he was well known and appreciated. He visited Spain in 1866, Egypt in 1868, when he went up the Nile with Ferdinand de Lesseps in a steamer lent by the Khedive. He was at Damascus for a short time in 1873. It was his custom on all these trips to make little lively sketches of landscape and buildings. These fresh little flowers of his leisure used to decorate the walls of his studio, and at the sale of its contents after his death realized considerable prices. It was when he was in the full tide of his popularity and

success, and apparently in the full tide of his personal vigour also, that he was struck with *angina pectoris*. For a long time he struggled bravely with this cruel disease, never omitting except from absolute necessity any of his official duties except during a brief period of rest abroad, which failed to produce the desired effect. His death occurred on the 25th of January 1896.

Leighton was elected an Academician in 1868, and succeeded Sir Francis Grant as President in 1878, when he was knighted. He was created a baronet in 1886, and was raised to the peerage in 1896, a few days before his death. He held honorary degrees at the universities of Oxford, Cambridge, Dublin, Edinburgh and Durham, was an Associate of the Institute of France; a Commander of the Legion of Honour, and of the Order of Leopold. He was a Knight of the Coburg Order, "Dem Verdienste," and of the Prussian Order, "Pour le Mérite," and a member of at least ten foreign Academies. In 1859 he won a medal of the second class at the Paris Salon, and at the Exposition Universelle of 1889 a gold medal. As a sculptor he was awarded a medal of the first class in 1878 and the Grand Prix in 1889.

See *Art Annual* (Mrs A. Lang), 1884; Royal Academy Catalogue, Winter Exhibition, 1897; National Gallery of British Art Catalogue; C. Monkhouse, *British Contemporary Artists* (London, 1899); Ernest Rhys, *Frederick, Lord Leighton* (London, 1898, 1900).

(C. Mo.)

LEIGHTON, ROBERT

(1611-1684), archbishop of Glasgow, was born, probably in London (others say at Ulishaven, Forfarshire), in 1611, the eldest son of Dr Alexander Leighton, the author of *Zion's Plea against the Prelacie*, whose terrible sufferings for having dared to question the divine right of Episcopacy, under the persecution of Laud, form one of the most disgraceful incidents of the reign of Charles I. Dr Leighton is said to have been of the old family of Ulishaven in Forfarshire. From his earliest childhood, according to Burnet, Robert Leighton was distinguished for his saintly disposition. In his sixteenth year (1627) he was sent to the university of Edinburgh, where, after studying with distinguished success for four years, he took the degree of M.A. in 1631. His father then sent him to travel abroad, and he is understood to have spent several years in France, where he acquired a complete mastery of the French language. While there he passed a good deal of time with relatives at Douai who had become Roman Catholics, and with whom he kept up a correspondence for many years afterwards. Either at this time or on some subsequent visit he had also a good deal of intercourse with members of the Jansenist party. This intercourse contributed to the charity towards those who differed from him in religious opinion, which ever afterwards formed a feature in his character. The exact period of his return to Scotland has not been ascertained; but in 1641 he was ordained Presbyterian minister of Newbattle in Midlothian. In 1652 he resigned his charge and went to reside in Edinburgh. What led him to take this step does not distinctly appear. The account given is that he had little sympathy with the fiery zeal of his brother clergymen on certain political questions, and that this led to severe censures on their part.

Early in 1653 he was appointed principal of the university of Edinburgh, and primarius professor of divinity. In this post he continued for seven or eight years. A considerable number of his Latin prelections and other addresses (published after his death) are remarkable for the purity and elegance of their Latinity, and their subdued and meditative eloquence. They are valuable instructions in the art of living a holy life rather than a body of scientific divinity. Throughout, however, they bear the marks of a deeply learned and accomplished mind, saturated with both classical and patristic reading, and like all his works they breathe the spirit of one who lived very much above the world. His mental temper was too unlike the temper of his time to secure success as a teacher.

In 1661, when Charles II. had resolved to force Episcopacy once more upon Scotland, he fixed upon Leighton for one of his bishops (see Scotland, Church of). Leighton, living very much out of the world, and being somewhat deficient in what may be called the political sense, was too open to the persuasions used to induce him to enter a sphere for which he instinctively felt he was ill qualified. The Episcopacy which he contemplated was that modified form which had been suggested by Archbishop Ussher, and to which Baxter and many of the best of the English Nonconformists would have readily given their adherence. It is significant that he always refused to be addressed as "my lord," and it is stated that when dining with his clergy on one occasion he wished to seat himself at the foot of the table.

Leighton soon began to discover the sort of men with whom he was to be associated in the episcopate. He travelled with them in the same coach from London towards Scotland, but having become, as he told Burnet, very weary of their company (as he doubted not they were of his), and having found that they intended to make a kind of triumphal entrance into Edinburgh, he left them at Morpeth and retired to the earl of Lothian's at Newbattle. He very soon lost all hope of being able to build up the church by the means which the government had set on foot, and his work, as he confessed to Burnet, "seemed to him a fighting against God." He did, however, what he could, governing his diocese (that of Dunblane) with the utmost mildness, as far as he could, preventing the persecuting measures in active operation elsewhere, and endeavouring to persuade the Presbyterian clergy to come to an accommodation with their Episcopal brethren. After a hopeless struggle of three or four years to induce the government to put a stop to their fierce persecution of the Covenanters, he determined to resign his bishopric, and went up to London in 1665 for this purpose. He so far worked upon the mind of Charles that he promised to enforce the adoption of milder measures, but it does not appear that any material improvement took place. In 1669 Leighton again went to London and made fresh representations on the subject, but little result followed. The slight disposition, however, shown by the government to accommodate matters appears to have inspired Leighton with so much hope that in the following year he agreed, though with a good deal of hesitation, to accept the archbishopric of Glasgow. In this higher sphere he redoubled his efforts with the Presbyterians to bring about some degree of conciliation with Episcopacy, but the only result was to embroil himself with the hot-headed Episcopal party as well as with the Presbyterians. In utter despair, therefore, of being able to be of any further service to the cause of religion, he resigned the archbishopric in 1674 and retired to the house of his widowed sister, Mrs Lightmaker, at Broadhurst in Sussex. Here he spent the remaining ten years, probably the happiest of his life, and died suddenly on a visit to London in 1684.

It is difficult to form a just or at least a full estimate of Leighton's character. He stands almost alone in his age. In some respects he was immeasurably superior both in intellect and in piety to most of the Scottish ecclesiastics of his time; and yet he seems to have had almost no influence in moulding the characters or conduct of his contemporaries. So intense was his absorption in the love of God that little room seems to have been left in his heart for human sympathy or affection. Can it be that there was after all something to repel in his outward manner? Burnet tells us that he had never seen him laugh, and very seldom even smile. In other respects, too, he gives the impression of standing aloof from human interests and ties. It may go for little that he never married, but it was surely a curious idiosyncrasy that he habitually cherished the wish (which was granted him) that he might die in an inn. In fact, holy meditation seems to have been the one absorbing interest of his life. At Dunblane tradition preserved the memory of "the good bishop," silent and companionless, pacing up and down the sloping walk by the river's bank under the beautiful west window of his cathedral. And from a letter of the earl of Lothian to his countess it appears that, whatever other reasons Leighton might have had for resigning his charge at Newbattle, the main object which he had in view was to be left to his own thoughts. It is therefore not very wonderful that he was completely misjudged and even disliked both by the Presbyterian and by the Episcopal party.

It was characteristic of him that he could never be made to understand that anything which he wrote possessed the smallest value. None of his works were published by himself, and it is stated that he left orders that all his MSS. should be destroyed after his death. But fortunately for the world this charge was disregarded. Like all the best writing, it seems to flow without effort; it is the easy unaffected outcome of his saintly nature. Throughout, however, it is the language of a scholar and a man of perfect literary taste; and with all its spirituality of thought there are no mystical raptures, such as are often found mingled with the Scottish practical theology of the 17th century. It was a common reproach against Leighton that he had leanings towards Roman Catholicism, and perhaps this is so far true that he had formed himself in some degree upon the model of some of the saintly persons of that faith, such as Pascal and Thomas à Kempis.

The best account of Leighton's character is that of Bishop Burnet in *Hist. of his Own Times* (1723-1734). No perfectly satisfactory edition of Leighton's works exists. After his death his *Commentary on Peter* and several of his other works were published under the editorship of his friend Dr Fall, and those early editions may be said to be, with some drawbacks, by far the best. His later editors have been possessed by the mania of reducing his good archaic and nervous language to the bald feebleness of modern phraseology. It is unfortunately impossible to exempt from this criticism even the edition, in other respects very valuable and meritorious, published under the superintendence of the Rev. W. West (7 vols., London, 1869-1875); see also volume of selections (with biography) by Dr Blair of Dunblane (1883), who also contributed "Bibliography of Archbishop Leighton" to the *British and Foreign Evangelical Review* (July 1883); Andrew Lang, *History of Scotland* (1902).

(J. T. Br.; D. Mn.)

LEIGHTON BUZZARD, a market town in the southern parliamentary division of Bedfordshire, England, 40 m. N.W. of London by the London & North-Western railway. Pop. of urban district (1901) 6331. It lies in the flat valley of the Ouzel, a tributary of the Ouse, sheltered to east and west by low hills. The river here forms the county boundary with Buckinghamshire. The Grand Junction canal follows its course, and gives the town extensive water-communications. The church of All Saints is cruciform, with central tower and spire. It is mainly Early English, and a fine example of the style; but some of the windows including the nave clerestory, and the beautiful carved wooden roof, are Perpendicular. The west door has good early iron-work; and on one of the tower-arch pillars are some remarkable early carvings of jocular character, one of which represents a man assaulted by a woman with a ladle. The market cross is of the 14th century, much restored, having an open arcade supporting a pinnacle, with flying buttresses. The statues in its niches are modern, but the originals are placed on the exterior of the town hall. Leighton has a considerable agricultural trade, and some industry in straw-plaiting. Across the Ouzel in Buckinghamshire, where Leighton railway station is situated, is the urban district of Linslade (pop. 2157).

LEININGEN, the name of an old German family, whose lands lay principally in Alsace and Lorraine. The first count of Leiningen about whom anything certain is known was a certain Emicho (d. 1117), whose family became extinct in the male line when Count Frederick, a Minnesinger, died about 1220. Frederick's sister, Liutgarde, married Simon, count of Saarbrücken, and Frederick, one of their sons, inheriting the lands of the counts of Leiningen, took their arms and their name. Having increased its possessions the Leiningen family was divided about 1317 into two branches; the elder of these, whose head was a landgrave, died out in 1467. On this event its lands fell to a female, the last landgrave's sister Margaret, wife of Reinhard, lord of Westerburg, and their descendants were known as the family of Leiningen-Westerburg. Later this family was divided into two branches, those of Alt-Leiningen-Westerburg and Neu-Leiningen-Westerburg, both of which are represented to-day.

Meanwhile the younger branch of the Leiningens, known as the family of Leiningen-Dagsburg, was flourishing, and in 1560 this was divided into the lines of Leiningen-Dagsburg-Hartenburg, founded by Count John Philip (d. 1562), and Leiningen-Dagsburg-Heidesheim or Falkenburg, founded by Count Emicho (d. 1593). In 1779 the head of the former line was raised to the rank of a prince of the Empire. In 1801 this family was deprived of its lands on the left bank of the Rhine by France, but in 1803 it received ample compensation for these losses. A few years later its possessions were mediatized, and they are now included mainly in Baden, but partly in Bavaria and in Hesse. A former head of this family, Prince Emich Charles, married Maria Louisa Victoria, princess of Saxe-

Coburg; after his death in 1814 the princess married George III.'s son, the duke of Kent, by whom she became the mother of Queen Victoria. In 1910 the head of the family was Prince Emich (b. 1866).

The family of Leiningen-Dagsburg-Heidesheim was divided into three branches, the two senior of which became extinct during the 18th century. At present it is represented by the counts of Leiningen-Guntersblum and Leiningen-Heidesheim, called also Leiningen-Billigheim and Leiningen-Neidenau.

See Brinckmeier, *Genealogische Geschichte des Hauses Leiningen* (Brunswick, 1890-1891).

LEINSTER, a province of Ireland, occupying the middle and south-eastern portion of the island, and extending to the left bank of the Shannon. It includes counties Longford, Westmeath, Meath, Louth, King's County, Kildare, Dublin, Queen's County, Carlow, Wicklow, Kilkenny and Wexford (*q.v.* for topography, &c.). Leinster (*Laighen*) was one of the early Milesian provinces of Ireland. Meath, the modern county of which is included in Leinster, was the name of a separate province created in the 2nd century A.D. The kings of Leinster retained their position until 1171, and their descendants maintained independence within a circumscribed territory as late as the 16th century. In 1170 Richard Strongbow married Aoife, daughter of the last king Diarmid, and thus acquired the nominal right to the kingdom of Leinster. Henry II. confirmed him in powers of jurisdiction equivalent to those of a palatinate. His daughter Isabel married William Marshal, earl of Pembroke. Their five daughters shared the territory of Leinster, which was now divided into five liberties carrying the same extensive privileges as the undivided territory, namely, Carlow, Kilkenny, Wexford, Kildare and Leix. The history of Leinster thereafter passes to the several divisions which were gradually organized into the present counties.

LEIPZIG, a city of Germany, the second town of the kingdom of Saxony in size and the first in commercial importance, 70 m. N.W. of Dresden and 111 m. S.W. of Berlin by rail, and 6 m. from the Prussian frontier. It lies 350 ft. above the sea-level, In a broad and fertile plain, just above the junction of three small rivers, the Pleisse, the Parthe and the Elster, which flow in various branches through or round the town and afterwards under the name of the Elster, discharge themselves into the Saale. The climate, though not generally unhealthy, may be inclement in winter and hot in summer.

Leipzig is one of the most enterprising and prosperous of German towns, and in point of trade and industries ranks among German cities immediately after Berlin and Hamburg. It possesses the third largest German university, is the seat of the supreme tribunal of the German empire and the headquarters of the XIX. (Saxon) army corps, and forms one of the most prominent literary and musical centres in Europe. Its general aspect is imposing, owing to the number of new public buildings erected during the last 20 years of the 19th century. It consists of the old, or inner city, surrounded by a wide and pleasant promenade laid out on the site of the old fortifications, and of the very much more extensive inner and outer suburbs. Many thriving suburban villages, such as Reudnitz, Volkmarsdorf, Gohlis, Eutritzsch, Plagwitz and Lindenau, have been incorporated with the city, and with these accretions the population in 1905 amounted to 502,570. On the north-west the town is bordered by the fine public park and woods of the Rosenthal, and on the west by the Johanna Park and by pleasant groves leading along the banks of the Pleisse.

The old town, with its narrow streets and numerous houses of the 16th and 17th centuries, with their high-pitched roofs, preserves much of its quaint medieval aspect. The market square, lying almost in its centre, is of great interest. Upon it the four main business streets, the Grimmaische-, the Peters-, the Hain- and the Katharinen-strassen, converge, and its north side is occupied by the beautiful old Rathaus, a Gothic edifice built by the burgomaster Hieronymus Lotter in 1556, and containing life-size portraits of the Saxon rulers. Superseded by the new Rathaus, it has been restored and accommodates a municipal museum. Behind the market square and the main street lie a labyrinth of narrow streets interconnected by covered courtyards and alleys, with extensive warehouses and cellars. The whole, in the time of the great fairs, when every available place is packed with merchandise and thronged with a motley crowd, presents the semblance of an oriental bazaar. Close to the old Rathaus is Auerbach's *Hof*, built about 1530 and interesting as being immortalized in Goethe's *Faust*. It has a curious old wine vault (Keller) which contains a series of mural paintings of the 16th century, representing the legend on which the play is based. Near by is the picturesque Königshaus, for several centuries the palace of the Saxon monarchs in Leipzig and in which King Frederick Augustus I. was made prisoner by the Allies after the battle of Leipzig in October 1813. At the end of the Petersstrasse, in the south-west corner of the inner town and on the promenade, lay the Pleissenburg, or citadel, modelled, according to tradition, on that of Milan, and built early in the 13th century. Here Luther in 1519 held his momentous disputation. The round tower was long used as an observatory and the building as a barrack. With the exception of the tower, which has been encased and raised to double its former height—to 300 ft.—the citadel has been removed and its site is occupied by the majestic pile of the new Rathaus in Renaissance style, with the tower as its central feature. The business of Leipzig is chiefly concentrated in the inner city, but the headquarters of the book trade lie in the eastern suburb. Between the inner town and the latter lies the magnificent Augustusplatz, one of the most spacious squares in Europe. Upon it, on the side of the inner town and included within it, is the Augusteum, or main building of the university, a handsome edifice containing a splendid hall (1900), lecture rooms and archaeological collections; adjoining it is the Paulinerkirche, the university church. The other sides of the square are occupied by the new theatre, an imposing Renaissance structure, designed by C. F. Langhans, the post office and the museum of sculpture and painting, the latter faced by the Mende fountain. The churches of Leipzig are comparatively

uninteresting. The oldest, in its present form, is the Paulinerkirche, built in 1229-1240, and restored in 1900, with a curiously grooved cloister; the largest in the inner town is the Thomaskirche, with a high-pitched roof dating from 1496, and memorable for its association with J. Sebastian Bach, who was organist here. Among others may be mentioned the new Gothic Petrikirche, with a lofty spire, in the south suburb. On the east is the Johanniskirche, round which raged the last conflict in the battle of 1813, when it suffered severely from cannon shot. In it is the tomb of Bach, and outside that of the poet Gellert. Opposite its main entrance is the Reformation monument, with bronze statues of Luther and Melanchthon, by Johann Schilling, unveiled in 1883. In the Johanna Park is the Lutherkirche (1886), and close at hand the Roman Catholic and English churches. To the south-west of the new Rathaus, lying beyond the Pleisse and between it and the Johanna Park, is the new academic quarter. Along the fine thoroughfares, noticeable among which is the Karl Tauchnitz Strasse, are closely grouped many striking buildings. Here is the new Gewandhaus, or Konzerthaus, built in 1880-1884, in which the famous concerts called after its name are given, the old Gewandhaus, or Drapers' Hall, in the inner town having again been devoted to commercial use as a market hall during the fairs. Immediately opposite to it is the new university library, built in 1891, removed hither from the old monasterial buildings behind the Augusteum, and containing some 500,000 volumes and 5000 MSS. Behind that again is the academy of art, one wing of which accommodates the industrial art school; and close beside it are the school of technical arts and the conservatoire of music. Between the university library and the new Gewandhaus stands a monument of Mendelssohn (1892). Immediately to the east of the school of arts rises the grand pile of the supreme tribunal of the German empire, the Reichsgericht, which compares with the Reichstag building in Berlin. It was built in 1888-1895 from plans by Ludwig Hoffmann, and is distinguished for the symmetry and harmony of its proportions. It bears an imposing dome, 225 ft. high, crowned by a bronze figure of Truth by O. Lessing, 18 ft. high. Opposite, on the outer side of the Pleisse, are the district law-courts, large and substantial, though not specially imposing edifices. In the same quarter stands the Grassi Museum (1893-1896) for industrial art and ethnology, and a short distance away are the palatial buildings of the Reichs and Deutsche Banks. Farther east and lying in the centre of the book-trade quarter stand close together the Buchhändlerhaus (booksellers' exchange), the great hall decorated with allegorical pictures by Sascha Schneider, and the Buchgewerbehaus, a museum of the book trade, both handsome red brick edifices in the German Renaissance style, erected in 1886-1890. South-west of these buildings, on the other side of the Johannisthal Park, are clustered the medical institutes and hospitals of the university—the infirmary, clinical and other hospitals, the physico-chemical institute, pathological institute, physiological institute, ophthalmic hospital, pharmacological institute, the schools of anatomy, the chemical laboratory, the zoological institute, the physico-mineralogical institute, the botanical garden and also the veterinary schools, deaf and dumb asylum, agricultural college and astronomical observatory. Among other noteworthy buildings in this quarter must be noted the Johannisstift, an asylum for the relief of the aged poor, with a handsome front and slender spire. On the north side of the inner town and on the promenade are the handsome exchange with library, and the reformed church, a pleasing edifice in late Gothic.

Leipzig has some interesting monuments; the Siegesdenkmal, commemorative of the wars of 1866 and 1870, on the market square, statues of Goethe, Leibnitz, Gellert, J. Sebastian Bach, Robert Schumann, Hahnemann, the homeopathist, and Bismarck. There are also many memorials of the battle of Leipzig, including an obelisk on the Randstädter-Steinweg, on the site of the bridge which was prematurely blown up, when Prince Poniatowski was drowned; a monument of cannon balls collected after the battle; a "relief" to Major Friccius, who stormed the outer Grimma gate; while on the battle plain itself and close to "Napoleonstein," which commemorates Napoleon's position on the last day of the battle, a gigantic obelisk surrounded by a garden has been planned for dedication on the hundredth anniversary of the battle (October 19, 1913).

The University and Education.—The university of Leipzig, founded in 1409 by a secession of four hundred German students from Prague, is one of the most influential universities in the world. It was a few years since the most numerously attended of any university in Germany, but it has since been outstripped by those of Berlin and of Munich. Its large revenues, derived to a great extent from house property in Leipzig and estates in Saxony, enable it, in conjunction with a handsome state subvention, to provide rich endowments for the professorial chairs. To the several faculties also belong various collegiate buildings, notably, to the legal, that of the *Collegium beatae Virginis* in the Petersstrasse, and to the philosophical the *Rothe Haus* on the promenade facing the theatre. The other educational institutions of Leipzig include the Nicolai and Thomas gymnasia, several "Realschulen," a commercial academy (*Handelsschule*), high schools for girls, and a large number of public and private schools of all grades.

Art and Literature.—The city has a large number of literary, scientific and artistic institutions. One of the most important is the museum, which contains about four hundred modern paintings, a large number of casts, a few pieces of original sculpture and a well-arranged collection of drawings and engravings. The collection of the historical society and the ethnographical and art-industrial collections in the Grassi Museum are also of considerable interest. The museum was erected with part of the munificent bequest made to the city by Dominic Grassi in 1881. As a musical centre Leipzig is known all over the world for its excellent conservatorium, founded in 1843 by Mendelssohn. The series of concerts given annually in the Gewandhaus is also of world-wide reputation, and the operatic stage of Leipzig is deservedly ranked among the finest in Germany. There are numerous vocal and orchestral societies, some of which have brought their art to a very high pitch of perfection. The prominence of the publishing interest has attracted to Leipzig a large number of gifted authors, and made it a literary centre of considerable importance. Over five hundred newspapers and periodicals are published here, including several of the most widely circulated in Germany. Intellectual interests of a high order have always characterized Leipzig, and what Karl von Holtei once said of it is true to-day: "There is only one city in Germany that represents Germany; only a single city where one can forget that he is a Hessian, a Bavarian, a Swabian, a Prussian or a Saxon; only one city where, amid the opulence of the commercial world with which science is so gloriously allied, even the man who possesses nothing but his personality is honoured and esteemed; only one city, in which, despite a few narrownesses, all the advantages of a great, I may say a world-metropolis, are conspicuous! This city is, in my opinion, and in my experience, Leipzig."

Commerce, Fairs.—The outstanding importance of Leipzig as a commercial town is mainly derived from its three great fairs, which annually attract an enormous concourse of merchants from all parts of Europe, and from Persia, Armenia and other Asiatic countries. The most important fairs are held at Easter and Michaelmas, and are said to have been founded as markets about 1170. The smaller New Year's fair was established in 1458. Under the fostering care of the margraves of Meissen, and then of the electors of Saxony they attained great popularity. In 1268 the margrave of Meissen granted a safe-conduct to all frequenters of the fairs, and in 1497 and 1507 the

emperor Maximilian I. greatly increased their importance by prohibiting the holding of annual markets at any town within a wide radius of Leipzig. During the Thirty Years' War, the Seven Years' War and the troubles consequent upon the French Revolution, the trade of the Leipzig fairs considerably decreased, but it recovered after the accession of Saxony to the German Customs Union (*Zollverein*) in 1834, and for the next twenty years rapidly and steadily increased. Since then, owing to the greater facilities of communication, the transactions at the fairs have diminished in relative, though they have increased in actual, value. Wares that can be safely purchased by sample appear at the fairs in steadily diminishing quantities, while others, such as hides, furs and leather, which require to be actually examined, show as marked an increase. The value of the sales considerably exceeds £10,000,000 sterling per annum. The principal commodity is furs (chiefly American and Russian), of which about one and a quarter million pounds worth are sold annually; other articles disposed of are leather, hides, wool, cloth, linen and glass. The Leipzig wool-market, held for two days in June, is also important.

In the trades of bookselling and publishing Leipzig occupies a unique position, not only taking the first place in Germany, but even surpassing London and Paris in the number and total value of its sales. There are upwards of nine hundred publishers and booksellers in the town, and about eleven thousand firms in other parts of Europe are represented here. Several hundred booksellers assemble in Leipzig every year, and settle their accounts at their own exchange (*Buchhändler-Börse*). Leipzig also contains about two hundred printing-works, some of great extent, and a corresponding number of type-foundries, binding-shops and other kindred industries.

The book trades give employment to over 15,000 persons, and since 1878 Leipzig has grown into an industrial town of the first rank. The iron and machinery trades employ 4500 persons; the textile industries, cotton and yarn spinning and hosiery, 6000; and the making of scientific and musical instruments, including pianos, 2650. Other industries include the manufacture of artificial flowers, wax-cloth, chemicals, ethereal oils and essences, beer, mineral waters, tobacco and cigars, lace, india-rubber wares, rush-work and paper, the preparation of furs and numerous other branches. These industries are mostly carried on in the suburbs of Plagwitz, Reudnitz, Lindenau, Gohlis, Eutritzsch, Konnewitz and the neighbouring town of Markranstädt.

Communications.—Leipzig lies at the centre of a network of railways giving it direct communication with all the more important cities of Germany. There are six main line railway stations, of which the Dresden and the Magdeburg lie side by side in the north-east corner of the promenade, the Thuringian and Berlin stations further away in the northern suburb; in the eastern is the Eilenburg station (for Breslau and the east) and in the south the Bavarian station. The whole traffic of these stations is to be directed into a vast central station (the largest in the world), lying on the sites of the Dresden, Magdeburg and Thuringian stations. The estimated cost, borne by Prussia, Saxony and the city of Leipzig, is estimated at 6 million pounds sterling. The city has an extensive electric tramway system, bringing all the outlying suburbs into close connexion with the business quarters of the town.

Population.—The population of Leipzig was quintupled within the 19th century, rising from 31,887 in 1801 to 153,988 in 1881, to 455,089 in 1900 and to 502,570 in 1905.

History.—Leipzig owes its origin to a Slav settlement between the Elster and the Pleisse, which was in existence before the year 1000, and its name to the Slav word *lipa*, a lime tree. There was also a German settlement near this spot, probably round a castle erected early in the 10th century by the German king, Henry the Fowler. The district was part of the mark of Merseburg, and the bishops of Merseburg were the lords of extensive areas around the settlements. In the 11th century Leipzig is mentioned as a fortified place and in the 12th it came into the possession of the margrave of Meissen, being granted some municipal privileges by the margrave, Otto the Rich, before 1190. Its favourable situation in the midst of a plain intersected by the principal highways of central Europe, together with the fostering care of its rulers, now began the work of raising Leipzig to the position of a very important commercial town. Its earliest trade was in the salt produced at Halle, and its enterprising inhabitants constructed roads and bridges to lighten the journey of the traders and travellers whose way led to the town. Soon Leipzig was largely used as a depot by the merchants of Nuremberg, who carried on a considerable trade with Poland. Powers of self-government were acquired by the council (*Rat*) of the town, the importance of which was enhanced during the 15th century by several grants of privileges from the emperors. When Saxony was divided in 1485 Leipzig fell to the Albertine, or ducal branch of the family, whose head Duke George gave new rights to the burghers. This duke, however, at whose instigation the famous discussion between Luther and Johann von Eck took place in the Pleissenburg of Leipzig, inflicted some injury upon the town's trade and also upon its university by the harsh treatment which he meted out to the adherents of the new doctrines; but under the rule of his successor, Henry, Leipzig accepted the teaching of the reformers. In 1547 during the war of the league of Schmalkalden the town was besieged by the elector of Saxony, John Frederick I. It was not captured, although its suburbs were destroyed. These and the Pleissenburg were rebuilt by the elector Maurice, who also strengthened the fortifications. Under the elector Augustus I. emigrants from the Netherlands were encouraged to settle in Leipzig and its trade with Hamburg and with England was greatly extended.

During the Thirty Years' War Leipzig suffered six sieges and on four occasions was occupied by hostile troops, being retained by the Swedes as security for the payment of an indemnity from 1648 to 1650. After 1650 its fortifications were strengthened; its finances were put on a better footing; and its trade, especially with England, began again to prosper; important steps being taken with regard to its organization. Towards the end of the 17th century the publishing trade began to increase very rapidly, partly because the severity of the censorship at Frankfort-on-the-Main caused many booksellers to remove to Leipzig. During the Seven Years' War Frederick the Great exacted a heavy contribution from Leipzig, but this did not seriously interfere with its prosperity. In 1784 the fortifications were pulled down. The wars in the first decade of the 19th century were not on the whole unfavourable to the commerce of Leipzig, but in 1813 and 1814, owing to the presence of enormous armies in the neighbourhood, it suffered greatly. Another revival, however, set in after the peace of 1815, and this was aided by the accession of Saxony to the German Zollverein in 1834, and by the opening of the first railway a little later. In 1831 the town was provided with a new constitution, and in 1837 a scheme for the reform of the university was completed. A riot in 1845, the revolutionary movement of 1848 and the Prussian occupation of 1866 were merely passing shadows. In 1879 Leipzig acquired a new importance by becoming the seat of the supreme court of the German empire.

The immediate neighbourhood of Leipzig has been the scene of several battles, two of which are of more than ordinary importance. These are the battles of Breitenfeld, fought on the 17th of September 1631, between the Swedes under Gustavus Adolphus and the imperialists, and the great battle of Leipzig, known in Germany as the Völkerschlacht, fought in October 1813 between Napoleon and the allied forces of Russia, Prussia and Austria.

Towards the middle of the 18th century Leipzig was the seat of the most influential body of literary men in

Germany, over whom Johann Christoph Gottsched, like his contemporary, Samuel Johnson, in England, exercised a kind of literary dictatorship. Then, if ever, Leipzig deserved the epithet of a "Paris in miniature" (*Klein Paris*) assigned to it by Goethe in his *Faust*. The young Lessing produced his first play in the Leipzig theatre, and the university counts Goethe, Klopstock, Jean Paul Richter, Fichte and Schelling among its alumni. Schiller and Gellert also resided for a time in Leipzig, and Sebastian Bach and Mendelssohn filled musical posts here. Among the celebrated natives of the town are the philosopher Leibnitz and the composer Wagner.

AUTHORITIES.—For the history of Leipzig see E. Hasse, *Die Stadt Leipzig und ihre Umgebung, geographisch und statistisch beschrieben* (Leipzig, 1878); K. Grosse, *Geschichte der Stadt Leipzig* (Leipzig, 1897-1898); Rachel, *Verwaltungsorganisation und Ämterwesen der Stadt Leipzig bis 1627* (Leipzig, 1902); G. Wustmann, *Aus Leipzigs Vergangenheit* (Leipzig, 1898); *Bilderbuch aus der Geschichte der Stadt Leipzig* (Leipzig, 1897); *Leipzig durch drei Jahrhunderte, Atlas zur Geschichte des Leipziger Stadtbildes* (Leipzig, 1891); *Quellen zur Geschichte Leipzigs* (Leipzig, 1889-1895); and *Geschichte der Stadt Leipzig* (Leipzig, 1905); F. Seifert, *Die Reformation in Leipzig* (Leipzig, 1883); G. Buchwald, *Reformationsgeschichte der Stadt Leipzig* (Leipzig, 1900); Geffcken and Tykocinski, *Stiftungsbuch der Stadt Leipzig* (Leipzig, 1905); the *Urkundenbuch der Stadt Leipzig*, edited by C. F. Posern-Klett and Förstemann (Leipzig, 1870-1895); and the *Schriften des Vereins für die Geschichte Leipzigs* (Leipzig, 1872-1904). For other aspects of the town's life see Hirschfeld, *Leipzigs Grossindustrie und Grosshandel* (Leipzig, 1887); Hassert, *Die geographische Lage und Entwickelung Leipzigs* (Leipzig, 1899); Helm, *Heimatkunde von Leipzig* (Leipzig, 1903); E. Friedberg, *Die Universität Leipzig in Vergangenheit und Gegenwart* (Leipzig, 1897); F. Zarncke, *Die Statutenbücher der Universität Leipzig* (Leipzig, 1861); E. Hasse, *Geschichte der Leipziger Messen* (Leipzig, 1885); Tille, *Die Anfänge der hohen Landstrasse* (Gotha, 1906); Biedermann, *Geschichte der Leipziger Kramerinnung* (Leipzig, 1881); and Moltke, *Die Leipziger Kramerinnung im 15 und 16 Jahrhundert* (Leipzig, 1901).

LEIRIA, an episcopal city and the capital of the district of Leiria, formerly included in Estremadura, Portugal; on the river Liz and on the Lisbon-Figueria da Foz railway. Pop. (1900) 4459. The principal buildings of Leiria are the ruined citadel, which dates from 1135, and the cathedral, a small Renaissance building erected in 1571 but modernized in the 18th century. The main square of the city is named after the poet Francisco Rodrigues Lobo, who was born here about 1500. Between Leiria and the Atlantic there are extensive pine woods known as the Pinhal de Leiria, which were planted by King Diniz (1279-1325) with trees imported from the Landes in France, in order to give firmness to the sandy soil. In the neighbourhood there are glass and iron foundries, oil wells and mineral springs. Leiria, the Roman Calippo, was taken from the Moors in 1135 by Alphonso I. (Affonso Henriques). King Diniz made it his capital. In 1466 the first Portuguese printing-press was established here; in 1545 the city was made an episcopal see. The administrative district of Leiria coincides with the north and north-west of the ancient province of Estremadura (*q.v.*); pop. (1900) 238,755; area 1317 sq. m.

LEISLER, JACOB (*c.* 1635-1691), American political agitator, was born probably at Frankfort-on-Main, Germany, about 1635. He went to New Netherland (New York) in 1660, married a wealthy widow, engaged in trade, and soon accumulated a fortune. The English Revolution of 1688 divided the people of New York into two well-defined factions. In general the small shop-keepers, small farmers, sailors, poor traders and artisans were arrayed against the patroons, rich fur-traders, merchants, lawyers and crown officers. The former were led by Leisler, the latter by Peter Schuyler (1657-1724), Nicholas Bayard (*c.* 1644-1707), Stephen van Cortlandt (1643-1700), William Nicolls (1657-1723) and other representatives of the aristocratic Hudson Valley families. The "Leislerians" pretended greater loyalty to the Protestant succession. When news of the imprisonment of Gov. Andros in Massachusetts was received, they took possession on the 31st of May 1689 of Fort James (at the southern end of Manhattan Island), renamed it Fort William and announced their determination to hold it until the arrival of a governor commissioned by the new sovereigns. The aristocrats also favoured the Revolution, but preferred to continue the government under authority from James II. rather than risk the danger of an interregnum. Lieutenant-Governor Francis Nicholson sailed for England on the 24th of June, a committee of safety was organized by the popular party, and Leisler was appointed commander-in-chief. Under authority of a letter from the home government addressed to Nicholson, "or in his absence, to such as for the time being takes care for preserving the peace and administering the laws in His Majesty's province of New York," he assumed the title of lieutenant-governor in December 1689, appointed a council and took charge of the government of the entire province. He summoned the first Intercolonial Congress in America, which met in New York on the 1st of May 1690 to plan concerted action against the French and Indians. Colonel Henry Sloughter was commissioned governor of the province on the 2nd of September 1689 but did not reach New York until the 19th of March 1691. In the meantime Major Richard Ingoldsby and two companies of soldiers had landed (January 28, 1691) and demanded possession of the fort. Leisler refused to surrender it, and after some controversy an attack was made on the 17th of March in which two soldiers were killed and several wounded. When Sloughter arrived two days later Leisler hastened to give over to him the fort and other evidences of authority. He and his son-in-law, Jacob Milborne, were charged with treason for refusing to submit to Ingoldsby, were convicted, and on the 16th of May 1691 were executed. There has been much controversy among historians with regard both to the facts and to the significance of Leisler's brief career as ruler in New York.

See J. R. Brodhead, *History of the State of New York* (vol. 2, New York, 1871). For the documents connected with the controversy see E. B. O'Callaghan, *Documentary History of the State of New York* (vol. 2, Albany, 1850).

LEISNIG, a town in the kingdom of Saxony, prettily situated on the Freiberger Mulde, 7 m. S. of Grimma by the railway from Leipzig to Dresden via Döbeln. Pop. (1905) 8147. On a high rock above the town lies the old castle of Mildenstein, now utilized as administrative offices. The industries include the manufacture of cloth, furniture, boots, buttons, cigars, beer, machinery and chemicals. Leisnig is a place of considerable antiquity. About 1080 it passed into the possession of the counts of Groitzsch, but was purchased in 1157 by the emperor Frederick I., who committed it to the charge of counts. It fell to Meissen in 1365, and later to Saxony.

LEITH, a municipal and police burgh, and seaport, county of Midlothian, Scotland. Pop. (1901) 77,439. It is situated on the south shore of the Firth of Forth, 1½ m. N.N.E. of Edinburgh, of which it is the port and with which it is connected by Leith Walk, practically a continuous street. It has stations on the North British and Caledonian railways, and a branch line (N.B.R.) to Portobello. Lying at the mouth of the Water of Leith, which is crossed by several bridges and divides it into the parishes of North and South Leith, it stretches for 3¼ m. along the shore of the Firth from Seafield in the east to near Granton in the west. There is tramway communication with Edinburgh and Newhaven.

The town is a thriving centre of trade and commerce. St Mary's in Kirkgate, the parish church of South Leith, was founded in 1483, and was originally cruciform but, as restored in 1852, consists of an aisled nave and north-western tower. Here David Lindsay (1531-1613), its minister, James VI.'s chaplain and afterwards bishop of Ross, preached before the king the thanksgiving sermon on the Gowrie conspiracy (1600). John Logan, the hymn-writer and reputed author of "The Ode to the Cuckoo," was minister for thirteen years; and in its graveyard lies the Rev. John Home, author of *Douglas*, a native of Leith. Near it in Constitution Street is St James's Episcopal church (1862-1869), in the Early English style by Sir Gilbert Scott, with an apsidal chancel and a spire 160 ft. high. The parish church of North Leith, in Madeira Street, with a spire 158 ft. high, is one of the best livings in the Established Church of Scotland. St Thomas's, at the head of Shirra Brae, in the Gothic style, was built in 1843 by Sir John Gladstone of Fasque, who—prior to his removal to Liverpool, where his son, W. E. Gladstone, was born—had been a merchant in Leith. The public buildings are wholly modern, the principal being of classic design. They include the custom house (1812) in the Grecian style; Trinity House (1817), also Grecian, containing Sir Henry Raeburn's portrait of Admiral Lord Duncan, David Scott's "Vasco da Gama Rounding the Cape" and other paintings; the markets (1818); the town hall (1828), with an Ionic façade on Constitution Street and a Doric porch on Charlotte Street; the corn exchange (1862) in the Roman style; the assembly rooms; exchange buildings; the public institute (1867) and Victoria public baths (1899). Trinity House was founded in 1555 as a home for old and disabled sailors, but on the decline of its revenues it became the licensing authority for pilots, its humane office being partly fulfilled by the sailors' home, established about 1840 in a building adjoining the Signal Tower, and rehoused in a handsome structure in the Scottish Baronial style in 1883-1884. Other charitable institutions include the hospital, John Watt's hospital and the smallpox hospital. The high school, built in 1806, for many years a familiar object on the west margin of the Links, gave way to the academy, a handsome and commodious structure, to which are drafted senior pupils from the numerous board schools for free education in the higher branches. Here also is accommodated the technical college. Secondary instruction is given also in Craighall Road school. A bronze statue of Robert Burns was unveiled in 1898. Leith Links, one of the homes of golf in Scotland, is a popular resort, on Lochend Road are situated Hawkhill recreation grounds, and Lochend Loch is used for skating and curling. There are small links at Newhaven, and in Trinity are Starbank Park and Cargilfield playing ground. The east pier (1177 yds. long) and the west pier (1041 yds.) are favourite promenades. The waterway between them is the entrance to the harbour. Leith cemetery is situated at Seafield and the Eastern cemetery in Easter Road.

The oldest industry is shipbuilding, which dates from 1313. Here in 1511 James IV. built the "St Michael," "ane verrie monstruous great ship, whilk tuik sae meikle timber that schee waisted all the woodis in Fyfe, except Falkland wood, besides the timber that cam out of Norroway." Other important industries are engineering, sugar-refining (established 1757), meat-preserving, flour-milling, sailcloth-making, soap-boiling, rope and twine-making, tanning, chemical manures-making, wood-sawing, hosiery, biscuit-baking, brewing, distilling and lime-juice making. Of the old trade of glass-making, which began in 1682, scarcely a trace survives. As a distributing centre, Leith occupies a prominent place. It is the headquarters of the whisky business in Great Britain, and stores also large quantities of wine from Spain, Portugal and France. This pre-eminence is due to its excellent dock and harbour accommodation and capacious warehouses. The two old docks (1801-1807) cover 10½ acres; Victoria Dock (1852) 5 acres; Albert Dock (1863-1869) 10¾ acres; Edinburgh Dock (1874-1881) 16⅔ acres; and the New Dock (1892-1901) 60 acres. There are several dry docks, of which the Prince of Wales Graving Dock (1858), the largest, measures 370 ft. by 60 ft. Space can always be had for more dock room by reclaiming the east sands, where in the 17th and 18th centuries Leith Races were held, the theme of a humorous descriptive poem by Robert Fergusson. Apart from coasting trade there are constant sailings to the leading European ports, the United States and the British colonies. In 1908 the tonnage of ships entering the harbour was (including coastwise trade) 1,975,457; that of ships clearing the harbour 1,993,227. The number of vessels registered at the port was 213 (net tonnage 146,799). The value of imports was £12,883,890, of exports £5,377,188. In summer there are frequent excursions to the Bass Rock and the Isle of May, North Berwick, Elie, Aberdour, Alloa and Stirling. Leith Fort, built in North Leith in 1779 for the defence of the harbour, is now the headquarters of the Royal Artillery in Scotland. Leith is the head of a fishery district. The town, which is governed by a provost, bailies and council, unites with Musselburgh and Portobello to send one member to parliament.

Leith figures as Inverleith in the foundation charter of Holyrood Abbey (1128). In 1329 Robert I. granted the

harbour to the magistrates of Edinburgh, who did not always use their power wisely. They forbade, for example, the building of streets wide enough to admit a cart, a regulation that accounted for the number of narrow wynds and alleys in the town. Had the overlords been more considerate incorporation with Edinburgh would not have been so bitterly resisted. Several of the quaint bits of ancient Leith yet remain, and the appearance of the shore as it was in the 17th and 18th centuries, and even at a later date, was picturesque in the extreme. During the centuries of strife between Scotland and England its situation exposed the port to attack both by sea and land. At least twice (in 1313 and 1410) its shipping was burned by the English, who also sacked the town in 1544—when the 1st earl of Hertford destroyed the first wooden pier—and 1547. In the troublous times that followed the death of James V., Leith became the stronghold of the Roman Catholic and French party from 1548 to 1560, Mary of Guise, queen regent, not deeming herself secure in Edinburgh. In 1549 the town was walled and fortified by Montalembert, sicur d'Essé, the commander of the French troops, and endured an ineffectual siege in 1560 by the Scots and their English allies. A house in Coalhill is thought to be the "handsome and spacious edifice" erected for her privy council by Mary of Guise. D'Essé's wall, pierced by six gates, was partly dismantled on the death of the queen regent, but although rebuilt in 1571, not a trace of it exists. The old tolbooth, in which William Maitland of Lethington, Queen Mary's secretary, poisoned himself in 1573, to avoid execution for adhering to Mary's cause, was demolished in 1819. Charles I. is said to have received the first tidings of the Irish rebellion while playing golf on the links in 1641. Cromwell in his Scottish campaign built the Citadel in 1650 and the mounds on the links, known as "Giant's Brae" and "Lady Fife's Brae," were thrown up by the Protector as batteries. In 1698 the sailing of the first Darien expedition created great excitement. In 1715 William Mackintosh of Borlum (1662-1743) and his force of Jacobite Highlanders captured the Citadel, of which only the name of Citadel Street and the archway in Couper Street have preserved the memory.

A mile S.E. of the links lies the ancient village of RESTALRIG, the home of the Logans, from whom the superiority of Leith was purchased in 1553 by the queen regent. Sir Robert Logan (d. 1606) was alleged to have been one of the Gowrie conspirators and to have arranged to imprison the king in Fast Castle. This charge, however, was not made until three years after his death, when his bones were exhumed for trial. He was then found guilty of high treason and sentence of forfeiture pronounced; but there is reason to suspect that the whole case was trumped up. The old church escaped demolition at the Reformation and even the fine east window was saved. In the vaults repose Sir Robert and other Logans, besides several of the lords Balmerino, and Lord Brougham's father lies in the kirkyard. The well of St Triduana, which was reputed to possess wonderful curative powers, vanished when the North British railway was constructed.

LEITMERITZ

(Czech, *Litoměřice*), a town and episcopal see of Bohemia, 45 m. N. of Prague by rail. Pop. (1900) 13,075, mostly German. It lies on the right bank of the Elbe, which becomes here navigable for steamers and is spanned by an iron bridge 1700 ft. in length. The fine cathedral, founded in 1057, was built in 1671 and contains some valuable paintings. The library of the episcopal palace, built between 1694 and 1701, possesses the oldest maps of Bohemia made in 1518 by Nicolaus Claudianus of Jung-Bunzlau. Of the other churches that of All Saints dates from the 13th century. The town-hall, with its remarkable bell tower, dates from the 15th century. Leitmeritz is situated in the midst of a very fertile country, called the "Bohemian Paradise," which produces great quantities of corn, fruit, hops and wines. The beer brewed here enjoys a high reputation. On the opposite bank of the river, where the Eger discharges itself into the Elbe, lies Theresienstadt (pop. 7046), an important garrison town. It was formerly an important fortress, erected in 1780 by the emperor Joseph II. and named after his mother Maria Theresa, but the fortress was dismantled in 1882.

Leitmeritz was originally the castle of a royal count and is first mentioned, in 993, in the foundation charter of the convent of St Margaret near Prague. In 1248 it received a town charter, and was governed by the laws of Magdeburg until the time of Ferdinand I., having a special court of jurisdiction over all the royal towns where this law obtained. The town reached its highest degree of prosperity under Charles IV., who bestowed upon it large tracts of forest, agricultural land and vineyards. In the Hussite wars, after its capture by the utraquist, Leitmeritz remained true to "the Chalice," shared also in the revolt against Ferdinand I., and suffered in consequence. It was still more unfortunate during the Thirty Years' War, in the course of which most of the Protestant inhabitants left it; the property of the Bohemian refugees being given to German immigrants. The present bishopric was established in 1655.

LEITNER, GOTTLIEB WILHELM

(1840-1899), Anglo-Hungarian orientalist, was born at Budapest in 1840. He was the son of a physician, and was educated at Malta Protestant college. At the age of fifteen he acted as an interpreter in the Crimean War. He entered King's College, London, in 1858, and in 1861 was appointed professor of Arabic and Mahommedan law. He became principal of the government college at Lahore in 1864, and there originated the term "Dardistan" for a portion of the mountains on the north-west frontier, which was subsequently recognized to be a purely artificial distinction. He collected much valuable information on Graeco-Buddhist art and the origins of Indian art. He spoke, read and wrote twenty-five languages. He founded an oriental institute at Woking, and for some years edited the *Asiatic Quarterly Review*. He died at Bonn in 1899.

See J. H. Stocqueler, *Life and Labours of Dr Leitner* (1875).

LEITRIM, a county of Ireland in the province of Connaught, bounded N.W. by Donegal Bay, N.E. by Fermanagh, E. by Cavan, S.E. by Longford, S.W. by Roscommon and W. by Sligo. The area is 392,381 acres, or about 613 sq. m. The northern portion of the county consists of an elevated tableland, of which the highest summits belong to the Truskmore Hills, reaching 1712 ft.; with Benbo, 1365 ft. and Lackagh, 1446 ft. In the southern part the country is comparatively level, and is generally richly wooded. The county touches the south coast of Donegal Bay, but the coast-line is only about 3 m. The principal river is the Shannon, which, issuing from Lough Allen, forms the south-western boundary of the county with Roscommon. The Bonnet rises in the north-west and flows to Lough Gill, and the streams of Drones and Duff separate Leitrim from Donegal and Sligo. Besides Lough Allen, which has an area of 8900 acres, the other principal lakes in the county are Lough Macnean, Lough Scur, Lough Garadice and Lough Melvin. The scenery of the north is wild and attractive, while in the neighbourhood of the Shannon it is of great beauty. Lough Melvin and the coast rivers afford rod fishing, the lough being noted for its gillaroo trout.

This varied county has in general a floor of Carboniferous Limestone, which forms finely scarped hills as it reaches the sea in Donegal Bay. The underlying sandstone appears at Lough Melvin, and again on the margin of a Silurian area in the extreme south. The Upper Carboniferous series, dipping gently southward, form mountainous country round Lough Allen, where the name of Slieve Anierin records the abundance of clay-ironstone beneath the coal seams. The sandstones and shales of this series scarp boldly towards the valley of the Bonnet, across which rises, in picturesque contrast, the heather-clad ridge of ancient gneiss which forms, in Benbo, the north-east end of the Ox Mountains. The ironstone was smelted in the upland at Creevelea down to 1859, and the coal is worked in a few thin seams.

The climate is moist and unsuitable for grain crops. On the higher districts the soil is stiff and cold, and, though abounding in stones, retentive of moisture, but in the valleys there are some fertile districts. Lime, marl and similar manures are abundant, and on the coast seaweed is plentiful. The proportion of tillage to pasture is roughly as 1 to 3. Potatoes are grown, but oats, the principal grain crop, are scanty. The live stock consists chiefly of cattle, pigs and poultry. Coarse linens for domestic purposes are manufactured and coarse pottery is also made. The Sligo, Leitrim and Northern Counties railway, connecting Sligo with Enniskillen, crosses the northern part of the county, by way of Manor Hamilton; the Mullingar and Sligo line of the Midland Great Western touches the south-western boundary of the county, with a station at Carrick-on-Shannon; while connecting with this line at Dromod is the Cavan and Leitrim railway to Ballinamore and Arigna, and to Belturbet in county Cavan.

The population (78,618 in 1891; 69,343 in 1901) decreases owing to emigration, the decrease being one of the most serious shown by any Irish county. It includes nearly 90% of Roman Catholics. The only towns are Carrick-on-Shannon (pop. 1118) and Manor Hamilton (993). The county is divided into five baronies. It is within the Connaught circuit, and assizes are held at Carrick-on-Shannon, and quarter sessions at Ballinamore, Carrick-on-Shannon and Manor Hamilton. It is in the Protestant diocese of Kilmore, and the Roman Catholic dioceses of Ardagh and Kilmore. In the Irish House of Commons two members were returned for the county and two for the boroughs of Carrick-on-Shannon and Jamestown, but at the Union the boroughs were disfranchised. The county divisions are termed the North and South, each returning one member.

With the territory which afterwards became the county Cavan, Leitrim formed part of Brenny or Breffny, which was divided into two principalities, of which Leitrim, under the name of Hy Bruin-Brenny, formed the western. Being for a long time in the possession of the O'Rourkes, descendants of Roderick, king of Ireland, it was also called Brenny O'Rourke. This family long maintained its independence; even in 1579, when the other existing counties of Connaught were created, the creation of Leitrim was deferred, and did not take place until 1583. Large confiscations were made in the reigns of Elizabeth and James I., in the Cromwellian period, and after the Revolution of 1688.

There are "druidical" remains near Fenagh and at Letterfyan, and important monastic ruins at Creevelea near the Bonnet, with several antique monuments, and in the parish of Fenagh. There was a flourishing Franciscan friary at Jamestown. The abbeys of Mohill, Annaduff and Drumlease are converted into parish churches. Among the more notable old castles are Manor Hamilton Castle, originally very extensive, but now in ruins, and Castle John on an island in Lough Scur. There is a small village named Leitrim about 4 m. N. of Carrick-on-Shannon, which was once of enough importance to give its name to a barony and to the county, and is said to have been the seat of an early bishopric.

LEIXÕES, a seaport and harbour of refuge of northern Portugal; in 41° 9′ 10″ N., 8° 40′ 35″ W., 3 m. N. of the mouth of the Douro. Leixões is included in the parish of Matozinhos (pop. 1900, 7690) and constitutes the main port of the city of Oporto (*q.v.*), with which it is connected by an electric tramway. The harbour, of artificial construction, has an area of over 220 acres, and admits vessels of any size, the depth at the entrance being nearly 50 ft. The transference of cargo to and from ships lying in the Leixões basin is effected entirely by means of lighters from Oporto. In addition to wine, &c., from Oporto, large numbers of emigrants to South America are taken on board here. The trade of the port is mainly in British hands, and large numbers of British ships call at Leixões on the voyage between Lisbon and Liverpool, London or Southampton.

LEJEUNE, LOUIS FRANÇOIS, Baron (1776-1848), French general, painter, and lithographer, was born at Versailles. As aide-de-camp to General Berthier he took an active part in many of the Napoleonic campaigns, which he made the subjects of an important series of battle-pictures. The vogue he enjoyed is due to the truth and vigour of his work, which was generally executed from sketches and studies made on the battlefield. When his battle-pictures were shown at the Egyptian Hall in London, a rail had to be put up to protect them from the eager crowds of sightseers. Among his chief works are "The Entry of Charles X. into Paris, 6 June 1825" at Versailles; "Episode of the Prussian War, October 1807" at Douai Museum; "Marengo" (1801); "Lodi," "Thabor," "Aboukir" (1804); "The Pyramids" (1806); "Passage of the Rhine in 1795" (1824), and "Moskawa" (1812). The German campaign of 1806 brought him to Munich, where he visited the workshop of Senefelder, the inventor of lithography. Lejeune was so fascinated by the possibilities of the new method that he then and there made the drawing on stone of his famous "Cossack" (printed by C. and T. Senefelder, 1806). Whilst he was taking his dinner, and with his horses harnessed and waiting to take him back to Paris, one hundred proofs were printed, one of which he subsequently submitted to Napoleon. The introduction of lithography into France was greatly due to the efforts of Lejeune. Many of his battle-pictures were engraved by Coiny and Bovinet.

See Fournier-Sarlovèze, *Le Général Lejeune* (Paris, *Libraire de l'art*).

LEKAIN, the stage name of Henri Louis Cain (1728-1778), French actor, who was born in Paris on the 14th of April 1728, the son of a silversmith. He was educated at the Collège Mazarin, and joined an amateur company of players against which the Comédie Française obtained an injunction. Voltaire supported him for a time and enabled him to act in his private theatre and also before the duchess of Maine. Owing to the hostility of the actors it was only after a struggle of seventeen months that, by the command of Louis XV., he was received at the Comédie Française. His success was immediate. Among his best parts were Herod in *Mariamne*, Nero in *Britannicus* and similar tragic rôles, in spite of the fact that he was short and stout, with irregular and rather common features. His name is connected with a number of important scenic reforms. It was he who had the benches removed on which privileged spectators formerly sat encumbering the stage, Count Lauragais paying for him an excessive indemnity demanded. Lekain also protested against the method of sing-song declamation prevalent, and endeavoured to correct the costuming of the plays, although unable to obtain the historic accuracy at which Talma aimed. He died in Paris on the 8th of February 1778.

His eldest son published his *Mémoires* (1801) with his correspondence with Voltaire, Garrick and others. They were reprinted with a preface by Talma in *Mémoires sur l'art dramatique* (1825).

LELAND, CHARLES GODFREY (1824-1903), American author, son of a merchant, was born at Philadelphia on the 15th of August 1824, and graduated at Princeton in 1845. He afterwards studied at Heidelberg, Munich and Paris. He was in Paris during the revolution of 1848, and took an active part in it. He then returned to Philadelphia, and after being admitted to the bar in 1851, devoted himself to contributing to periodicals, editing various magazines and writing books. At the opening of the Civil War he started at Boston the *Continental Magazine*, which advocated emancipation. In 1868 he became known as the humorous author of *Hans Breitmann's Party and Ballads*, which was followed by other volumes of the same kind, collected in 1871 with the title of *Hans Breitmann's Ballads*. These dialect poems, burlesquing the German American, at once became popular. In 1869 he went to Europe, and till 1880 was occupied, chiefly in London, with literary work; after returning to Philadelphia for six years, he again made his home in Europe, generally at Florence, where he died on the 20th of March 1903. Though his humorous verses were most attractive to the public, Leland was a serious student of folk-lore, particularly of the gipsies, his writings on the latter (*The English Gypsies and their Language*, 1872; *The Gypsies*, 1882; *Gypsy Sorcery and Fortune-telling* ..., 1891, &c.) being recognized as valuable contributions to the literature of the subject. He was president of the first European folk-lore congress, held in Paris in 1889.

His other publications include *Poetry and Mystery of Dreams* (1855), *Meister Karl's Sketch-book* (1855), *Pictures of Travel* (1856), *Sunshine in Thought* (1862), *Heine's Book of Songs* (1862), *The Music Lesson of Confucius* (1870), *Egyptian Sketch-book* (1873), *Abraham Lincoln* (1879), *The Minor Arts* (1880), *Algonquin Legends of New England* (1884), *Songs of the Sea and Lays of the Land* (1895), *Hans Breitmann in Tyrol* (1895), *One Hundred Profitable Acts* (1897), *Unpublished Legends of Vergil* (1899), *Kuloskap the Master, and other Algonquin Poems* (1903, with J. Dyneley Prince).

See his *Memoirs* (2 vols., 1893), and E. R. Pennell, *C. G. Leland* (1906).

LELAND (Leyland or Laylonde), JOHN (*c.* 1506-1552), English antiquary, was born in London on the 13th of September, probably in 1506. He owed his education at St Paul's school under William Lilly, and at Christ's

College, Cambridge, to the kindness of a patron, Thomas Myles. He graduated at Cambridge in 1521, and subsequently studied at All Souls College, Oxford, and in Paris under François Dubois (Sylvius). On his return to England he took holy orders. He had been tutor to Lord Thomas Howard, son of the 3rd duke of Norfolk, and to Francis Hastings, afterwards earl of Huntingdon. Meanwhile his learning had recommended him to Henry VIII., who presented him to the rectory of Peuplingues in the marches of Calais in 1530. He was already librarian and chaplain to the king, and in 1533 he received a novel commission under the great seal as king's antiquary, with power to search for records, manuscripts and relics of antiquity in all the cathedrals, colleges and religious houses of England. Probably from 1534, and definitely from 1536 onwards to 1542, he was engaged on an antiquarian tour through England and Wales. He sought to preserve the MSS. scattered at the dissolution of the monasteries, but his powers did not extend to the actual collection of MSS. Some valuable additions, however, he did procure for the king's library, chiefly from the abbey of St Augustine at Canterbury. He had received a special dispensation permitting him to absent himself from his rectory of Peuplingues in 1536, and on his return from his itinerary he received the rectory of Haseley in Oxfordshire; his support of the church policy of Henry and Cranmer being further rewarded by a canonry and prebend of King's College (now Christ Church), Oxford, and a prebend of Salisbury. In a *Strena Henrico*[1] (pr. 1546), addressed to Henry VIII. in 1545, he proposed to execute from the materials which he had collected in his journeys a topography of England, an account of the adjacent islands, an account of the British nobility, and a great history of the antiquities of the British Isles. He toiled over his papers at his house in the parish of St Michael le Querne, Cheapside, London, but he was not destined to complete these great undertakings, for he was certified insane in March 1550, and died on the 18th of April 1552.

Leland was an exact observer, and a diligent student of local chronicles. The bulk of his work remained in MS. at the time of his death, and various copies were made, one by John Stowe in 1576. After passing through various hands the greater part of Leland's MSS. were deposited by William Burton, the historian of Leicestershire, in the Bodleian at Oxford. They had in the meantime been freely used by other antiquaries, notably by John Bale, William Camden and Sir William Dugdale. The account of his journey in England and Wales in eight MS. quarto volumes received its name *The Itinerary of John Leland* from Thomas Burton and was edited by Thomas Hearne (9 vols., Oxford, 1710-1712; other editions in 1745 and 1770). The scattered portions dealing with Wales were re-edited by Miss L. Toulmin Smith in 1907. His other most important work, the *Collectanea*, in four folio MS. volumes, was also published by Hearne (6 vols., Oxford, 1715). His *Commentarii de scriptoribus Britannicis*, which had been used and distorted by his friend John Bale, was edited by Anthony Hall (2 vols., Oxford, 1709). Some of Leland's MSS., which formerly belonged to Sir Robert Cotton, passed into the possession of the British Museum. He was a Latin poet of some merit, his most famous piece being the *Cygneo Cantio* (1545) in honour of Henry VIII. Many of his minor works are included in Hearne's editions of the *Itinerary* and the *Collectanea*.

For accounts of Leland see John Bale, *Catalogus* (1557); Anthony à Wood, *Athenae Oxonienses*; W. Huddesford, *Lives of those eminent Antiquaries John Leland, Thomas Hearne and Anthony à Wood* (Oxford, 1772). A life of Leland, attributed to Edward Burton (*c.* 1750), from the library of Sir Thomas Phillipps, printed in 1896 contains a bibliography. See also the biography by Sidney Lee, in the *Dict. Nat. Biog.*

1 Re-edited in 1549 by John Bale as *The laboryeuse Journey and Serche of J. Leylande for Englandes Antiquitees geven of him for a Neu Yeares Gifte, &c.*, modern edition by W. A. Copinger (Manchester, 1895).

LELAND, JOHN (1691-1766), English Nonconformist divine, was born at Wigan, Lancashire, and educated in Dublin, where he made such progress that in 1716, without having attended any college or hall, he was appointed first assistant and afterwards sole pastor of a congregation of Presbyterians in New Row. This office he continued to fill until his death on the 16th of January 1766. He received the degree of D.D. from Aberdeen in 1739. His first publication was *A Defence of Christianity* (1733), in reply to Matthew Tindal's *Christianity as old as the Creation*; it was succeeded by his *Divine Authority of the Old and New Testaments asserted* (1738), in answer to *The Moral Philosopher* of Thomas Morgan; in 1741 he published two volumes, in the form of two letters, being *Remarks on* [H. Dodwell's] *Christianity not founded on Argument*; and in 1753 *Reflexions on the late Lord Bolingbroke's Letters on the Study and Use of History*. His *View of the Principal Deistical Writers that have appeared in England* was published in 1754-1756. This is the chief work of Leland—"most worthy, painstaking and commonplace of divines," as Sir Leslie Stephen called him—and in spite of many defects and inconsistencies is indispensable to every student of the deistic movement of the 18th century.

His *Discourses on various Subjects*, with a *Life* prefixed, was published posthumously (4 vols., 1768-1789).

LELAND STANFORD JR. UNIVERSITY, near Palo Alto, California, U.S.A., in the beautiful Santa Clara valley, was founded in 1885 by Leland Stanford[1] (1824-1893), and by his wife Jane Lathrop Stanford (1825-1905), as a memorial to their only child, Leland Stanford, Jr., who died in 1884 in his seventeenth year. The doors were opened in 1891 to 559 students. The university campus consists of Stanford's former Palo Alto farm, which comprises about 9000 acres. From the campus there are charming views of San Francisco Bay, of the Coast Range, particularly of Mount Hamilton some 30 m. E. with the Lick Observatory on its summit, of mountain foothills, and of the magnificent redwood forests toward Santa Cruz.

The buildings, designed originally by H. H. Richardson and completed by his successors, Shepley, Rutan and Coolidge, are of soft buff sandstone in a style adapted from the old California mission (Moorish-Romanesque) architecture, being long and low with wide colonnades, open arches and red tiled roofs. An outer surrounds an

inner quadrangle of buildings. The inner quadrangle, about a court which is 586 by 246 ft. and is faced by a continuous open arcade and adorned with large circular beds of tropical plants and flowers, consists of twelve one-storey buildings and a beautiful memorial church. Of the fourteen buildings of the outer quadrangle some are two storeys high. A magnificent memorial arch (100 ft. high), adorned with a frieze designed by John Evans, representing the "Progress of Civilization in America," and forming the main gateway, was destroyed by the earthquake of 1906. Outside the quadrangles are other buildings—a museum of art and archaeology, based on collections made by Leland Stanford, Jr., chemical laboratories, engineering work-shops, dormitories, a mausoleum of the founders, &c. There is a fine arboretum (300 acres) and a cactus garden. The charming views, the grace and harmonious colours of the buildings, and the tropic vegetation make a campus of wonderful beauty. The students in 1907-1908 numbered 1738, of whom 126 were graduates, 99 special students, and 500 women.[2] The university library (with the library of the law department) contained in 1908 about 107,000 volumes. A marine biological laboratory, founded by Timothy Hopkins, is maintained at Pacific Grove on the Bay of Monterey. The university has an endowment from its founders estimated at $30,000,000, including three great estates with 85,000 acres of farm and vineyard lands, and several smaller tracts; but the endowment was very largely in interest-bearing securities, income from which was temporarily cut off in the early years of the university's life by litigation. The founders wished the university "to qualify students for personal success and direct usefulness in life; to promote the public welfare by exercising an influence in behalf of humanity and civilization, teaching the blessings of liberty regulated by law, and inculcating love and reverence for the great principles of government as derived from the inalienable rights of man to life, liberty and the pursuit of happiness." There are no inflexible entrance requirements as to particular studies except English composition to ensure a degree of mental maturity, the minimum amount of preparation is fixed as that which should be given by four years in a secondary school, leaving to the applicants a wide choice of subjects (35 in 1906) ranging from ancient history to woodworking and machine shop. In the curriculum, liberty perhaps even greater than at Harvard is allowed as to "electives." Work on some one major subject occupies about one-third of the undergraduate course; the remaining two-thirds (or more) is purely elective. The influence of sectarianism and politics is barred from the university by its charter, and by its private origin and private support. At the same time in its policy it is practically a state university of the most liberal type. Instruction is entirely free. The president of the university has the initiative in all appointments and in all matters of general policy. Within the university faculty power lies in an academic council, and, more particularly, in an advisory board of nine professors, elected by the academic council, to which all propositions of the president are submitted. The growth of the university has been steady, and its conduct careful. David Starr Jordan[3] was its first president.

See O. H. Elliot and O. V. Eaton, *Stanford University and thereabouts* (San Francisco, 1896), and the official publications of the university.

1 Stanford was born in Watervliet, New York; studied law in Albany; removed to California in 1852 and went into business at Michigan Bluff, Placer county, whence he removed to Sacramento in 1856; was made president in 1861 of the Central Pacific railroad company, which built the first trans-continental railway line over the Sierra Nevada; was governor of California in 1862-1863, and United States senator in 1885-1893; and was owner of the great Vina farm (55,000 acres) in Tehama county, containing the largest vineyard in the world (13,400 acres), the Gridley tract (22,000 acres) in Butte county, and the Palo Alto breeding farm, which was the home of his famous thoroughbred racers, Electioneer, Arion, Sunol, Palo Alto and Advertiser.

2 The number of women attending the university as students in any semester is limited by the founding grant to 500.

3 President Jordan was born in 1851 at Gainesville, New York; was educated at Cornell, where he taught botany for a time; became an assistant to the United States fish commission in 1872; in 1885-1891 was president of the university of Indiana, where from 1879 he had been professor of zoology; and in 1891 was elected president of Leland Stanford Jr. University. An eminent ichthyologist, he wrote, with Barton Warren Evermann (b. 1853), of the United States Bureau of Fisheries, *Fishes of North and Middle America* (4 vols., 1896-1900), and *Food and Game Fishes of North America* (1902); and prepared *A Guide to the Study of Fishes* (1905).

LELEGES, the name applied by Greek writers to an early people or peoples of which traces were believed to remain in Greek lands.

1. *In Asia Minor.*—In Homer the Leleges are allies of the Trojans, but they do not occur in the formal catalogue in *Iliad*, bk. ii., and their habitat is not specified. They are distinguished from the Carians, with whom some later writers confused them; they have a king Altes, and a town Pedasus which was sacked by Achilles. The name Pedasus occurs (i.) near Cyzicus, (ii.) in the Troad on the Satnioeis river, (iii.) in Caria, as well as (iv.) in Messenia. Alcaeus (7th-6th centuries B.C.) calls Antandrus in the Troad Lelegian, but Herodotus (5th century) substitutes Pelasgian (*q.v.*). Gargara in the Troad also counted as Lelegian. Pherecydes (5th century) attributed to Leleges the coast land of Caria from Ephesus to Phocaea, with the islands of Samos and Chios, placing the "true Carians" farther south from Ephesus to Miletus. If this statement be from Pherecydes of Leros (*c.* 480) it has great weight. In the 4th century, however, Philippus of Theangela in south Caria describes Leleges still surviving as serfs of the true Carians, and Strabo, in the 1st century B.C., attributes to the Leleges a well-marked group of deserted forts, tombs and dwellings which ranged (and can still be traced) from the neighbourhood of Theangela and Halicarnassus as far north as Miletus, the southern limit of the "true Carians" of Pherecydes. Plutarch also implies the historic existence of Lelegian serfs at Tralles in the interior.

2. *In Greece and the Aegean.*—A single passage in the Hesiodic catalogue (fr. 136 Kinkel) places Leleges "in Deucalion's time," *i.e.* as a primitive people, in Locris in central Greece. Not until the 4th century B.C. does any other writer place them anywhere west of the Aegean. But the confusion of the Leleges with the Carians (immigrant conquerors akin to Lydians and Mysians, and probably to Phrygians) which first appears in a Cretan legend (quoted by Herodotus, but repudiated, as he says, by the Carians themselves) and is repeated by Callisthenes, Apollodorus and other later writers, led easily to the suggestion of Callisthenes, that Leleges joined the Carians in their (half legendary) raids on the coasts of Greece. Meanwhile other writers from the 4th century

onwards claimed to discover them in Boeotia, west Acarnania (Leucas), and later again in Thessaly, Euboea, Megara, Lacedaemon and Messenia. In Messenia they were reputed immigrant founders of Pylos, and were connected with the seafaring Taphians and Teleboans of Homer, and distinguished from the Pelasgians; in Lacedaemon and in Leucas they were believed to be aboriginal. These European Leleges must be interpreted in connexion with the recurrence of place names like Pedasus, Physcus, Larymna and Abae, (*a*) in Caria, and (*b*) in the "Lelegian" parts of Greece; perhaps this is the result of some early migration; perhaps it is also the cause of these Lelegian theories.

Modern speculations (mainly corollaries of Indo-Germanic theory) add little of value to the Greek accounts quoted above. H. Kiepert ("Über den Volksstamm der Leleges," in *Monatsber. Berl. Akad.*, 1861, p. 114) makes the Leleges an aboriginal people akin to Albanians and Illyrians; K. W. Deimling, *Die Leleger* (Leipzig, 1862), starts them in south-west Asia Minor, and brings them thence to Greece (practically the Greek view); G. F. Unger, "Hellas in Thessalien," in *Philologus*, Suppl. ii. (1863), makes them Phoenician, and derives their name from λαλάζειν (cf. the names βάρβαρος, *Wälsche*). E. Curtius (*History of Greece*, i.) distinguished a "Lelegian" phase of nascent Aegean culture. Most later writers follow Deimling. For Strabo's "Lelegian" monuments, cf. Paton and Myres, *Journal of Hellenic Studies*, xvi. 188-270.

(J. L. M.)

LELEWEL, JOACHIM (1786-1861), Polish historian, geographer and numismatist, was born at Warsaw on the 22nd of March 1786. His family came from Prussia in the early part of the 18th century; his grandfather was appointed physician to the reigning king of Poland, and his father caused himself to be naturalized as a Polish citizen. The original form of the name appears to have been Lölhöffel. Joachim was educated at the university of Vilna, and became in 1807 a teacher in a school at Krzemieniec in Volhynia, in 1814 teacher of history at Vilna, and in 1818 professor and librarian at the university of Warsaw. He returned to Vilna in 1821. His lectures enjoyed great popularity, and enthusiasm felt for him by the students is shown in the beautiful lines addressed to him by Mickiewicz. But this very circumstance made him obnoxious to the Russian government, and at Vilna Novosiltsev was then all-powerful. Lelewel was removed from his professorship in 1824, and returned to Warsaw, where he was elected a deputy to the diet in 1829. He joined the revolutionary movement with more enthusiasm than energy, and though the emperor Nicholas I. distinguished him as one of the most dangerous rebels, did not appear to advantage as a man of action. On the suppression of the rebellion he made his way in disguise to Germany, and subsequently reached Paris in 1831. The government of Louis Philippe ordered him to quit French territory in 1833 at the request of the Russian ambassador. The cause of this expulsion is said to have been his activity in writing revolutionary proclamations. He went to Brussels, where for nearly thirty years he earned a scanty livelihood by his writings. He died on the 29th of May 1861 in Paris, whither he had removed a few days previously.

Lelewel, a man of austere character, simple tastes and the loftiest conception of honour, was a lover of learning for its own sake. His literary activity was enormous, extending from his *Edda Skandinawska* (1807) to his *Géographie des Arabes* (2 vols., Paris, 1851). One of his most important publications was *La Géographie du moyen âge* (5 vols., Brussels, 1852-1857), with an atlas (1849) of plates entirely engraved by himself, for he rightly attached such importance to the accuracy of his maps that he would not allow them to be executed by any one else. His works on Polish history are based on minute and critical study of the documents; they were collected under the title *Polska, dzieje i rzeczy jej rozpatrzywane* (*Poland, her History and Affairs surveyed*), in 20 vols. (Posen, 1853-1876). He intended to write a complete history of Poland on an extensive scale, but never accomplished the task. His method is shown in the little history of Poland, first published at Warsaw in Polish in 1823, under the title *Dzieje Polski*, and afterwards almost rewritten in the *Histoire de Pologne* (2 vols., Paris, 1844). Other works on Polish history which may be especially mentioned are *La Pologne au moyen âge* (3 vols., Posen, 1846-1851), an edition of the *Chronicle of Matthew Cholewa*[1] (1811) and *Ancient Memorials of Polish Legislation* (*Ksiegi ustaw polskich i mazowieckich*). He also wrote on the trade of Carthage, on Pytheas of Marseilles, the geographer, and two important works on numismatics (*La Numismatique du moyen âge*, Paris, 2 vols., 1835; *Études numismatiques*, Brussels, 1840). While employed in the university library of Warsaw he studied bibliography, and the fruits of his labours may be seen in his *Bibliograficznych Ksiag dwoje* (*A Couple of Books on Bibliography*) (2 vols., Vilna, 1823-1826). The characteristics of Lelewel as an historian are great research and power to draw inferences from his facts; his style is too often careless, and his narrative is not picturesque, but his expressions are frequently terse and incisive.

He left valuable materials for a just comprehension of his career in the autobiography (*Adventures while Prosecuting Researches and Inquiries on Polish Matters*) printed in his *Polska*.

1 *I.e.* the three first books of the *Historia Polonica* of Vincentius (Kadlbek), bishop of Cracow (d. 1223), wrongly ascribed by Lelewel to Matthaeus Cholewa, bishop of Cracow. See Potthast, *Bibliotheca hist, med. aev., s.v.* "Vincentius."

LELONG, JACQUES (1665-1721), French bibliographer, was born at Paris on the 19th of April 1665. He was a priest of the Oratory, and was librarian to the establishment of the Order in Paris, where he spent his life in seclusion. He died at Paris on the 13th of August 1721. He first published a *Bibliotheca sacra* (1709), an index of all the editions of the Bible, then a *Bibliothèque historique de la France* (1719), a volume of considerable size, containing 17,487 items to which Lelong sometimes appends useful notes. His work is far from complete. He vainly hoped that his friend and successor Father Desmolets, would continue it; but it was resumed by Charles-

Marie Fevret de Fontette, a councillor of the parlement of Dijon, who spent fifteen years of his life and a great deal of money in rewriting the *Bibliothèque historique*. The first two volumes (1768 and 1769) contained as many as 29,143 items. Fevret de Fontette died on the 16th of February 1772, leaving the third volume almost finished. It appeared in 1772, thanks to Barbaud de La Bruyère, who later brought out the 4th and 5th volumes (1775 and 1778). In this new edition the *Bibliothèque historique* is a work of reference of the highest order; it is still of great value.

LELY, SIR PETER (1617-1680) English painter, was born at Soest, Westphalia, in 1617. His father, a military captain and a native of Holland, was originally called van der Vaes; the nickname of Le Lys or Lely, by which he was generally known, was adopted by his son as a surname. After studying for two years under Peter de Grebber, an artist of some note at Haarlem, Lely, induced by the patronage of Charles I. for the fine arts, removed to England in 1641. There he at first painted historical subjects and landscape; he soon became so eminent in his profession as to be employed by Charles to paint his portrait shortly after the death of Vandyck. He afterwards portrayed Cromwell. At the Restoration his genius and agreeable manners won the favour of Charles II., who made him his state-painter, and afterwards knighted him. He formed a famous collection, the best of his time, containing drawings, prints and paintings by the best masters; it sold by auction for no less than £26,000. His great example, however, was Vandyck, whom, in some of his most successful pieces, he almost rivals. Lely's paintings are carefully finished, warm and clear in colouring, and animated in design. The graceful posture of the heads, the delicate rounding of the hands, and the broad folds of the draperies are admired in many of his portraits. The eyes of the ladies are drowsy with languid sentiment, and allegory of a commonplace sort is too freely introduced. His most famous work is a collection of portraits of the ladies of the court of Charles II., known as "the Beauties," formerly at Windsor Castle, and now preserved at Hampton Court Palace. Of his few historical pictures, the best is "Susannah and the Elders," at Burleigh House. His "Jupiter and Europa," in the duke of Devonshire's collection, is also worthy of note. Lely was nearly as famous for crayon work as for oil-painting. Towards the close of his life he often retired to an estate which he had bought at Kew. He died of apoplexy in the Piazza, Covent Garden, London, and was buried in Covent Garden church, where a monument was afterwards erected to his memory. Pepys characterized Lely as "a mighty proud man and full of state." The painter married an English lady of family, and left a son and daughter, who died young. His only disciples were J. Greenhill and J. Buckshorn; he did not, however, allow them to obtain an insight into his special modes of work.

(W. M. R.)

LE MAÇON (or Le Masson), ROBERT (*c.* 1365-1443), chancellor of France, was born at Château du Loir, Sarthe. He was ennobled in March 1401, and became six years later a councillor of Louis II., duke of Anjou and king of Sicily. A partisan of the house of Orleans, he was appointed chancellor to Isabella of Bavaria on the 29th of January 1414, on the 20th of July commissary of the mint, and in June 1416 chancellor to the count of Ponthieu, afterwards Charles VII. On the 16th of August he bought the barony of Trèves in Anjou, and henceforward bore the title of seigneur of Trèves. When Paris was surprised by the Burgundians on the night of the 29th of May 1418 he assisted Tanguy Duchâtel in saving the dauphin. His devotion to the cause of the latter having brought down on him the wrath of John the Fearless, duke of Burgundy, he was excluded from the political amnesty known as the peace of Saint Maur des Fossés, though he retained his seat on the king's council. He was by the dauphin's side when John the Fearless was murdered at the bridge of Montereau on the 10th of September 1419. He resigned the seals at the beginning of 1422; but he continued to exercise great influence, and in 1426 he effected a reconciliation between the king and the duke of Brittany. Having been captured by Jean de Langeac, seneschal of Auvergne, in August of the same year, he was shut up for three months in the château of Usson. When set at liberty he returned to court, where he staunchly supported Joan of Arc against all the cabals that menaced her. It was he who signed the patent of nobility for the Arc family in December 1429. In 1430 he was once more entrusted with an embassy to Brittany. Having retired from political life in 1436, he died on the 28th of January 1443, and was interred at Trèves, where his epitaph may still be seen.

See C. Bourcier, "Robert le Masson," in the *Revue historique de l'Anjou* (1873); and the *Nouvelle biographie générale*, vol. xxx.

(J. V.*)

LE MAIRE DE BELGES, JEAN (1473-*c.* 1525), French poet and historiographer, was born at Bavai in Hainault. He was a nephew of Jean Molinet, and spent some time with him at Valenciennes, where the elder writer held a kind of academy of poetry. Le Maire in his first poems calls himself a disciple of Molinet. In certain aspects he does belong to the school of the *grands rhétoriqueurs*, but his great merit as a poet is that he emancipated himself from the affectations and puerilities of his masters. This independence of the Flemish school he owed in part perhaps to his studies at the university of Paris and to the study of the Italian poets at Lyons, a centre of the French renascence. In 1503 he was attached to the court of Margaret of Austria, duchess of Savoy, afterwards regent of the Netherlands. For this princess he undertook more than one mission to Rome; he became

her librarian and a canon of Valenciennes. To her were addressed his most original poems, *Epistres de l'amand verd*, the *amant vert* being a green parrot belonging to his patroness. Le Maire gradually became more French in his sympathies, eventually entering the service of Anne of Brittany. His prose *Illustrations des Gaules et singularitez de Troye* (1510-1512), largely adapted from Benoît de Sainte More, connects the Burgundian royal house with Hector. Le Maire probably died before 1525. Étienne Pasquier, Ronsard and Du Bellay all acknowledged their indebtedness to him. In his love for antiquity, his sense of rhythm, and even the peculiarities of his vocabulary he anticipated the *Pléiade*.

His works were edited in 1882-1885 by J. Stecher, who wrote the article on him in the *Biographie nationale de Belgique*.

LEMAÎTRE, FRANÇOIS ÉLIE JULES (1853-), French critic and dramatist, was born at Vennecy (Loiret) on the 27th of April 1853. He became a professor at the university of Grenoble, but he had already become known by his literary criticisms, and in 1884 he resigned his position to devote himself entirely to literature. He succeeded J. J. Weiss as dramatic critic of the *Journal des Débats*, and subsequently filled the same office on the *Revue des Deux Mondes*. His literary studies were collected under the title of *Les Contemporains* (7 series, 1886-1899), and his dramatic *feuilletons as Impressions de théâtre* (10 series, 1888-1898). His sketches of modern authors are interesting for the insight displayed in them, the unexpectedness of the judgments and the gaiety and originality of their expression. He published two volumes of poetry: *Les Médaillons* (1880) and *Petites orientales* (1883); also some volumes of *contes*, among them *En marge des vieux livres* (1905). His plays are: *Révoltée* (1889), *Le député Leveau*, and *Le Mariage blanc* (1891), *Les Rois* (1893), *Le Pardon* and *L'Age difficile* (1895), *La Massière* (1905) and *Bertrade* (1906). He was admitted to the French Academy on the 16th of January 1896. His political views were defined in *La Campagne nationaliste* (1902), lectures delivered in the provinces by him and by G. Cavaignac. He conducted a nationalist campaign in the *Écho de Paris*, and was for some time president of the Ligue de la Patrie Française, but resigned in 1904, and again devoted himself to literature.

LE MANS, a town of north-western France, capital of the department of Sarthe, 77 m. S.W. of Chartres on the railway from Paris to Brest. Pop. (1906) town, 54,907, commune, 65,467. It is situated just above the confluence of the Sarthe and the Huisne, on an elevation rising from the left bank of the Sarthe. Several bridges connect the old town and the new quarters which have sprung up round it with the more extensive quarter of Pré on the right bank. Modern thoroughfares are gradually superseding the winding and narrow streets of old houses; a tunnel connects the Place des Jacobins with the river side. The cathedral, built in the highest part of the town, was originally founded by St Julian, to whom it is dedicated. The nave dates from the 11th and 12th centuries. In the 13th century the choir was enlarged in the grandest and boldest style of that period. The transepts, which are higher than the nave, were rebuilt in the 15th century, and the bell-tower of the south transept, the lower part of which is Romanesque, was rebuilt in the 15th and 16th centuries. Some of the stained glass in the nave, dating from the first half of the 12th century, is the oldest in France; the west window, representing the legend of St Julian, is especially interesting. The south lateral portal (12th century) is richly decorated, and its statuettes exhibit many costumes of the period. The austere simplicity of the older part of the building is in striking contrast with the lavish richness of the ornamentation in the choir, where the stained glass is especially fine. The rose-window (15th century) of the north transept, representing the Last Judgment, contains many historical figures. The cathedral also has curious tapestries and some remarkable tombs, including that of Berengaria, queen of Richard Cœur de Lion. Close to the western wall is a megalithic monument nearly 15 ft. in height. The church of La Couture, which belonged to an old abbey founded in the 7th century by St Bertrand, has a porch of the 13th century with fine statuary; the rest of the building is older. The church of Notre-Dame du Pré, on the right bank of the Sarthe, is Romanesque in style. The hôtel de ville was built in 1756 on the site of the former castle of the counts of Maine; the prefecture (1760) occupies the site of the monastery of La Couture, and contains the library, the communal archives, and natural history and art collections; there is also an archaeological museum. Among the old houses may be mentioned the Hôtel du Grabatoire of the Renaissance, once a hospital for the canons and the so-called house of Queen Berengaria (16th century), meeting place of the historical and archaeological society of Maine. A monument to General Chanzy commemorates the battle of Le Mans (1871). Le Mans is the seat of a bishopric dating from the 3rd century, of a prefect, and of a court of assizes, and headquarters of the IV. army corps. It has also tribunals of first instance and of commerce, a council of trade-arbitrators, a chamber of commerce, a branch of the Bank of France, an exchange, a lycée for boys, training colleges, a higher ecclesiastical seminary and a school of music. The town has a great variety of industries, carried on chiefly in the southern suburb of Pontlieue. The more important are the state manufacture of tobacco, the preparation of preserved vegetables, fish, &c., tanning, hemp-spinning, bell-founding, flour-milling, the founding of copper and other metals, and the manufacture of railway wagons, machinery and engineering material, agricultural implements, rope, cloth and stained glass. The fattening of poultry is an important local industry, and there is trade in cattle, wine, cloth, farm-produce, &c. The town is an important railway centre.

As the capital of the Aulerci Cenomanni, Le Mans was called Suindinum or Vindinum. The Romans built walls round it in the 3rd century, and traces of them are still to be seen close to the left bank of the river near the cathedral. In the same century the town was evangelized by St Julian, who became its first bishop. Ruled at first by his successors—notably St Aldric—Le Mans passed in the middle ages to the counts of Maine (*q.v.*), whose capital and residence it became. About the middle of the 11th century the citizens secured a communal charter,

but in 1063 the town was seized by William the Conqueror, who deprived them of their liberties, which were recovered when the countship of Maine had passed to the Plantagenet kings of England. Le Mans was taken by Philip Augustus in 1189, recaptured by John, subsequently confiscated and later ceded to Queen Berengaria, who did much for its prosperity. It was several times besieged in the 15th and 16th centuries. In 1793 it was seized by the Vendeans, who were expelled by the Republican generals Marceau and Westermann after a stubborn battle in the streets. In 1799 it was again occupied by the Chouans.

The battle of Le Mans (10th-12th January 1871) was the culminating point of General Chanzy's fighting retreat into western France after the winter campaign in Beauce and Perche (see Franco-German War). The numerous, but ill-trained and ill-equipped, levies of the French were followed up by Prince Frederick Charles with the German II. Army, now very much weakened but consisting of soldiers who had in six months' active warfare acquired the self-confidence of veterans. The Germans advanced with three army corps in first line and one in reserve. On the 9th of January the centre corps (III.) drove an advanced division of the French from Ardenay (13 m. E. of Le Mans). On the 10th of January Chanzy's main defensive position was approached. Its right wing was east of the Sarthe and 3-5 m. from Le Mans, its centre on the heights of Anvours with the river Huisne behind it, and its left scattered along the western bank of the same river as far as Montfort (12 m. E.N.E. of Le Mans) and thence northward for some miles. On the 10th there was a severe struggle for the villages along the front of the French centre. On the 11th Chanzy attempted a counter-offensive from many points, but owing to the misbehaviour of certain of his rawest levies, the Germans were able to drive him back, and as their cavalry now began to appear beyond his extreme left flank, he retreated in the night of the 11th on Laval, the Germans occupying Le Mans after a brief rearguard fight on the 12th.

LE MARCHANT, JOHN GASPARD

(1766-1812), English major-general, was the son of an officer of dragoons, John Le Marchant, a member of an old Guernsey family. After a somewhat wild youth, Le Marchant, who entered the army in 1781, attained the rank of lieutenant-colonel in 1797. Two years before this he had designed a new cavalry sword; and in 1801 his scheme for establishing at High Wycombe and Great Marlow schools for the military instruction of officers was sanctioned by Parliament, and a grant of £30,000 was voted for the "royal military college," the two original departments being afterwards combined and removed to Sandhurst. Le Marchant was the first lieutenant-governor, and during the nine years that he held this appointment he trained many officers who served with distinction under Wellington in the Peninsula. Le Marchant himself was given the command of a cavalry brigade in 1810, and greatly distinguished himself in several actions, being killed at the battle of Salamanca on the 22nd of July 1812, after the charge of his brigade had had an important share in the English victory. He wrote several treatises on cavalry tactics and other military subjects, but few of them were published. By his wife, Mary, daughter of John Carey of Guernsey, Le Marchant had four sons and six daughters.

His second son, Sir Denis le Marchant, Bart. (1795-1874), was educated at Eton and Trinity College, Cambridge, and was called to the bar in 1823. In 1830 he became secretary to Lord Chancellor Brougham, and in the Reform Bill debates made himself exceedingly useful to the ministers. Having been secretary to the board of trade from 1836 to 1841, he was created a baronet in 1841. He entered the House of Commons in 1846, and was under secretary for the home department in the government of Lord John Russell. He was chief clerk of the House of Commons from 1850 to 1871. He published a *Life* of his father in 1841, and began a *Life* of Lord Althorpe which was completed after his death by his son; he also edited Horace Walpole's *Memoirs of the Reign of George III.* (1845). Sir Denis Le Marchant died in London on the 30th of October 1874.

The third son of General Le Marchant, Sir John Gaspard Le Marchant (1803-1874), entered the English army, and saw service in Spain in the Carlist War of 1835-37. He was afterwards lieutenant-governor of Newfoundland (1847-1852) and of Nova Scotia (1852-1857); governor of Malta (1859-1864); commander-in-chief at Madras (1865-1868). He was made K.C.B. in 1865, and died on the 6th of February 1874.

See Sir Denis Le Marchant, *Memoirs of General Le Marchant* (1841); Sir William Napier, *History of the War in the Peninsula* (6 vols., 1828-1840).

LEMBERG

(Pol. *Lwów*, Lat. *Leopolis*), the capital of the crownland of Galicia, Austria, 468 m. N.W. of Vienna by rail. Pop. (1900) 159,618, of whom over 80% were Poles, 10% Germans, and 8% Ruthenians; nearly 30% of the population were Jews. According to population Lemberg is the fourth city in the Austrian empire, coming after Vienna, Prague and Trieste. Lemberg is situated on the small river Peltew, an affluent of the Bug, in a valley in the Sarmatian plateau, and is surrounded by hills. It is composed of the inner town and of four suburbs. The inner town was formerly fortified, but the fortifications were transformed into pleasure grounds in 1811. Lemberg is the residence of Roman Catholic, Greek Catholic and Armenian archbishops, and contains three cathedrals. The Roman Catholic cathedral was finished by Casimir IV. in 1480 in Gothic style; near it is a chapel (1609) remarkable for its architecture and sculpture. The Greek cathedral, built in 1740-1779 in the Basilica style, is situated on a height which dominates the town. The Armenian cathedral was built in 1437 in the Armenian-Byzantine style. The Dominican church, built in 1749 after the model of St Peter's at Rome, contains a monument by Thorvaldsen to the Countess Dunin-Borkowska; the Greek St Nicholas church was built in 1292; and the Roman Catholic St Mary church was built in 1363 by the first German settlers. The town hall (1828-1837) with a tower 250 ft. high is situated in the middle of a square. Also notable are the hall of the estates (1877-1881), the industrial museum, the theatre, the palace of the Roman Catholic archbishop and several educational

establishments. There are many beautiful private buildings, broad and well-paved streets, numerous squares and public gardens. At the head of the educational institutions stands the university, founded in 1784 by Joseph II., transformed into a lycée in 1803, and restored and reorganized in 1817. Since 1871 the language of instruction has been Polish, and in 1901 the university had 110 lecturers, and was attended by 2060 students. There are also a polytechnic, gymnasia—for Poles, Ruthenians and Germans respectively—seminaries for priests, training colleges for teachers, and other special and technical schools. In Lemberg is the National Institute founded by Count Ossolinski, which contains a library of books and manuscripts relating chiefly to the history and literature of Poland, valuable antiquarian and scientific collections, and a printing establishment; also the Dzieduszycki museum with collections of natural history and ethnography relating chiefly to Galicia. Industrially and commercially Lemberg is the most important city in Galicia, its industries including the manufacture of machinery and iron wares, matches, stearin candles and naphtha, arrack and liqueurs, chocolate, chicory, leather and plaster of Paris, as well as brewing, corn-milling and brick and tile making. It has important commerce in linen, flax, hemp, wool and seeds, and a considerable transit trade. Of the well-wooded hills which surround Lemberg, the most important is the Franz-Josef-Berg to the N.E., with an altitude of 1310 ft. Several beautiful parks have been laid out on this hill.

Leopolis was founded about 1259 by the Ruthenian prince Leo Danilowicz, who moved here his residence from Halicz in 1270. From Casimir the Great, who captured it in 1340, it received the Magdeburg rights, and for almost two hundred years the public records were kept in German. In 1412 it became the see of a Roman Catholic archbishopric, and from 1432 until 1772 it was the capital of the Polish province of Reussen (*Terra Russia*). During the whole period of Polish supremacy it was a most important city, and after the fall of Constantinople it greatly developed its trade with the East. In 1648 and 1655 it was besieged by the Cossacks, and in 1672 by the Turks. Charles XII. of Sweden captured it in 1704. In 1848 it was bombarded.

LEMERCIER, LOUIS JEAN NÉPOMUCÉNE

(1771-1840), French poet and dramatist, was born in Paris on the 21st of April 1771. His father had been intendant successively to the duc de Penthièvre, the comte de Toulouse and the unfortunate princesse de Lamballe, who was the boy's godmother. Lemercier showed great precocity; before he was sixteen his tragedy of *Méléagre* was produced at the *Théâtre Français*. *Clarissa Harlowe* (1792) provoked the criticism that the author was not *assez roué pour peindre les roueries*. *Le Tartufe révolutionnaire*, a parody full of the most audacious political allusions, was suppressed after the fifth representation. In 1795 appeared Lemercier's masterpiece *Agamemnon*, called by Charles Labitte the last great antique tragedy in French literature. It was a great success, but was violently attacked later by Geoffroy, who stigmatized it as a bad caricature of Crébillon. *Quatre métamorphoses* (1799) was written to prove that the most indecent subjects might be treated without offence. The *Pinto* (1800) was the result of a wager that no further dramatic innovations were possible after the comedies of Beaumarchais. It is a historical comedy on the subject of the Portuguese revolution of 1640. This play was construed as casting reflections on the first consul, who had hitherto been a firm friend of Lemercier. His extreme freedom of speech finally offended Napoleon, and the quarrel proved disastrous to Lemercier's fortune for the time. None of his subsequent work fulfilled the expectations raised by *Agamemnon*, with the exception perhaps of *Frédégonde et Brunéhaut* (1821). In 1810 he was elected to the Academy, where he consistently opposed the romanticists, refusing to give his vote to Victor Hugo. In spite of this, he has some pretensions to be considered the earliest of the romantic school. His *Christophe Colomb* (1809), advertised on the playbill as a *comédie shakespirienne* (*sic*), represented the interior of a ship, and showed no respect for the unities. Its numerous innovations provoked such violent disturbances in the audience that one person was killed and future representations had to be guarded by the police. Lemercier wrote four long and ambitious epic poems: *Homère, Alexandre* (1801), *L'Atlantiade, ou la théogonie newtonienne* (1812) and *Moïse* (1823), as well as an extraordinary *Panhypocrisiade* (1819-1832), a distinctly romantic production in twenty cantos, which has the sub-title *Spectacle infernal du XVI^{e} siècle*. In it 16th-century history, with Charles V. and Francis I. as principal personages, is played out on an imaginary stage by demons in the intervals of their sufferings. Lemercier died on the 7th of June 1840 in Paris.

LEMERY, NICOLAS

(1645-1715), French chemist, was born at Rouen on the 17th of November 1645. After learning pharmacy in his native town he became a pupil of C. Glaser's in Paris, and then went to Montpellier, where he began to lecture on chemistry. He next established a pharmacy in Paris, still continuing his lectures, but in 1683, being a Calvinist, he was obliged to retire to England. In the following year he returned to France, and turning Catholic in 1686 was able to reopen his shop and resume his lectures. He died in Paris on the 19th of June 1715. Lemery did not concern himself much with theoretical speculations, but holding chemistry to be a demonstrative science, confined himself to the straightforward exposition of facts and experiments. In consequence, his lecture-room was thronged with people of all sorts, anxious to hear a man who shunned the barren obscurities of the alchemists, and did not regard the quest of the philosopher's stone and the elixir of life as the sole end of his science. Of his *Cours de chymie* (1675) he lived to see 13 editions, and for a century it maintained its reputation as a standard work. His other publications included *Pharmacopée universelle* (1697), *Traité universel des drogues simples* (1698), *Traité de l'antimoine* (1707), together with a number of papers contributed to the French Academy, one of which offered a chemical and physical explanation of underground fires, earthquakes, lightning and thunder. He discovered that heat is evolved when iron filings and sulphur are rubbed together to a paste with water, and the artificial *volcan de Lemery* was produced by burying underground a considerable quantity of this mixture, which he regarded as a potent agent in the causation of volcanic action.

His son Louis (1677-1743) was appointed physician at the Hôtel Dieu in 1710, and became demonstrator of chemistry at the Jardin du Roi in 1731. He was the author of a *Traité des aliments* (1702), and of a *Dissertation sur la nature des os* (1704), as well as of a number of papers on chemical topics.

LEMERY, a town of the province of Batangas, Luzon, Philippine Islands, on the Gulf of Balayan and the Pansipit river, opposite Taal (with which it is connected by a bridge), and about 50 m. S. of Manila. Pop. of the municipality (1903) 11,150. It has a fine church and convent. Lemery is situated on a plain in a rich agricultural district, which produces rice, Indian corn, sugar and cotton, and in which horses and cattle are bred. It is also a port for coasting vessels, and has an important trade with various parts of the archipelago. The language is Tagalog.

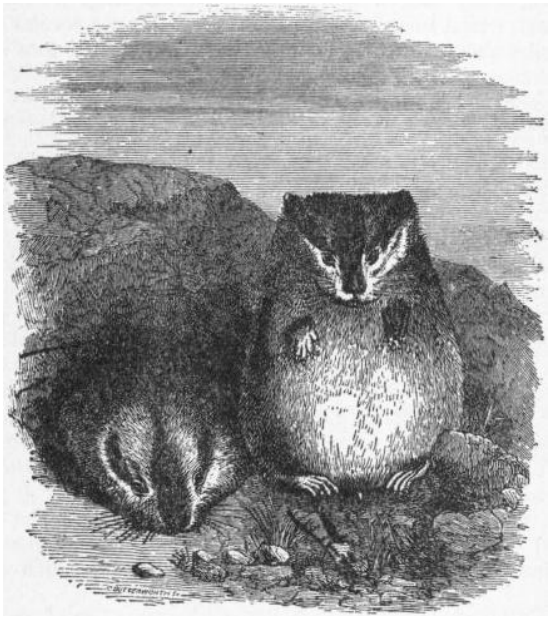
LEMGO, a town of Germany, in the principality of Lippe, in a broad and fertile plain, 9 m. N. from Detmold and on the railway Hameln-Lage. Pop. (1900) 8840. Its somewhat gloomy aspect, enhanced by the tortuous narrow lanes flanked by gabled houses of the 15th century, has gained for it among countryfolk the sobriquet of the "Witches' nest" (*Hexen-Nest*). It is replete with interest for the antiquarian. It has four Evangelical churches, two with curiously leaning, lead-covered spires; an old town-hall; a gymnasium; and several philanthropic and religious institutions. Among the latter is the Jungfrauenstift, of which a princess of the reigning house of Lippe-Detmold has always been lady superior since 1306. The chief industry of Lemgo is the manufacture of meerschaum pipes, which has attained here a high pitch of excellence; other industries are weaving, brewing and the manufacture of leather and cigars. The town was a member of the Hanseatic league.

LEMIERRE, ANTOINE MARIN (1733-1793), French dramatist and poet, was born in Paris on the 12th of January 1733. His parents were poor, but Lemierre found a patron in the collector-general of taxes, Dupin, whose secretary he became. Lemierre gained his first success on the stage with *Hypermnestre* (1758); *Térée* (1761) and *Idoménée* (1764) failed on account of the subjects. *Artaxerce*, modelled on Metastasio, and *Guillaume Tell* were produced in 1766; other successful tragedies were *La Veuve de Malabar* (1770) and *Barnavelt* (1784). Lemierre revived *Guillaume Tell* in 1786 with enormous success. After the Revolution he professed great remorse for the production of a play inculcating revolutionary principles, and there is no doubt that the horror of the excesses he witnessed hastened his death, which took place on the 4th of July 1793. He had been admitted to the Academy in 1781. Lemierre published *La Peinture* (1769), based on a Latin poem by the abbé de Marsy, and a poem in six cantos, *Les Fastes, ou les usages de l'année* (1779), an unsatisfactory imitation of Ovid's *Fasti*.

His *Œuvres* (1810) contain a notice of Lemierre by R. Perrin and his *Œuvres choisies* (1811) one by F. Fayolle.

LEMIRE, JULES AUGUSTE (1853-), French priest and social reformer, was born at Vieux-Berquin (Nord) on the 23rd of April 1853. He was educated at the college of St Francis of Assisi, Hazebrouck, where he subsequently taught philosophy and rhetoric. In 1897 he was elected deputy for Hazebrouck and was returned unopposed at the elections of 1898, 1902 and 1906. He organized a society called *La Ligue du coin de terre et du foyer*, the object of which was to secure, at the expense of the state, a piece of land for every French family desirous of possessing one. The abbé Lemire sat in the chamber of deputies as a conservative republican and Christian Socialist. He protested in 1893 against the action of the Dupuy cabinet in closing the Bourse du Travail, characterizing it as the expression of "a policy of disdain of the workers." In December 1893 he was seriously injured by the bomb thrown by the anarchist Vaillant from the gallery of the chamber.

LEMMING, the native name of a small Scandinavian rodent mammal *Lemmus norvegicus* (or *L. lemmus*), belonging to the mouse tribe, or *Muridae*, and nearly related, especially in the structure of its cheek-teeth, to the voles. Specimens vary considerably in size and colour, but the usual length is about 5 in., and the soft fur yellowish-brown, marked with spots of dark brown and black. It has a short, rounded head, obtuse muzzle, small bead-like eyes, and short rounded ears, nearly concealed by the fur. The tail is very short. The feet are small, each with five claws, those of the fore feet strongest, and fitted for scratching and digging. The usual habitat of lemmings is the high lands or fells of the great central mountain chain of Norway and Sweden, from the southern branches of the Langfjeldene in Christiansand *stift* to the North Cape and the Varangerfjord. South of the Arctic circle they are, under ordinary circumstances, confined to the plateaus covered with dwarf birch and juniper above the conifer-region, though in Tromsö *amt* and in Finmarken they occur in all suitable localities down to the level of the sea. The nest, under a tussock of grass or a stone, is constructed of short dry straws, and usually lined with hair. The number of young in each nest is generally five, sometimes only three occasionally seven or eight, and at least two broods are produced annually. Their food is entirely vegetable, especially grass roots and stalks, shoots of dwarf birch, reindeer lichens and mosses, in search of which they form, in winter, long galleries through the turf or under the snow. They are restless, courageous and pugnacious little animals. When suddenly disturbed, instead of trying to escape they sit upright, with their back against a stone, hissing and showing fight in a determined manner.



The Norwegian Lemming (*Lemmus Norvegicus*).

The circumstance which has given popular interest to the lemming is that certain districts of the cultivated lands of Norway and Sweden, where in ordinary circumstances they are unknown, are, at uncertain intervals varying from five to twenty or more years, overrun by an army of these little creatures, which steadily and slowly advance, always in the same direction, and regardless of all obstacles, swimming streams and even lakes of several miles in breadth, and committing considerable devastation on their line of march by the quantity of food they consume. In their turn they are pursued and harassed by crowds of beasts and birds of prey, as bears, wolves, foxes, dogs, wild cats, stoats, weasels, eagles, hawks and owls, and never spared by man; even domestic animals, as cattle, goats and reindeer, join in the destruction, stamping them to the ground with their feet, and even eating their bodies. Numbers also die from diseases produced apparently from overcrowding. None returns, and the onward march of the survivors never ceases until they reach the sea, into which they plunge, and swimming onwards in the same direction perish in the waves. These sudden appearances of vast bodies of lemmings, and their singular habit of persistently pursuing the same onward course of migration, have given rise to various speculations, from the ancient belief of the Norwegian peasants, shared by Olaus Magnus, that they fall down from the clouds, to the hypothesis that they are acting in obedience to an instinct inherited from ancient times, and still seeking the congenial home in the submerged Atlantis, to which their ancestors of the Miocene period were wont to resort when driven from their ordinary dwelling-places by crowding or scarcity of food. The principal facts regarding these migrations seem to be as follows. When any combination of circumstances has occasioned an increase of the numbers of the lemmings in their ordinary dwelling-places, impelled by the restless or migratory instinct possessed in a less developed degree by so many of their congeners, a movement takes place at the edge of the elevated plateau, and a migration towards the lower-lying land begins. The whole body moves forward slowly, always advancing in the same general direction in which they originally started, but following more or less the course of the great valleys. They only travel by night; and, staying in congenial places for considerable periods, with unaccustomed abundance of provender, notwithstanding the destructive influences to which they are exposed, they multiply excessively during their journey, having families more numerous and frequent than in their usual homes. The progress may last from one to three years, according to the route taken, and the distance to be traversed until the sea-coast is reached, which in a country so surrounded by water as the Scandinavian peninsula must be the ultimate goal of such a journey. This may be either the Atlantic or the Gulf of Bothnia, according as the migration has commenced from the west or the east side of the central elevated plateau. Those that finally perish in the sea, committing what appears to be a voluntary suicide, are only acting under the same blind impulse which has led them previously to cross shallower pieces of water with safety. In Eastern Europe, Northern Asia and North America the group is represented by the allied *L. obensis*, and in Alaska, by *L. nigripes*; while the circumpolar banded lemming, *Dicrostonyx torquatus*, which turns white in winter, represents a second genus taking its name from the double claws on one of the toes of the forefeet.

For habits of lemmings, see R. Collett, *Myodes lemmus, its habits and migrations in Norway* (Christiania Videnskabs-Selskabs Forhandlinger, 1895).

(W. H. F.; R. L.*)

LEMNISCATE (from Gr. λημνίσκος, ribbon), a quartic curve invented by Jacques Bernoulli (*Acta Eruditorum*, 1694) and afterwards investigated by Giulio Carlo Fagnano, who gave its principal properties and applied it to effect the division of a quadrant into 2.2^m, 3.2^m and 5.2^m equal parts. Following Archimedes, Fagnano desired the curve to be engraved on his tombstone. The complete analytical treatment was first given by Leonhard Euler. The lemniscate of Bernoulli may be defined as the locus of a point which moves so that the product of its distances from two fixed points is constant and is equal to the square of half the distance between these points. It is therefore a particular form of Cassini's oval (see OVAL). Its cartesian equation, when the line joining the two fixed points is the axis of x and the middle point of this line is the origin, is $(x^2 + y^2)^2 = 2a^2(x^2 - y^2)$ and the polar equation is $r^2 = 2a^2 \cos 2\theta$. The curve (fig. 1) consists of two loops symmetrically placed about the coordinate axes. The pedal equation is $r^3 = a^2p$, which shows that it is the first positive pedal of a rectangular hyperbola with regard to the centre. It is also the inverse of the same curve for the same point. It is the envelope of circles described on the central radii of an ellipse as diameters. The area of the complete curve is $2a^2$, and the length of any arc may be expressed in the form $\int (1 - x^4)^{-1/2}dx$, an elliptic integral sometimes termed the *lemniscatic integral*.

FIG. 1.

FIG. 2.

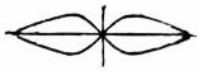


FIG. 3.

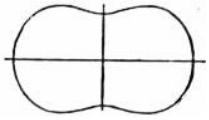


FIG. 4.

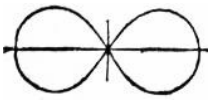


FIG. 5.

The name lemniscate is sometimes given to any crunodal quartic curve having only one real finite branch which is symmetric about the axis. Such curves are given by the equation $x^2 - y^2 = ax^4 + bx^2y^2 + cy^4$. If a be greater than b the curve resembles fig. 2 and is sometimes termed the *fishtail-lemniscate*; if a be less than b, the curve resembles fig. 3. The same name is also given to the first positive pedal of any central conic. When the conic is a rectangular hyperbola, the curve is the lemniscate of Bernoulli previously described. The *elliptic lemniscate* has for its equation $(x^2 + y^2)^2 = a^2x^2 + b^2y^2$ or $r^2 = a^2 \cos^2\theta + b^2 \sin^2\theta$ ($a > b$). The centre is a conjugate point (or acnode) and the curve resembles fig. 4. The *hyperbolic lemniscate* has for its equation $(x^2 + y^2)^2 = a^2x^2 - b^2y^2$ or $r^2 = a^2 \cos^2\theta - b^2 \sin^2\theta$. In this case the centre is a crunode and the curve resembles fig. 5. These curves are instances of unicursal bicircular quartics.

LEMNOS (mod. *Limnos*), an island in the northern part of the Aegean Sea. The Italian form of the name, Stalimene, *i.e.* ἐς τὴν Λῆμνον, is not used in the island itself, but is commonly employed in geographical works. The island, which belongs to Turkey, is of considerable size: Pliny says that the coast-line measured 112½ Roman miles, and the area has been estimated at 150 sq. m. Great part is mountainous, but some very fertile valleys exist, to cultivate which 2000 yoke of oxen are employed. The hill-sides afford pasture for 20,000 sheep. No forests exist on the island; all wood is brought from the coast of Rumelia or from Thasos. A few mulberry and fruit trees grow, but no olives. The population is estimated by some as high as 27,000, of whom 2000 are Turks and the rest Greeks, but other authorities doubt whether it reaches more than half this number. The chief towns are Kastro on the western coast, with a population of 4000 Greeks and 800 Turks, and Mudros on the southern coast. Kastro possesses an excellent harbour, and is the seat of all the trade carried on with the island. Greek, English and Dutch consuls or consular agents were formerly stationed there; but the whole trade is now in Greek hands. The archbishops of Lemnos and Ai Strati, a small neighbouring island with 2000 inhabitants, resides in Kastro. In ancient times the island was sacred to Hephaestus, who as the legend tells fell on Lemnos when his father Zeus hurled him headlong out of Olympus. This tale, as well as the name Aethaleia, sometimes applied to it, points to its volcanic character. It is said that fire occasionally blazed forth from Mosychlos, one of its mountains; and Pausanias (viii. 33) relates that a small island called Chryse, off the Lemnian coast, was swallowed up by the sea. All volcanic action is now extinct.

The most famous product of Lemnos is the medicinal earth, which is still used by the natives. At one time it was popular over western Europe under the name *terra sigillata*. This name, like the Gr. Λημνία σφραγίς, is derived from the stamp impressed on each piece of the earth; in ancient times the stamp was the head of Artemis. The Turks now believe that a vase of this earth destroys the effect of any poison drunk from it—a belief which the ancients attached rather to the earth from Cape Kolias in Attica. Galen went to see the digging up of this earth (see Kuhn, *Medic. Gr. Opera*, xii. 172 sq.); on one day in each year a priestess performed the due ceremonies, and a waggon-load of earth was dug out. At the present time the day selected is the 6th of August, the feast of Christ the Saviour. Both the Turkish *hodja* and the Greek priest are present to perform the necessary ceremonies; the whole process takes place before daybreak. The earth is sold by apothecaries in stamped cubical blocks. The hill from which the earth is dug is a dry mound, void of vegetation, beside the village of Kotschinos, and about two

hours from the site of Hephaestia. The earth was considered in ancient times a cure for old festering wounds, and for the bite of poisonous snakes.

The name Lemnos is said by Hecataeus (*ap.* Steph. Byz.) to have been a title of Cybele among the Thracians, and the earliest inhabitants are said to have been a Thracian tribe, called by the Greeks Sinties, *i.e.* "the robbers." According to a famous legend the women were all deserted by their husbands, and in revenge murdered every man on the island. From this barbarous act, the expression Lemnian deeds, Λήμνια ἔργα, became proverbial. The Argonauts landing soon after found only women in the island, ruled over by Hypsipyle, daughter of the old king Thoas. From the Argonauts and the Lemnian women were descended the race called Minyae, whose king Euneus, son of Jason and Hypsipyle, sent wine and provisions to the Greeks at Troy. The Minyae were expelled by a Pelasgian tribe who came from Attica. The historical element underlying these traditions is probably that the original Thracian people were gradually brought into communication with the Greeks as navigation began to unite the scattered islands of the Aegean (see JASON); the Thracian inhabitants were barbarians in comparison with the Greek mariners. The worship of Cybele was characteristic of Thrace, whither it spread from Asia Minor at a very early period, and it deserves notice that Hypsipyle and Myrina (the name of one of the chief towns) are Amazon names, which are always connected with Asiatic Cybele-worship. Coming down to a better authenticated period, we find that Lemnos was conquered by Otanes, one of the generals of Darius Hystaspis; but was soon reconquered by Miltiades, the tyrant of the Thracian Chersonese. Miltiades afterwards returned to Athens, and Lemnos continued an Athenian possession till the Macedonian empire absorbed it. On the vicissitudes of its history in the 3rd century B.C. see Köhler in *Mittheil. Inst. Athen.* i. 261. The Romans declared it free in 197 B.C., but gave it over in 166 to Athens, which retained nominal possession of it till the whole of Greece was made a Roman province. A colony of Attic cleruchs was established by Pericles, and many inscriptions on the island relate to Athenians. After the division of the empire, Lemnos passed under the Byzantine emperors; it shared in the vicissitudes of the eastern provinces, being alternately in the power of Greeks, Italians and Turks, till finally the Turkish sultans became supreme in the Aegean. In 1476 the Venetians successfully defended Kotschinos against a Turkish siege; but in 1657 Kastro was captured by the Turks from the Venetians after a siege of sixty-three days. Kastro was again besieged by the Russians in 1770.

Homer speaks as if there were one town in the island called Lemnos, but in historical times there was no such place. There were two towns, Myrina, now Kastro, and Hephaestia. The latter was the chief town; its coins are found in considerable number, the types being sometimes the Athenian goddess and her owl, sometimes native religious symbols, the caps of the Dioscuri, Apollo, &c. Few coins of Myrina are known. They belong to the period of Attic occupation, and bear Athenian types. A few coins are also known which bear the name, not of either city, but of the whole island. Conze was the first to discover the site of Hephaestia, at a deserted place named Palaeokastro on the east coast. It had once a splendid harbour, which is now filled up. Its situation on the east explains why Miltiades attacked it first when he came from the Chersonese. It surrendered at once, whereas Myrina, with its very strong citadel built on a perpendicular rock, sustained a siege. It is said that the shadow of Mount Athos fell at sunset on a bronze cow in the agora of Myrina. Pliny says that Athos was 87 m. to the north-west; but the real distance is about 40 English miles. One legend localized in Lemnos still requires notice. Philoctetes was left there by the Greeks on their way to Troy; and there he suffered ten years' agony from his wounded foot, until Ulysses and Neoptolemus induced him to accompany them to Troy. He is said by Sophocles to have lived beside Mount Hermaeus, which Aeschylus (*Agam.* 262) makes one of the beacon points to flash the news of Troy's downfall home to Argos.

See Rhode, *Res Lemnicae*; Conze, *Reise auf den Inseln des Thrakischen Meeres* (from which the above-mentioned facts about the present state of the island are taken); also Hunt in Walpole's *Travels*; Belon du Mans, *Observations de plusieurs singularitez*, &c.; Finlay, *Greece under the Romans*; von Hammer, *Gesch. des Osman. Reiches; Gött. Gel. Anz.* (1837). The chief references in ancicnt writers are *Iliad* i. 593, v. 138, xiv. 229, &c.; Herod. iv. 145; Str. pp. 124, 330; Plin. iv. 23, xxxvi. 13.

LEMOINNE, JOHN ÉMILE (1815-1892), French journalist, was born of French parents, in London, on the 17th of October 1815. He was educated first at an English school and then in France. In 1840 he began writing for the *Journal des débats*, on English and other foreign questions, and under the empire he held up to admiration the free institutions of England by contrast with imperial methods. After 1871 he supported Thiers, but his sympathies rather tended towards a liberalized monarchy, until the comte de Chambord's policy made such a development an impossibility, and he then ranged himself with the moderate Republicans. In 1875 Lemoinne was elected to the French Academy, and in 1880 he was nominated a life senator. Distinguished though he was for a real knowledge of England among the French journalists who wrote on foreign affairs, his tone towards English policy greatly changed in later days, and though he never shared the extreme French bitterness against England as regards Egypt, he maintained a critical attitude which served to stimulate French Anglophobia. He was a frequent contributor to the *Revue des deux mondes*, and published several books, the best known of which is his *Études critiques et biographiques* (1862). He died in Paris on the 14th of December 1892.

LEMON, MARK (1809-1870), editor of *Punch*, was born in London on the 30th of November 1809. He had a natural talent for journalism and the stage, and, at twenty-six, retired from less congenial business to devote himself to the writing of plays. More than sixty of his melodramas, operettas and comedies were produced in London. At the same time he contributed to a variety of magazines and newspapers, and founded and edited the

Field. In 1841 Lemon and Henry Mayhew conceived the idea of a humorous weekly paper to be called *Punch*, and when the first number was issued, in July 1841, were joint-editors and, with the printer and engraver, equal owners. The paper was for some time unsuccessful, Lemon keeping it alive out of the profits of his plays. On the sale of *Punch* Lemon became sole editor for the new proprietors, and it remained under his control until his death, achieving remarkable popularity and influence. Lemon was an actor of ability, a pleasing lecturer and a successful impersonator of Shakespearian characters. He also wrote a host of novelettes and lyrics, over a hundred songs, a few three-volume novels, several Christmas fairy tales and a volume of jests. He died at Crawley, Sussex, on the 23rd of May 1870.

LEMON, the fruit of *Citrus Limonum*, which is regarded by some botanists as a variety of *Citrus medica*. The wild stock of the lemon tree is said to be a native of the valleys of Kumaon and Sikkim in the North-West provinces of India, ascending to a height of 4000 ft., and occurring under several forms. Sir George Watt (*Dictionary of Economic Products of India*, ii. 352) regards the wild plants as wild forms of the lime or citron and considers it highly probable that the wild form of the lemon has not yet been discovered.

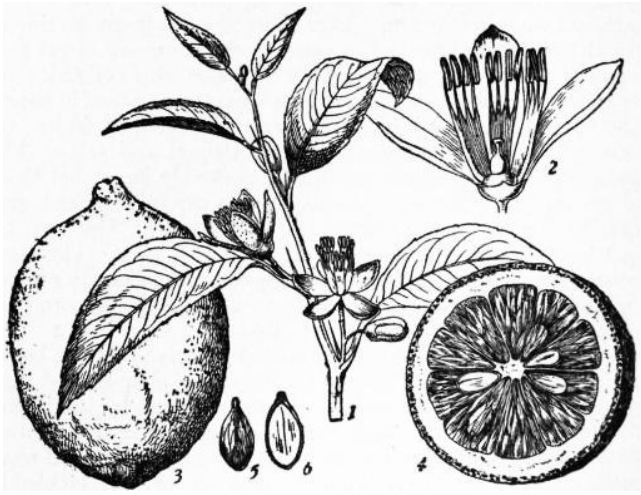


Fig. 1.—Lemon—*Citrus Limonum*.

1, Flowering shoot.
2, Flower with two petals and two bundles of stamens removed; slightly enlarged.
3, Fruit.
4, Same cut across.
5, Seed.
6, Same cut lengthwise.

The lemon seems to have been unknown to the ancient Greeks and Romans, and to have been introduced by the Arabs into Spain between the 12th and 13th centuries. In 1494 the fruit was cultivated in the Azores, and largely shipped to England, but since 1838 the exportation has ceased. As a cultivated plant the lemon is now met with throughout the Mediterranean region, in Spain and Portugal, in California and Florida, and in almost all tropical and subtropical countries. Like the apple and pear, it varies exceedingly under cultivation. Risso and Poiteau enumerate forty-seven varieties of this fruit, although they maintain as distinct the sweet lime, *C. Limetta*, with eight varieties, and the sweet lemon, *C. Lumia*, with twelve varieties, which differ only in the fruit possessing an insipid instead of an acid juice.

The lemon is more delicate than the orange, although, according to Humboldt, both require an annual mean temperature of 62° Fahr. Unlike the orange, which presents a fine close head of deep green foliage, it forms a straggling bush, or small tree, 10 to 12 ft. high, with paler, more scattered leaves, and short angular branches with sharp spines in the axils. The flowers, which possess a sweet odour quite distinct from that of the orange, are in part hermaphrodite and in part unisexual, the outside of the corolla having a purplish hue. The fruit, which is usually crowned with a nipple, consists of an outer rind or peel, the surface of which is more or less rough from the convex oil receptacles imbedded in it, and of a white inner rind, which is spongy and nearly tasteless, the whole of the interior of the fruit being filled with soft parenchymatous tissue, divided into about ten to twelve compartments, each generally containing two or three seeds. The white inner rind varies much in thickness in different kinds, but is never so thick as in the citron. As lemons are much more profitable to grow than oranges, on account of their keeping properties, and from their being less liable to injury during voyages, the cultivation of the lemon is preferred in Italy wherever it will succeed. In damp valleys it is liable like the orange (*q.v.*) to be attacked by a fungus sooty mould, the stem, leaves, and fruit becoming covered with a blackish dust. This is coincident with or subsequent to the attacks of a small oval brown insect, *Chermes hesperidum*. Trees not properly exposed to sunlight and air suffer most severely from these pests. Syringing with resin-wash or milk of lime when the young insects are hatched, and before they have fixed themselves to the plant, is a preventive. Since 1875 this fungoid disease has made great ravages in Sicily among the lemon and citron trees, especially around Catania and Messina. Heritte attributes the prevalence of the disease to the fact that the growers have induced an unnatural degree of fertility in the trees, permitting them to bear enormous crops year after year. This loss of vitality is in some measure met by grafting healthy scions of the lemon on the bitter orange, but trees so grafted do not bear fruit until they are eight or ten years old.

The lemon tree is exceedingly fruitful, a large one in Spain or Sicily ripening as many as three thousand fruits in favourable seasons. In the south of Europe lemons are collected more or less during every month of the year, but

in Sicily the chief harvest takes place from the end of October to the end of December, those gathered during the last two months of the year being considered the best for keeping purposes. The fruit is gathered while still green. After collection the finest specimens are picked out and packed in cases, each containing about four hundred and twenty fruits, and also in boxes, three of which are equal to two cases, each lemon being separately packed in paper. The remainder, consisting of ill-shaped or unsound fruits, are reserved for the manufacture of essential oil and juice. The whole of the sound lemons are usually packed in boxes, but those which are not exported immediately are carefully picked over and the unsound ones removed before shipment. The exportation is continued as required until April and May. The large lemons with a rougher rind, which appear in the London market in July and August, are grown at Sorrento near Naples, and are allowed to remain on the trees until ripe.

Candied lemon peel is usually made in England from a larger variety of the lemon cultivated in Sicily on higher ground than the common kind, from which it is distinguished by its thicker rind and larger size. This kind, known as the Spadaforese lemon, is also allowed to remain on the trees until ripe, and when gathered the fruit is cut in half longitudinally and pickled in brine, before being exported in casks. Before candying the lemons are soaked in fresh water to remove the salt. Citrons are also exported from Sicily in the same way, but these are about six times as expensive as lemons, and a comparatively small quantity is shipped. Besides those exported from Messina and Palermo, lemons are also imported into England to a less extent from the Riviera of Genoa, and from Malaga in Spain, the latter being the most esteemed. Of the numerous varieties the wax lemon, the imperial lemon and the Gaeta lemon are considered to be the best. Lemons are also extensively grown in California and Florida.

Lemons of ordinary size contain about 2 oz. of juice, of specific gravity 1.039-1.046, yielding on an average 32.5 to 42.53 grains of citric acid per oz. The amount of this acid, according to Stoddart, varies in different seasons, decreasing in lemons kept from February to July, at first slowly and afterwards rapidly, until at the end of that period it is all split up into glucose and carbonic acid—the specific gravity of the juice being in February 1.046, in May 1.041 and in July 1.027, while the fruit is hardly altered in appearance. It has been stated that lemons may be kept for some months with scarcely perceptible deterioration by varnishing them with an alcoholic solution of shellac—the coating thus formed being easily removed when the fruit is required for household use by gently kneading it in the hands. Besides citric acid, lemon juice contains 3 to 4% of gum and sugar, albuminoid matters, malic acid and 2.28% of inorganic salts. Cossa has determined that the ash of dried lemon juice contains 54% of potash, besides 15% of phosphoric acid. In the white portion of the peel (in common with other fruits of the genus) a bitter principle called *hesperidin* has been found. It is very slightly soluble in boiling water, but is soluble in dilute alcohol and in alkaline solutions, which it soon turns of a yellow or reddish colour. It is also darkened by tincture of perchloride of iron. Another substance named *lemonin*, crystallizing in lustrous plates, was discovered in 1879 by Palerno and Aglialoro in the seeds, in which it is present in very small quantity, 15,000 grains of seed yielding only 80 grains of it. It differs from hesperidin in dissolving in potash without alteration. It melts at 275° F.

The simplest method of preserving lemon juice in small quantities for medicinal or domestic use is to keep it covered with a layer of olive or almond oil in a closed vessel furnished with a glass tap, by which the clear liquid may be drawn off as required. Lemon juice is largely used on shipboard as a preventive of scurvy. By the Merchant Shipping Act 1867 every British ship going to other countries where lemon or lime juice cannot be obtained was required to take sufficient to give 1 oz. to every member of the crew daily. Of this juice it requires about 13,000 lemons to yield l pipe (108 gallons). Sicilian juice in November yields about 9 oz. of crude citric acid per gallon, but only 6 oz. if the fruit is collected in April. The crude juice was formerly exported to England, and was often adulterated with sea-water, but is now almost entirely replaced by lime juice. A concentrated lemon juice for the manufacture of citric acid is prepared in considerable quantities, chiefly at Messina and Palermo, by boiling down the crude juice in copper vessels over an open fire until its specific gravity is about 1.239, seven to ten pipes of raw making only one of concentrated lemon juice. “Lemon juice” for use on shipboard is prepared also from the fruits of limes and Bergamot oranges. It is said to be sometimes adulterated with sulphuric acid on arrival in England.

The lemon used in medicine is described in the British pharmacopoeia as being the fruit of *Citrus medica*, var. Limonum. The preparations of lemon peel are of small importance. From the fresh peel is obtained the *oleum limonis* (dose ½-3 minims), which has the characters of its class. It contains a terpene known as citrene or limonene, which also occurs in orange peel: and citral, the aldehyde of geraniol, which is the chief constituent of oil of roses. Of much importance is the *succus limonis* or lemon juice, 1 oz. of which contains about 40 grains of free citric acid, besides the citrate of potassium (.25%) and malic acid, free and combined. Ten per cent. of alcohol must be added to lemon juice if it is to be kept. From it are prepared the *syrupus limonis* (dose ½-2 drachms), which consists of sugar, lemon juice and an alcoholic extract of lemon peel, and also citric acid itself. Lemon juice is practically impure citric acid (*q.v.*).

Essence or Essential Oil of Lemon.—The essential oil contained in the rind of the lemon occurs in commerce as a distinct article. It is manufactured chiefly in Sicily, at Reggio in Calabria, and at Mentone and Nice in France. The small and irregularly shaped fruits are employed while still green, in which state the yield of oil is greater than when they are quite ripe. In Sicily and Calabria the oil is extracted in November and December as follows. A workman cuts three longitudinal slices off each lemon, leaving a three-cornered central core having a small portion of rind at the apex and base. These pieces are then divided transversely and cast on one side, and the strips of peel are thrown in another place. Next day the pieces of peel are deprived of their oil by pressing four or five times successively the outer surface of the peel (zest or flavedo) bent into a convex shape, against a flat sponge held in the palm of the left hand and wrapped round the forefinger. The oil vesicles in the rind, which are ruptured more easily in the fresh fruit than in the state in which lemons are imported, yield up their oil to the sponge, which when saturated is squeezed into an earthen vessel furnished with a spout and capable of holding about three pints. After a time the oil separates from the watery liquid which accompanies it, and is then decanted. By this process four hundred fruits yield 9 to 14 oz. of essence. The prisms of pulp are afterwards expressed to obtain lemon juice, and then distilled to obtain the small quantity of volatile oil they contain. At Mentone and Nice a different process is adopted. The lemons are placed in an *écuelle à piquer*, a shallow basin of pewter about 8½ in. in diameter, having i a lip for pouring on one side and a closed tube at the bottom about 5 in. long and 1 in. in diameter. A number of stout brass pins stand up about half an inch from the bottom of the vessel. The workman rubs a lemon over these pins, which rupture the oil vesicles, and the oil collects in the tube, which when it becomes full is emptied into another vessel that it may separate from the aqueous liquid mixed with it. When filtered it is known as *Essence de citron au zeste*, or, in the English market, as perfumers’ essence of lemon, inferior qualities being distinguished as druggists’ essence of lemon. An additional product is obtained by immersing the scarified lemons in warm water and separating the oil which floats off. *Essence de citron distillée* is obtained by rubbing the surface of fresh lemons (or of those which have been submitted to the action of the

écuelle à piquer) on a coarse grater of tinned iron, and distilling the grated peel. The oil so obtained is colourless, and of inferior fragrance, and is sold at a lower price, while that obtained by the cold processes has a yellow colour and powerful odour.

Essence of lemon is chiefly brought from Messina and Palermo packed in copper bottles holding 25 to 50 kilogrammes or more, and sometimes in tinned bottles of smaller size. It is said to be rarely found in a state of purity in commerce, almost all that comes into the market being diluted with the cheaper distilled oil. This fact may be considered as proved by the price at which the essence of lemon is sold in England, this being less than it costs the manufacturer to make it. When long kept the essence deposits a white greasy stearoptene, apparently identical with the bergaptene obtained from the essential oil of the Bergamot orange. The chief constituent of oil of lemon is the terpene, $C_{10}H_{16}$, boiling at 348°.8 Fahr., which, like oil of turpentine, readily yields crystals of terpin, $C_{10}H_{16}3OH_2$, but differs in yielding the crystalline compound, $C_{10}H_{16} + 2Cl$, oil of turpentine forming one having the formula $C_{10}H_{16} + HCl$. Oil of lemons also contains, according to Tilden, another hydrocarbon, $C_{10}H_{16}$, boiling at 3.20° Fahr., a small amount of *cymene*, and a compound acetic ether, $C_2H_3O{\cdot}C_{10}H_{17}O$. The natural essence of lemon not being wholly soluble in rectified spirit of wine, an essence for culinary purposes is sometimes prepared by digesting 6 oz of lemon peel in one pint of pure alcohol of 95%, and, when the rind has become brittle, which takes place in about two and a half hours, powdering it and percolating the alcohol through it. This article is known as “lemon flavour.”

The name lemon is also applied to some other fruits. The Java lemon is the fruit of *Citrus javanica*, the pear lemon of a variety of *C. Limetta*, and the pearl lemon of *C. margarita*. The fruit of a passion-flower, *Passiflora laurifolia*, is sometimes known as the water-lemon, and that of a Berberidaceous plant, *Podophyllum peltatum*, as the wild lemon. In France and Germany the lemon is known as the citron, and hence much confusion arises concerning the fruits referred to in different works. The essential oil known as oil of cedrat is usually a factitious article instead of being prepared, as its name implies, from the citron (Fr. *cédratier*). An essential oil is also prepared from *C. Lumia*, at Squillace in Calabria, and has an odour like that of Bergamot but less powerful.

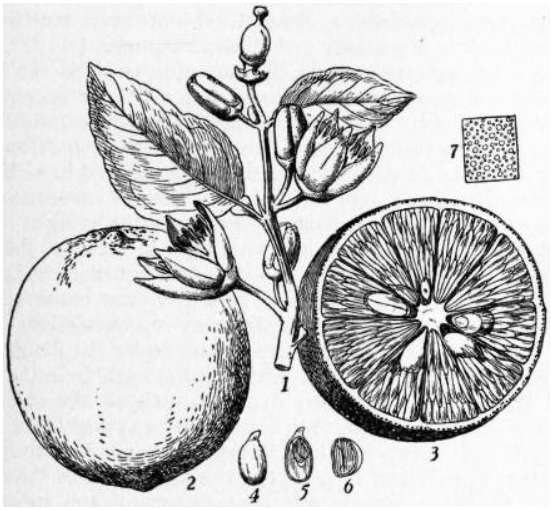


FIG. 2.—Lime—*Citrus medica*, var. *acida*.

1, Flowering shoot.
2, Fruit.
3, Same cut transversely.
4, Seed.
5, Seed cut lengthwise.
6, Seed cut transversely.
7, Superficial view of portion of rind showing oil glands.

The sour lime is *Citrus acida*, generally regarded as a var. (*acida*) of *C. medica*. It is a native of India, ascending to about 4000 ft. in the mountains, and occurring as a small, much-branched thorny bush. The small flowers are white or tinged with pink on the outside; the fruit is small and generally round, with a thin, light green or lemon-yellow bitter rind, and a very sour, somewhat bitter juicy pulp. It is extensively cultivated throughout the West Indies, especially in Dominica, Montserrat and Jamaica, the approximate annual value of the exports from these islands being respectively £45,000, £6000 and £6000. The plants are grown from seed in nurseries and planted out about 200 to the acre. They begin to bear from about the third year, but full crops are not produced until the trees are six or seven years old. The ripe yellow fruit is gathered as it falls. The fruit is bruised by hand in a funnel-shaped vessel known as an *écuelle*, with a hollow stem; by rolling the fruit on a number of points on the side of the funnel the oil cells in the rind are broken and the oil collects in the hollow stem—this is the essential oil or essence of limes. The fruits are then taken to the mill, sorted, washed and passed through rollers and exposed to two squeezings. Two-thirds of the juice is expressed by the first squeezing, is strained at once, done up in puncheons and exported as raw juice. The product of the second squeezing, together with the juice extracted by a subsequent squeezing in a press, is strained and evaporated down to make concentrated juice; ten gallons of the raw juice yield one gallon of the concentrated juice. The raw juice is used for preparations of lime juice cordial, the concentrated for manufactures of citric acid.

On some estates citrate of lime is now manufactured in place of concentrated acid. Distilled oil of limes is prepared by distilling the juice, but its value is low in comparison with the expressed oil obtained by hand as described above. Green limes and pickled limes preserved in brine are largely exported to the United States, and more recently green limes have been exported to the United Kingdom. Limalade or preserved limes is an excellent substitute for marmalade. A spineless form of the lime appeared as a sport in Dominica in 1892, and is now grown there and elsewhere on a commercial scale. A form with seedless fruits has also recently been obtained in Dominica and Trinidad independently. The young leaves of the lime are used for perfuming the water in finger-glasses, a few being placed in the water and bruised before use.

LEMONNIER, ANTOINE LOUIS CAMILLE (1844-), Belgian poet, was born at Ixelles, Brussels, on the 24th of March 1844. He studied law, and then took a clerkship in a government office, which he resigned after three years. Lemonnier inherited Flemish blood from both parents, and with it the animal force and pictorial energy of the Flemish temperament. He published a *Salon de Bruxelles* in 1863, and again in 1866. His early friendships were chiefly with artists; and he wrote art criticisms with recognized discernment. Taking a house in the hills near Namur, he devoted himself to sport, and developed the intimate sympathy with nature which informs his best work. *Nos Flamands* (1869) and *Croquis d'automne* (1870) date from this time. *Paris-Berlin* (1870), a pamphlet pleading the cause of France, and full of the author's horror of war, had a great success. His capacity as a novelist, in the fresh, humorous description of peasant life, was revealed in *Un Coin de village* (1879). In *Un Mâle* (1881) he achieved a different kind of success. It deals with the amours of a poacher and a farmer's daughter, with the forest as a background. Cachaprès, the poacher, seems the very embodiment of the wild life around him. The rejection of *Un Mâle* by the judges for the quinquennial prize of literature in 1883 made Lemonnier the centre of a school, inaugurated at a banquet given in his honour on the 27th of May 1883. *Le Mort* (1882), which describes the remorse of two peasants for a murder they have committed, is a masterpiece in its vivid representation of terror. It was remodelled as a tragedy in five acts (Paris, 1899) by its author. *Ceux de la glèbe* (1889), dedicated to the "children of the soil," was written in 1885. He turned aside from local subjects for some time to produce a series of psychological novels, books of art criticism, &c., of considerable value, but assimilating more closely to French contemporary literature. The most striking of his later novels are: *L'Hystérique* (1885); *Happe-chair* (1886), often compared with Zola's *Germinal*; *Le Possédé* (1890); *La Fin des bourgeois* (1892); *L'Arche, journal d'une maman* (1894), a quiet book, quite different from his usual work; *La Faute de Mme Charvet* (1895); *L'Homme en amour* (1897); and, with a return to Flemish subjects, *Le Vent dans les moulins* (1901); *Petit Homme de Dieu* (1902), and *Comme va le ruisseau* (1903). In 1888 Lemonnier was prosecuted in Paris for offending against public morals by a story in *Gil Blas*, and was condemned to a fine. In a later prosecution at Brussels he was defended by Edmond Picard, and acquitted; and he was arraigned for a third time, at Bruges, for his *Homme en amour*, but again acquitted. He represents his own case in *Les Deux consciences* (1902), *L'Île vierge* (1897) was the first of a trilogy to be called *La Légende de la vie*, which was to trace, under the fortunes of the hero, the pilgrimage of man through sorrow and sacrifice to the conception of the divinity within him. In *Adam et Ève* (1899), and *Au Cœur frais de la forêt* (1900), he preached the return to nature as the salvation not only of the individual but of the community. Among his other more important works are *G. Courbet, et ses œuvres* (1878); *L'Histoire des Beaux-Arts en Belgique* 1830-1887 (1887); *En Allemagne* (1888), dealing especially with the Pinakothek at Munich; *La Belgique* (1888), an elaborate descriptive work with many illustrations; *La Vie belge* (1905); and *Alfred Stevens et son œuvre* (1906).

Lemonnier spent much time in Paris, and was one of the early contributors to the *Mercure de France*. He began to write at a time when Belgian letters lacked style; and with much toil, and some initial extravagances, he created a medium for the expression of his ideas. He explained something of the process in a preface contributed to Gustave Abel's *Labeur de la prose* (1902). His prose is magnificent and sonorous, but abounds in neologisms and strange metaphors.

See the *Revue de Belgique* (15th February 1903), which contains the syllabus of a series of lectures on Lemonnier by Edmond Picard, a bibliography of his works, and appreciations by various writers.

LEMONNIER, PIERRE CHARLES (1715-1799), French astronomer, was born on the 23rd of November 1715 in Paris, where his father was professor of philosophy at the collège d'Harcourt. His first recorded observation was made before he was sixteen, and the presentation of an elaborate lunar map procured for him admission to the Academy, on the 21st of April 1736, at the early age of twenty. He was chosen in the same year to accompany P. L. Maupertuis and Alexis Clairault on their geodetical expedition to Lapland. In 1738, shortly after his return, he explained, in a memoir read before the Academy, the advantages of J. Flamsteed's mode of determining right ascensions. His persistent recommendation, in fact, of English methods and instruments contributed effectively to the reform of French practical astronomy, and constituted the most eminent of his services to science. He corresponded with J. Bradley, was the first to represent the effects of nutation in the solar tables, and introduced, in 1741, the use of the transit-instrument at the Paris observatory. He visited England in 1748, and, in company with the earl of Morton and James Short the optician, continued his journey to Scotland, where he observed the annular eclipse of July 25. The liberality of Louis XV., in whose favour he stood high, furnished him with the means of procuring the best instruments, many of them by English makers. Amongst the fruits of his industry may be mentioned a laborious investigation of the disturbances of Jupiter by Saturn, the results of which were employed and confirmed by L. Euler in his prize essay of 1748; a series of lunar observations extending over fifty years; some interesting researches in terrestrial magnetism and atmospheric electricity, in the latter of which he detected a regular diurnal period; and the determination of the places of a great number of stars, including twelve separate observations of Uranus, between 1765 and its discovery as a planet. In his lectures at the collège de France he first publicly expounded the analytical theory of gravitation, and his timely patronage secured the services of J. J. Lalande for astronomy. His temper was irritable, and his hasty utterances exposed him to retorts which he did not readily forgive. Against Lalande, owing to some trifling pique, he closed his doors "during an entire revolution of the moon's nodes." His career was arrested by paralysis late in 1791, and a repetition of the stroke terminated his life. He died at Héril near Bayeux on the 31st of May 1799. By his marriage with Mademoiselle de Cussy he left three daughters, one of whom became the wife of J. L.

Lagrange. He was admitted in 1739 to the Royal Society, and was one of the one hundred and forty-four original members of the Institute.

He wrote *Histoire céleste* (1741); *Théorie des comètes* (1743), a translation, with additions of Hailey's *Synopsis*; *Institutions astronomiques* (1746), an improved translation of J. Keill's text-book; *Nouveau zodiaque* (1755); *Observations de la lune, du soleil, et des étoiles fixes* (1751-1775); *Lois du magnétisme* (1776-1778), &c.

See J. J. Lalande, *Bibl. astr.*, p. 819 (also in the *Journal des savants* for 1801); F. X. von Zach, *Allgemeine geog. Ephemeriden* iii. 625; J. S. Bailly, *Hist. de l'astr. moderne*, iii.; J. B. J. Delambre. *Hist. de l'astr. au XVIII^e siècle*, p. 179; J. Mädler, *Geschichte der Himmelskunde*, ii. 6; R. Wolf, *Geschichte der Astronomie*, p. 480.

LEMOYNE, JEAN BAPTISTE (1704-1778), French sculptor, was the pupil of his father, Jean Louis Lemoyne, and of Robert le Lorrain. He was a great figure in his day, around whose modest and kindly personality there waged opposing storms of denunciation and applause. Although his disregard of the classic tradition and of the essentials of dignified sculpture, as well as his lack of firmness and of intellectual grasp of the larger principles of his art, lay him open to stringent criticism, de Clarac's charge that he had delivered a mortal blow at sculpture is altogether exaggerated. Lemoyne's more important works have for the most part been destroyed or have disappeared. The equestrian statue of "Louis XV." for the military school, and the composition of "Mignard's daughter, Mme Feuquières, kneeling before her father's bust" (which bust was from the hand of Coysevox) were subjected to the violence by which Bouchardon's equestrian monument of Louis XIV. (*q.v.*) was destroyed. The panels only have been preserved. In his busts evidence of his riotous and florid imagination to a great extent disappears, and we have a remarkable series of important portraits, of which those of women are perhaps the best. Among Lemoyne's leading achievements in this class are "Fontenelle" (at Versailles), "Voltaire," "Latour" (all of 1748), "Duc de la Valière" (Versailles), "Comte de St Florentin," and "Crébillon" (Dijon Museum); "Mlle Chiron" and "Mlle Dangeville," both produced in 1761 and both at the Théâtre Français in Paris, and "Mme de Pompadour," the work of the same year. Of the Pompadour he also executed a statue in the costume of a nymph, very delicate and playful in its air of grace. Lemoyne was perhaps most successful in his training of pupils, one of the leaders of whom was Falconnet.

LEMPRIÈRE, JOHN (*c.* 1765-1824), English classical scholar, was born in Jersey, and educated at Winchester and Pembroke College, Oxford. He is chiefly known for his *Bibliotheca Classica* or *Classical Dictionary* (1788), which, edited by various later scholars, long remained a readable if not very trustworthy reference book in mythology and classical history. In 1792, after holding other scholastic posts, he was appointed to the head-mastership of Abingdon grammar school, and later became the vicar of that parish. While occupying this living, he published a *Universal Biography of Eminent Persons in all Ages and Countries* (1808). In 1809 he succeeded to the head-mastership of Exeter free grammar school. On retiring from this, in consequence of a disagreement with the trustees, he was given the living of Meeth in Devonshire, which, together with that of Newton Petrock, he held till his death in London on the 1st of February 1824.

LEMUR (from Lat. *lemures*, "ghosts"), the name applied by Linnaeus to certain peculiar Malagasy representatives of the order PRIMATES (*q.v.*) which do not come under the designation of either monkeys or apes, and, with allied animals from the same island and tropical Asia and Africa, constitute the suborder *Prosimiae*, or *Lemuroidea*, the characteristics of which are given in the article just mentioned. The typical lemurs include species like *Lemur mongoz* and *L. catta*, but the English name "lemur" is often taken to include all the members of the suborder, although the aberrant forms are often conveniently termed "lemuroids." All the Malagasy lemurs, which agree in the structure of the internal ear, are now included in the family *Lemuridae*, confined to Madagascar and the Comoro Islands, which comprises the great majority of the group. The other families are the *Nycticebidae*, common to tropical Asia and Africa, and the *Tarsiidae*, restricted to the Malay countries. In the more typical *Lemuridae* there are two pairs of upper incisor teeth, separated by a gap in the middle line; the premolars may be either two or three, but the molars, as in the lower jaw, are always three on each side. In the lower jaw the incisors and canines are directed straight forwards, and are of small size and nearly similar form; the function of the canine being discharged by the first premolar, which is larger than the other teeth of the same series. With the exception of the second toe of the hind-foot, the digits have well-formed, flattened nails as in the majority of monkeys. In the members of the typical genus *Lemur*, as well as in the allied *Hapalemur* and *Lepidolemur*, none of the toes or fingers are connected by webs, and all have the hind-limbs of moderate length, and the tail long. The maximum number of teeth is 36, there being typically two pairs of incisors and three of premolars in each jaw. In habits some of the species are nocturnal and others diurnal; but all subsist on a mixed diet, which includes birds, reptiles, eggs, insects and fruits. Most are arboreal, but the ring-tailed lemur (*L. catta*) often dwells among rocks. The species of the genus *Lemur* are diurnal, and may be recognized by the length of the muzzle, and the large tufted ears. In some cases, as in the black lemur (*L. macaco*) the two sexes are

differently coloured; but in others, especially the ruffed lemur (*L. varius*), there is much individual variation in this respect, scarcely any two being alike. The gentle lemurs (*Hapalemur*) have a rounder head, with smaller ears and a shorter muzzle, and also a bare patch covered with spines on the fore-arm. The sportive lemurs (*Lepidolemur*) are smaller than the typical species of *Lemur*, and the adults generally lose their upper incisors. The head is short and conical, the ears large, round and mostly bare, and the tail shorter than the body. Like the gentle lemurs they are nocturnal. (See Avahi, Aye-Aye, Galago, Indri, Loris, Potto, Sifaka and Tarsier.)

(R. L.*)

LENA, a river of Siberia, rising in the Baikal Mountains, on the W. side of Lake Baikal, in 54° 10′ N. and 107° 55′ E. Wheeling round by the S., it describes a semicircle, then flows N.N.E. and N.E., being joined by the Kirenga and the Vitim, both from the right; from 113° E. it flows E.N.E as far as Yakutsk (62° N., 127° 40′ E.), where it enters the lowlands, after being joined by the Olekma, also from the right. From Yakutsk it goes N. until joined by its right-hand affluent the Aldan, which deflects it to the north-west; then, after receiving its most important left-hand tributary, the Vilyui, it makes its way nearly due N. to the Nordenskjöld Sea, a division of the Arctic, disemboguing S.W. of the New Siberian Islands by a delta 10,800 sq. m. in area, and traversed by seven principal branches, the most important being Bylov, farthest east. The total length of the river is estimated at 2860 m. The delta arms sometimes remain blocked with ice the whole year round. At Yakutsk navigation is generally practicable from the middle of May to the end of October, and at Kirensk, at the confluence of the Lena and the Kirenga, from the beginning of May to about the same time. Between these two towns there is during the season regular steamboat communication. The area of the river basin is calculated at 895,500 sq. m. Gold is washed out of the sands of the Vitim and the Olekma, and tusks of the mammoth are dug out of the delta.

See G. W. Melville, *In the Lena Delta* (1885).

LE NAIN, the name of three brothers, Louis, Antoine and Mathieu, who occupy a peculiar position in the history of French art. Although they figure amongst the original members of the French Academy, their works show no trace of the influences which prevailed when that body was founded. Their sober execution and choice of colour recall characteristics of the Spanish school, and when the world of Paris was busy with mythological allegories, and the “heroic deeds” of the king, the three Le Nain devoted themselves chiefly to subjects of humble life such as “Boys Playing Cards,” “The Forge,” or “The Peasants’ Meal.” These three paintings are now in the Louvre; various others may be found in local collections, and some fine drawings may be seen in the British Museum; but the Le Nain signature is rare, and is never accompanied by initials which might enable us to distinguish the work of the brothers. Their lives are lost in obscurity; all that can be affirmed is that they were born at Laon in Picardy towards the close of the 16th century. About 1629 they went to Paris; in 1648 the three brothers were received into the Academy, and in the same year both Antoine and Louis died. Mathieu lived on till August 1677; he bore the title of chevalier, and painted many portraits. Mary of Medici and Mazarin were amongst his sitters, but these works seem to have disappeared.

See Champfleury, *Essai sur la vie et l’œuvre des Le Nain* (1850), and *Catalogue des tableaux des Le Nain* (1861).

LENAU, NIKOLAUS, the pseudonym of Nikolaus Franz Niembsch von Strehlenau (1802-1850), Austrian poet, who was born at Csatád near Temesvar in Hungary, on the 15th of August 1802. His father, a government official, died at Budapest in 1807, leaving his children to the care of an affectionate, but jealous and somewhat hysterical, mother, who in 1811 married again. In 1819 the boy went to the university of Vienna; he subsequently studied Hungarian law at Pressburg and then spent the best part of four years in qualifying himself in medicine. But he was unable to settle down to any profession. He had early begun to write verses; and the disposition to sentimental melancholy acquired from his mother, stimulated by love disappointments and by the prevailing fashion of the romantic school of poetry, settled into gloom after his mother’s death in 1829. Soon afterwards a legacy from his grandmother enabled him to devote himself wholly to poetry. His first published poems appeared in 1827, in J. G. Seidl’s *Aurora*. In 1831 he went to Stuttgart, where he published a volume of *Gedichte* (1832) dedicated to the Swabian poet Gustav Schwab. Here he also made the acquaintance of Uhland, Justinus Kerner, Karl Mayer[1] and others; but his restless spirit longed for change, and he determined to seek for peace and freedom in America. In October 1832 he landed at Baltimore and settled on a homestead in Ohio. But the reality of life in “the primeval forest” fell lamentably short of the ideal he had pictured; he disliked the Americans with their eternal “English lisping of dollars” (*englisches Talergelispel*); and in 1833 he returned to Germany, where the appreciation of his first volume of poems revived his spirits. From now on he lived partly in Stuttgart and partly in Vienna. In 1836 appeared his *Faust*, in which he laid bare his own soul to the world; in 1837, *Savonarola*, an epic in which freedom from political and intellectual tyranny is insisted upon as essential to Christianity. In 1838 appeared his *Neuere Gedichte*, which prove that *Savonarola* had been but the result of a passing exaltation.

Of these new poems, some of the finest were inspired by his hopeless passion for Sophie von Löwenthal, the wife of a friend, whose acquaintance he had made in 1833 and who "understood him as no other." In 1842 appeared *Die Albigenser*, and in 1844 he began writing his *Don Juan*, a fragment of which was published after his death. Soon afterwards his never well-balanced mind began to show signs of aberration, and in October 1844 he was placed under restraint. He died in the asylum at Oberdöbling near Vienna on the 22nd of August 1850. Lenau's fame rests mainly upon his shorter poems; even his epics are essentially lyric in quality. He is the greatest modern lyric poet of Austria, and the typical representative in German literature of that pessimistic *Weltschmerz* which, beginning with Byron, reached its culmination in the poetry of Leopardi.

Lenau's *Sämtliche Werke* were published in 4 vols. by A. Grün (1855); but there are several more modern editions, as those by M. Koch in Kürschner's *Deutsche Nationalliteratur*, vols. 154-155 (1888), and by E. Castle (2 vols., 1900). See A. Schurz, *Lenaus Leben, grösstenteils aus des Dichters eigenen Briefen* (1855); L. A. Frankl, *Zu Lenaus Biographie* (1854, 2nd ed., 1885); A. Marchand, *Les Poètes lyriques de l'Autriche* (1881); L. A. Frankl, *Lenaus Tagebuch und Briefe an Sophie Löwenthal* (1891); A. Schlossar, *Lenaus Briefe an die Familie Reinbeck* (1896); L. Roustan, *Lenau et son temps* (1898); E. Castle, *Lenau und die Familie Löwenthal* (1906).

1 Karl Friedrich Hartmann Mayer (1786-1870), poet, and biographer of Uhland, was by profession a lawyer and government official in Württemberg.

LENBACH, FRANZ VON (1836-1904), German painter, was born at Schrobenhausen, in Bavaria, on the 13th of December 1836. His father was a mason, and the boy was intended to follow his father's trade or be a builder. With this view he was sent to school at Landsberg, and then to the polytechnic at Augsburg. But after seeing Hofner, the animal painter, executing some studies, he made various attempts at painting, which his father's orders interrupted. However, when he had seen the galleries of Augsburg and Munich, he finally obtained his father's permission to become an artist, and worked for a short time in the studio of Gräfle, the painter; after this he devoted much time to copying. Thus he was already accomplished in technique when he became the pupil of Piloty, with whom he set out for Italy in 1858. A few interesting works remain as the outcome of this first journey—"A Peasant seeking Shelter from Bad Weather" (1855), "The Goatherd" (1860, in the Schack Gallery, Munich), and "The Arch of Titus" (in the Palfy collection, Budapest). On returning to Munich, he was at once called to Weimar to take the appointment of professor at the Academy. But he did not hold it long, having made the acquaintance of Count Schack, who commissioned a great number of copies for his collection. Lenbach returned to Italy the same year, and there copied many famous pictures. He set out in 1867 for Spain, where he copied not only the famous pictures by Velasquez in the Prado, but also some landscapes in the museums of Granada and the Alhambra (1868). In the previous year he had exhibited at the great exhibition at Paris several portraits, one of which took a third-class medal. Thereafter he exhibited frequently both at Munich and at Vienna, and in 1900 at the Paris exhibition was awarded a Grand Prix for painting. Lenbach, who died in 1904, painted many of the most remarkable personages of his time.

See Berlepsch, "Lenbach," *Velhagen und Klasings Monatshefte* (1891); Bégouen, *Les Portraits de Lenbach à l'exposition de Munich* (1899); K. Knackfuss, *Lenbach*, and *Franz von Lenbach Bildnisse* (1900).

LENCLOS, NINON DE (1615-1705), the daughter of a gentleman of good position in Touraine, was born in Paris in November 1615. Her long and eventful life divides into two periods, during the former of which she was the typical Frenchwoman of the gayest and most licentious society of the 17th century, during the latter the recognized leader of the fashion in Paris, and the friend of wits and poets. All that can be pleaded in defence of her earlier life is that she had been educated by her father in epicurean and sensual beliefs, and that she retained throughout the frank demeanour, and disregard of money, which won from Saint Évremond the remark that she was an *honnête homme*. She had a succession of distinguished lovers, among them being Gaspard de Coligny, the marquis d'Éstrées, La Rochefoucauld, Condé and Saint Évremond. Queen Christina of Sweden visited her, and Anne of Austria was powerless against her. After she had continued her career for a preposterous length of time, she settled down to the social leadership of Paris. Among her friends she counted Mme de la Sablière, Mme de la Fayette and Mme de Maintenon. It became the fashion for young men as well as old to throng round her, and the best of all introductions for a young man who wished to make a figure in society was an introduction to Mlle de Lenclos. Her long friendship with Saint Évremond must be briefly noticed. They were of the same age, and had been lovers in their youth, and throughout his long exile the wit seems to have kept a kind remembrance of her. The few really authentic letters of Ninon are those addressed to her old friend, and the letters of both in the last few years of their equally long lives are exceptionally touching, and unique in the polite compliments with which they try to keep off old age. If Ninon owes part of her posthumous fame to Saint Évremond, she owes at least as much to Voltaire, who was presented to her as a promising boy poet by the abbé de Chateauneuf. To him she left 2000 francs to buy books, and his letter on her was the chief authority of many subsequent biographers. Her personal appearance is, according to Sainte-Beuve, best described in *Clélie*, a novel by Mlle de Scudéry, in which she figures as Clarisse. Her distinguishing characteristic was neither beauty nor wit, but high spirits and perfect evenness of temperament.

The letters of Ninon published after her death were, according to Voltaire, all spurious, and the only authentic ones are those to Saint Évremond, which can be best studied in Dauxmesnil's edition of *Saint Évremond*, and his notice on her. Sainte-Beuve has an interesting notice of these letters in the *Causeries du Lundi*, vol. iv. The

Correspondance authentique was edited by E. Colombey in 1886. See also Helen K. Hayes, *The Real Ninon de l'Enclos* (1908); and Mary C. Rowsell, *Ninon de l'Enclos and her century* (1910).

LENFANT, JACQUES (1661-1728), French Protestant divine, was born at Bazoche in La Beauce on the 13th of April 1661, son of Paul Lenfant, Protestant pastor at Bazoche and afterwards at Châtillon-sur-Loing until the revocation of the edict of Nantes, when he removed to Cassel. After studying at Saumur and Geneva, Lenfant completed his theological course at Heidelberg, where in 1684 he was ordained minister of the French Protestant church, and appointed chaplain to the dowager electress palatine. When the French invaded the Palatinate in 1688 Lenfant withdrew to Berlin, as in a recent book he had vigorously attacked the Jesuits. Here in 1689 he was again appointed one of the ministers of the French Protestant church; this office he continued to hold until his death, ultimately adding to it that of chaplain to the king, with the dignity of *Consistorialrath*. He visited Holland and England in 1707, preached before Queen Anne, and, it is said, was invited to become one of her chaplains. He was the author of many works, chiefly on church history. In search of materials he visited Helmstädt in 1712, and Leipzig in 1715 and 1725. He died at Berlin on the 7th of August 1728.

An exhaustive catalogue of his publications, thirty-two in all, will be found in J. G. de Chauffepié's *Dictionnaire*. See also E. and S. Haag's *France Protestante*. He is now best known by his *Histoire du concile de Constance* (Amsterdam, 1714; 2nd ed., 1728; English trans., 1730). It is of course largely dependent upon the laborious work of Hermann von der Hardt (1660-1746), but has literary merits peculiar to itself, and has been praised on all sides for its fairness. It was followed by *Histoire du concile de Pise* (1724), and (posthumously) by *Histoire de la guerre des Hussites et du concile de Basle* (Amsterdam, 1731; German translation, Vienna, 1783-1784). Lenfant was one of the chief promoters of the *Bibliothèque Germanique*, begun in 1720; and he was associated with Isaac Beausobre (1659-1738) in the preparation of the new French translation of the New Testament with original notes, published at Amsterdam in 1718.

LENKORAN, a town in Russian Transcaucasia, in the government of Baku, stands on the Caspian Sea, at the mouth of a small stream of its own name, and close to a large lagoon. The lighthouse stands in 38° 45′ 38″ N. and 48° 50′ 18″ E. Taken by storm on New Year's day 1813 by the Russians, Lenkoran was in the same year formally surrendered by Persia to Russia by the treaty of Gulistan, along with the khanate of Talysh, of which it was the capital. Pop. (1867) 15,933, (1897) 8768. The fort has been dismantled; and in trade the town is outstripped by Astara, the customs station on the Persian frontier.

The District of Lenkoran (2117 sq. m.) is a thickly wooded mountainous region, shut off from the Persian plateau by the Talysh range (7000-8000 ft. high), and with a narrow marshy strip along the coast. The climate is exceptionally moist and warm (annual rainfall 52.79 in; mean temperature in summer 75° F., in winter 40°), and fosters the growth of even Indian species of vegetation. The iron tree (*Parrotia persica*), the silk acacia, *Carpinus betulus*, *Quercus iberica*, the box tree and the walnut flourish freely, as well as the sumach, the pomegranate, and the *Gleditschia caspica*. The Bengal tiger is not unfrequently met with, and wild boars are abundant. Of the 131,361 inhabitants in 1897 the Talyshes (35,000) form the aboriginal element, belonging to the Iranian family, and speaking an independently developed language closely related to Persian. They are of middle height and dark complexion, with generally straight nose, small round skull, small sharp chin and large full eyes, which are expressive, however, rather of cunning than intelligence. They live exclusively on rice. In the northern half of the district the Tatar element predominates (40,000) and there are a number of villages occupied by Russian Raskolniks (Nonconformists). Agriculture, bee-keeping, silkworm-rearing and fishing are the principal occupations.

LENNEP, JACOB VAN (1802-1868), Dutch poet and novelist, was born on the 24th of March 1802 at Amsterdam, where his father, David Jacob van Lennep (1774-1853), a scholar and poet, was professor of eloquence and the classical languages in the Athenaeum. Lennep took the degree of doctor of laws at Leiden, and then settled as an advocate in Amsterdam. His first poetical efforts had been translations from Byron, of whom he was an ardent admirer, and in 1826 he published a collection of original *Academische Idyllen*, which had some success. He first attained genuine popularity by the *Nederlandsche Legenden* (2 vols., 1828) which reproduced, after the manner of Sir Walter Scott, some of the more stirring incidents in the early history of his fatherland. His fame was further raised by his patriotic songs at the time of the Belgian revolt, and by his comedies *Het Dorp aan de Grenzen* (1830) and *Het Dorp over de Grenzen* (1831), which also had reference to the political events of 1830. In 1833 he broke new ground with the publication of *De Pleegzoon* (*The Adopted Son*), the first of a series of historical romances in prose, which have acquired for him in Holland a position somewhat analogous to that of Sir Walter Scott in Great Britain. The series included *De Roos van Dekama* (2 vols., 1836), *Onze Voorouders* (5 vols., 1838), *De Lotgevallen van Ferdinand Huyck* (2 vols., 1840), *Elizabeth Musch* (3 vols., 1850), and *De Lotgevallen van Klaasje Zevenster* (5 vols., 1865), several of which have been translated into German and French, and two

—*The Rose of Dekama* (1847) and *The Adopted Son* (New York, 1847)—into English. His Dutch history for young people (*Voornaamste Geschiedenissen van Noord-Nederland aan mijne Kindern verhaald*, 4 vols., 1845) is attractively written. Apart from the two comedies already mentioned, Lennep was an indefatigable journalist and literary critic, the author of numerous dramatic pieces, and of an excellent edition of Vondel's works. For some years Lennep held a judicial appointment, and from 1853 to 1856 he was a member of the second chamber, in which he voted with the conservative party. He died at Oosterbeek near Arnheim on the 25th of August 1868.

There is a collective edition of his *Poetische Werken* (13 vols., 1859-1872), and also of his *Romantische Werken* (23 vols., 1855-1872). See also a bibliography by P. Knoll (1869); and Jan ten Brink, *Geschiedenis der Noord-Nederlandsche Letteren in de XIX^e Eeuw* (No. iii.).

LENNEP, a town of Germany, in the Prussian Rhine province, 18 m. E. of Düsseldorf, and 9 m. S. of Barmen by rail, at a height of 1000 ft. above the level of the sea. Pop. (1905) 10,323. It lies in the heart of one of the busiest industrial districts in Germany, and carries on important manufactures of the finer kinds of cloth, wool, yarn and felt, and also of iron and steel goods. It has an Evangelical and a Protestant church, a modern school and a well-equipped hospital. Lennep, which was the residence of the counts of Berg from 1226 to 1300, owes the foundation of its prosperity to an influx of Cologne weavers during the 14th century.

LENNOX, a name given to a large district in Dumbartonshire and Stirlingshire, which was erected into an earldom in the latter half of the 12th century. It embraced the ancient sheriffdom of Dumbarton and nineteen parishes with the whole of the lands round Loch Lomond, formerly Loch Leven, and the river of that name which glides into the estuary of the Clyde at the ancient castle of Dumbarton.

On this river Leven, at Balloch, was the seat of Alwin, first earl of Lennox. It is probable that he was of Celtic descent, but the records are silent as to his part in history; that he was earl at all is only proved from the charters of his son, another Alwin, and he died some time before 1217. The second Alwin was father of ten sons, one of whom founded the clan Macfarlane, famous in the annals of the district, while another was ancestor of Walter of Farlane, who married the heiress of the 6th earl of Lennox. Maldouen, the 3rd earl, eldest of the sons of Alwin the younger, is an historical personage; he was a witness to the treaty between Alexander II., king of Scotland, and his brother-in-law the English king Henry III., at Newcastle in 1237, concerning the much disputed northern counties of England. His grandson, Malcolm, successor to the title, swore fealty to Edward I. in 1296; it was apparently his son, another Malcolm, the 5th earl, who was summoned by Edward to parliament and entrusted with the important post of guarding the fords of the river Forth. But the 5th earl soon after gave his services to the party of Bruce, the cause of that family having been embraced by his father as early as 1292. As a result the English king bestowed the earldom on Sir John Menteith, who was holding it in 1307 while the real earl was with King Robert Bruce in his wanderings in the Lennox country. For his services he was rewarded with a renewal of the earldom and the keeping of Dumbarton Castle; he fell fighting for his country at Halidon Hill in 1333. His son Donald, the 6th earl, an adherent of King David II., left a daughter, Margaret, countess of Lennox, who was married to her kinsman the above-mentioned Walter of Farlane, nearest heir male of the Lennox family.

In 1392, on the marriage of their grand-daughter Isabella, eldest daughter of Duncan, 8th earl, with Sir Murdoch Stewart, afterwards duke of Albany, the earldom was resigned into the hands of the king, who re-granted it to Earl Duncan, with remainder to the heirs male of his body, with remainder to Murdoch and Isabella and the heirs of their bodies begotten between them, with eventual remainder to Earl Duncan's nearest and lawful heirs. In 1424, when Murdoch, then duke of Albany, succeeded in ransoming the poet king James I. from his long English captivity, the aged Earl Duncan went with the Scottish party to Durham. The next year, however, he suffered the fate of Albany, being executed perhaps for no other reason than that he was his father-in-law. The earldom was not forfeited, and the widowed duchess of Albany, now also countess of Lennox, lived secure in her island castle of Inchmurrin on Loch Lomond until her death. Of her four sons, none of whom left legitimate issue, the eldest died in 1421, the two next suffered their father's fate at Stirling, while the youngest had to flee for his life to Ireland. Her daughter Isobel appears to have been the wife of Sir Walter Buchanan of that ilk.

It was from Elizabeth, sister of the countess, that the next holders of the title descended. She was married to Sir John Stewart of Darnley (distinguished in the military history of France as seigneur d'Aubigny), whose immediate ancestor was brother of James, 5th high steward of Scotland. Their grandson, another Sir John Stewart, created a lord of parliament as Lord Darnley, was served heir to his great-grandfather Duncan, earl of Lennox, in 1473, and was designated as earl of Lennox in a charter under the great seal in the same year. Thereafter followed disputes with John of Haldane, whose wife's great-grandmother had been another of the three daughters of Duncan, 8th earl of Lennox, and in her right he contested the succession. Lord Darnley, however, appears to have silenced all opposition and for the last seven years of his life maintained his right to the earldom undisputed. Three of his younger sons were greatly distinguished in the French service, one being captain of Scotsmen-at-arms, another *premier homme d'armes*, and a third *maréchal de France*. Their elder brother Matthew, 2nd earl of this line, fell on Flodden Field, leaving by his wife Elizabeth, daughter of James, earl of Arran, and niece of James III., a son and successor John, who became one of the guardians of James V. and was murdered in 1526. His son Matthew, the 4th earl, played a great part in the intrigues of his time, and by his marriage with Margaret Douglas allied himself to the royal house of England as well as strengthening the ties which bound his family to that of Scotland; because Margaret was the daughter and heir of the 6th earl of Angus

by his wife, Margaret Tudor, sister of King Henry VIII. and widow of King James IV. Though his estates were forfeited in 1545, Earl Matthew in 1564 not only had them restored but had the satisfaction of getting his eldest son Henry married to Mary, queen of Scots. The murder of Lord Darnley, now created earl of Rosse, lord of Ardmanoch and duke of Albany, took place in February 1567, and in July his only son James, by Mary's abdication, became king of Scotland. The old earl of Lennox, now grandfather of his sovereign, obtained the regency in 1570, but in the next year was killed in the attack made on the parliament at Stirling, being the third earl in succession to meet with a violent death.

The title was now merged in the crown in the person of James VI. the next heir, but was soon after granted to the king's uncle Charles, who died in 1576, leaving an only child, the unfortunate Lady Arabella Stewart.

Two years later the title was granted to Robert Stewart, the king's grand-uncle, second son of John, the 3rd earl, but he in 1580 exchanged it for that of earl of March. On the same day the earldom of Lennox was given to Esme Stewart, first cousin of the king and grandson of the 3rd earl, he being son of John Stewart (adopted heir of the maréchal d'Aubigny) and his French wife, Anne de la Queulle. In the following year Esme was created duke of Lennox, earl of Darnley, Lord Aubigny, Tarboulton and Dalkeith, and other favours were heaped upon him, but the earl of Ruthven sent him back to France where he died soon after. His elder son, Ludovic, was thereupon summoned to Scotland by James, who invested him with all his father's honours and estates, and after his accession to the English throne created him Lord Settrington and earl of Richmond (1613), and earl of Newcastle-upon-Tyne and duke of Richmond (1623), all these titles being in the peerage of England. After holding many appointments the 2nd duke died without issue in 1624, being succeeded in his Scottish titles by his brother Esme, who had already been created earl of March and Lord Clifton of Leighton Bromswold in the peerage of England (1619) and was seigneur d'Aubigny in France. Of his sons, Henry succeeded to Aubigny and died young at Venice; Ludovic, seigneur d'Aubigny, entered the Roman Catholic Church and received a cardinal's hat just before his death; while the three other younger sons, George, seigneur d'Aubigny, John and Bernard, were all distinguished as royalists in the Civil war. Each met a soldier's death, George at Edgehill, John at Alresford and Bernard at Rowton Heath. James, the eldest son and 4th duke of Lennox, was created duke of Richmond in 1641, being like his brother a devoted adherent of Charles I.

With the death of his little son Esme, the 5th duke, in 1660, the titles, including that of Richmond, passed to his first cousin Charles, who had already been created Lord Stuart of Newbury and earl of Lichfield, being likewise now seigneur d'Aubigny. Disliked by Charles II., principally because of his marriage with "la belle Stuart"—"the noblest romance and example of a brave lady that ever I read in my life," writes Pepys—he was sent into exile as ambassador to Denmark, where he was drowned in 1672. His wife had had the Lennox estates granted to her for life, but his only sister Katharine, wife of Henry O'Brien, heir apparent of the 7th earl of Thomond, was served heir to him. Her only daughter, the countess of Clarendon, was mother of Theodosia Hyde, ancestress of the present earls of Darnley.

The Lennox dukedom, being to heirs male, now devolved upon Charles II., who bestowed it with the titles of earl of Darnley and Lord Tarbolton upon one of his bastards, Charles Lennox, son of the celebrated duchess of Portsmouth, he having previously been created duke of Richmond, earl of March and Lord Settrington in the peerage of England. The ancient lands of the Lennox title were also granted to him, but these he sold to the duke of Montrose.

His son Charles, who inherited his grandmother's French dukedom of Aubigny, was a soldier of distinction, as were the 3rd and 4th dukes. The wife of the last, Lady Charlotte Gordon, as heir of her brother brought the ancient estates of her family to the Lennoxes; the additional name of Gordon being taken by the 5th duke of Richmond and of Lennox on the death of his uncle, the 5th duke of Gordon. In the next generation further honours were granted to the family in the person of the 6th duke, who was rewarded for his great public services with the titles of duke of Gordon and earl of Kinrara in the peerage of the United Kingdom (1876).

See Scots Peerage, vol. v., for excellent accounts of these peerages by the Rev. John Anderson, curator Historical Dept. H.M. Register House; A. Francis Steuart and Francis J. Grant, Rothesay Herald. See also *The Lennox* by William Fraser.

LENNOX, CHARLOTTE (1720-1804), British writer, daughter of Colonel James Ramsay, lieutenant-governor of New York, was born in 1720. She went to London in 1735, and, being left unprovided for at her father's death, she began to earn her living by writing. She made some unsuccessful appearances on the stage and married in 1748. Samuel Johnson had an exaggerated admiration for her. "Three such women," he said, speaking of Elizabeth Carter, Hannah More and Fanny Burney, "are not to be found; I know not where to find a fourth, except Mrs Lennox, who is superior to them all." Her chief works are: *The Female Quixote; or the Adventures of Arabella* (1752), a novel; *Shakespear illustrated; or the novels and histories on which the plays ... are founded* (1753-1754), in which she argued that Shakespeare had spoiled the stories he borrowed for his plots by interpolating unnecessary intrigues and incidents; *The Life of Harriot Stuart* (1751), a novel; and *The Sister*, a comedy produced at Covent Garden (18th February 1769). This last was withdrawn after the first night, after a stormy reception, due, said Goldsmith, to the fact that its author had abused Shakespeare.

LENNOX, MARGARET, Countess of (1515-1578), daughter of Archibald Douglas, 6th earl of Angus, and

Margaret Tudor, daughter of Henry VII. of England and widow of James IV. of Scotland, was born at Harbottle Castle, Northumberland, on the 8th of October 1515. On account of her nearness to the English crown, Lady Margaret Douglas was brought up chiefly at the English court in close association with the Princess Mary, who remained her fast friend throughout life. She was high in Henry VIII.'s favour, but was twice disgraced; first for an attachment to Lord Thomas Howard, who died in the Tower in 1537, and again in 1541 for a similar affair with Sir Charles Howard, brother of Queen Catherine Howard. In 1544 she married a Scottish exile, Matthew Stewart, 4th earl of Lennox (1516-1571), who was regent of Scotland in 1570-1571. During Mary's reign the countess of Lennox had rooms in Westminster Palace; but on Elizabeth's accession she removed to Yorkshire, where her home at Temple Newsam became a centre for Catholic intrigue. By a series of successful manœuvres she married her son Henry Stewart, Lord Darnley, to Mary, queen of Scots. In 1566 she was sent to the Tower, but after the murder of Darnley in 1567 she was released. She was at first loud in her denunciations of Mary, but was eventually reconciled with her daughter-in-law. In 1574 she again aroused Elizabeth's anger by the marriage of her son Charles, earl of Lennox, with Elizabeth Cavendish, daughter of the earl of Shrewsbury. She was sent to the Tower with Lady Shrewsbury, and was only pardoned after her son's death in 1577. Her diplomacy largely contributed to the future succession of her grandson James to the English throne. She died on the 7th of March 1578.

The famous Lennox jewel, made for Lady Lennox as a memento of her husband, was bought by Queen Victoria in 1842.

LENO, DAN, the stage-name of George Galvin (1861-1904), English comedian, who was born at Somers Town, London, in February 1861. His parents were actors, known as Mr and Mrs Johnny Wilde. Dan Leno was trained to be an acrobat, but soon became a dancer, travelling with his brother as "the brothers Leno," and winning the world's championship in clog-dancing at Leeds in 1880. Shortly afterwards he appeared in London at the Oxford, and in 1886-1887 at the Surrey Theatre. In 1888-1889 he was engaged by Sir Augustus Harris to play the Baroness in the *Babes in the Wood*, and from that time he was a principal figure in the Drury Lane pantomimes. He was the wittiest and most popular comedian of his day, and delighted London music-hall audiences by his shop-walker, stores-proprietor, waiter, doctor, beef-eater, bathing attendant, "Mrs Kelly," and other impersonations. In 1900 he engaged to give his entire services to the Pavilion Music Hall, where he received £100 per week. In November 1901 he was summoned to Sandringham to do a "turn" before the king, and was proud from that time to call himself the "king's jester." Dan Leno's generosity endeared him to his profession, and he was the object of much sympathy during the brain failure which recurred during the last eighteen months of his life. He died on the 31st of October 1904.

LENORMANT, FRANÇOIS (1837-1883), French Assyriologist and archaeologist, was born in Paris on the 17th of January 1837. His father, Charles Lenormant, distinguished as an archaeologist, numismatist and Egyptologist, was anxious that his son should follow in his steps. He made him begin Greek at the age of six, and the child responded so well to this precocious scheme of instruction, that when he was only fourteen an essay of his, on the Greek tablets found at Memphis, appeared in the *Revue archéologique*. In 1856 he won the numismatic prize of the Académie des Inscriptions with an essay entitled *Classification des monnaies des Lagides*. In 1862 he became sub-librarian of the Institute. In 1859 he accompanied his father on a journey of exploration to Greece, during which Charles Lenormant succumbed to fever at Athens (24th November). Lenormant returned to Greece three times during the next six years, and gave up all the time he could spare from his official work to archaeological research. These peaceful labours were rudely interrupted by the war of 1870, when Lenormant served with the army and was wounded in the siege of Paris. In 1874 he was appointed professor of archaeology at the National Library, and in the following year he collaborated with Baron de Witte in founding the *Gazette archéologique*. As early as 1867 he had turned his attention to Assyrian studies; he was among the first to recognize in the cuneiform inscriptions the existence of a non-Semitic language, now known as Accadian. Lenormant's knowledge was of encyclopaedic extent, ranging over an immense number of subjects, and at the same time thorough, though somewhat lacking perhaps in the strict accuracy of the modern school. Most of his varied studies were directed towards tracing the origins of the two great civilizations of the ancient world, which were to be sought in Mesopotamia and on the shores of the Mediterranean. He had a perfect passion for exploration. Besides his early expeditions to Greece, he visited the south of Italy three times with this object, and it was while exploring in Calabria that he met with an accident which ended fatally in Paris on the 9th of December 1883, after a long illness. The amount and variety of Lenormant's work is truly amazing when it is remembered that he died at the early age of forty-six. Probably the best known of his books are *Les Origines de l'histoire d'après la Bible*, and his ancient history of the East and account of Chaldean magic. For breadth of view, combined with extraordinary subtlety of intuition, he was probably unrivalled.

LENOX, a township of Berkshire county, Massachusetts, U.S.A. Pop. (1900) 2942, (1905) 3058; (1910) 3060. Area, 19.2 sq. m. The principal village, also named Lenox (or Lenox-on-the-Heights), lies about 2 m. W. of the Housatonic river, at an altitude of about 1000 ft., and about it are high hills—Yokun Seat (2080 ft.), South Mountain (1200 ft.), Bald Head (1583 ft.), and Rattlesnake Hill (1540 ft.). New Lenox and Lenoxdale are other villages in the township. Lenox is a fashionable summer and autumn resort, much frequented by wealthy people from Washington, Newport and New York. There are innumerable lovely walks and drives in the surrounding region, which contains some of the most beautiful country of the Berkshires—hills, lakes, charming intervales and woods. As early as 1835 Lenox began to attract summer residents. In the next decade began the creation of large estates, although the great holdings of the present day, and the villas scattered over the hills, are comparatively recent features. The height of the season is in the autumn, when there are horse-shows, golf, tennis, hunts and other outdoor amusements. The Lenox library (1855) contained about 20,000 volumes in 1908. Lenox was settled about 1750, was included in Richmond township in 1765, and became an independent township in 1767. The names were those of Sir Charles Lennox, third duke of Richmond and of Lennox (1735-1806), one of the staunch friends of the American colonies during the War of Independence. Lenox was the county-seat from 1787 to 1868. It has literary associations with Catherine M. Sedgwick (1789-1867), who passed here the second half of her life; with Nathaniel Hawthorne, whose brief residence here (1850-1851) was marked by the production of the *House of the Seven Gables* and the *Wonder Book*; with Fanny Kemble, a summer resident from 1836-1853; and with Henry Ward Beecher (see his *Star Papers*). Elizabeth (Mrs Charles) Sedgwick, the sister-in-law of Catherine Sedgwick, maintained here from 1828 to 1864 a school for girls, in which Harriet Hosmer, the sculptor, and Maria S. Cummins (1827-1866), the novelist, were educated; and in Lenox academy (1803), a famous classical school (now a public high school) were educated W. L. Yancey, A. H. Stephens, Mark Hopkins and David Davis (1815-1886), a circuit judge of Illinois from 1848 to 1862, a justice (1862-1877) of the United States Supreme Court, a Republican member of the United States Senate from Illinois in 1877-1883, and president of the Senate from the 31st of October 1881, when he succeeded Chester A. Arthur, until the 3rd of March 1883. There is a statue commemorating General John Paterson (1744-1808) a soldier from Lenox in the War of Independence.

See R. de W. Mallary, *Lenox and the Berkshire Highlands* (1902); J. C. Adams, *Nature Studies in Berkshire*; C. F. Warner, *Picturesque Berkshire* (1890); and Katherine M. Abbott, *Old Paths and Legends of the New England Border* (1907).

LENS, a town of Northern France, in the department of Pas-de-Calais, 13 m. N.N.E. of Arras by rail on the Déûle and on the Lens canal. Pop. (1906) 27,692. Lens has important iron and steel foundries, and engineering works and manufactories of steel cables, and occupies a central position in the coalfields of the department. Two and a half miles W.S.W. lies Liévin (pop. 22,070), likewise a centre of the coalfield. In 1648 the neighbourhood of Lens was the scene of a celebrated victory gained by Louis II. of Bourbon, prince of Condé, over the Spaniards.

LENS (from Lat. *lens*, lentil, on account of the similarity of the form of a lens to that of a lentil seed), in optics, an instrument which refracts the luminous rays proceeding from an object in such a manner as to produce an image of the object. It may be regarded as having four principal functions: (1) to produce an image larger than the object, as in the magnifying glass, microscope, &c.; (2) to produce an image smaller than the object, as in the ordinary photographic camera; (3) to convert rays proceeding from a point or other luminous source into a definite pencil, as in lighthouse lenses, the engraver's globe, &c.; (4) to collect luminous and heating rays into a smaller area, as in the burning glass. A lens made up of two or more lenses cemented together or very close to each other is termed "composite" or "compound"; several lenses arranged in succession at a distance from each other form a "system of lenses," and if the axes be collinear a "centred system." This article is concerned with the general theory of lenses, and more particularly with spherical lenses. For a special part of the theory of lenses see Aberration; the instruments in which the lenses occur are treated under their own headings.

The most important type of lens is the spherical lens, which is a piece of transparent material bounded by two spherical surfaces, the boundary at the edge being usually cylindrical or conical. The line joining the centres, C_1, C_2 (fig. 1), of the bounding surfaces is termed the *axis*; the points S_1, S_2, at which the axis intersects the surfaces, are termed the "vertices" of the lens; and the distance between the vertices is termed the "thickness." If the edge be everywhere equidistant from the vertex, the lens is "centred."

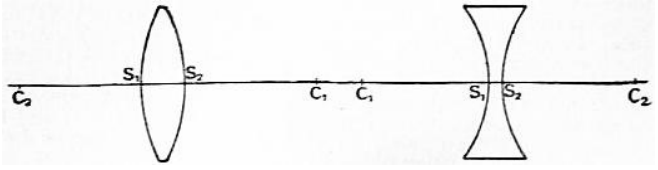


Fig. 1.

Although light is really a wave motion in the aether, it is only necessary, in the investigation of the optical properties of systems of lenses, to trace the rectilinear path of the waves, *i.e.* the direction of the normal to the wave front, and this can be done by purely geometrical methods. It will be assumed that light, so long as it

traverses the same medium, always travels in a straight line; and in following out the geometrical theory it will always be assumed that the light travels from left to right; accordingly all distances measured in this direction are positive, while those measured in the opposite direction are negative.

Theory of Optical Representation.—If a pencil of rays, *i.e.* the totality of the rays proceeding from a luminous point, falls on a lens or lens system, a section of the pencil, determined by the dimensions of the system, will be transmitted. The emergent rays will have directions differing from those of the incident rays, the alteration, however, being such that the transmitted rays are convergent in the "image-point," just as the incident rays diverge from the "object-point." With each incident ray is associated an emergent ray; such pairs are termed "conjugate ray pairs." Similarly we define an object-point and its image-point as "conjugate points"; all object-points lie in the "object-space," and all image-points lie in the "image-space."

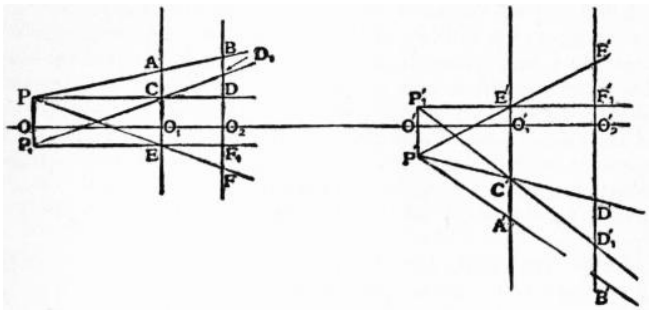


Fig. 2.

The laws of optical representations were first deduced in their most general form by E. Abbe, who assumed (1) that an optical representation always exists, and (2) that to every point in the object-space there corresponds a point in the image-space, these points being mutually convertible by straight rays; in other words, with each object-point is associated one, and only one, image-point, and if the object-point be placed at the image-point, the conjugate point is the original object-point. Such a transformation is termed a "collineation," since it transforms points into points and straight lines into straight lines. Prior to Abbe, however, James Clerk Maxwell published, in 1856, a geometrical theory of optical representation, but his methods were unknown to Abbe and to his pupils until O. Eppenstein drew attention to them. Although Maxwell's theory is not so general as Abbe's, it is used here since its methods permit a simple and convenient deduction of the laws.

Maxwell assumed that two object-planes perpendicular to the axis are represented sharply and similarly in two image-planes also perpendicular to the axis (by "sharply" is meant that the assumed ideal instrument unites all the rays proceeding from an object-point in one of the two planes in its image-point, the rays being generally transmitted by the system). The symmetry of the axis being premised, it is sufficient to deduce laws for a plane containing the axis. In fig. 2 let O_1, O_2 be the two points in which the perpendicular object-planes meet the axis; and since the axis corresponds to itself, the two conjugate points O'_1, O'_2, are at the intersections of the two image-planes with the axis. We denote the four planes by the letters O_1, O_2, and O'_1, O'_2. If two points A, C be taken in the plane O_1, their images are A′, C′ in the plane O'_1, and since the planes are represented similarly, we have $O'_1A' : O_1A = O'_1C'_1 : O_1C = \beta_1$ (say), in which β_1 is easily seen to be the *linear magnification* of the plane-pair O_1, O'_1. Similarly, if two points B, D be taken in the plane O_2 and their images B′, D′ in the plane O'_2, we have $O'_2B' : O_2B = O'_2D' : O_2D = \beta_2$ (say), β_2 being the linear magnification of the plane-pair O_2, O'_2. The joins of A and B and of C and D intersect in a point P, and the joins of the conjugate points similarly determine the point P′.

If P′ is the only possible image-point of the object-point P, then the conjugate of every ray passing through P must pass through P′. To prove this, take a third line through P intersecting the planes O_1, O_2 in the points E, F, and by means of the magnifications β_1, β_2 determine the conjugate points E′, F′ in the planes O'_1, O'_2. Since the planes O_1, O_2 are parallel, then AC/AE = BD/BF; and since these planes are represented similarly in O'_1, O'_2, then A′C′/A′E′ = B′D′/B′F′. This proportion is only possible when the straight line E′F′ contains the point P′. Since P was any point whatever, it follows that every point of the object-space is represented in one and only one point in the image-space.

Take a second object-point P_1, vertically under P and defined by the two rays CD_1, and EF_1, the conjugate point P'_1 will be determined by the intersection of the conjugate rays $C'D'_1$ and $E'F'_1$, the points D'_1, F'_1, being readily found from the magnifications β_1, β_2. Since PP_1 is parallel to CE and also to DF, then $DF = D_1F_1$. Since the plane O_2 is similarly represented in O'_2, $D'F' = D'_1F'_1$; this is impossible unless $P'P'_1$ be parallel to C′E′. Therefore every perpendicular object-plane is represented by a perpendicular image-plane.

Let O be the intersection of the line PP_1 with the axis, and let O′ be its conjugate; then it may be shown that a fixed magnification β_3 exists for the planes O and O′. For $PP_1/FF_1 = OO_1/O_1O_2$, $P'P'_1/F'F'_1 = O'O'/O'_1O'_2$, and $F'F'_1 = \beta_2FF_1$. Eliminating FF_1 and $F'F'_1$ between these ratios, we have $P'P'_1/PP_1\beta_2 = O'O'_1 \cdot O_1O_2/OO_1$. $O'_1O'_2$, or $\beta_3 = \beta_2 \cdot O'O'_1 \cdot O_1O_2/OO_1 \cdot O'_1O'_2$, *i.e.* $\beta_3 = \beta_2 \times$ a product of the axial distances.

The determination of the image-point of a given object-point is facilitated by means of the so-called "cardinal points" of the optical system. To determine the image-point O'_1 (fig. 3) corresponding to the object-point O_1, we begin by choosing from the ray pencil proceeding from O_1, the ray parallel with the axis, *i.e.* intersecting the axis at infinity. Since the axis is its own conjugate, the parallel ray through O_1 must intersect the axis after refraction (say at F′). Then F′ is the image-point of an object-point situated at infinity on the axis, and is termed the "second principal focus" (German *der bildseitige Brennpunkt*, the image-side focus). Similarly if O'_4 be on the parallel through O_1 but in the image-space, then the conjugate ray must intersect the axis at a point (say F), which is conjugate with the point at infinity on the axis in the image-space. This point is termed the "first principal focus" (German *der objektseitige Brennpunkt*, the object-side focus).

Let H_1, H'_1 be the intersections of the focal rays through F and F′ with the line $O_1O'_4$. These two points are in the position of object and image, since they are each determined by two pairs of conjugate rays (O_1H_1 being conjugate with H'_1F', and $O'_4H'_1$ with H_1F). It has already been shown that object-planes perpendicular to the axis are represented by image-planes also perpendicular to the axis. Two vertical planes through H_1 and H'_1, are related as object- and image-planes; and if these planes intersect the axis in two points H and H′, these points are named the "principal," or "Gauss points" of the system, H being the "object-side" and H′ the "image-side principal

point." The vertical planes containing H and H′ are the "principal planes." It is obvious that conjugate points in these planes are equidistant from the axis; in other words, the magnification β of the pair of planes is unity. An additional characteristic of the principal planes is that the object and image are direct and not inverted. The distances between F and H, and between F′ and H′ are termed the focal lengths; the former may be called the "object-side focal length" and the latter the "image-side focal length." The two focal points and the two principal points constitute the so-called four cardinal points of the system, and with their aid the image of any object can be readily determined.

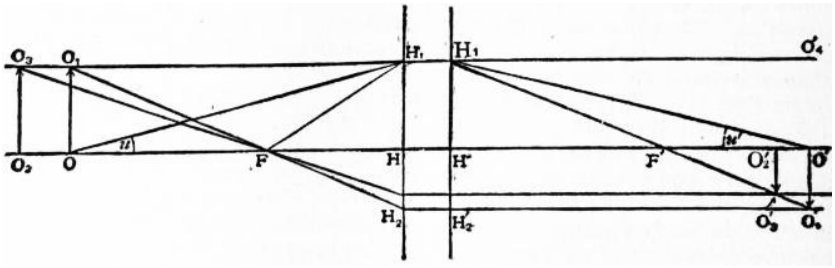


FIG. 3.

Equations relating to the Focal Points.—We know that the ray proceeding from the object point O_1, parallel to the axis and intersecting the principal plane H in H_1, passes through H'_1 and F′. Choose from the pencil a second ray which contains F and intersects the principal plane H in H_2; then the conjugate ray must contain points corresponding to F and H_2. The conjugate of F is the point at infinity on the axis, *i.e.* on the ray parallel to the axis. The image of H_2 must be in the plane H′ at the same distance from, and on the same side of, the axis, as in H'_2. The straight line passing through H'_2 parallel to the axis intersects the ray H'_1F' in the point O'_1, which must be the image of O_1. If O be the foot of the perpendicular from O_1 to the axis, then OO_1 is represented by the line $O'O'_1$ also perpendicular to the axis.

This construction is not applicable if the object or image be infinitely distant. For example, if the object OO_1 be at infinity (O being assumed to be on the axis for the sake of simplicity), so that the object appears under a constant angle w, we know that the second principal focus is conjugate with the infinitely distant axis-point. If the object is at infinity in a plane perpendicular to the axis, the image must be in the perpendicular plane through the focal point F′ (fig. 4).

The size y′ of the image is readily deduced. Of the parallel rays from the object subtending the angle w, there is one which passes through the first principal focus F, and intersects the principal plane H in H_1. Its conjugate ray passes through H′ parallel to, and at the same distance from the axis, and intersects the image-side focal plane in O'_1; this point is the image of O_1, and y′ is its magnitude. From the figure we have tan w = HH_1/FH = y′/f, or f = y′/tan w; this equation was used by Gauss to define the focal length.

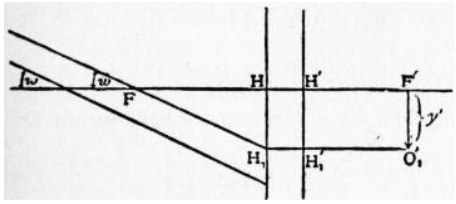


FIG. 4.

Referring to fig. 3, we have from the similarity of the triangles OO_1F and HH_2F, HH_2/OO_1 = FH/FO, or $O'O'_1/OO_1$ = FH/FO. Let y be the magnitude of the object OO_1, y′ that of the image $O'O'_1$, x the focal distance FO of the object, and f the object-side focal distance FH; then the above equation may be written y′/y = f/x. From the similar triangles $H'_1H'F'$ and $O'_1O'F'$, we obtain $O'O'_1/OO_1$ = F′O′/F′H′. Let x′ be the focal distance of the image F′O′, and f′ the image-side focal length F′H′; then y′/y = x′/f′. The ratio of the size of the image to the size of the object is termed the *lateral magnification*. Denoting this by β, we have

$$\beta = y'/y = f/x = x'/f', \tag{1}$$

and also

$$xx' = ff'. \tag{2}$$

By differentiating equation (2) we obtain

$$dx' = -(ff'/x^2)\,dx \text{ or } dx'/dx = -ff'/x^2. \tag{3}$$

The ratio of the displacement of the image dx′ to the displacement of the object dx is the axial magnification, and is denoted by α. Equation (3) gives important information on the displacement of the image when the object is moved. Since f and f′ always have contrary signs (as is proved below), the product −ff′ is invariably positive, and since x^2 is positive for all values of x, it follows that dx and dx′ have the same sign, *i.e.* the object and image always move in the same direction, either both in the direction of the light, or both in the opposite direction. This is shown in fig. 3 by the object O_3O_2 and the image $O'_3O'_2$.

If two conjugate rays be drawn from two conjugate points on the axis, making angles u and u′ with the axis, as for example the rays OH_1, $O'H'_1$, in fig. 3, u is termed the "angular aperture for the object," and u′ the "angular aperture for the image." The ratio of the tangents of these angles is termed the "convergence" and is denoted by γ, thus γ = tan u′/tan u. Now tan u′= $H'H'_1/O'H'$ = $H'H'_1/(O'F' + F'H')$ = $H'H'_1/(F'H' - F'O')$. Also tan u = HH_1/OH = $HH_1/(OF + FH)$ = $HH_1/(FH - FO)$. Consequently γ = (FH − FO)/(F′H′ − F′O′), or, in our previous notation, γ = (f − x)/(f′ − x′).

From equation (1) f/x = x′/f′, we obtain by subtracting unity from both sides (f − x)/x = (x′ − f′)/f′, and

consequently

$$\frac{f - x}{f' - x'} = -\frac{x}{f'} = -\frac{f}{x'} = \gamma. \tag{4}$$

From equations (1), (3) and (4), it is seen that a simple relation exists between the lateral magnification, the axial magnification and the convergence, viz. $\alpha\gamma = \beta$.

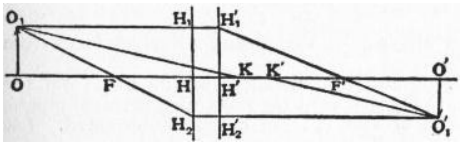


FIG. 5.

In addition to the four cardinal points F, H, F′, H′, J. B. Listing, "Beiträge aus physiologischen Optik," *Göttinger Studien* (1845) introduced the so-called "nodal points" (*Knotenpunkte*) of the system, which are the two conjugate points from which the object and image appear under the same angle. In fig. 5 let K be the nodal point from which the object y appears under the same angle as the image y′ from the other nodal point K′. Then $OO_1/KO = O'O'_1/K'O'$, or $OO_1/(KF + FO) = O'O'_1/(K'F' + F'O')$, or $OO_1/(FO - FK) = O'O'_1/(F'O' - F'K')$. Calling the focal distances FK and F′K′, X and X′, we have $y/(x - X) = y'/(x' - X')$, and since $y'/y = \beta$, it follows that $1/(x - X) = \beta/(x' - X')$. Replace x′ and X′ by the values given in equation (2), and we obtain

$$\frac{1}{x - X} = \beta / \left(\frac{ff'}{x} - \frac{ff'}{X} \right) \text{ or } 1 = -\beta \frac{xX}{ff'}.$$

Since $\beta = f/x = x'/f'$, we have $f' = -X$, $f = -X'$.

These equations show that to determine the nodal points, it is only necessary to measure the focal distance of the second principal focus from the first principal focus, and vice versa. In the special case when the initial and final medium is the same, as for example, a lens in air, we have $f = -f'$, and the nodal points coincide with the principal points of the system; we then speak of the "nodal point property of the principal points," meaning that the object and corresponding image subtend the same angle at the principal points.

Equations Relating to the Principal Points.—It is sometimes desirable to determine the distances of an object and its image, not from the focal points, but from the principal points. Let A (see fig. 3) be the principal point distance of the object and A′ that of the image, we then have

$$A = HO = HF + FO = FO - FH = x - f,$$
$$A' = H'O' = H'F' + F'O' = F'O' - F'H' = x' - f',$$

whence

$$x = A + f \text{ and } x' = A' + f'.$$

Using $xx' = ff'$, we have $(A + f)(A' + f') = ff'$, which leads to $AA' + Af' + A'f = O$, or

$$1 + \frac{f'}{A'} + \frac{f}{A} = O;$$

this becomes in the special case when $f = -f'$,

$$\frac{1}{A'} - \frac{1}{A} = \frac{1}{f}.$$

To express the linear magnification in terms of the principal point distances, we start with equation (4) $(f - x)/(f' - x') = -x/f'$. From this we obtain $A/A' = -x/f'$, or $x = -f'A/A'$; and by using equation (1) we have $\beta = -fA'/f'A$.

In the special case of $f = -f'$, this becomes $\beta = A'/A = y'/y$, from which it follows that the ratio of the dimensions of the object and image is equal to the ratio of the distances of the object and image from the principal points.

The convergence can be determined in terms of A and A′ by substituting $x = -f'A/A'$ in equation (4), when we obtain $\gamma = A/A'$.

Compound Systems.—In discussing the laws relating to compound systems, we assume that the cardinal points of the component systems are known, and also that the combinations are centred, *i.e.* that the axes of the component lenses coincide. If some object be represented by two systems arranged one behind the other, we can regard the systems as co-operating in the formation of the final image.

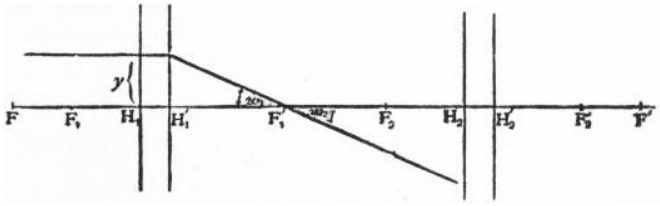


FIG. 6.

Let such a system be represented in fig. 6. The two single systems are denoted by the suffixes 1 and 2; for example, F_1 is the first principal focus of the first, and F'_2 the second principal focus of the second system. A ray parallel to the axis at a distance y passes through the second principal focus F'_1 of the first system, intersecting the axis at an angle w'_1. The point F'_1 will be represented in the second system by the point F′, which is therefore conjugate to the point at infinity for the entire system, *i.e.* it is the second principal focus of the compound system. The representation of F'_1 in F′ by the second system leads to the relations $F_2F'_1 = x_2$, and $F'_2F' = x'_2$, whence $x_2x'_2 = f_2f'_2$. Denoting the distance between the adjacent focal planes F'_1, F_2 by Δ, we have $\Delta = F'_1F_2 = -F_2F'_1$, so that $x'_2 = -f_2f'_2/\Delta$. A similar ray parallel to the axis at a distance y proceeding from the image-side will intersect the axis at the focal point F_2; and by finding the image of this point in the first system, we determine the first principal

focus of the compound system. Equation (2) gives $x_1x'_1 = f_1f'_1$, and since $x'_1 = F'_1F_2 = \Delta$, we have $x_1 = f_1f'_1/\Delta$ as the distance of the first principal focus F of the compound system from the first principal focus F_1 of the first system.

To determine the focal lengths f and f′ of the compound system and the principal points H and H′, we employ the equations defining the focal lengths, viz. $f = y'/\tan w$, and $f' = y/\tan w'$. From the construction (fig. 6) $\tan w'_1 = y/f'_1$. The variation of the angle w'_1 by the second system is deduced from the equation to the convergence, viz. $\gamma = \tan w'_2/\tan w_2 = -x_2/f'_2 = \Delta/f'_2$, and since $w_2 = w'_1$, we have $\tan w'_2 = (\Delta/f'_2) \tan w'_1$. Since $w' = w'_2$ in our system of notation, we have

$$f' = \frac{y}{\tan w'} = \frac{yf'_2}{\Delta \tan w'_1} = \frac{f'_1 \cdot f'_2}{\Delta}.$$

By taking a ray proceeding from the image-side we obtain for the first principal focal distance of the combination

$$f = -f_1f_2/\Delta.$$

In the particular case in which $\Delta = 0$, the two focal planes F'_1, F_2 coincide, and the focal lengths f, f′ are infinite. Such a system is called a telescopic system, and this condition is realized in a telescope focused for a normal eye.

So far we have assumed that all the rays proceeding from an object-point are exactly united in an image-point after transmission through the ideal system. The question now arises as to how far this assumption is justified for spherical lenses. To investigate this it is simplest to trace the path of a ray through one spherical refracting surface. Let such a surface divide media of refractive indices n and n′, the former being to the left. The point where the axis intersects the surface is the vertex S (fig. 7). Denote the distance of the axial object-point O from S by s; the distance from O to the point of incidence P by p; the radius of the spherical surface by r; and the distance OC by c, C being the centre of the sphere. Let u be the angle made by the ray with the axis, and i the angle of incidence, *i.e.* the angle between the ray and the normal to the sphere at the point of incidence. The corresponding quantities in the image-space are denoted by the same letters with a dash. From the triangle O′PC we have $\sin u = (r/c) \sin i$, and from the triangle O′PC we have $\sin u' = (r/c') \sin i'$. By Snell's law we have $n'/n = \sin i/\sin i'$, and also $\varphi = u' + i'$. Consequently c′ and the position of the image may be found.

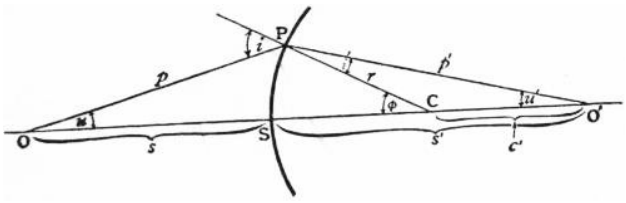


Fig. 7.

To determine whether all the rays proceeding from O are refracted through O′, we investigate the triangle OPO′. We have $p/p' = \sin u'/\sin u$. Substituting for sin u and sin u′ the values found above, we obtain $p'/p = c' \sin i/c \sin i' = n'c'/nc$. Also $c = OC = CS + SO = -SC + SO = s - r$, and similarly $c' = s' - r$. Substituting these values we obtain

$$\frac{p'}{p} = \frac{n'(s' - r)}{n(s - r)}, \text{ or } \frac{n(s - r)}{p} = \frac{n'(s' - r)}{p'}. \tag{6}$$

To obtain p and p′ we use the triangles OPC and O′PC; we have $p^2 = (s - r)^2 + r^2 + 2r(s - r) \cos \varphi$, $p'^2 = (s' - r)^2 + r^2 + 2r(s' - r) \cos \varphi$. Hence if s, r, n and n′ be constant, s′ must vary as φ varies. The refracted rays therefore do not reunite in a point, and the deflection is termed the spherical aberration (see Aberration).

Developing cos φ in powers of φ, we obtain

$$p^2 = (s - r)^2 + r^2 + 2r(s - r) \left\{ 1 - \frac{\varphi^2}{2!} + \frac{\varphi^4}{4!} - \frac{\varphi^6}{6!} + \ldots \right\},$$

and therefore for such values of φ for which the second and higher powers may be neglected, we have $p^2 = (s - r)^2 + r^2 + 2r(s - r)$, *i.e.* p = s, and similarly p′ = s′. Equation (6) then becomes $n(s - r)/s = n'(s' - r)/s'$ or

$$\frac{n'}{s'} = \frac{n}{s} + \frac{n' - n}{r}. \tag{7}$$

This relation shows that in a very small central aperture in which the equation p = s holds, all rays proceeding from an object-point are exactly united in an image-point, and therefore the equations previously deduced are valid for this aperture. K. F. Gauss derived the equations for thin pencils in his *Dioptrische Untersuchungen* (1840) by very elegant methods. More recently the laws relating to systems with finite aperture have been approximately realized, as for example, in well-corrected photographic objectives.

Position of the Cardinal Points of a Lens.—Taking the case of a single spherical refracting surface, and limiting ourselves to the small central aperture, it is seen that the second principal focus F′ is obtained when s is infinitely great. Consequently s′ = -f′; the difference of sign is obvious, since s′ is measured from S, while f′ is measured from F′. The focal lengths are directly deducible from equation (7):—

$$f' = -n'r / (n' - n) \tag{8}$$

$$f = nr / (n' - n). \tag{9}$$

By joining this simple refracting system with a similar one, so that the second spherical surface limits the medium of refractive index n′, we derive the spherical lens. Generally the two spherical surfaces enclose a glass lens, and are bounded on the outside by air of refractive index 1.

The deduction of the cardinal points of a spherical glass lens in air from the relations already proved is readily effected if we regard the lens as a combination of two systems each having one refracting surface, the light passing in the first system from air to glass, and in the second from glass to air. If we know the refractive index of the glass n, the radii r_1, r_2 of the spherical surfaces, and the distances of the two lens-vertices (or the thickness of

the lens d) we can determine all the properties of the lens. A biconvex lens is shown in fig. 8. Let F_1 be the first principal focus of the first system of radius r_1, and F_1' the second principal focus; and let S_1 be its vertex. Denote the distance $F_1\ S_1$ (the first principal focal length) by f_1, and the corresponding distance $F'_1\ S_1$ by f'_1. Let the corresponding quantities in the second system be denoted by the same letters with the suffix 2.

By equations (8) and (9) we have

$$f_1 = \frac{r_1}{n-1}, \quad f'_1 = -\frac{nr_1}{n-1}, \quad f_2 = -\frac{nr_2}{n-1}, \quad f'_2 = \frac{r_2}{n-1},$$

f_2 having the opposite sign to f_1. Denoting the distance F'_1F_2 by Δ, we have $\Delta = F'_1F_2 = F'_1S_1 + S_1S_2 + S_2F_2 = F'_1S_1 + S_1S_2 - F_2S_2 = f'_1 + d - f_2$. Substituting for f'_1 and f_2 we obtain

$$\Delta = -\frac{nr_1}{n-1} + d + \frac{nr_2}{n-1}.$$

Writing $R = \Delta(n-1)$, this relation becomes

$$R = n(r_2 - r_1) + d(n-1).$$

We have already shown that f (the first principal focal length of a compound system) $= -f_1f_2/\Delta$. Substituting for f_1, f_2 and Δ the values found above, we obtain

$$f = \frac{r_1r_2n}{(n-1)R} = \frac{r_1r_2n}{(n-1)\{n(r_2-r_1) + d(n-1)\}}, \tag{10}$$

which is equivalent to

$$\frac{1}{f} = (n-1)\left\{\frac{1}{r_1} - \frac{1}{r_2}\right\} + \frac{(n-1)^2\,d}{r_1r_2n}.$$

If the lens be infinitely thin, *i.e.* if d be zero, we have for the first principal focal length.

$$\frac{1}{f} = (n-1)\left\{\frac{1}{r_1} - \frac{1}{r_2}\right\}.$$

By the same method we obtain for the second principal focal length

$$f' = \frac{f'_1f'_2}{\Delta} = -\frac{nr_1r_2}{(n-1)R} = -f.$$

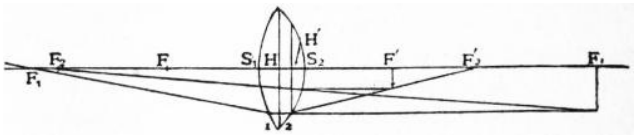


FIG. 8.

The reciprocal of the focal length is termed the *power* of the lens and is denoted by φ. In formulae involving φ it is customary to denote the reciprocal of the radii by the symbol ρ; we thus have $\varphi = 1/f$, $\rho = 1/r$. Equation (10) thus becomes

$$\varphi = (n-1)(\rho_1 - \rho_2) + \frac{(n-1)^2\,d\rho_1\rho_2}{n}.$$

The unit of power employed by spectacle-makers is termed the *diopter* or *dioptric* (see SPECTACLES).

We proceed to determine the distances of the focal points from the vertices of the lens, *i.e.* the distances FS_1 and $F'S_2$. Since F is represented by the first system in F_2, we have by equation (2)

$$x_1 = \frac{f_1f'_1}{x'_1} = \frac{f_1f'_1}{\Delta} = -\frac{nr_1^2}{(n-1)R},$$

where $x_1 = F_1F$, and $x'_1 = F'_1F_2 = \Delta$. The distance of the first principal focus from the vertex S, *i.e.* S_1F, which we denote by s_F is given by $s_F = S_1F = S_1F_1 + F_1F = -F_1S_1 + F_1F$. Now F_1S_1 is the distance from the vertex of the first principal focus of the first system, *i.e.* f_1 and $F_1F = x_1$. Substituting these values, we obtain

$$s_F = -\frac{r_1}{n-1} - \frac{nr_1^2}{(n-1)R} = -\frac{r_1(nr_1 + R)}{(n-1)R}.$$

The distance F'_2F' or x'_2 is similarly determined by considering F'_1 to be represented by the second system in F′.

We have

$$x'_2 = \frac{f_2f'_2}{x_2} = -\frac{f_2f'_2}{\Delta} = \frac{nr_2^2}{(n-1)R},$$

so that

$$s_{F'} = x'_2 - f'_2 = \frac{r_2(nr_2 - R)}{(n-1)R},$$

where $s_{F'}$ denotes the distance of the second principal focus from the vertex S_2.

The two focal lengths and the distances of the foci from the vertices being known, the positions of the remaining cardinal points, *i.e.* the principal points H and H′, are readily determined. Let $s_H = S_1H$, *i.e.* the distance of the object-side principal point from the vertex of the first surface, and $s_{H'} = S_2H'$, *i.e.* the distance of the image-side principal point from the vertex of the second surface, then $f = FH = FS_1 + S_1H = -S_1F + S_1H = -s_F + s_H$; hence $s_H = s_F + f = -dr_1/R$. Similarly $s_{H'} = s_{F'} + f' = -dr_2/R$. It is readily seen that the distances s_H and $s_{H'}$ are in the ratio of the radii r_1 and r_2.

The distance between the two principal planes (the interstitium) is deduced very simply. We have $S_1S_2 = S_1H + HH' + H'S_2$, or $HH' = S_1S_2 - S_1H + S_2H'$. Substituting, we have

$$HH' = d - s_H + s_{H'} = d(n-1)(r_2 - r_1 + d)/R.$$

The interstitium becomes zero, or the two principal planes coincide, if $d = r_1 - r_2$.

We have now derived all the properties of the lens in terms of its elements, viz. the refractive index, the radii of the surfaces, and the thickness.

Forms of Lenses.—By varying the signs and relative magnitude of the radii, lenses may be divided into two groups according to their action, and into four groups according to their form.

According to their action, lenses are either collecting, convergent and condensing, or divergent and dispersing; the term positive is sometimes applied to the former, and the term negative to the latter. Convergent lenses transform a parallel pencil into a converging one, and increase the convergence, and diminish the divergence of any pencil. Divergent lenses, on the other hand, transform a parallel pencil into a diverging one, and diminish the convergence, and increase the divergence of any pencil. In convergent lenses the first principal focal distance is positive and the second principal focal distance negative; in divergent lenses the converse holds.

The four forms of lenses are interpretable by means of equation (10).

$$f = \frac{r_1 r_2 n}{(n-1)\{n(r_2 - r_1) + d(n-1)\}}.$$

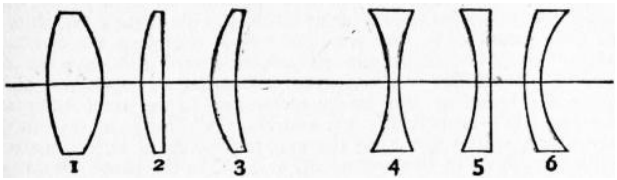


FIG. 9.

(1) If r_1 be positive and r_2 negative. This type is called biconvex (fig. 9, 1). The first principal focus is in front of the lens, and the second principal focus behind the lens, and the two principal points are inside the lens. The order of the cardinal points is therefore $FS_1HH'S_2F'$. The lens is convergent so long as the thickness is less than $n(r_1 - r_2)/(n-1)$. The special case when one of the radii is infinite, in other words, when one of the bounding surfaces is plane is shown in fig. 9, 2. Such a collective lens is termed *plano-convex*. As d increases, F and H move to the right and F′ and H′ to the left. If $d = n(r_1 - r_2)/(n-1)$, the focal length is infinite, *i.e.* the lens is telescopic. If the thickness be greater than $n(r_1 - r_2)/(n-1)$, the lens is dispersive, and the order of the cardinal points is $HFS_1S_2F'H'$.

(2) If r_1 is negative and r_2 positive. This type is called *biconcave* (fig. 9, 4). Such lenses are dispersive for all thicknesses. If d increases, the radii remaining constant, the focal lengths diminish. It is seen from the equations giving the distances of the cardinal points from the vertices that the first principal focus F is always behind S_1, and the second principal focus F′ always in front of S_2, and that the principal points are within the lens, H′ always following H. If one of the radii becomes infinite, the lens is *plano-concave* (fig. 9, 5).

(3) If the radii are both positive. These lenses are called *convexo-concave*. Two cases occur according as $r_2 > r_1$, or $< r_1$. (*a*) If $r_2 > r_1$, we obtain the *mensicus* (fig. 9, 3). Such lenses are always collective; and the order of the cardinal points is FHH′F′. Since s_F and s_H are always negative, the object-side cardinal points are always in front of the lens. H′ can take up different positions. Since $s_{H'} = -dr_2/R = -dr_2/\{n(r_2 - r_1) + d(n-1)\}$, $s_{H'}$ is greater or less than d, *i.e.* H′ is either in front of or inside the lens, according as $d <$ or $> \{r_2 - n(r_2 - r_1)\}/(n-1)$. (*b*) If $r_2 < r_1$ the lens is dispersive so long as $d < n(r_1 - r_2)/(n-1)$. H is always behind S_1 and H′ behind S_2, since s_H and $s_{H'}$ are always positive. The focus F is always behind S_1 and F′ in front of S_2. If the thickness be small, the order of the cardinal points is F′HH′F; a dispersive lens of this type is shown in fig. 9, 6. As the thickness increases, H, H′ and F move to the right, F more rapidly than H, and H more rapidly than H′; F′, on the other hand, moves to the left. As with biconvex lenses, a telescopic lens, having all the cardinal points at infinity, results when $d = n(r_1 - r_2)/(n-1)$. If $d > n(r_1 - r_2)/(n-1)$, f is positive and the lens is collective. The cardinal points are in the same order as in the mensicus, viz. FHH′F′; and the relation of the principal points to the vertices is also the same as in the mensicus.

(4) If r_1 and r_2 are both negative. This case is reduced to (3) above, by assuming a change in the direction of the light, or, in other words, by interchanging the object- and image-spaces.

The six forms shown in fig. 9 are all used in optical constructions. It may be stated fairly generally that lenses which are thicker at the middle are collective, while those which are thinnest at the middle are dispersive.

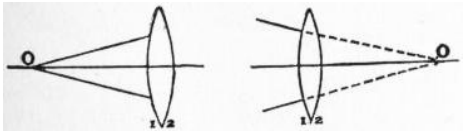


FIG. 10.

Different Positions of Object and Image.—The principal points are always near the surfaces limiting the lens, and consequently the lens divides the direct pencil containing the axis into two parts. The object can be either in front of or behind the lens as in fig. 10. If the object point be in front of the lens, and if it be realized by rays passing from it, it is called *real*. If, on the other hand, the object be behind the lens, it is called *virtual*; it does not actually exist, and can only be realized as an image.

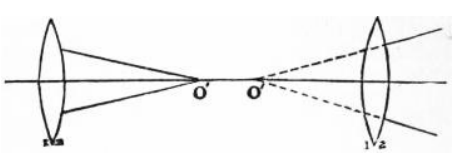


Fig. 11.

When we speak of “object-points,” it is always understood that the rays from the object traverse the first surface of the lens before meeting the second. In the same way, images may be either real or virtual. If the image be behind the second surface, it is *real*, and can be intercepted on a screen. If, however, it be in front of the lens, it is visible to an eye placed behind the lens, although the rays do not actually intersect, but only appear to do so, but the image cannot be intercepted on a screen behind the lens. Such an image is said to be *virtual*. These relations are shown in fig. 11.

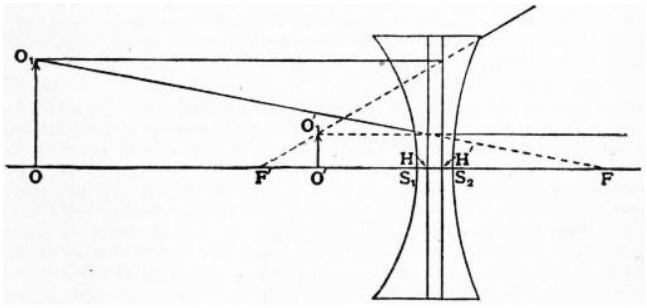


Fig. 12.

By referring to the equations given above, it is seen that a thin convergent lens produces both real and virtual images of real objects, but only a real image of a virtual object, whilst a divergent lens produces a virtual image of a real object and both real and virtual images of a virtual object. The construction of a real image of a real object by a convergent lens is shown in fig. 3; and that of a virtual image of a real object by a divergent lens in fig. 12.

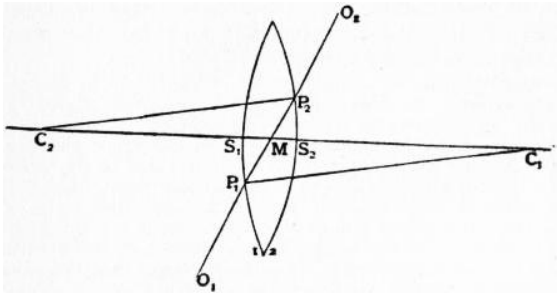


Fig. 13.

The optical centre of a lens is a point such that, for any ray which passes through it, the incident and emergent rays are parallel. The idea of the optical centre was originally due to J. Harris (*Treatise on Optics*, 1775); it is not properly a cardinal point, although it has several interesting properties. In fig. 13, let C_1P_1 and C_2P_2 be two parallel radii of a biconvex lens. Join P_1P_2 and let O_1P_1 and O_2P_2 be incident and emergent rays which have P_1P_2 for the path through the lens. Then if M be the intersection of P_1P_2 with the axis, we have angle C_1P_1M = angle C_2P_2M; these two angles are—for a ray travelling in the direction $O_1P_1P_2O_2$—the angles of emergence and of incidence respectively. From the similar triangles C_2P_2M and C_1P_1M we have

$$C_1M : C_2M = C_1P_1 : C_2P_2 = r_1 : r_2. \tag{11}$$

Such rays as P_1P_2 therefore divide the distance C_1C_2 in the ratio of the radii, *i.e.* at the fixed point M, the optical centre. Calling $S_1M = s_1$, $S_2M = s_2$, then $C_1S_1 = C_1M + MS_1 = C_1M - S_1M$, *i.e.* since $C_1S_1 = r_1$, $C_1M = r_1 + s_1$, and similarly $C_2M = r_2 + s_2$. Also $S_1S_2 = S_1M + MS_2 = S_1M - S_2M$, *i.e.* $d = s_1 - s_2$. Then by using equation (11) we have $s_1 = r_1d/(r - r_2)$ and $s_2 = r_2d/(r_1 - r_2)$, and hence $s_1/s_2 = r_1/r_2$. The vertex distances of the optical centre are therefore in the ratio of the radii.

The values of s_1 and s_2 show that the optical centre of a biconvex or biconcave lens is in the interior of the lens, that in a plano-convex or plano-concave lens it is at the vertex of the curved surface, and in a concavo-convex lens outside the lens.

The Wave-theory Derivation of the Focal Length.—The formulae above have been derived by means of geometrical rays. We here give an account of Lord Rayleigh’s wave-theory derivation of the focal length of a convex lens in terms of the aperture, thickness and refractive index (*Phil. Mag.* 1879 (5) 8, p. 480; 1885, 20, p. 354); the argument is based on the principle that the optical distance from object to image is constant.

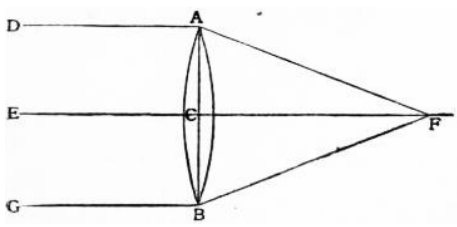


Fig. 14.

“Taking the case of a convex lens of glass, let us suppose that parallel rays DA, EC, GB (fig. 14) fall upon the lens ACB, and are collected by it to a focus at F. The points D, E, G, equally distant from ACB, lie upon a front of the wave before it impinges upon the lens. The focus is a point at which the different parts of the wave arrive at the same time, and that such a point can exist depends upon the fact that the propagation is slower in glass than in air. The ray ECF is retarded from having to pass through the thickness (*d*) of glass by the amount (n − 1)d. The

ray DAF, which traverses only the extreme edge of the lens, is retarded merely on account of the crookedness of its path, and the amount of the retardation is measured by AF − CF. If F is a focus these retardations must be equal, or AF − CF = (n − 1)d. Now if y be the semi-aperture AC of the lens, and f be the focal length CF, AF − CF = $\sqrt{(f^2 + y^2)} - f = \frac{1}{2}y^2/f$ approximately, whence

$$f = \tfrac{1}{2}y^2 / (n - 1)d. \qquad (12)$$

In the case of plate-glass (n − 1) = ½ (nearly), and then the rule (12) may be thus stated: *the semi-aperture is a mean proportional between the focal length and the thickness*. The form (12) is in general the more significant, as well as the more practically useful, but we may, of course, express the thickness in terms of the curvatures and semi-aperture by means of $d = \frac{1}{2}y^2 (r_1^{-1} - r_2^{-1})$. In the preceding statement it has been supposed for simplicity that the lens comes to a sharp edge. If this be not the case we must take as the thickness of the lens the difference of the thicknesses at the centre and at the circumference. In this form the statement is applicable to concave lenses, and we see that the focal length is positive when the lens is thickest at the centre, but negative when the lens is thickest at the edge."

Regulation of the Rays.

The geometrical theory of optical instruments can be conveniently divided into four parts: (1) The relations of the positions and sizes of objects and their images (see above); (2) the different aberrations from an ideal image (see Aberration); (3) the intensity of radiation in the object- and image-spaces, in other words, the alteration of brightness caused by physical or geometrical influences; and (4) the regulation of the rays (*Strahlenbegrenzung*).

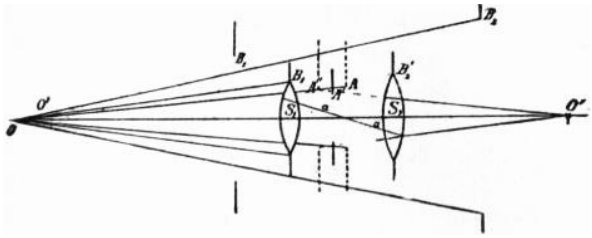


Fig. 15.

The regulation of rays will here be treated only in systems free from aberration. E. Abbe first gave a connected theory; and M. von Rohr has done a great deal towards the elaboration. The Gauss cardinal points make it simple to construct the image of a given object. No account is taken of the size of the system, or whether the rays used for the construction really assist in the reproduction of the image or not. The diverging cones of rays coming from the object-points can only take a certain small part in the production of the image in consequence of the apertures of the lenses, or of diaphragms. It often happens that the rays used for the construction of the image do not pass through the system; the image being formed by quite different rays. If we take a luminous point of the object lying on the axis of the system then an eye introduced at the image-point sees in the instrument several concentric rings, which are either the fittings of the lenses or their images, or the real diaphragms or their images. The innermost and smallest ring is completely lighted, and forms the origin of the cone of rays entering the image-space. Abbe called it the *exit pupil*. Similarly there is a corresponding smallest ring in the object-space which limits the entering cone of rays. This is called the *entrance pupil*. The real diaphragm acting as a limit at any part of the system is called the *aperture-diaphragm*. These diaphragms remain for all practical purposes the same for all points lying on the axis. It sometimes happens that one and the same diaphragm fulfils the functions of the entrance pupil and the aperture-diaphragm or the exit pupil and the aperture-diaphragm.

Fig. 15 shows the general but simplified case of the different diaphragms which are of importance for the regulation of the rays. S_1, S_2 are two centred systems. A′ is a real diaphragm lying between them. B_1 and B'_2 are the fittings of the systems. Then S_1 produces the virtual image A of the diaphragm A′ and the image B_2 of the fitting B'_2, whilst the system S_2 makes the virtual image A″ of the diaphragm A′ and the virtual image B'_1 of the fitting B_1. The object-point O is reproduced really through the whole system in the point O′. From the object-point O three diaphragms can be seen in the object-space, viz. the fitting B_1, the image of the fitting B_2 and the image A of the diaphragm A′ formed by the system S_1. The cone of rays nearest to B_2 is not received to its total extent by the fitting B_1, and the cone which has entered through B_1 is again diminished in its further course, when passing through the diaphragm A′, so that the cone of rays really used for producing the image is limited by A, the diaphragm which seen from O appears to be the smallest. A is therefore the entrance pupil. The real diaphragm A′ which limits the rays in the centre of the system is the aperture diaphragm. Similarly three diaphragms lying in the image-space are to be seen from the image-point O′—namely B′, A″, and B'_2. A″ limits the rays in the image-space, and is therefore the exit pupil. As A is conjugate to the diaphragm A′ in the system S_1, and A″ to the same diaphragm A′ in the system S_2, the entrance pupil A is conjugate to the exit pupil A″ throughout the instrument. This relation between entrance and exit pupils is general.

The apices of the cones of rays producing the image of points near the axis thus lie in the object-points, and their common base is the entrance pupil. The axis of such a cone, which connects the object point with the centre of the entrance pupil, is called the *principal ray*. Similarly, the principal rays in the image-space join the centre of the exit pupil with the image-points. The centres of the entrance and exit pupils are thus the intersections of the principal rays.

For points lying farther from the axis, the entrance pupil no longer alone limits the rays, the other diaphragms taking part. In fig. 16 only one diaphragm L is present besides the entrance pupil A, and the object-space is divided to a certain extent into four parts. The section M contains all points rendered by a system with a complete aperture; N contains all points rendered by a system with a gradually diminishing aperture; but this diminution does not attain the principal ray passing through the centre C. In the section O are

those points rendered by a system with an aperture which gradually decreases to zero. No rays pass from the points of the section P through the system and no image can arise from them. The second diaphragm L therefore limits the three-dimensional object-space containing the points which can be rendered by the optical system. From C through this diaphragm L this three-dimensional object-space can be seen as through a window. L is called by M von Rohr the *entrance luke*. If several diaphragms can be seen from C, then the entrance *luke* is the diaphragm which seen from C appears the smallest. In the sections N and O the entrance *luke* also takes part in limiting the cones of rays. This restriction is known as the "vignetting" action of the entrance *luke*. The base of the cone of rays for the points of this section of the object-space is no longer a circle but a two-cornered curve which arises from the object-point by the projection of the entrance *luke* on the entrance pupil. Fig. 17*a* shows the base of such a cone of rays. It often happens that besides the entrance *luke*, another diaphragm acts in a vignetting manner, then the operating aperture of the cone of rays is a curve made up of circular arcs formed out of the entrance pupil and the two projections of the two acting diaphragms (fig. 17*b*).

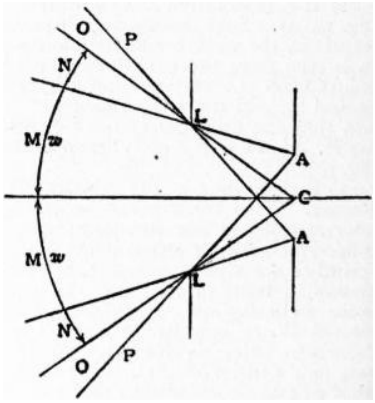


Fig. 16.

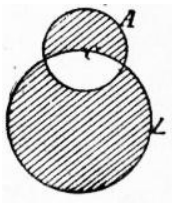


Fig. 17*a*.

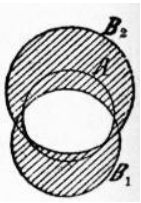


Fig. 17*b*.

If the entrance pupil is narrow, then the section NO, in which the vignetting is increasing, is diminished, and there is really only one division of the section M which can be reproduced, and of the section P which cannot be reproduced. The angle w + w = 2w, comprising the section which can be reproduced, is called the angle of the field of view on the object-side. The field of view 2w retains its importance if the entrance pupil is increased. It then comprises all points reached by principal rays. The same relations apply to the image-space, in which there is an exit *luke*, which, seen from the middle of the exit pupil, appears under the smallest angle. It is the image of the entrance *luke* produced by the whole system. The image-side field of view 2w′ is the angle comprised by the principal rays reaching the edge of the exit *luke*.

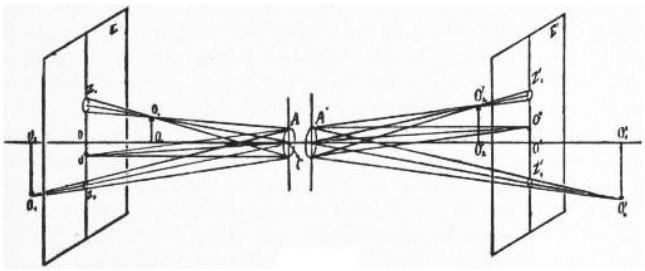


Fig. 18.

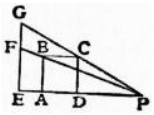
Most optical instruments are used to observe object-reliefs (three-dimensional objects), and generally an image-relief (a three-dimensional image) is conjugate to this object-relief. It is sometimes required, however, to represent by means of an optical instrument the object-relief on a plane or on a ground-glass as in the photographic camera. For simplicity we shall assume the intercepting plane as perpendicular to the axis and shall call it, after von Rohr, the "ground glass plane." All points of the image not lying in this plane produce circular spots (corresponding to the form of the pupils) on it, which are called "circles of confusion." The ground-glass plane (fig. 18) is conjugate to the object-plane E in the object-space, perpendicular to the axis, and called the "plane focused for." All points lying in this plane are reproduced exactly on the ground-glass plane as the points OO. The circle of confusion Z on the plane focused for corresponds to the circle of confusion Z′ on the ground-glass plane. The figure formed on the plane focused for by the cones of rays from all of the object-points of the total object-space directed to the entrance pupil, was called "object-side representation" (*imago*) by M von Rohr. This representation is a central projection. If, for instance, the entrance pupil is imagined so small that only the principal rays pass through, then they project directly, and the intersections of the principal rays represent the projections of the points of the object lying off the plane focused for. The centre of the projection or the perspective centre is the middle point of the entrance pupil C. If the entrance pupil is opened, in place of points, circles of confusion appear, whose size depends upon the size of the entrance pupil and the position of the object-points and the plane focused for. The intersection of the principal ray is the centre of the circle of confusion. The clearness of the representation on the plane focused for is of course diminished by the circles of confusion. This central projection does not at all depend upon the instrument, but is entirely geometrical, arising when the position and the size of the entrance pupil, and the position of the plane focused for have been fixed. The instrument then produces an image on the ground-glass plane of this perspective representation on the plane focused for, and on account of the exact likeness which this image has to the object-side representation it is called the "representation copy." By moving it round an angle of 180°, this representation can be brought into a perspective position to the objects, so that all rays coming from the middle of the entrance pupil and aiming at the object-points, would always meet the corresponding image-points. This representation is accessible to the observer in different ways in different instruments. If the observer desires a perfectly correct perspective impression of the object-relief the distance of the pivot of the eye from the representation copy must be equal to the *n*th part of the distance of the plane focused for from the entrance pupil, if the instrument has produced a nth diminution of the object-side representation. The pivot of the eye must coincide with the centre of the perspective, because all images are observed in direct vision. It is known that the pivot of the eye is the point of intersection of all the directions in which one can look. Thus all these points represented by circles of confusion which are less than the angular sharpness of vision appear clear to the eye; the space containing all these object-points, which appear clear to the eye, is called the *depth*. The depth of definition, therefore, is not a special property of the instrument, but depends on the size of the entrance pupil, the position of the plane focused for and on the conditions under which the representation can be observed.

If the distance of the representation from the pivot of the eye be altered from the correct distance already mentioned, the angles of vision under which various objects appear are changed; perspective errors arise, causing

an incorrect idea to be given of the depth. A simple case is shown in fig. 19. A cube is the object, and if it is observed as in fig. 19*a* with the representation copy at the correct distance, a correct idea of a cube will be obtained. If, as in figs. 19*b* and 19*c*, the distance is too great, there can be two results. If it is known that the farthest section is just as high as the nearer one then the cube appears exceptionally deepened, like a long parallelepipedon. But if it is known to be as deep as it is high then the eye will see it low at the back and high at the front. The reverse occurs when the distance of observation is too short, the body then appears either too flat, or the nearer sections seem too low in relation to those farther off. These perspective errors can be seen in any telescope. In the telescope ocular the representation copy has to be observed under too large an angle or at too short a distance: all objects therefore appear flattened, or the more distant objects appear too large in comparison with those nearer at hand.

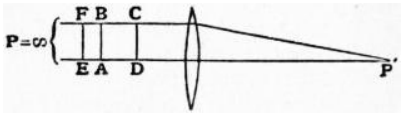
After von Rohr.

Fig. 19.



After von Rohr.

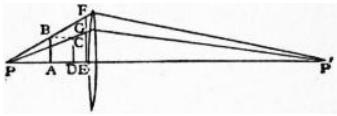
Fig. 20.



After von Rohr.

Fig. 21.

From the above the importance of experience will be inferred. But it is not only necessary that the objects themselves be known to the observer but also that they are presented to his eye in the customary manner. This depends upon the way in which the principal rays pass through the system—in other words, upon the special kind of "transmission" of the principal rays. In ordinary vision the pivot of the eye is the centre of the perspective representation which arises on the very distant plane standing perpendicular to the mean direction of sight. In this kind of central projection all objects lying in front of the plane focused for are diminished when projected on this plane, and those lying behind it are magnified. (The distances are always given in the direction of light.) Thus the objects near to the eye appear large and those farther from it appear small. This perspective has been called by M von Rohr[1] "entocentric transmission" (fig. 20). If the entrance pupil of the instrument lies at infinity, then all the principal rays are parallel and the projections of all objects on the plane focused for are exactly as large as the objects themselves. After E. Abbe, this course of rays is called "telecentric transmission" (fig. 21). The exit pupil then lies in the image-side focus of the system. If the perspective centre lies in front of the plane focused for, then the objects lying in front of this plane are magnified and those behind it are diminished. This is just the reverse of perspective representation in ordinary sight, so that the relations of size and the arrangements for space must be quite incorrectly indicated (fig. 22); this representation is called by M von Rohr a "hypercentric transmission."



After von Rohr.

Fig. 22.

(O. Hr.)

1 M von Rohr, *Zeitschr. für Sinnesphysiologie* (1907), xli. 408-429.

LENT (O. Eng. *lencten*, "spring," M. Eng. *lenten*, *lente*, *lent*; cf. Dut. *lente*, Ger. *Lenz*, "spring," O. H. Ger. *lenzin*, *lengizin*, *lenzo*, probably from the same root as "long" and referring to "the lengthening days"), in the Christian Church, the period of fasting preparatory to the festival of Easter. As this fast falls in the early part of the year, it became confused with the season, and gradually the word Lent, which originally meant spring, was confined to this use. The Latin name for the fast, *Quadragesima* (whence Ital. *quaresima*, Span. *cuaresma* and Fr. *carême*), and its Gr. equivalent τεσσαρακοστή (now superseded by the term ἡ νηστεία "the fast"), are derived from the Sunday which was the fortieth day before Easter, as *Quinquagesima* and *Sexagesima* are the fiftieth and sixtieth, Quadragesima being until the 7th century the *caput jejunii* or first day of the fast.

The length of this fast and the rigour with which it has been observed have varied greatly at different times and in different countries (see Fasting). In the time of Irenaeus the fast before Easter was very short, but very severe; thus some ate nothing for forty hours between the afternoon of Good Friday and the morning of Easter. This was the only authoritatively prescribed fast known to Tertullian (*De jejunio*, 2, 13, 14; *De oratione*, 18). In Alexandria about the middle of the 3rd century it was already customary to fast during Holy Week; and earlier still the 428
Montanists boasted that they observed a two weeks' fast instead of one. Of the Lenten fast or Quadragesima, the first mention is in the fifth canon of the council of Nicaea (325), and from this time it is frequently referred to, but chiefly as a season of preparation for baptism, of absolution of penitents or of retreat and recollection. In this season fasting played a part, but it was not universally nor rigorously enforced. At Rome, for instance, the whole period of fasting was but three weeks, according to the historian Socrates (*Hist. eccl.* v. 22), these three weeks, in Mgr. Duchesne's opinion, being not continuous but, following the primitive Roman custom, broken by intervals. Gradually, however, the fast as observed in East and West became more rigorously defined. In the East, where after the example of the Church of Antioch the Quadragesima fast had been kept distinct from that of Holy Week, the whole fast came to last for seven weeks, both Saturdays and Sundays (except Holy Saturday) being, however, excluded. In Rome and Alexandria, and even in Jerusalem, Holy Week was included in Lent and the whole fast lasted but six weeks, Saturdays, however, not being exempt. Both at Rome and Constantinople, therefore, the actual fast was but thirty-six days. Some Churches still continued the three weeks' fast, but by the middle of the

5th century most of these divergences had ceased and the usages of Antioch-Constantinople and Rome-Alexandria had become stereotyped in their respective spheres of influence.

The thirty-six days, as forming a tenth part of the year and therefore a perfect number, at first found a wide acceptance (so Cassianus, *Coll.* xxi. 30); but the inconsistency of this period with the name Quadragesima, and with the forty days' fast of Christ, came to be noted, and early in the 7th century four days were added, by what pope is unknown, Lent in the West beginning henceforth on Ash Wednesday (*q.v.*). About the same time the cycle of paschal solemnities was extended to the ninth week before Easter by the institution of stational masses for Septuagesima, Sexagesima and Quinquagesima Sundays. At Constantinople, too, three Sundays were added and associated with the Easter festival in the same way as the Sundays in Lent proper. These three Sundays were added in the Greek Church also, and the present custom of keeping an eight weeks' fast (*i.e.* exactly 8×5 days), now universal in the Eastern Church, originated in the 7th century. The Greek Lent begins on the Monday of Sexagesima, with a week of preparatory fasting, known as τυροφάγια, or the "butter-week"; the actual fast, however, starts on the Monday of Quinquagesima (Estomihi), this week being known as "the first week of the fast" (ἑβδομὰς τῶν νηστειῶν). The period of Lent is still described as "the six weeks of the fast" (ἓξ ἑβδομάδες τῶν νηστειῶν), Holy Week (ἡ ἁγία καὶ μεγάλη ἑβδομάς) not being reckoned in. The Lenten fast was retained at the Reformation in some of the reformed Churches, and is still observed in the Anglican and Lutheran communions. In England a Lenten fast was first ordered to be observed by Earconberht, king of Kent (640-664). In the middle ages, meat, eggs and milk were forbidden in Lent not only by ecclesiastical but by statute law; and this rule was enforced until the reign of william III. The chief Lenten food from the earliest days was fish, and entries in the royal household accounts of Edward III. show the amount of fish supplied to the king. Herring-pies were a great delicacy. Charters granted to seaports often stipulated that the town should send so many herrings or other fish to the king annually during Lent. How severely strict medieval abstinence was may be gauged from the fact that armies and garrisons were sometimes, in default of dispensations, as in the case of the siege of Orleans in 1429, reduced to starvation for want of Lenten food, though in full possession of meat and other supplies. The battle of the Herrings (February 1429) was fought in order to cover the march of a convoy of Lenten food to the English army besieging Orleans. Dispensations from fasting were, however, given in case of illness.

During the religious confusion of the Reformation, the practice of fasting was generally relaxed and it was found necessary to reassert the obligation of keeping Lent and the other periods and days of abstinence by a series of proclamations and statutes. In these, however, the religious was avowedly subordinate to a political motive, viz. to prevent the ruin of the fisheries, which were the great nursery of English seamen. Thus the statute of 2 and 3 Edward VI., cap. 9 (1549), while inculcating that "due and godly abstinence from flesh is a means to virtue," adds that "by the eating of fish much flesh is saved to the country," and that thereby, too, the fishing trade is encouraged. The statute, however, would not seem to have had much effect; for in spite of a proclamation of Queen Elizabeth in 1560 imposing a fine of £20 for each offence on butchers slaughtering animals during Lent, in 1563 Sir William Cecil, in *Notes upon an Act for the Increase of the Navy*, says that "in old times no flesh at all was eaten on fish days; even the king himself could not have license; which was occasion of eating so much fish as now is eaten in flesh upon fish days." The revolt against fish had ruined the fisheries and driven the fishermen to turn pirates, to the great scandal and detriment of the realm. Accordingly, in the session of 1562-1563, Cecil forced upon an unwilling parliament "a politic ordinance on fish eating," by which the eating of flesh on fast days was made punishable by a fine of three pounds or three months' imprisonment, one meat dish being allowed on Wednesdays on condition that three fish dishes were present on the table. The kind of argument by which Cecil overcame the Protestant temper of the parliament is illustrated by a clause which he had meditated adding to the statute, a draft of which in his own handwriting is preserved: "Because no person should misjudge the intent of the statute," it runs, "which is politicly meant only for the increase of fishermen and mariners, and not for any superstition for choice of meats; whoever shall preach or teach that eating of fish or forbearing of flesh is for the saving of the soul of man, or for the service of God, shall be punished as the spreader of false news" (Dom. MSS., Elizabeth, vol. xxvii.). But in spite of statutes and proclamations, of occasional severities and of the patriotic example of Queen Elizabeth, the practice of fasting fell more and more into disuse. Ostentatious avoidance of a fish-diet became, indeed, one of the outward symbols of militant Protestantism among the Puritans. "I have often noted," writes John Taylor, the water-poet, in his *Jack a Lent* (1620), "that if any superfluous feasting or gormandizing, paunch-cramming assembly do meet, it is so ordered that it must be either in Lent, upon a Friday, or a fasting: for the meat does not relish well except it be sauced with disobedience and comtempt of authority." The government continued to struggle against this spirit of defiance; proclamations of James I. in 1619 and 1625, and of Charles I. in 1627 and 1631, again commanded abstinence from all flesh during Lent, and the High Church movement of the 17th century lent a fresh religious sanction to the official attitude. So late as 1687, James II. issued a proclamation ordering abstention from meat; but, after the Revolution, the Lenten laws fell obsolete, though they remained on the statute-book till repealed by the Statute Law Revision Act 1863. But during the 18th century, though the strict observance of the Lenten fast was generally abandoned, it was still observed and inculcated by the more earnest of the clergy, such as William Law and John Wesley; and the custom of women wearing mourning in Lent, which had been followed by Queen Elizabeth and her court, survived until well into the 19th century. With the growth of the Oxford Movement in the English Church, the practice of observing Lent was revived; and, though no rules for fasting are authoritatively laid down, the duty of abstinence is now very generally inculcated by bishops and clergy, either as a discipline or as an exercise in self-denial. For the more "advanced" Churches, Lenten practice tends to conform to that of the pre-Reformation Church.

Mid-Lent, or the fourth Sunday in Lent, was long known as *Mothering Sunday*, in allusion to the custom for girls in service to be allowed a holiday on that day to visit their parents. They usually took as a present for their mother a small cake known as a *simnel*. In shape it resembled a pork-pie but in materials it was a rich plum-pudding. The word is derived through M. Lat. *simenellus*, *simella*, from Lat. *simila*, wheat flour. In Gloucestershire simnel cakes are still common; and at Usk, Monmouth, the custom of mothering is still scrupulously observed.

LENTHALL, WILLIAM (1591-1662), English parliamentarian, speaker of the House of Commons,

second son of William Lenthall, of Lachford, Oxfordshire, a descendent of an old Herefordshire family, was born at Henley-on-Thames in June 1591. He left Oxford without taking a degree in 1609, and was called to the bar at Lincoln's Inn in 1616, becoming a bencher in 1633. He represented Woodstock in the Short Parliament (April 1640), and was chosen by King Charles I. to be speaker of the Long Parliament, which met on the 3rd of November 1640. According to Clarendon, a worse choice could not have been made, for Lenthall was of a "very timorous nature." He was treated with scanty respect in the chair, and seems to have had little control over the proceedings. On the 4th of January 1642, however, when the king entered the House of Commons to seize the five members, Lenthall behaved with great prudence and dignity. Having taken the speaker's chair and looked round in vain to discover the offending members, Charles turned to Lenthall standing below, and demanded of him "whether any of those persons were in the House, whether he saw any of them and where they were." Lenthall fell on his knees and replied: "May it please your Majesty, I have neither eyes to see nor tongue to speak in this place but as the House is pleased to direct me, whose servant I am here." On the outbreak of the great rebellion, Lenthall threw in his lot with the parliament. He had already called attention to the inadequacy of his salary and been granted a sum of £6000 (9th of April 1642); and he was now appointed master of the rolls (22nd of November 1643), and one of the commissioners of the great seal (Oct. 1646-March 1648).

He carried on his duties as speaker without interruption till 1647, when the power of the parliament had been transferred to the army. On the 26th of July a mob invaded the House of Commons and obliged it to rescind the ordinance re-establishing the old parliamentary committee of militia; Lenthall was held in the chair by main force and compelled to put to the vote a resolution inviting the king to London. Threats of worse things came subsequently to Lenthall's ears, and, taking the mace with him, he left London on the 29th to join the army and Fairfax. Lenthall and Manchester, the speaker of the Lords, headed the fugitive members at the review on Hounslow Heath on the 3rd of August, being received by the soldiers "as so many angels sent from heaven for their good." Returning to London with the army, he was installed again by Fairfax in the chair (6th August), and all votes passed during his absence were annulled. He adhered henceforth to the army party, but with a constant bias in favour of the king.

At the Restoration he claimed to have sent money to the king at Oxford, to have provided the queen with comforts and necessaries and to have taken care of the royal children. But he put the question for the king's trial from the chair, and continued to act as speaker after the king's execution. He still continued to use his influence in favour of the royalists, whenever this was possible without imperilling his own interests, and he saved the lives of both the earl of Norwich (8th March 1649) and Sir W. D'Avenant (3rd July 1650) by his casting vote. The removal of the king had left the parliament supreme; and Lenthall as its representative, though holding little real power, was the first man in the state.

His speakership continued till the 20th of April 1653, when the Long Parliament was summarily expelled. Cromwell directed Colonel Harrison, on the refusal of Lenthall to quit the chair, to pull him out—and Lenthall submitted to the show of force. He took no part in politics till the assembling of the first protectorate parliament, on the 3rd of September 1654, in which he sat as member for Oxfordshire. He was again chosen speaker, his former experience and his pliability of character being his chief recommendations. In the second protectorate parliament, summoned by Cromwell on the 17th of September 1656, Lenthall was again chosen member for Oxfordshire, but had some difficulty in obtaining admission, and was not re-elected speaker. He supported Cromwell's administration, and was active in urging the protector to take the title of king. In spite of his services, Lenthall was not included by Cromwell in his new House of Lords, and was much disappointed and crestfallen at his omission. The protector, hearing of his "grievous complaint," sent him a writ, and Lenthall was elated at believing he had secured a peerage. After Cromwell's death, the officers, having determined to recall the "Rump" Parliament, assembled at Lenthall's house at the Rolls (6th May 1659), to desire him to send out the writs. Lenthall, however, had no wish to resume his duties as speaker, preferring the House of Lords, and made various excuses for not complying. Nevertheless, upon the officers threatening to summon the parliament without his aid, and hearing the next morning that several members had assembled, he led the procession to the parliament house. Lenthall was now restored to the position of dignity which he had filled before. He was temporarily made keeper of the new great seal (14th of May). On the 6th of June it was voted that all commissions should be signed by Lenthall and not by the commander-in-chief. His exalted position, however, was not left long unassailed. On the 13th of October Lambert placed soldiers round the House and prevented the members from assembling. Lenthall's coach was stopped as he was entering Palace Yard, the mace was seized and he was obliged to return. The army, however, soon returned to their allegiance to the parliament. On the 24th of December they marched to Lenthall's house, and expressed their sorrow. On the 29th the speaker received the thanks of the reassembled parliament.

Lenthall now turned his attention to bring about the Restoration. He "very violently" opposed the oath abjuring the house of Stuart, now sought to be imposed by the republican faction on the parliament, and absented himself from the House for ten days, to avoid, it was said, any responsibility for the bill. He had been in communication with Monk for some time, and on Monk entering London with his army (3rd February 1660) Lenthall met him in front of Somerset House. On the 6th of February Monk visited the House of Commons, when Lenthall pronounced a speech of thanks. On the 28th of March Lenthall forwarded to the king a paper containing "Heads of Advice." According to Monk, he "was very active for the restoring of His Majesty and performed many services ... which could not have been soe well effected without his helpe." Lenthall notwithstanding found himself in disgrace at the Restoration. In spite of Monk's recommendation, he was not elected by Oxford University for the Convention Parliament, nor was he allowed by the king, though he had sent him a present of £3000, to remain master of the rolls. On the 11th of June he was included by the House of Commons, in spite of a recommendatory letter from Monk, among the twenty persons excepted from the act of indemnity and subject to penalties not extending to life. In the House of Lords, however, Monk's testimony and intercession were effectual, and Lenthall was only declared incapable of holding for the future any public office. His last public act was a disgraceful one. Unmindful now of the privileges of parliament, he consented to appear as a witness against the regicide Thomas Scot, for words spoken in the House of Commons while Lenthall was in the chair. It was probably after this that he was allowed to present himself at court, and his contemporaries took a malicious glee in telling how "when, with some difficulty, he obtained leave to kiss the king's hand he, out of guilt, fell backward, as he was kneeling."

Lenthall died on the 3rd of September 1662. In his will he desired to be buried without any state and without a monument, "but at the utmost a plain stone with this superscription only, *Vermis sum*, acknowledging myself to be unworthy of the least outward regard in this world and unworthy of any remembrance that hath been so great a sinner." He was held in little honour by his contemporaries, and was universally regarded as a time-server. He

was, however, a man of good intentions, strong family affections and considerable ability. Unfortunately he was called by the irony of fate to fill a great office, in which governed constantly by fears for his person and estate, he was seduced into a series of unworthy actions. He left one son, Sir John Lenthall, who had descendants. His brother, Sir John Lenthall, who, it was said, had too much influence with him, was notorious for his extortions as keeper of the King's Bench prison.

See C. H. Firth in the *Dict. Nat. Biog.*; Wood (ed. Bliss), *Ath. Oxon.* iii. 603, who gives a list of his printed speeches and letters; Foss, *Lives of the Judges*, vi. 447; and J. A. Manning, *Lives of the Speakers of the House of Commons*. There are numerous references to Lenthall in his official capacity, and letters written by and to him, in the Calendar of State Papers, Domestic Series, and in various MSS. calendared in the Hist. MSS. Commission Series. See also D'Ewes's *Diary*, in the Harleian Collection, British Museum, some extracts from which have been given by J. Forster, *Case of the Five Members*, 233 sq.; and *Notes and Queries*, ser. iii., vii. 45 ("Lenthall's Lamentation"), viii., i. 165, 338, 2, ix., xi. 57.

LENTIL, the seed of *Lens esculenta* (also known as *Ervum Lens*), a small annual of the vetch tribe. The plant varies from 6 to 18 in. in height, and has many long ascending branches. The leaves are alternate, with six pairs of oblong-linear, obtuse, mucronate leaflets. The flowers, two to four in number, are of a pale blue colour, and are borne in the axils of the leaves, on a slender footstalk nearly equalling the leaves in length; they are produced in June or early in July. The pods are about ½ in. long, broadly oblong, slightly inflated, and contain two seeds, which are of the shape of a doubly convex lens, and about $\frac{1}{6}$ in. in diameter. There are several cultivated varieties of the plant, differing in size, hairiness and colour of the leaves, flowers and seeds. The last may be more or less compressed in shape, and in colour may vary from yellow or grey to dark brown; they are also sometimes mottled or speckled. In English commerce two kinds of lentils are principally met with, French and Egyptian. The former are usually sold entire, and are of an ash-grey colour externally and of a yellow tint within; the latter are usually sold like split peas, without the seed coat, and consist of the reddish-yellow cotyledons, which are smaller and rounder than those of the French lentil; the seed coat when present is of a dark brown colour. Considerable quantities of lentils are also imported into the United States.

The native country of the lentil is not known. It was probably one of the first plants brought under cultivation by mankind; lentils have been found in the lake dwellings of St Peter's Island, Lake of Bienne, which are of the Bronze age. The name 'adas (Heb. עדש) appears to be an original Semitic word, and the red pottage of lentils for which Esau sold his birthright (Gen. xxv. 34) was apparently made from the red Egyptian lentil. This lentil is cultivated in one or other variety in India, Persia, Syria, Egypt, Nubia and North Africa, and in Europe, along the coast of the Mediterranean, and as far north as Germany, Holland and France. In Egypt, Syria and other Eastern countries the parched seeds are exposed for sale in shops, and esteemed the best food to carry on long journeys. Lentils form a chief ingredient in the Spanish puchero, and are used in a similar way in France and other countries. For this purpose they are usually sold in the shelled state.

The reddish variety of the lentil (*lentillon d'hiver*) is the kind most esteemed in Paris on account of the superior flavour of its smaller seeds. It is sown in autumn either with a cereal crop or alone, and is cultivated chiefly in the north and east of France. The large or common variety, *lentille large blonde*, cultivated in Lorraine and at Gallardon (Eure-et-Loir), and largely in Germany, is the most productive, but is less esteemed. This kind has very small whitish flowers, two or rarely three on a footstalk, and the pods are generally one-seeded, the seeds being of a whitish or cream colour, about $\frac{3}{8}$ of an inch broad and $\frac{1}{8}$ in. thick. A single plant produces from 100 to 150 pods, which are flattened, about ¾ in. long and ½ in. broad. Another variety, with seeds similar in form and colour to the last, but of much smaller size, is known as the *lentillon de Mars*. It is sown in spring. This variety and the *lentille large* are both sometimes called the *lentille à la reine*. A small variety, *lentille verte du Puy*, cultivated chiefly in the departments of Haute Loire and Cantal, is also grown as a vegetable and for forage. The Egyptian lentil was introduced into Britain in 1820. It has blue flowers. Another species of lentil, *Ervum monanthos*, is grown in France about Orleans and elsewhere under the name of *jarosse* and *jarande*. It is, according to Vilmorin, one of the best kinds of green food to grow on a poor dry sandy soil; on calcareous soil it does not succeed so well. It is usually sown in autumn with a little rye or winter oats, at the rate of a hectolitre to a hectare.

The lentil prefers a light warm sandy soil; on rich land it runs to leaf and produces but few pods. The seeds are sown in March or April or early in May, according to the climate of the country, as they cannot endure night frosts. If for fodder they are sown broadcast, but in drills if the ripe seeds are required. The pods are gathered in August or September, as soon as they begin to turn brown—the plants being pulled up like flax while the foliage is still green, and on a dry day lest the pods split in drying and loss of seed takes place. Lentils keep best in the husk so far as flavour is concerned, and will keep good in this way for two years either for sowing or for food. An acre of ground yields on an average about 11 cwt. of seed and 30 cwt. of straw. The amount and character of the mineral matter requisite in the soil may be judged from the analysis of the ash, which in the seeds has as its chief ingredients—potash 34.6%, soda 9.5, lime 6.3, phosphoric acid 36.2, chloride of sodium 7.6, while in the straw the percentages are—potash 10.8, lime 52.3, silica 17.6, phosphoric acid 12.3, chloride of sodium 2.1.

Lentils have attracted considerable notice among vegetarians as a food material, especially for soup. A Hindu proverb says, "Rice is good, but lentils are my life." The husk of the seed is indigestible, and to cook lentils properly requires at least two and a half hours, but they are richer in nutritious matter than almost any other kind of pulse, containing, according to Payen's analysis, 25.2% of nitrogenous matter (legumin), 56% of starch and 2.6% of fatty matter. Fresenius's analysis differs in giving only 35% of starch; Einhoff gives 32.81 of starch and 37.82% of nitrogenous matter. Lentils are more properly the food of the poor in all countries where they are grown, and have often been spurned when better food could be obtained, hence the proverb *Dives factus jam desiit gaudere lente*. The seeds are said to be good for pigeons, or mixed in a ground state with potatoes or barley for fattening pigs. The herbage is highly esteemed as green food for suckling ewes and all kinds of cattle (being said to increase the yield of milk), also for calves and lambs. Haller says that lentils are so flatulent as to kill horses. They were also believed to be the cause of severe scrofulous disorders common in Egypt. This bad reputation may possibly be due to the substitution of the seeds of the bitter vetch or tare lentil, *Ervum Ervilia*, a

plant which closely resembles the true lentil in height, habit, flower and pod, but whose seeds are without doubt possessed of deleterious properties—producing weakness or even paralysis of the extremities in horses which have partaken of them. The poisonous principle seems to reside chiefly in the bitter seed coat, and can apparently be removed by steeping in water, since Gerard, speaking of the "bitter vetch" (*E. Ervilia*), says "kine in Asia and in most other countries do eat thereof, being made sweet by steeping in water." The seed of *E. Ervilia* is about the same size and almost exactly of the same reddish-brown colour as that of the Egyptian lentil, and when the seed coat is removed they are both of the same orange red hue, but the former is not so bright as the latter. The shape is the best means of distinguishing the two seeds, that of E. *Ervilia* being obtusely triangular.

Sea-lentil is a name sometimes applied to the gulfweed *Sargassum vulgare*.

LENTULUS, the name of a Roman patrician family of the Cornelian gens, derived from *lentes* ("lentils"), which its oldest members were fond of cultivating (according to Pliny, *Nat. Hist.* xviii. 3, 10). The word *Lentulitas* ("Lentulism"; cf. *Appietas*) is coined by Cicero (*Ad Fam.* iii. 7, 5) to express the attributes of a pronounced aristocrat. The three first of the name were L. Cornelius Lentulus (consul 327 B.C.), Servius Cornelius Lentulus (consul 303) and L. Cornelius Lentulus Caudinus (consul 275). Their connexion with the later Lentuli (especially those of the Ciceronian period) is very obscure and difficult to establish. The following members of the family deserve mention.

Publius Cornelius Lentulus, nicknamed Sura, one of the chief figures in the Catilinarian conspiracy. When accused by Sulla (to whom he had been quaestor in 81 B.C.) of having squandered the public money, he refused to render any account, but insolently held out the calf of his leg (*sura*), on which part of the person boys were punished when they made mistakes in playing ball. He was praetor in 75, governor of Sicily 74, consul 71. In 70, being expelled from the senate with a number of others for immorality, he joined Catiline. Relying upon a Sibylline oracle that three Cornelii should be rulers of Rome, Lentulus regarded himself as the destined successor of Cornelius Sulla and Cornelius Cinna. When Catiline left Rome after Cicero's first speech *In Catilinam*, Lentulus took his place as chief of the conspirators in the city. In conjunction with C. Cornelius Cethegus, he undertook to murder Cicero and set fire to Rome, but the plot failed owing to his timidity and indiscretion. Ambassadors from the Allobroges being at the time in Rome, the bearers of a complaint against the oppressions of provincial governors, Lentulus made overtures to them, with the object of obtaining armed assistance. Pretending to fall in with his views, the ambassadors obtained a written agreement signed by the chief conspirators, and informed Q. Fabius Sanga, their "patron" in Rome, who in his turn acquainted Cicero. The conspirators were arrested and forced to admit their guilt. Lentulus was compelled to abdicate his praetorship, and, as it was feared that there might be an attempt to rescue him, he was put to death in the Tullianum on the 5th of December 63.

See Dio Cassius xxxvii. 30, xlvi. 20; Plutarch, *Cicero*, 17; Sallust, *Catilina*; Cicero, *In Catilinam*, iii., iv.; *Pro Sulla*, 25; also Catiline.

Publius Cornelius Lentulus, called Spinther from his likeness to an actor of that name, one of the chief adherents of the Pompeian party. In 63 B.C. he was curule aedile, assisted Cicero in the suppression of the Catilinarian conspiracy, and distinguished himself by the splendour of the games he provided. Praetor in 60, he obtained the governorship of Hispania Citerior (59) through the support of Caesar, to whom he was also indebted for his election to the consulship (57). Lentulus played a prominent part in the recall of Cicero from exile, and although a temporary coolness seems to have arisen between them, Cicero speaks of him in most grateful terms. From 56-53 Lentulus was governor of the province of Cilicia (with Cyprus) and during that time was commissioned by the senate to restore Ptolemy XI. Auletes to his kingdom (see Ptolemies). The Sibylline books, however, declared that the king must not be restored by force of arms, at the risk of peril to Rome. As a provincial governor, Lentulus appears to have looked after the interests of his subjects, and did not enrich himself at their expense. In spite of his indebtedness to Caesar, Lentulus joined the Pompeians on the outbreak of civil war (49). The generosity with which he was treated by Caesar after the capitulation of Corfinium made him hesitate, but he finally decided in favour of Pompey. After the battle of Pharsalus, Lentulus escaped to Rhodes, where he was at first refused admission, although he subsequently found an asylum there (Cicero, *Ad Att.* xi. 13. 1). According to Aurelius Victor (*De vir. ill.* lxxviii., 9, if the reading be correct), he subsequently fell into Caesar's hands and was put to death.

See Caesar, *Bell. Civ.* i. 15-23, iii. 102; Plutarch, *Pomp.* 49; Valerius Maximus ix. 14, 4; many letters of Cicero, especially *Ad Fam.* i. 1-9.

Lucius Cornelius Lentulus, surnamed Crus or Cruscello (for what reason is unknown), member of the anti-Caesarian party. In 61 B.C. he was the chief accuser of P. Clodius (*q.v.*) in the affair of the festival of Bona Dea. When consul (49) he advised the rejection of all peace terms offered by Caesar, and declared that, if the senate did not at once decide upon opposing him by force of arms, he would act upon his own responsibility. There seems no reason to doubt that Lentulus was mainly inspired by selfish motives, and hoped to find in civil war an opportunity for his own aggrandizement. But in spite of his brave words he fled in haste from Rome as soon as he heard of Caesar's advance, and crossed over to Greece. After Pharsalus, he made his way to Rhodes (but was refused admission), thence, by way of Cyprus, to Egypt. He landed at Pelusium the day after the murder of Pompey, was immediately seized by Ptolemy, imprisoned, and put to death.

See Caesar, *Bell. Civ.* i. 4, iii. 104; Plutarch, *Pompey*, 80.

A full account of the different Cornelii Lentuli, with genealogical table, will be found in Pauly-Wissowa's *Realencyclopädie*, iv. pt. 1, p. 1355 (1900) (s.v. "Cornelius"); see also V. de Vit, *Onomasticon*, ii. 433.

LENZ, JAKOB MICHAEL REINHOLD (1751-1792), German poet, was born at Sesswegen in Livonia, the son of the village pastor, on the 12th of January 1751. He removed with his parents to Dorpat in 1759, and soon began to compose sacred odes, in the manner of Klopstock. In 1768 he entered the university of Königsberg as a student of theology, and in 1771 accompanied, as tutor, two young German nobles, named von Kleist, to Strassburg, where they were to enter the French army. In Strassburg Lenz was received into the literary circle that gathered round Friedrich Rudolf Salzmann (1749-1821) and became acquainted with Goethe, at that time a student at the university. In order to be close to his young pupils, Lenz had to remove to Fort Louis in the neighbourhood, and while here became deeply enamoured of Goethe's friend, Friederike Elisabeth Brion (1752-1813), daughter of the pastor of Sesenheim. Lenz endeavoured, after Goethe's departure from Strassburg, to replace the great poet in her affections, and to her he poured out songs and poems (*Die Liebe auf dem Lande*) which were long attributed to Goethe himself, as was also Lenz's first drama, the comedy, *Der Hofmeister, oder Vorteile der Privaterziehung* (1774). In 1776 he visited Weimar and was most kindly received by the duke; but his rude, overbearing manner and vicious habits led to his expulsion. In 1777 he became insane, and in 1779 was removed from Emmendingen, where J. G. Schlosser (1739-1799), Goethe's brother-in-law, had given him a home, to his native village. Here he lived in great poverty for several years, and then was given, more out of charity than on account of his merits, the appointment of tutor in a pension school near Moscow, where he died on the 24th of May 1792. Lenz, though one of the most talented poets of the *Sturm und Drang* period, presented a strange medley of genius and childishness. His great, though neglected and distorted, abilities found vent in ill-conceived imitations of Shakespeare. His comedies, *Der Hofmeister*; *Der neue Menoza* (1774); *Die Soldaten* (1776); *Die Freunde machen den Philosophen* (1776), though accounted the best of his works, are characterized by unnatural situations and an incongruous mixture of tragedy and comedy.

Lenz's *Gesammelte Schriften* were published by L. Tieck in three volumes (1828); supplementary to these volumes are E. Dorer-Egloff, *J. M. R. Lenz und seine Schriften* (1857) and K. Weinhold, *Dramatischer Nachlass von J. M. R. Lenz* (1884); a selection of Lenz's writings will be found in A. Sauer, *Stürmer und Dränger*, ii.; Kürschner's *Deutsche Nationalliteratur*, vol. lxxx., (1883). See further E. Schmidt, *Lenz und Klinger* (1878); J. Froitzheim, *Lenz und Goethe* (1891); H. Rauch, *Lenz und Shakespeare* (1892); F. Waldmann, *Lenz in Briefen* (1894).

LEO, the name of thirteen popes.

LEO I., who alone of Roman pontiffs shares with Gregory I. the surname of THE GREAT, pope from 440 to 461, was a native of Rome, or, according to a less probable account, of Volterra in Tuscany. Of his family or early life nothing is known; that he was highly cultivated according to the standards of his time is obvious, but it does not appear that he could write Greek, or even that he understood that language. In one of the letters (*Ep.* 104) of Augustine, an acolyte named Leo is mentioned as having been in 418 the bearer of a communication from Sixtus of Rome (afterwards pope) to Aurelius of Carthage against the Pelagians. In 429, when the first unmistakable reference to Pope Leo occurs, he was still only a deacon, but already a man of commanding influence; it was at his suggestion that the *De incarnatione* of the aged Cassianus, having reference to the Nestorian heresy, was composed in that year, and about 431 we find Cyril of Alexandria writing to him that he might prevent the Roman Church from lending its support in any way to the ambitious schemes of Juvenal of Jerusalem. In 440, while Leo was in Gaul, whither he had been sent to compose some differences between Aetius and another general named Albinus, Pope Sixtus III. died. The absent deacon, or rather archdeacon, was unanimously chosen to succeed him, and received consecration on his return six weeks afterwards (September 29). In 443 he began to take measures against the Manichaeans (who since the capture of Carthage by Genseric in 439 had become very numerous at Rome), and in the following year he was able to report to the Italian bishops that some of the heretics had returned to Catholicism, while a large number had been sentenced to perpetual banishment "in accordance with the constitutions of the Christian emperors," and others had fled; in seeking these out the help of the provincial clergy was sought. It was during the earlier years of Leo's pontificate that the events in Gaul occurred which resulted in this triumph over Hilarius of Arles, signalized by the edict of Valentinian III. (445), denouncing the contumacy of the Gallic bishop, and enacting "that nothing should be done in Gaul, contrary to ancient usage, without the authority of the bishop of Rome, and that the decree of the apostolic see should henceforth be law." In 447 Leo held the correspondence with Turribus of Astorga which led to the condemnation of the Priscillianists by the Spanish national church. In 448 he received with commendation a letter from Eutyches, the Constantinopolitan monk, complaining of the revival of the Nestorian heresy there; and in the following year Eutyches wrote his circular, appealing against the sentence which at the instance of Eusebius of Dorylaeum had been passed against him at a synod held in Constantinople under the presidency of the patriarch Flavian, and asking papal support at the oecumenical council at that time under summons to meet at Ephesus. The result of a correspondence was that Leo by his legates sent to Flavian that famous epistle in which he sets forth with great fulness of detail the doctrine ever since recognized as orthodox regarding the union of the two natures in the one person of Jesus Christ. The events at the "robber" synod at Ephesus belong to general church history rather than to the biography of Leo; his letter, though submitted, was not read by the assembled fathers, and the papal legates had some difficulty in escaping with their lives from the violence of the theologians who, not content with deposing Flavian and Eusebius, shouted for the dividing of those who divided Christ. When the news of the result of this oecumenical council (oecumenical in every circumstance except that it was not presided over by the pope) reached Rome, Leo wrote to Theodosius "with groanings and tears," requesting the emperor to sanction another council, to be held this time, however, in Italy. In this petition he was supported by Valentinian III., by the empress-mother Galla Placidia and by the empress Eudoxia, but the appeal was made in vain. A change, however, was brought about by the accession in the following year of Marcian, who three days after coming to the throne published an edict bringing within the scope of the penal laws against heretics the supporters of the dogmas of Apollinaris and Eutyches. To convoke a synod in which greater orthodoxy might reasonably be expected was in

these circumstances no longer difficult, but all Leo's efforts to secure that the meeting should take place on Italian soil were unavailing. When the synod of Chalcedon assembled in 451, the papal legates were treated with great respect, and Leo's former letter to Flavian was adopted by acclamation as formulating the creed of the universal church on the subject of the person of Christ. Among the reasons urged by Leo for holding this council in Italy had been the threatening attitude of the Huns; the dreaded irruption took place in the following year (452). After Aquileia had succumbed to Attila's long siege, the conqueror set out for Rome. Near the confluence of the Mincio and the Po he was met by Leo, whose eloquence persuaded him to turn back. Legend has sought to enhance the impressiveness of the occurrence by an unnecessarily imagined miracle. The pope was less successful with Genseric when the Vandal chief arrived under the walls of Rome in 455, but he secured a promise that there should be no incendiarism or murder, and that three of the oldest basilicas should be exempt from plunder—a promise which seems to have been faithfully observed. Leo died on the 10th of November 461, the liturgical anniversary being the 11th of April. His successor was Hilarius or Hilarus, who had been one of the papal legates at the "robber" synod in 449.

The title of *doctor ecclesiae* was given to Leo by Benedict XIV. As bishop of the diocese of Rome, Leo distinguished himself above all his predecessors by his preaching, to which he devoted himself with great zeal and success. From his short and pithy *Sermones* many of the lessons now to be found in the Roman breviary have been taken. Viewed in conjunction with his voluminous correspondence, the sermons sufficiently explain the secret of his greatness, which chiefly lay in the extraordinary strength and purity of his convictions as to the primacy of the successors of St Peter at a time when the civil and ecclesiastical troubles of the civilized world made men willing enough to submit themselves to any authority whatsoever that could establish its right to exist by courage, honesty and knowledge of affairs.

> The works of Leo I. were first collectively edited by Quesnel (Lyons, 1700), and again, on the basis of this, in what is now the standard edition by Ballerini (Venice, 1753-1756). Ninety-three Sermones and one hundred and seventy-three *Epistolae* occupy the first volume; the second contains the *Liber Sacramentorum*, usually attributed to Leo, and the *De Vocatione Omnium Gentium*, also ascribed, by Quesnel and others, to him, but more probably the production of a certain Prosper, of whom nothing further is known. The works of Hilary of Arles are appended.

Leo II., pope from August 682 to July 683, was a Sicilian by birth, and succeeded Agatho I. Agatho had been represented at the sixth oecumenical council (that of Constantinople in 681), where Pope Honorius I. was anathematized for his views in the Monothelite controversy as a favourer of heresy, and the only fact of permanent historical interest with regard to Leo is that he wrote once and again in approbation of the decision of the council and in condemnation of Honorius, whom he regarded as one who *profana proditione immaculatam fidem subvertere conatus est*. In their bearing upon the question of papal infallibility these words have excited considerable attention and controversy, and prominence is given to the circumstance that in the Greek text of the letter to the emperor in which the phrase occurs the milder expression παρεχώρησεν (*subverti permisit*) is used for subvertere conatus est. This Hefele in his *Conciliengeschichte* (iii. 294) regards as alone expressing the true meaning of Leo. It was during Leo's pontificate that the dependence of the see of Ravenna upon that of Rome was finally settled by imperial edict. Benedict II. succeeded him.

Leo III., whose pontificate (795-816) covered the last eighteen years of the reign of Charlemagne, was a native of Rome, and having been chosen successor of Adrian I. on the 26th of December 795, was consecrated to the office on the following day. His first act was to send to Charles as patrician the standard of Rome along with the keys of the sepulchre of St Peter and of the city; a gracious and condescending letter in reply made it still more clear where all real power at that moment lay. For more than three years his term of office was uneventful; but at the end of that period the feelings of disappointment which had secretly been rankling in the breasts of Paschalis and Campulus, nephews of Adrian I., who had received from him the offices of *primicerius* and *sacellarius* respectively, suddenly manifested themselves in an organized attack upon Leo as he was riding in procession through the city on the day of the Greater Litany (25th April 799); the object of his assailants was, by depriving him of his eyes and tongue, to disqualify him for the papal office, and, although they were unsuccessful in this attempt, he found it necessary to accept the protection of Winegis, the Frankish duke of Spoleto, who came to the rescue. Having vainly requested the presence of Charles in Rome, Leo went beyond the Alps to meet the king at Paderborn; he was received with much ceremony and respect, but his enemies having sent in serious written charges, of which the character is not now known, Charles decided to appoint both the pope and his accusers to appear as parties before him when he should have arrived in Rome. Leo returned in great state to his diocese, and was received with honour; Charles, who did not arrive until November in the following year, lost no time in assuming the office of a judge, and the result of his investigation was the acquittal of the pope, who at the same time, however, was permitted or rather required to clear himself by the oath of compurgation. The coronation of the emperor followed two days afterwards; its effect was to bring out with increased clearness the personally subordinate position of Leo. The decision of the emperor, however, secured for Leo's pontificate an external peace which was only broken after the accession of Louis the Pious. His enemies began to renew their attacks; the violent repression of a conspiracy led to an open rebellion at Rome; serious charges were once more brought against him, when he was overtaken by death in 816. It was under this pontificate that Felix of Urgel, the adoptianist, was anathematized (798) by a Roman synod. Leo at another synod held in Rome in 810 admitted the dogmatic correctness of the *filioque*, but deprecated its introduction into the creed. On this point, however, the Frankish Church persevered in the course it had already initiated. Leo's successor was Stephen IV.

Leo IV., pope from 847 to 855, was a Roman by birth, and succeeded Sergius II. His pontificate was chiefly distinguished by his efforts to repair the damage done by the Saracens during the reign of his predecessor to various churches of the city, especially those of St Peter and St Paul. It was he who built and fortified the suburb on the right bank of the Tiber still known as the Civitas Leonina. A frightful conflagration, which he is said to have extinguished by his prayers, is the subject of Raphael's great work in the Sala dell' Incendio of the Vatican. He held three synods, one of them (in 850) distinguished by the presence of Louis II., who was crowned emperor on the occasion, but none of them otherwise of importance. The history of the papal struggle with Hincmar of Reims, which began during Leo's pontificate, belongs rather to that of Nicholas I. Benedict III. was Leo's immediate successor.

Leo V., a native of Ardea, was pope for two months in 903 after the death of Benedict IV. He was overthrown and cast into prison by the priest Christopher, who installed himself in his place.

Leo VI. succeeded John X. in 928, and reigned seven months and a few days. He was succeeded by Stephen VIII.

Leo VII., pope from 936 to 939, was preceded by John XI., and followed by Stephen IX.

Leo VIII., pope from 963 to 965, a Roman by birth, held the lay office of *protoscrinius* when he was elected to the papal chair at the instance of Otto the Great by the Roman synod which deposed John XII. in December 963. Having been hurried with unseemly haste through all the intermediate orders, he received consecration two days after his election, which was unacceptable to the people. In February 964, the emperor having withdrawn from the city, Leo found it necessary to seek safety in flight, whereupon he was deposed by a synod held under the presidency of John XII. On the sudden death of the latter, the populace chose Benedict V. as his successor; but Otto, returning and laying siege to the city, compelled their acceptance of Leo. It is usually said that, at the synod which deposed Benedict, Leo conceded to the emperor and his successors as sovereign of Italy full rights of investiture, but the genuineness of the document on which this allegation rests is more than doubtful. Leo VIII. was succeeded by John XIII.

Leo IX., pope from 1049 to 1054, was a native of Upper Alsace, where he was born on the 21st of June 1002. His proper name was Bruno; the family to which he belonged was of noble rank, and through his father he was related to the emperor Conrad II. He was educated at Toul, where he successively became canon and (1026) bishop; in the latter capacity he rendered important political services to his relative Conrad II., and afterwards to Henry III., and at the same time he became widely known as an earnest and reforming ecclesiastic by the zeal he showed in spreading the rule of the order of Cluny. On the death of Damasus II., Bruno was in December 1048, with the concurrence both of the emperor and of the Roman delegates, selected his successor by an assembly at Worms; he stipulated, however, as a condition of his acceptance that he should first proceed to Rome and be canonically elected by the voice of clergy and people. Setting out shortly after Christmas, he had a meeting with abbot Hugo of Cluny at Besançon, where he was joined by the young monk Hildebrand, who afterwards became Pope Gregory VII.; arriving in pilgrim garb at Rome in the following February, he was received with much cordiality, and at his consecration assumed the name of Leo IX. One of his first public acts was to hold the well-known Easter synod of 1049, at which celibacy of the clergy (down to the rank of subdeacon) was anew enjoined, and where he at least succeeded in making clear his own convictions against every kind of simony. The greater part of the year that followed was occupied in one of those progresses through Italy, Germany and France which form a marked feature in Leo's pontificate. After presiding over a synod at Pavia, he joined the emperor Henry III. in Saxony, and accompanied him to Cologne and Aix-la-Chapelle; to Reims he also summoned a meeting of the higher clergy, by which several important reforming decrees were passed. At Mainz also he held a council, at which the Italian and French as well as the German clergy were represented, and ambassadors of the Greek emperor were present; here too simony and the marriage of the clergy were the principal matters dealt with. After his return to Rome he held (29th April 1050) another Easter synod, which was occupied largely with the controversy about the teachings of Berengarius of Tours; in the same year he presided over provincial synods at Salerno, Siponto and Vercelli, and in September revisited Germany, returning to Rome in time for a third Easter synod, at which the question of the reordination of those who had been ordained by simonists was considered. In 1052 he joined the emperor at Pressburg, and vainly sought to secure the submission of the Hungarians; and at Regensburg, Bamberg and Worms the papal presence was marked by various ecclesiastical solemnities. After a fourth Easter synod in 1053 Leo set out against the Normans in the south with an army of Italians and German volunteers, but his forces sustained a total defeat at Astagnum near Civitella (18th June 1053); on going out, however, from the city to meet the enemy he was received with every token of submission, relief from the pressure of his ban was implored and fidelity and homage were sworn. From June 1053 to March 1054 he was nevertheless detained at Benevento in honourable captivity; he did not long survive his return to Rome, where he died on the 19th of April 1054. He was succeeded by Victor II.

Leo X. [Giovanni de' Medici] (1475-1521), pope from the 11th of March 1513 to the 1st of December 1521, was the second son of Lorenzo de' Medici, called the Magnificent, and was born at Florence on the 11th of December 1475. Destined from his birth for the church, he received the tonsure at the age of seven and was soon loaded with rich benefices and preferments. His father prevailed on Innocent VIII. to name him cardinal-deacon of Sta Maria in Dominica in March 1489, although he was not allowed to wear the insignia or share in the deliberations of the college until three years later. Meanwhile he received a careful education at Lorenzo's brilliant humanistic court under such men as Angelo Poliziano, the classical scholar, Pico della Mirandola, the philosopher and theologian, the pious Marsilio Ficino who endeavoured to unite the Platonic cult with Christianity and the poet Bernardo Dovizio Bibbiena. From 1489 to 1491 he studied theology and canon law at Pisa under Filippo Decio and Bartolomeo Sozzini. On the 23rd of March 1492 he was formally admitted into the sacred college and took up his residence at Rome, receiving a letter of advice from his father which ranks among the wisest of its kind. The death of Lorenzo on the 8th of April, however, called the seventeen-year-old cardinal to Florence. He participated in the conclave which followed the death of Innocent VIII. in July 1492 and opposed the election of Cardinal Borgia. He made his home with his elder brother Piero at Florence throughout the agitation of Savonarola and the invasion of Charles VIII. of France, until the uprising of the Florentines and the expulsion of the Medici in November 1494. While Piero found refuge at Venice and Urbino, Cardinal Giovanni travelled in Germany, in the Netherlands and in France. In May 1500 he returned to Rome, where he was received with outward cordiality by Alexander VI., and where he lived for several years immersed in art and literature. In 1503 he welcomed the accession of Julius II. to the pontificate; the death of Piero de' Medici in the same year made Giovanni head of his family. On the 1st of October 1511 he was appointed papal legate of Bologna and the Romagna, and when the Florentine republic declared in favour of the schismatic Pisans Julius II. sent him against his native city at the head of the papal army. This and other attempts to regain political control of Florence were frustrated, until a bloodless revolution permitted the return of the Medici on the 14th of September 1512. Giovanni's younger brother Giuliano was placed at the head of the republic, but the cardinal actually managed the government. Julius II. died in February 1513, and the conclave, after a stormy seven day's session, united on Cardinal de' Medici as the candidate of the younger cardinals. He was ordained to the priesthood on the 15th of March, consecrated bishop on the 17th, and enthroned with the name of Leo X. on the 19th. There is no evidence of simony in the conclave, and Leo's election was hailed with delight by the Romans on account of his reputation for liberality, kindliness and love of peace. Following the example of many of his predecessors, he promptly repudiated his election "capitulation" as an infringement on the divinely bestowed prerogatives of the Holy See.

Many problems confronted Leo X. on his accession. He must preserve the papal conquests which he had inherited from Alexander VI. and Julius II. He must minimize foreign influence, whether French, Spanish or German, in Italy. He must put an end to the Pisan schism and settle the other troubles incident to the French invasion. He must restore the French Church to Catholic unity, abolish the pragmatic sanction of Bourges, and

bring to a successful close the Lateran council convoked by his predecessor. He must stay the victorious advance of the Turks. He must quiet the disagreeable wranglings of the German humanists. Other problems connected with his family interests served to complicate the situation and eventually to prevent the successful consummation of many of his plans. At the very time of Leo's accession Louis XII. of France, in alliance with Venice, was making a determined effort to regain the duchy of Milan, and the pope, after fruitless endeavours to maintain peace, joined the league of Mechlin on the 5th of April 1513 with the emperor Maximilian I., Ferdinand I. of Spain and Henry VIII. of England. The French and Venetians were at first successful, but on the 6th of June met overwhelming defeat at Novara. The Venetians continued the struggle until October. On the 19th of December the fifth Lateran council, which had been reopened by Leo in April, ratified the peace with Louis XII. and registered the conclusion of the Pisan schism. While the council was engaged in planning a crusade and in considering the reform of the clergy, a new crisis occurred between the pope and the king of France. Francis I., who succeeded Louis XII. on the 1st of January 1515, was an enthusiastic young prince, dominated by the ambition of recovering Milan and Naples. Leo at once formed a new league with the emperor and the king of Spain, and to ensure English support made Wolsey a cardinal. Francis entered Italy in August and on the 14th of September won the battle of Marignano. The pope in October signed an agreement binding him to withdraw his troops from Parma and Piacenza, which had been previously gained at the expense of the duchy of Milan, on condition of French protection at Rome and Florence. The king of Spain wrote to his ambassador at Rome "that His Holiness had hitherto played a double game and that all his zeal to drive the French from Italy had been only a mask"; this reproach seemed to receive some confirmation when Leo X. held a secret conference with Francis at Bologna in December 1515. The ostensible subjects under consideration were the establishment of peace between France, Venice and the Empire, with a view to an expedition against the Turks, and the ecclesiastical affairs of France. Precisely what was arranged is unknown. During these two or three years of incessant political intrigue and warfare it was not to be expected that the Lateran council should accomplish much. Its three main objects, the peace of Christendom, the crusade and the reform of the church, could be secured only by general agreement among the powers, and Leo or the council failed to secure such agreement. Its most important achievements were the registration at its eleventh sitting (19th December 1516) of the abolition of the pragmatic sanction, which the popes since Pius II. had unanimously condemned, and the confirmation of the concordat between Leo X. and Francis I., which was destined to regulate the relations between the French Church and the Holy See until the Revolution. Leo closed the council on the 16th of March 1517. It had ended the schism, ratified the censorship of books introduced by Alexander VI. and imposed tithes for a war against the Turks. It raised no voice against the primacy of the pope.

The year which marked the close of the Lateran council was also signalized by Leo's unholy war against the duke of Urbino. The pope was naturally proud of his family and had practised nepotism from the outset. His cousin Giulio, who subsequently became Clement VII., he had made the most influential man in the curia, naming him archbishop of Florence, cardinal and vice-chancellor of the Holy See. Leo had intended his younger brother Giuliano and his nephew Lorenzo for brilliant secular careers. He had named them Roman patricians; the latter he had placed in charge of Florence; the former, for whom he planned to carve out a kingdom in central Italy of Parma, Piacenza, Ferrara and Urbino, he had taken with himself to Rome and married to Filiberta of Savoy. The death of Giuliano in March 1516, however, caused the pope to transfer his ambitions to Lorenzo. At the very time (December 1516) that peace between France, Spain, Venice and the Empire seemed to give some promise of a Christendom united against the Turk, Leo was preparing an enterprise as unscrupulous as any of the similar exploits of Cesare Borgia. He obtained 150,000 ducats towards the expenses of the expedition from Henry VIII. of England, in return for which he entered the imperial league of Spain and England against France. The war lasted from February to September 1517 and ended with the expulsion of the duke and the triumph of Lorenzo; but it revived the nefarious policy of Alexander VI., increased brigandage and anarchy in the States of the Church, hindered the preparations for a crusade and wrecked the papal finances. Guicciardini reckoned the cost of the war to Leo at the prodigious sum of 800,000 ducats. The new duke of Urbino was the Lorenzo de' Medici to whom Machiavelli addressed *The Prince*. His marriage in March 1518 was arranged by the pope with Madeleine la Tour d'Auvergne, a royal princess of France, whose daughter was the Catherine de' Medici celebrated in French history. The war of Urbino was further marked by a crisis in the relations between pope and cardinals. The sacred college had grown especially worldly and troublesome since the time of Sixtus IV., and Leo took advantage of a plot of several of its members to poison him, not only to inflict exemplary punishments by executing one and imprisoning several others, but also to make a radical change in the college. On the 3rd of July 1517 he published the names of thirty-one new cardinals, a number almost unprecedented in the history of the papacy. Some of the nominations were excellent, such as Lorenzo Campeggio, Giambattista Pallavicini, Adrian of Utrecht, Cajetan, Cristoforo Numai and Egidio Canisio. The naming of seven members of prominent Roman families, however, reversed the wise policy of his predecessor which had kept the dangerous factions of the city out of the curia. Other promotions were for political or family considerations or to secure money for the war against Urbino. The pope was accused of having exaggerated the conspiracy of the cardinals for purposes of financial gain, but most of such accusations appear to be unsubstantiated.

Leo, meanwhile, felt the need of staying the advance of the warlike sultan, Selim I., who was threatening western Europe, and made elaborate plans for a crusade. A truce was to be proclaimed throughout Christendom; the pope was to be the arbiter of disputes; the emperor and the king of France were to lead the army; England, Spain and Portugal were to furnish the fleet; and the combined forces were to be directed against Constantinople. Papal diplomacy in the interests of peace failed, however; Cardinal Wolsey made England, not the pope, the arbiter between France and the Empire; and much of the money collected for the crusade from tithes and indulgences was spent in other ways. In 1519 Hungary concluded a three years' truce with Selim I., but the succeeding sultan, Suliman the Magnificent, renewed the war in June 1521 and on the 28th of August captured the citadel of Belgrade. The pope was greatly alarmed, and although he was then involved in war with France he sent about 30,000 ducats to the Hungarians. Leo treated the Uniate Greeks with great loyalty, and by bull of the 18th of May 1521 forbade Latin clergy to celebrate mass in Greek churches and Latin bishops to ordain Greek clergy. These provisions were later strengthened by Clement VII. and Paul III. and went far to settle the chronic disputes between the Latins and Uniate Greeks.

Leo was disturbed throughout his pontificate by heresy and schism. The dispute between Reuchlin and Pfefferkorn relative to the Talmud and other Jewish books was referred to the pope in September 1513. He in turn referred it to the bishops of Spires and Worms, who gave decision in March 1514 in favour of Reuchlin. After the appeal of the inquisitor-general, Hochstraten, and the appearance of the *Epistolae obscurorum virorum*, however, Leo annulled the decision (June 1520) and imposed silence on Reuchlin. The pope had already

authorized the extensive grant of indulgences in order to secure funds for the crusade and more particularly for the rebuilding of St Peter's at Rome. Against the attendant abuses the Augustinian monk Martin Luther (*q.v.*) posted (31st October 1517) on the church door at Wittenberg his famous ninety-five theses, which were the signal for widespread revolt against the church. Although Leo did not fully comprehend the import of the movement, he directed (3rd February 1518) the vicar-general of the Augustinians to impose silence on the monks. On the 30th of May Luther sent an explanation of his theses to the pope; on the 7th of August he was cited to appear at Rome. An arrangement was effected, however, whereby that citation was cancelled, and Luther betook himself in October 1518 to Augsburg to meet the papal legate, Cardinal Cajetan, who was attending the imperial diet convened by the emperor Maximilian to impose the tithes for the Turkish war and to elect a king of the Romans; but neither the arguments of the learned cardinal, nor the dogmatic papal bull of the 9th of November to the effect that all Christians must believe in the pope's power to grant indulgences, moved Luther to retract. A year of fruitless negotiation followed, during which the pamphlets of the reformer set all Germany on fire. A papal bull of the 15th of June 1520, which condemned forty-one propositions extracted from Luther's teachings, was taken to Germany by Eck in his capacity of apostolic nuncio, published by him and the legates Alexander and Caracciola, and burned by Luther on the 10th of December at Wittenberg. Leo then formally excommunicated Luther by bull of the 3rd of January 1521; and in a brief directed the emperor to take energetic measures against heresy. On the 26th of May 1521 the emperor signed the edict of the diet of Worms, which placed Luther under the ban of the Empire; on the 21st of the same month Henry VIII. of England sent to Leo his book against Luther on the seven sacraments. The pope, after careful consideration, conferred on the king of England the title "Defender of the Faith" by bull of the 11th of October 1521. Neither the imperial edict nor the work of Henry VIII. stayed the Lutheran movement, and Luther himself, safe in the solitude of the Wartburg, survived Leo X. It was under Leo X. also that the Protestant movement had its beginning in Scandinavia. The pope had repeatedly used the rich northern benefices to reward members of the Roman curia, and towards the close of the year 1516 he sent the grasping and impolitic Arcimboldi as papal nuncio to Denmark to collect money for St Peter's. King Christian II. took advantage of the growing dissatisfaction on the part of the native clergy toward the papal government, and of Arcimboldi's interference in the Swedish revolt, in order to expel the nuncio and summon (1520) Lutheran theologians to Copenhagen. Christian approved a plan by which a formal state church should be established in Denmark, all appeals to Rome should be abolished, and the king and diet should have final jurisdiction in ecclesiastical causes. Leo sent a new nuncio to Copenhagen (1521) in the person of the Minorite Francesco de Potentia, who readily absolved the king and received the rich bishopric of Skara. The pope or his legate, however, took no steps to remove abuses or otherwise reform the Scandinavian churches.

That Leo did not do more to check the tendency toward heresy and schism in Germany and Scandinavia is to be partially explained by the political complications of the time, and by his own preoccupation with schemes of papal and Medicean aggrandizement in Italy. The death of the emperor Maximilian on the 12th of January 1519 had seriously affected the situation. Leo vacillated between the powerful candidates for the succession, allowing it to appear at first that he favoured Francis I. while really working for the election of some minor German prince. He finally accepted Charles I. of Spain as inevitable, and the election of Charles (28th of June 1519) revealed Leo's desertion of his French alliance, a step facilitated by the death at about the same time of Lorenzo de' Medici and his French wife. Leo was now anxious to unite Ferrara, Parma and Piacenza to the States of the Church. An attempt late in 1519 to seize Ferrara failed, and the pope recognized the need of foreign aid. In May 1521 a treaty of alliance was signed at Rome between him and the emperor. Milan and Genoa were to be taken from France and restored to the Empire, and Parma and Piacenza were to be given to the Church on the expulsion of the French. The expense of enlisting 10,000 Swiss was to be borne equally by pope and emperor. Charles took Florence and the Medici family under his protection and promised to punish all enemies of the Catholic faith. Leo agreed to invest Charles with Naples, to crown him emperor, and to aid in a war against Venice. It was provided that England and the Swiss might join the league. Henry VIII. announced his adherence in August. Francis I. had already begun war with Charles in Navarre, and in Italy, too, the French made the first hostile movement (23rd June 1521). Leo at once announced that he would excommunicate the king of France and release his subjects from their allegiance unless Francis laid down his arms and surrendered Parma and Piacenza. The pope lived to hear the joyful news of the capture of Milan from the French and of the occupation by papal troops of the long-coveted provinces (November 1521). Leo X. died on the 1st of December 1521, so suddenly that the last sacraments could not be administered; but the contemporary suspicions of poison were unfounded. His successor was Adrian VI.

Several minor events of Leo's pontificate are worthy of mention. He was particularly friendly with King Emmanuel of Portugal on account of the latter's missionary enterprises in Asia and Africa. His concordat with Florence (1516) guaranteed the free election of the clergy in that city. His constitution of the 1st of March 1519 condemned the king of Spain's claim to refuse the publication of papal bulls. He maintained close relations with Poland because of the Turkish advance and the Polish contest with the Teutonic Knights. His bull of the 1st of July 1519, which regulated the discipline of the Polish Church, was later transformed into a concordat by Clement VII. Leo showed special favours to the Jews and permitted them to erect a Hebrew printing-press at Rome. He approved the formation of the Oratory of Divine Love, a group of pious men at Rome which later became the Theatine Order, and he canonized Francesco di Paola.

As patron of learning Leo X. deserves a prominent place among the popes. He raised the church to a high rank as the friend of whatever seemed to extend knowledge or to refine and embellish life. He made the capital of Christendom the centre of culture. Every Italian artist and man of letters in an age of singular intellectual brilliancy tasted or hoped to taste of his bounty, while yet a cardinal, he had restored the church of Sta Maria in Domnica after Raphael's designs; and as pope he built S. Giovanni on the Via Giulia after designs by Jacopo Sansovino and pressed forward the work on St Peter's and the Vatican under Raphael and Chigi. His constitution of the 5th of November 1513 reformed the Roman university, which had been neglected by Julius II. He restored all its faculties, gave larger salaries to the professors, and summoned distinguished teachers from afar; and, although it never attained to the importance of Padua or Bologna, it nevertheless possessed in 1514 an excellent faculty of eighty-eight professors. Leo called Theodore Lascaris to Rome to give instruction in Greek, and established a Greek printing-press from which the first Greek book printed at Rome appeared in 1515. He made Raphael custodian of the classical antiquities of Rome and the vicinity. The distinguished Latinists Pietro Bembo (1470-1547) and Jacopo Sadoleto (1477-1547) were papal secretaries, as well as the famous poet Bernardo Accolti (d. 1534). Writers of poetry like Vida (1490-1566), Trissino (1478-1550), and Bibbiena (1470-1520), writers of *novelle* like Bandello, and a hundred other *literati* of the time were bishops, or papal scriptors or abbreviators, or in other papal employ. Leo's lively interest in art and literature, to say nothing of his natural liberality, his

nepotism, his political ambitions and necessities, and his immoderate personal luxury, exhausted within two years the hard savings of Julius II., and precipitated a financial crisis from which he never emerged and which was a direct cause of most of the calamities of his pontificate. He created many new offices and shamelessly sold them. He sold cardinals' hats. He sold membership in the "Knights of Peter." He borrowed large sums from bankers, curials, princes and Jews. The Venetian ambassador Gradenigo estimated the paying number of offices on Leo's death at 2150, with a capital value of nearly 3,000,000 ducats and a yearly income of 328,000 ducats. Marino Giorgi reckoned the ordinary income of the pope for the year 1517 at about 580,000 ducats, of which 420,000 came from the States of the Church, 100,000 from annates, and 60,000 from the composition tax instituted by Sixtus IV. These sums, together with the considerable amounts accruing from indulgences, jubilees, and special fees, vanished as quickly as they were received. Then the pope resorted to pawning palace furniture, table plate, jewels, even statues of the apostles. Several banking firms and many individual creditors were ruined by the death of the pope.

In the past many conflicting estimates were made of the character and achievements of the pope during whose pontificate Protestantism first took form. More recent studies have served to produce a fairer and more honest opinion of Leo X. A report of the Venetian ambassador Marino Giorgi bearing date of March 1517 indicates some of his predominant characteristics:—"The pope is a good-natured and extremely free-hearted man, who avoids every difficult situation and above all wants peace; he would not undertake a war himself unless his own personal interests were involved; he loves learning; of canon law and literature he possesses remarkable knowledge; he is, moreover, a very excellent musician." Leo was dignified in appearance and elegant in speech, manners and writing. He enjoyed music and the theatre, art and poetry, the masterpieces of the ancients and the wonderful creations of his contemporaries, the spiritual and the witty—life in every form. It is by no means certain that he made the remark often attributed to him, "Let us enjoy the papacy since God has given it to us," but there is little doubt that he was by nature devoid of moral earnestness or deep religious feeling. On the other hand, in spite of his worldliness, Leo was not an unbeliever; he prayed, fasted, and participated in the services of the church with conscientiousness. To the virtues of liberality, charity and clemency he added the Machiavellian qualities of falsehood and shrewdness, so highly esteemed by the princes of his time. Leo was deemed fortunate by his contemporaries, but an incurable malady, wars, enemies, a conspiracy of cardinals, and the loss of all his nearest relations darkened his days; and he failed entirely in his general policy of expelling foreigners from Italy, of restoring peace throughout Europe, and of prosecuting war against the Turks. He failed to recognize the pressing need of reform within the church and the tremendous dangers which threatened the papal monarchy; and he unpardonably neglected the spiritual needs of the time. He was, however, zealous in firmly establishing the political power of the Holy See; he made it unquestionably supreme in Italy; he successfully restored the papal power in France; and he secured a prominent place in the history of culture.

Authorities.—The life of Leo X. was written shortly after his death by Paolo Giovio, bishop of Nocera, who had known him intimately. Other important contemporary sources are the Italian *History* of the Florentine writer Guicciardini, covering the period 1492-1530 (4 vols., Milan, 1884); the reports of the Venetian ambassadors, Marino Giorgi (1517), Marco Minio (1520) and Luigi Gradenigo (1523), in vol. iii. of the 2nd series of *Le Relazioni degli ambasciatori Veneti*, edited by Alberi (Florence, 1846); and the *Diarii* of the Venetian Marino Sanuto (58 vols., 1879-1903). Other materials for the biography are to be found in the incomplete *Regesta* edited by Joseph Cardinal Hergenröther (Freiburg-i-B., 1884 ff.); in the Turin collection of papal bulls (1859, &c.); in *Il Diario di Leone X. dai volumi manoscritti degli archivi Vaticani della S. Sede connote di M. Armellini* (Rome, 1884); and in "Documenti risguardanti Giovanni de' Medici e il pontifice Leone X.," appendix to vol. 1 of the *Archivio storico Italiano* (Florence, 1842).

See L. Pastor, *Geschichte der Päpste im Zeitalter der Renaissance u. der Glaubensspaltung von der Wahl Leos X. bis zum Tode Klemens VII.* part 1 (Freiburg-i.-B., 1906); M. Creighton, *History of the Papacy*, vol. 6 (1901); F. Gregorovius, *Rome in the Middle Ages*, trans. by Mrs G. W. Hamilton, vol. viii., part 1 (1902); L. von Ranke, *History of the Popes*, vol. i., trans. by E. Foster in the Bohn Library; *Histoire de France*, ed. by E. Lavisse, vol. 5, part 1 (1903); Walter Friedensburg, "Ein rotulus familiae Papst Leos X.," in *Quellen u. Forschungen aus italienischen Archiven u. Bibliotheken*, vol. vi. (1904); W. Roscoe, *Life and Pontificate of Leo X.* (6th ed., 2 vols., 1853), a celebrated biography but considerably out of date in spite of the valuable notes of the German and Italian translators, Henke and Bossi; F. S. Nitti, *Leone X. e la sua politica secondo documenti e carteggi inediti* (Florence, 1892); A. Schulte, *Die Fugger in Rom 1495-1523* (2 vols., Leipzig, 1906); and H. M. Vaughan, *The Medici Popes* (1908).

(C. H. Ha.)

Leo XI. (Alessandro de' Medici) was elected pope on the 1st of April 1605, at the age of seventy. He had long been archbishop of Florence and nuncio to Tuscany; and was entirely pro-French in his sympathies. He died on the 27th day of his pontificate, and was succeeded by Paul V.

See the contemporary life by Vitorelli, continuator of Ciaconius, *Vitae et res gestae summorum Pontiff. Rom.*; Ranke, *Popes* (Eng. trans., Austin), ii. 330; v. Reumont, *Gesch. der Stadt Rom.* iii. 2, 604; Brosch, *Gesch. des Kirchenstaates* (1880), i. 350.

Leo XII. (Annibale della Genga), pope from 1823 to 1829, was born of a noble family, near Spoleto, on the 22nd of August 1760. Educated at the Accademia dei Nobili ecclesiastici at Rome, he was ordained priest in 1783, and in 1790 attracted favourable attention by a tactful sermon commemorative of the emperor Joseph II. In 1792 Pius VI. made him his private secretary, in 1793 creating him titular archbishop of Tyre and despatching him to Lucerne as nuncio. In 1794 he was transferred to the nunciature at Cologne, but owing to the war had to make his residence in Augsburg. During the dozen or more years he spent in Germany he was entrusted with several honourable and difficult missions, which brought him into contact with the courts of Dresden, Vienna, Munich and Württemberg, as well as with Napoleon. It is, however, charged at one time during this period that his finances were disordered, and his private life not above suspicion. After the abolition of the States of the Church, he was treated by the French as a state prisoner, and lived for some years at the abbey of Monticelli, solacing himself with music and with bird-shooting, pastimes which he did not eschew even after his election as pope. In 1814 he was chosen to carry the pope's congratulations to Louis XVIII.; in 1816 he was created cardinal-priest of Santa Maria Maggiore, and appointed to the see of Sinigaglia, which he resigned in 1818. In 1820 Pius VII. gave him the distinguished post of cardinal vicar. In the conclave of 1823, in spite of the active opposition of France, he was elected pope by the *zelanti* on the 28th of September. His election had been facilitated because he was thought to be on the edge of the grave; but he unexpectedly rallied. His foreign policy, entrusted at first to Della Somaglia and then to the more able Bernetti, moved in general along lines laid down by Consalvi; and he negotiated certain

concordats very advantageous to the papacy. Personally most frugal, Leo reduced taxes, made justice less costly, and was able to find money for certain public improvements; yet he left the finances more confused than he had found them, and even the elaborate jubilee of 1825 did not really mend matters. His domestic policy was one of extreme reaction. He condemned the Bible societies, and under Jesuit influence reorganized the educational system. Severe ghetto laws led many of the Jews to emigrate. He hunted down the *Carbonari* and the Freemasons; he took the strongest measures against political agitation in theatres. A well-nigh ubiquitous system of espionage, perhaps most fruitful when directed against official corruption, sapped the foundations of public confidence. Leo, temperamentally stern, hard-working in spite of bodily infirmity, died at Rome on the 10th of February 1829. The news was received by the populace with unconcealed joy. He was succeeded by Pius VIII.

AUTHORITIES.—Artaud de Montor, *Histoire du Pape Léon XII.* (2 vols., 1843; by the secretary of the French embassy in Rome); Brück, "Leo XII.," in Wetzer and Welte's *Kirchenlexikon*, vol. vii. (Freiburg, 1891); F. Nippold, *The Papacy in the 19th Century* (New York, 1900), chap. 5; Benrath, "Leo XII.," in Herzog-Hauck, *Realencyklopädie*, vol. xi.-(Leipzig, 1902), 390-393, with bibliography; F. Nielsen, *The History of the Papacy in the 19th century* (1906), vol. ii. 1-30; Lady Blennerhassett, in the *Cambridge Modern History*, vol. x. (1907), 151-154.

(W. W. R.*)

LEO XIII. (Gioacchino Pecci) (1810-1903), pope from 1878 to 1903, reckoned the 257th successor of St Peter, was born at Carpineto on the 2nd of March 1810. His family was Sienese in origin, and his father, Colonel Domenico Pecci, had served in the army of Napoleon. His mother, Anna Prosperi, is said to have been a descendant of Rienzi, and was a member of the third order of St Francis. He and his elder brother Giuseppe (known as Cardinal Pecci) received their earliest education from the Jesuits at Viterbo, and completed their education in Rome. In the jubilee year 1825 he was selected by his fellow-students at the Collegium Romanum to head a deputation to Pope Leo XII., whose memory he subsequently cherished and whose name he assumed in 1878. Weak health, consequent on over-study, prevented him from obtaining the highest academical honours, but he graduated as doctor in theology at the age of twenty-two, and then entered the Accademia dei Nobili ecclesiastici, a college in which clergy of aristocratic birth are trained for the diplomatic service of the Roman Church. Two years later Gregory XVI. appointed him a domestic prelate, and bestowed on him, by way of apprenticeship, various minor administrative offices. He was ordained priest on the 31st of December 1837, and a few weeks later was made apostolic delegate of the small papal territory of Benevento, where he had to deal with brigands and smugglers, who enjoyed the protection of some of the noble families of the district. His success here led to his appointment in 1841 as delegate of Perugia, which was at that time a centre of anti-papal secret societies. This post he held for eighteen months only, but in that brief period he obtained a reputation as a social and municipal reformer. In 1843 he was sent as nuncio to Brussels, being first consecrated a bishop (19th February), with the title of archbishop of Damietta. During his three years' residence at the Belgian capital he found ample scope for his gifts as a diplomatist in the education controversy then raging, and as mediator between the Jesuits and the Catholic university of Louvain. He gained the esteem of Leopold I., and was presented to Queen Victoria of England and the Prince Consort. He also made the acquaintance of many Englishmen, Archbishop Whately among them. In January 1846, at the request of the magistrates and people of Perugia, he was appointed bishop of that city with the rank of archbishop; but before returning to Italy he spent February in London, and March and April in Paris. On his arrival in Rome he would, at the request of King Leopold, have been created cardinal but for the death of Gregory XVI. Seven years later, 19th December 1853, he received the red hat from Pius IX. Meanwhile, and throughout his long episcopate of thirty-two years, he foreshadowed the zeal and the enlightened policy later to be displayed in the prolonged period of his pontificate, building and restoring many churches, striving to elevate the intellectual as well as the spiritual tone of his clergy, and showing in his pastoral letters an unusual regard for learning and for social reform. His position in Italy was similar to that of Bishop Dupanloup in France; and, as but a moderate supporter of the policy enunciated in the Syllabus, he was not altogether *persona grata* to Pius IX. But he protested energetically against the loss of the pope's temporal power in 1870, against the confiscation of the property of the religious orders, and against the law of civil marriage established by the Italian government, and he refused to welcome Victor Emmanuel in his diocese. Nevertheless, he remained in the comparative obscurity of his episcopal see until the death of Cardinal Antonelli; but in 1877, when the important papal office of *camerlengo* became vacant, Pius IX. appointed to it Cardinal Pecci, who thus returned to reside in Rome, with the prospect of having shortly responsible functions to perform during the vacancy of the Holy See, though the *camerlengo* was traditionally regarded as disqualified by his office from succeeding to the papal throne.

When Pius IX. died (7th February 1878) Cardinal Pecci was elected pope at the subsequent conclave with comparative unanimity, obtaining at the third scrutiny (20th February) forty-four out of sixty-one votes, or more than the requisite two-thirds majority. The conclave was remarkably free from political influences, the attention of Europe being at the time engrossed by the presence of a Russian army at the gates of Constantinople. It was said that the long pontificate of Pius IX. led some of the cardinals to vote for Pecci, since his age (within a few days of sixty-eight) and health warranted the expectation that his reign would be comparatively brief; but he had for years been known as one of the few "papable" cardinals; and although his long seclusion at Perugia had caused his name to be little known outside Italy, there was a general belief that the conclave had selected a man who was a prudent statesman as well as a devout churchman; and Newman (whom he created a cardinal in the year following) is reported to have said, "In the successor of Pius I recognize a depth of thought, a tenderness of heart, a winning simplicity, and a power answering to the name of Leo, which prevent me from lamenting that Pius is no longer here."

The second day after his election Pope Leo XIII. crossed the Tiber *incognito* to his former residence in the Falconieri Palace to collect his papers, returning at once to the Vatican, where he continued to regard himself as "imprisoned" so long as the Italian government occupied the city of Rome. He was crowned in the Sistine Chapel 3rd March 1878, and at once began a reform of the papal household on austere and economic lines which found little favour with the *entourage* of the former pope. To fill posts near his own person he summoned certain of the Perugian clergy who had been trained under his own eye, and from the first he was less accessible than his predecessor had been, either in public or private audience. Externally uneventful as his life henceforth necessarily was, it was marked chiefly by the reception of distinguished personages and of numerous pilgrimages, often on a large scale, from all parts of the world, and by the issue of encyclical letters. The stricter theological training of the Roman Catholic clergy throughout the world on the lines laid down by St Thomas Aquinas was his first care, and to this end he founded in Rome and endowed an academy bearing the great schoolman's name, further devoting about £12,000 to the publication of a new and splendid edition of his works, the idea being that on this basis the later teaching of Catholic theologians and many of the speculations of modern thinkers could

best be harmonized and brought into line. The study of Church history was next encouraged, and in August 1883 the pope addressed a letter to Cardinals de Luca, Pitra and Hergenröther, in which he made the remarkable concession that the Vatican archives and library might be placed at the disposal of persons qualified to compile manuals of history. His belief was that the Church would not suffer by the publication of documents. A man of literary taste and culture, familiar with the classics, a facile writer of Latin verses[1] as well as of Ciceronian prose, he was as anxious that the Roman clergy should unite human science and literature with their theological studies as that the laity should be educated in the principles of religion; and to this end he established in Rome a kind of voluntary school board, with members both lay and clerical; and the rivalry of the schools thus founded ultimately obliged the state to include religious teaching in its curriculum. The numerous encyclicals by which the pontificate of Leo XIII. will always be distinguished were prepared and written by himself, but were submitted to the customary revision. The encyclical *Aeterni Patris* (4th August 1879) was written in the defence of the philosophy of St Thomas Aquinas. In later ones, working on the principle that the Christian Church should superintend and direct every form of civil life, he dealt with the Christian constitution of states (*Immortale Dei*, 1st November 1885), with human liberty (*Libertas*, 20th June 1888), and with the condition of the working classes (*Rerum novarum*, 15th May 1891). This last was slightly tinged with modern socialism; it was described as “the social Magna Carta of Catholicism,” and it won for Leo the name of “the working-man’s pope.” Translated into the chief modern languages, many thousands of copies were circulated among the working classes in Catholic countries. Other encyclicals, such as those on Christian marriage (*Arcanum divinae sapientiae*, 10th February 1880), on the Rosary (*Supremi apostolatus officii*, 1st September 1883, and *Superiore anno*, 5th September 1898), and on Freemasonry (*Humanum genus*, 20th April 1884), dealt with subjects on which his predecessor had been accustomed to pronounce allocutions, and were on similar lines. It was the knowledge that in all points of religious faith and practice Leo XIII. stood precisely where Pius IX. had stood that served to render ineffectual others of his encyclicals, in which he dealt earnestly and effectively with matters in which orthodox Protestants had a sympathetic interest with him and might otherwise have lent an ear to his counsels. Such were the letters on the study of Holy Scripture (18th November 1893), and on the reunion of Christendom (20th June 1894). He showed special anxiety for the return of England to the Roman Catholic fold, and addressed a letter *ad Anglos*, dated 14th April 1895. This he followed up by an encyclical on the unity of the Church (*Satis cognitum*, 29th June 1896); and the question of the validity of Anglican ordinations from the Roman Catholic point of view having been raised in Rome by Viscount Halifax, with whom the abbé Louis Duchesne and one or two other French priests were in sympathy, a commission was appointed to consider the subject, and on the 15th of September 1896 a condemnation of the Anglican form as theologically insufficient was issued, and was directed to be taken as final.

The establishment of a diocesan hierarchy in Scotland had been decided upon before the death of Pius IX., but the actual announcement of it was made by Leo XIII. On the 25th of July 1898 he addressed to the Scottish Catholic bishops a letter, in the course of which he said that “many of the Scottish people who do not agree with us in faith sincerely love the name of Christ and strive to ascertain His doctrine and to imitate His most holy example.” The Irish and American bishops he summoned to Rome to confer with him on the subjects of Home Rule and of “Americanism” respectively. In India he established a diocesan hierarchy, with seven archbishoprics, the archbishop of Goa taking precedence with the rank of patriarch.

With the government of Italy his general policy was to be as conciliatory as was consistent with his oath as pope never to surrender the “patrimony of St Peter”; but a moderate attitude was rendered difficult by partisans on either side in the press, each of whom claimed to represent his views. In 1879, addressing a congress of Catholic journalists in Rome, he exhorted them to uphold the necessity of the temporal power, and to proclaim to the world that the affairs of Italy would never prosper until it was restored; in 1887 he found it necessary to deprecate the violence with which this doctrine was advocated in certain journals. A similar counsel of moderation was given to the Canadian press in connexion with the Manitoba school question in December 1897. The less conciliatory attitude towards the Italian government was resumed in an encyclical addressed to the Italian clergy (5th August 1898), in which he insisted on the duty of Italian Catholics to abstain from political life while the papacy remained in its “painful, precarious and intolerable position.” And in January 1902, reversing the policy which had its inception in the encyclical, *Rerum novarum*, of 1891, and had further been developed ten years later in a letter to the Italian bishops entitled *Graves de communi*, the “Sacred Congregation of Extraordinary Ecclesiastical Affairs” issued instructions concerning “Christian Democracy in Italy,” directing that the popular Christian movement, which embraced in its programme a number of social reforms, such as factory laws for children, old-age pensions, a minimum wage in agricultural industries, an eight-hours’ day, the revival of trade gilds, and the encouragement of Sunday rest, should divert its attention from all such things as savoured of novelty and devote its energies to the restoration of the temporal power. The reactionary policy thus indicated gave the impression that a similar aim underlay the appointment about the same date of a commission to inquire into Biblical studies; and in other minor matters Leo XIII. disappointed those who had looked to him for certain reforms in the devotional system of the Church. A revision of the breviary, which would have involved the omission of some of the less credible legends, came to nothing, while the recitation of the office in honour of the Santa Casa at Loreto was imposed on all the clergy. The worship of Mary, largely developed during the reign of Pius IX., received further stimulus from Leo; nor did he do anything during his pontificate to correct the superstitions connected with popular beliefs concerning relics and indulgences.

His policy towards all governments outside Italy was to support them wherever they represented social order; and it was with difficulty that he persuaded French Catholics to be united in defence of the republic. The German *Kulturkampf* was ended by his exertions. In 1885 he successfully arbitrated between Germany and Spain in a dispute concerning the Caroline Islands. In Ireland he condemned the “Plan of Campaign” in 1888, but he conciliated the Nationalists by appointing Dr Walsh archbishop of Dublin. His hope that his support of the British government in Ireland would be followed by the establishment of formal diplomatic relations between the court of St James’s and the Vatican was disappointed. But the jubilee of Queen Victoria in 1887 and the pope’s priestly jubilee a few months later were the occasion of friendly intercourse between Rome and Windsor, Mgr. Ruffo Scilla coming to London as special papal envoy, and the duke of Norfolk being received at the Vatican as the bearer of the congratulations of the queen of England. Similar courtesies were exchanged during the jubilee of 1897, and again in March 1902, when Edward VII. sent the earl of Denbigh to Rome to congratulate Leo XIII. on reaching his ninety-third year and the twenty-fifth year of his pontificate. The visit of Edward VII. to Leo XIII. in April 1903 was a further proof of the friendliness between the English court and the Vatican.

The elevation of Newman to the college of Cardinals in 1879 was regarded with approval throughout the English-speaking world, both on Newman’s account and also as evidence that Leo XIII. had a wider horizon than

his predecessor; and his similar recognition of two of the most distinguished “inopportunist” members of the Vatican council, Haynald, archbishop of Kalocsa, and Prince Fürstenberg, archbishop of Olmütz, was even more noteworthy. Dupanloup would doubtless have received the same honour had he not died shortly after Leo’s accession. Döllinger the pope attempted to reconcile, but failed. He laboured much to bring about the reunion of the Oriental Churches with the see of Rome, establishing Catholic educational centres in Athens and in Constantinople with that end in view. He used his influence with the emperor of Russia, as also with the emperors of China and Japan and with the shah of Persia, to secure the free practice of their religion for Roman Catholics within their respective dominions. Among the canonizations and beatifications of his pontificate that of Sir Thomas More, author of *Utopia*, is memorable. His encyclical issued at Easter 1902, and described by himself as a kind of will, was mainly a reiteration of earlier condemnations of the Reformation, and of modern philosophical systems, which for their atheism and materialism he makes responsible for all existing moral and political disorders. Society, he earnestly pleaded, can only find salvation by a return to Christianity and to the fold of the Roman Catholic Church.

Grave and serious in manner, speaking slowly, but with energetic gestures, simple and abstemious in his life—his daily bill of fare being reckoned as hardly costing a couple of francs—Leo XIII. distributed large sums in charity, and at his own charges placed costly astronomical instruments in the Vatican observatory, providing also accommodation and endowment for a staff of officials. He always showed the greatest interest in science and in literature, and he would have taken a position as a statesman of the first rank had he held office in any secular government. He may be reckoned the most illustrious pope since Benedict XIV., and under him the papacy acquired a prestige unknown since the middle ages. On the 3rd of March 1903 he celebrated his jubilee in St Peter’s with more than usual pomp and splendour; he died on the 20th of July following. His successor was Pius X.

See *Scelta di atti episcopali del cardinale G. Pecci ...* (Rome, 1879); *Leonis XIII. Pont. Max. acta* (17 vols., Rome, 1881-1898); *Sanctissimi Domini N. Leonis XIII. allocutiones, epistolae, &c.* (Bruges and Lille, 1887, &c.); the encyclicals (*Sämtliche Rundschreiben*) with a German translation (6 vols., Freiburg, 1878-1904); *Discorsi del Sommo Pontefice Leone XIII. 1878-1882* (Rome, 1882). There are lives of Leo XIII. by B. O’Reilly (new ed., Chicago, 1903), H. des Houx (pseudonym of Durand Morimbeau) (Paris, 1900), by W. Meynell (1887), by J. McCarthy (1896), by Boyer d’Agen, (*Jeunesse de Léon XIII.* (1896); *La Prélature*, 1900), by M. Spahn (Munich, 1905), by L. K. Goetz (Gotha, 1899), &c. A life of Leo XIII. (4 vols.) was undertaken by F. Marion Crawford, Count Edoardo Soderini and Professor Giuseppe Clementi.

(A. W. Hu.; M. Br.)

1 *Leonis XIII. Pont. Maximi carmina*, ed. Brunelli (Udine, 1883); *Leonis XIII. carmina, inscriptiones, numismata*, ed. J. Bach (Cologne, 1903).

LEO, the name of six emperors of the East.

Leo I., variously surnamed Thrax, Magnus and Makelles, emperor of the East, 457-474, was born in Thrace about 400. From his position as military tribune he was raised to the throne by the soldiery and recognized both by senate and clergy; his coronation by the patriarch of Constantinople is said to have been the earliest instance of such a ceremony. Leo owed his elevation mainly to Aspar, the commander of the guards, who was debarred by his Arianism from becoming emperor in his own person, but hoped to exercise a virtual autocracy through his former steward and dependant. But Leo, following the traditions of his predecessor Marcian, set himself to curtail the domination of the great nobles and repeatedly acted in defiance of Aspar. Thus he vigorously suppressed the Eutychian heresy in Egypt, and by exchanging his Germanic bodyguard for Isaurians removed the chief basis of Aspar’s power. With the help of his generals Anthemius and Anagastus, he repelled invasions of the Huns into Dacia (466 and 468). In 467 Leo had Anthemius elected emperor of the West, and in concert with him equipped an armament of more than 1100 ships and 100,000 men against the pirate empire of the Vandals in Africa. Through the remissness of Leo’s brother-in-law Basiliscus, who commanded the expedition, the fleet was surprised by the Vandal king, Genseric, and half of its vessels sunk or burnt (468). This failure was made a pretext by Leo for killing Aspar as a traitor (471), and Aspar’s murder served the Goths in turn as an excuse for ravaging Thrace up to the walls of the capital. In 473 the emperor associated with himself his infant grandson, Leo II., who, however, survived him by only a few months. His surnames Magnus (Great) and Makelles (butcher) respectively reflect the attitude of the Orthodox and the Arians towards his religious policy.

See E. Gibbon, *The Decline and Fall of the Roman Empire* (ed. Bury, 1896), iv. 29-37; J. B. Bury, *The Later Roman Empire* (1889), i. 227-233.

Leo III. (*c.* 680-740), surnamed The Isaurian, emperor of the East, 717-740. Born about 680 in the Syrian province of Commagene, he rose to distinction in the military service, and under Anastasius II. was invested with the command of the eastern army. In 717 he revolted against the usurper Theodosius III. and, marching upon Constantinople, was elected emperor in his stead. The first year of Leo’s reign saw a memorable siege of his capital by the Saracens, who had taken advantage of the civil discord in the Roman empire to bring up a force of 80,000 men to the Bosporus. By his stubborn defence the new ruler wore out the invaders who, after a twelve months’ investment, withdrew their forces. An important factor in the victory of the Romans was their use of Greek fire. Having thus preserved the empire from extinction, Leo proceeded to consolidate its administration, which in the previous years of anarchy had become completely disorganized. He secured its frontiers by inviting Slavonic settlers into the depopulated districts and by restoring the army to efficiency; when the Arabs renewed their invasions in 726 and 739 they were decisively beaten. His civil reforms include the abolition of the system of prepaying taxes which had weighed heavily upon the wealthier proprietors, the elevation of the serfs into a class of free tenants, the remodelling of family and of maritime law. These measures, which were embodied in a new code published in 740, met with some opposition on the part of the nobles and higher clergy. But Leo’s most striking legislative reforms dealt with religious matters. After an apparently successful attempt to enforce the baptism of all Jews and Montanists in his realm (722), he issued a series of edicts against the worship of images

(726-729). This prohibition of a custom which had undoubtedly given rise to grave abuses seems to have been inspired by a genuine desire to improve public morality, and received the support of the official aristocracy and a section of the clergy. But a majority of the theologians and all the monks opposed these measures with uncompromising hostility, and in the western parts of the empire the people refused to obey the edict. A revolt which broke out in Greece, mainly on religious grounds, was crushed by the imperial fleet (727), and two years later, by deposing the patriarch of Constantinople, Leo suppressed the overt opposition of the capital. In Italy the defiant attitude of Popes Gregory II. and III. on behalf of image-worship led to a fierce quarrel with the emperor. The former summoned councils in Rome to anathematize and excommunicate the image-breakers (730, 732); Leo retaliated by transferring southern Italy and Greece from the papal diocese to that of the patriarch. The struggle was accompanied by an armed outbreak in the exarchate of Ravenna (727), which Leo finally endeavoured to subdue by means of a large fleet. But the destruction of the armament by a storm decided the issue against him; his south Italian subjects successfully defied his religious edicts, and the province of Ravenna became detached from the empire. In spite of this partial failure Leo must be reckoned as one of the greatest of the later Roman emperors. By his resolute stand against the Saracens he delivered all eastern Europe from a great danger, and by his thorough-going reforms he not only saved the empire from collapse, but invested it with a stability which enabled it to survive all further shocks for a space of five centuries.

See E. Gibbon, *The Decline and Fall of the Roman Empire* (ed. Bury, 1896), v. 185 seq., 251 seq. and appendices, vi. 6-12; J. B. Bury, *The Later Roman Empire* (1889), ii. 401-449; K. Schenk, *Kaiser Leo III.* (Halle, 1880), and in *Byzantinische Zeitschrift* (1896), v. 257-301; T. Hodgkin, *Italy and her Invaders* (1892, &c.), bk. vii., chs. 11, 12. See also Iconoclasts.

Leo IV., called Chozar, succeeded his father, Constantine V., as emperor of the East in 775. In 776 he associated his young son, Constantine, with himself in the empire, and suppressed a rising led by his five step-brothers which broke out as a result of this proceeding. Leo was largely under the influence of his wife Irene (*q.v.*), and when he died in 780 he left her as the guardian of his successor, Constantine VI.

Leo V., surnamed The Armenian, emperor of the East, 813-820, was a distinguished general of Nicephorus I. and Michael I. After rendering good service on behalf of the latter in a war with the Arabs (812), he was summoned in 813 to co-operate in a campaign against the Bulgarians. Taking advantage of the disaffection prevalent among the troops, he left Michael in the lurch at the battle of Adrianople and subsequently led a successful revolution against him. Leo justified his usurpation by repeatedly defeating the Bulgarians who had been contemplating the siege of Constantinople (814-817). By his vigorous measures of repression against the Paulicians and image-worshippers he roused considerable opposition, and after a conspiracy under his friend Michael Psellus had been foiled by the imprisonment of its leader, he was assassinated in the palace chapel on Christmas Eve, 820.

See E. Gibbon, *The Decline and Fall of the Roman Empire* (ed. Bury, 1896), v. 193-195.

(M. O. B. C.)

Leo VI., surnamed The Wise and The Philosopher, Byzantine emperor, 886-911. He was a weak-minded ruler, chiefly occupied with unimportant wars with barbarians and struggles with churchmen. The chief event of his reign was the capture of Thessalonica (904) by Mahommedan pirates (described in *The Capture of Thessalonica* by John Cameniata) under the renegade Leo of Tripolis. In Sicily and Lower Italy the imperial arms were unsuccessful, and the Bulgarian Symeon, who assumed the title of “Czar of the Bulgarians and autocrat of the Romaei” secured the independence of his church by the establishment of a patriarchate. Leo’s somewhat absurd surname may be explained by the facts that he “was less ignorant than the greater part of his contemporaries in church and state, that his education had been directed by the learned Photius, and that several books of profane and ecclesiastical science were composed by the pen, or in the name, of the imperial philosopher” (Gibbon). His works include seventeen *Oracula*, in iambic verse, on the destinies of future emperors and patriarchs of Constantinople; thirty-three *Orations*, chiefly on theological subjects (such as church festivals); *Basilica*, the completion of the digest of the laws of Justinian, begun by Basil I., the father of Leo; some epigrams in the Greek *Anthology*; an iambic lament on the melancholy condition of the empire; and some palindromic verses, curiously called καρκίνοι (crabs). The treatise on military tactics, attributed to him, is probably by Leo III., the Isaurian.

Complete edition in Migne, *Patrologia Graeca*, cvii.; for the literature of individual works see C. Krumbacher, *Geschichte der byzantinischen Litteratur* (1897).

(J. H. F.)

LEO, Brother (d. *c.* 1270), the favourite disciple, secretary and confessor of St Francis of Assisi. The dates of his birth and of his becoming a Franciscan are not known; but he was one of the small group of most trusted companions of the saint during his last years. After Francis’s death Leo took a leading part in the opposition to Elias: he it was who broke in pieces the marble box which Elias had set up for offertories for the completion of the basilica at Assisi. For this Elias had him scourged, and this outrage on St Francis’s dearest disciple consolidated the opposition to Elias and brought about his deposition. Leo was the leader in the early stages of the struggle in the order for the maintenance of St Francis’s ideas on strict poverty, and the chief inspirer of the tradition of the Spirituals on St Francis’s life and teaching. The claim that he wrote the so-called *Speculum perfectionis* cannot be allowed, but portions of it no doubt go back to him. A little volume of his writings has been published by Lemmeus (*Scripta Iratris Leonis*, 1901). Leo assisted at St Clara’s death-bed, 1253; after suffering many persecutions from the dominant party in the order he died at the Portiuncula in extreme old age.

All that is known concerning him is collected by Paul Sabatier in the “Introduction” to the *Speculum perfectionis* (1898). See St Francis and Franciscans.

(E. C. B.)

LEO, HEINRICH (1799-1878), German historian, was born at Rudolstadt on the 19th of March 1799, his father being chaplain to the garrison there. His family, not of Italian origin—as he himself was inclined to believe on the strength of family tradition—but established in Lower Saxony so early as the 16th century, was typical of the German upper middle classes, and this fact, together with the strongly religious atmosphere in which he was brought up and his early enthusiasm for nature, largely determined the bent of his mind. The taste for historical study was, moreover, early instilled into him by the eminent philologist Karl Wilhelm Göttling (1793-1869), who in 1816 became a master at the Rudolstadt gymnasium. From 1816 to 1819 Leo studied at the universities of Breslau, Jena and Göttingen, devoting himself more especially to history, philology and theology. At this time the universities were still agitated by the Liberal and patriotic aspirations aroused by the War of Liberation; at Breslau Leo fell under the influence of Jahn, and joined the political gymnastic association (*Turnverein*); at Jena he attached himself to the radical wing of the German *Burschenschaft*, the so-called "Black Band," under the leadership of Karl Follen. The murder of Kotzebue by Karl Sand, however, shocked him out of his extreme revolutionary views, and from this time he tended, under the influence of the writings of Hamann and Herder, more and more in the direction of conservatism and romanticism, until at last he ended, in a mood almost of pessimism, by attaching himself to the extreme right wing of the forces of reaction. So early as April 1819, at Göttingen, he had fallen under the influence of Karl Ludwig von Haller's *Handbuch der allgemeinen Staatenkunde* (1808), a text-book of the counter-Revolution. On the 11th of May 1820 he took his doctor's degree; in the same year he qualified as *Privatdozent* at the university of Erlangen. For this latter purpose he had chosen as his thesis the constitution of the free Lombard cities in the middle ages, the province in which he was destined to do most for the scientific study of history. His interest in it was greatly stimulated by a journey to Italy in 1823; in 1824 he returned to the subject, and, as the result, published in five volumes a history of the Italian states (1829-1832). Meanwhile he had been established (1822-1827) as *Dozent* at Berlin, where he came in contact with the leaders of German thought and was somewhat spoilt by the flattering attentions of the highest Prussian society. Here, too, it was that Hegel's philosophy of history made a deep impression upon him. It was at Halle, however, where he remained for forty years (1828-1868), that he acquired his fame as an academical teacher. His wonderful power of exposition, aided by a remarkable memory, is attested by the most various witnesses. In 1830 he became ordinary professor.

In addition to his lecturing, Leo found time for much literary and political work. He collaborated in the *Jahrbücher für Wissenschaftliche Kritik* from its foundation in 1827 until the publication was stopped in 1846. As a critic of independent views he won the approval of Goethe; on the other hand, he fell into violent controversy with Ranke about questions connected with Italian history. Up to the revolutionary year 1830 his religious views had remained strongly tinged with rationalism, Hegel remaining his guide in religion as in practical politics and the treatment of history. It was not till 1838 that Leo's polemical work *Die Hegelingen* proclaimed his breach with the radical developments of the philosopher's later disciples; a breach which developed into opposition to the philosopher himself. Under the impression of the July revolution in Paris and of the orthodox and pietistic influences at Halle, Leo's political convictions were henceforth dominated by reactionary principles. As a friend of the Prussian "Camarilla" and of King Frederick William IV. he collaborated especially in the high conservative *Politisches Wochenblatt*, which first appeared in 1831, as well as in the *Evangelische Kirchenzeitung*, the *Kreuzzeitung* and the *Volksblatt für Stadt und Land*. In all this his critics scented an inclination towards Catholicism; and Leo did actually glorify the counter-Reformation, *e.g.* in his *History of the Netherlands* (2 vols. 1832-1835). His other historical works also, notably his *Universalgeschichte* (6 vols., 1835-1844), display a very one-sided point of view. When, however, in connexion with the quarrel about the archbishopric of Cologne (1837), political Catholicism raised its head menacingly, Leo turned against it with extreme violence in his open letter (1838) to Goerres, its foremost champion. On the other hand, he took a lively part in the politico-religious controversies within the fold of Prussian Protestantism.

Leo was by nature highly excitable and almost insanely passionate, though at the same time strictly honourable, unselfish, and in private intercourse even gentle. During the last year of his life his mind suffered rapid decay, of which signs had been apparent so early as 1868. He died at Halle on the 24th of April 1878. In addition to the works already mentioned, he left behind an account of his early life (*Meine Jugendzeit*, Gotha, 1880) which is of interest.

See Lord Acton, *English Historical Review*, i. (1886); H. Haupt, *Karl Follen und die Giessener Schwarzen* (Giessen, 1907); W. Herbst, *Deutsch-Evangelische Blätter*, Bd. 3; P. Krägelin, *H. Leo*, vol. i. (1779-1844) (Leipzig, 1908); P. Kraus, *Allgemeine Konservative Monatsschrift*, Bd. 50 u. 51; R. M. Meyer, *Gestalten und Probleme* (1904); W. Schrader, *Geschichte der Friedrichs-Universität in Halle* (Berlin, 1894); C. Varrentrapp, *Historische Zeitschrift*, Bd. 92; F. X. Wegele, *Allgemeine Deutsche Biographie*, Bd. 18 (1883); *Geschichte der deutschen Historiographie* (1885); G. Wolf, *Einführung in das Studium der neueren Geschichte* (1910). Leo's *Rectitudines singularum personarum nebst einer einleitenden Abhandlung über Landsiedelung, Landbau, gutsherrliche und bäuerliche Verhältnisse der Angelsachsen*, was translated into English by Lord Acton (1852).

(J. Hn.)

LEO, JOHANNES (*c.* 1494-1552), in Italian Giovanni Leo or Leone, usually called Leo Africanus, sometimes Eliberitanus (*i.e.* of Granada), and properly known among the Moors as Al Hassan Ibn Mahommed Al Wezaz Al Fasi, was the author of a *Descrizione dell' Affrica*, or *Africae descriptio*, which long ranked as the best authority on Mahommedan Africa. Born probably at Granada of a noble Moorish stock (his father was a landowner; an uncle of his appears as an envoy from Fez to Timbuktu), he received a great part of his education at Fez, and while still very young began to travel widely in the Barbary States. In 1512 we trace him at Morocco, Tunis, Bugia and Constantine; in 1513 we find him returning from Tunis to Morocco; and before the close of the latter year he seems to have started on his famous Sudan and Sahara journeys (1513-1515) which brought him to Timbuktu, to many other regions of the Great Desert and the Niger basin (Guinea, Melli, Gago, Walata, Aghadez, Wangara, Katsena, &c.), and apparently to Bornu and Lake Chad. In 1516-1517 he travelled to Constantinople, probably

visiting Egypt on the way; it is more uncertain when he visited the three Arabias (*Deserta*, *Felix* and *Petraea*), Armenia and "Tartary" (the last term is perhaps satisfied by his stay at Tabriz). His three Egyptian journeys, immediately after the Turkish conquest, all probably fell between 1517 and 1520; on one of these he ascended the Nile from Cairo to Assuan. As he was returning from Egypt about 1520 he was captured by pirates near the island of Gerba, and was ultimately presented as a slave to Leo X. The pope discovered his merit, assigned him a pension, and having persuaded him to profess the Christian faith, stood sponsor at his baptism, and bestowed on him (as Ramusio says) his own names, Johannes and Leo. The new convert, having made himself acquainted with Latin and Italian, taught Arabic (among his pupils was Cardinal Egidio Antonini, bishop of Viterbo); he also wrote books in both the Christian tongues he had acquired. His *Description of Africa* was first, apparently, written in Arabic, but the primary text now remaining is that of the Italian version, issued by the author at Rome, on the 10th of March 1526, three years after Pope Leo's death, though originally undertaken at the latter's suggestion. The Moor seems to have lived on Rome for some time longer, but he returned to Africa some time before his death at Tunis in 1552; according to some, he renounced his Christianity and returned to Islam; but the later part of his career is obscure.

The *Descrizione dell' Affrica* in its original Arabic MS. is said to have existed for some time in the library of Vincenzo Pinelli (1535-1601); the Italian text, though issued in 1526, was first printed by Giovanni Battista Ramusio in his *Navigationi et Viaggi* (vol. i.) of 1550. This was reprinted in 1554, 1563, 1588, &c. In 1556 Jean Temporal executed at Lyons an admirable French version from the Italian (*Historiale description de l'Afrique*); and in the same year appeared at Antwerp both Christopher Plantin's and Jean Bellere's pirated issues of Temporal's translation, and a new (very inaccurate) Latin version by Joannes Florianus, *Joannis Leonis Africani de totius Africae descriptione libri i.-ix.* The latter was reprinted in 1558, 1559 (Zürich), and 1632 (Leiden), and served as the basis of John Pory's Elizabethan English translation, made at the suggestion of Richard Hakluyt (*A Geographical Historie of Africa*, London, 1600). Pory's version was reissued, with notes, maps, &c., by Robert Brown, E. G. Ravenstein, &c. (3 vols., Hakluyt Society, London, 1896). An excellent German translation was made by Lorsbach, from the Italian, in 1805 (*Johann Leos des Afrikaners Beschreibung von Afrika*, Herborn). See also Francis Moore's *Travels into the inland parts of Africa* (1738), containing a translation of Leo's account of negro kingdoms. Heinrich Barth intended to have made a fresh version, with a commentary, but was prevented by death; as it is, his own great works on the Sudan are the best elucidation of the *Descrizione dell' Affrica*.

Leo also wrote lives of the Arab physicians and philosophers (*De viris quibusdam illustribus apud Arabes*; see J. A. Fabricius, *Bibliotheca Graeca*, Hamburg, 1726, xiii. 259-298); a Spanish-Arabic vocabulary, now lost, but noticed by Ramusio as having been consulted by the famous Hebrew physician, Jacob Mantino; a collection of Arabic epitaphs in and near Fez (the MS. of this Leo presented, it is said, to the brother of the king); and poems, also lost. It is stated, moreover, that Leo intended writing a history of the Mahommedan religion, an epitome of Mahommedan chronicles, and an account of his travels in Asia and Egypt.

(C. R. B.)

LEO, LEONARDO (1694-1744), more correctly Lionardo Oronzo Salvatore de Leo, Italian musical composer, was born on the 5th of August 1694 at S. Vito dei Normanni, near Brindisi. He became a student at the Conservatorio della Pietà dei Turchini at Naples in 1703, and was a pupil first of Provenzale and later of Nicola Fago. It has been supposed that he was a pupil of Pitoni and Alessandro Scarlatti, but he could not possibly have studied with either of these composers, although he was undoubtedly influenced by their compositions. His earliest known work was a sacred drama, *L'Infedeltà abbattuta*, performed by his fellow-students in 1712. In 1714 he produced, at the court theatre, an opera, *Pisistrato*, which was much admired. He held various posts at the royal chapel, and continued to write for the stage, besides teaching at the conservatorio. After adding comic scenes to Gasparini's *Bajazette* in 1722 for performance at Naples, he composed a comic opera, *La Mpeca scoperta*, in Neapolitan dialect, in 1723. His most famous comic opera was *Amor vuol sofferenze* (1739), better known as *La Finta Frascatana*, highly praised by Des Brosses. He was equally distinguished as a composer of serious opera, *Demofoonte* (1735), *Farnace* (1737) and *L'Olimpiade* (1737) being his most famous works in this branch, and is still better known as a composer of sacred music. He died of apoplexy on the 31st of October 1744 while engaged in the composition of new airs for a revival of *La Finta Frascatana*.

Leo was the first of the Neapolitan school to obtain a complete mastery over modern harmonic counterpoint. His sacred music is masterly and dignified, logical rather than passionate, and free from the sentimentality which disfigures the work of F. Durante and G. B. Pergolesi. His serious operas suffer from a coldness and severity of style, but in his comic operas he shows a keen sense of humour. His *ensemble* movements are spirited, but never worked up to a strong climax.

A fine and characteristic example of his sacred music is the *Dixit Dominus* in C, edited by C. V. Stanford and published by Novello. A number of songs from operas are accessible in modern editions.

(E. J. D.)

LEO (The Lion), in astronomy, the fifth sign of the zodiac (*q.v.*), denoted by the symbol Ω. It is also a constellation, mentioned by Eudoxus (4th century B.C.) and Aratus (3rd century B.C.). According to Greek mythology this constellation is the Nemean lion, which, after being killed by Hercules, was raised to the heavens by Jupiter in honour of Hercules. A part of Ptolemy's Leo is now known as Coma Berenices (*q.v.*). α Leonis, also known as Cor Leonis or the Lion's Heart, Regulus, Basilicus, &c., is a very bright star of magnitude 1.23, and parallax 0.02″, and proper motion 0.27″ per annum. γ Leonis is a very fine orange-yellow binary star, of magnitudes 2 and 4, and period 400 years. ι Leonis is a binary, composed of a 4th magnitude pale yellow star,

and a 7th magnitude blue star. The Leonids are a meteoric swarm, appearing in November and radiating from this constellation (see Meteor).

LEOBEN, a town in Styria, Austria, 44 m. N.W. of Graz by rail. Pop. (1900) 10,204. It is situated on the Mur, and part of its old walls and towers still remain. It has a well-known academy of mining and a number of technical schools. Its extensive iron-works and trade in iron are a consequence of its position on the verge of the important lignite deposits of Upper Styria and in the neighbourhood of the iron mines and furnaces of Vordernberg and Eisenerz. On the 18th of April 1797 a preliminary peace was concluded here between Austria and France, which led to the treaty of Campo-Formio.

LEOBSCHÜTZ (Bohemian *Lubczyce*), a town of Germany, in the Prussian province of Silesia, on the Zinna, about 20 m. to the N.W. of Ratibor by rail. Pop. (1905) 12,700. It has a large trade in wool, flax and grain, its markets for these commodities being very numerously attended. The principal industries are malting, carriage-building, wool-spinning and glass-making. The town contains three Roman Catholic churches, a Protestant church, a synagogue, a new town-hall and a gymnasium. Leobschütz existed in the 10th century, and from 1524 to 1623 was the capital of the principality of Jägerndorf.

See F. Troska, *Geschichte der Stadt Leobschütz* (Leobschütz, 1892).

LEOCHARES, a Greek sculptor who worked with Scopas on the Mausoleum about 350 B.C. He executed statues of the family of Philip of Macedon, in gold and ivory, which were set up by that king in the Philippeum at Olympia. He also with Lysippus made a group in bronze at Delphi representing a lion-hunt of Alexander. Of this the base with an inscription was recently found. We hear of other statues by Leochares of Zeus, Apollo and Ares. The statuette in the Vatican, representing Ganymede being carried away by an eagle, though considerably restored and poor in execution, so closely corresponds with Pliny's description of a group by Leochares that we are justified in considering it a copy of that group, especially as the Vatican statue shows all the characteristics of Attic 4th-century art. Pliny (*N.H.* 34. 79) writes: "Leochares made a group of an eagle aware whom it is carrying off in Ganymede and to whom it is bearing him; holding the boy delicately in its claws, with his garment between." (For engraving see Greek Art, Plate I. fig. 53.) The tree stem is skilfully used as a support; and the upward strain of the group is ably rendered. The close likeness both in head and pose between the Ganymede and the well-known Apollo Belvidere has caused some modern archaeologists to assign the latter also to Leochares. With somewhat more confidence we may regard the fine statue of Alexander the Great at Munich as a copy of his gold and ivory portrait at Olympia.

(P. G.)

LEOFRIC (d. 1057), earl of Mercia, was a son of Leofwine, earl of Mercia, and became earl at some date previous to 1032. Henceforth, being one of the three great earls of the realm, he took a leading part in public affairs. On the death of King Canute in 1035 he supported the claim of his son Harold to the throne against that of Hardicanute; and during the quarrel between Edward the Confessor and Earl Godwine in 1051 he played the part of a mediator. Through his efforts civil war was averted, and in accordance with his advice the settlement of the dispute was referred to the Witan. When he became earl of Mercia his direct rule seems to have been confined to Cheshire, Staffordshire, Shropshire and the borders of north Wales, but afterwards he extended the area of his earldom. As Chester was his principal residence and the seat of his government, he is sometimes called earl of Chester. Leofric died at Bromley in Staffordshire on the 31st of August 1057. His wife was Godgifu, famous in legend as Lady Godiva. Both husband and wife were noted as liberal benefactors to the church, among their foundations being the famous Benedictine monastery at Coventry. Leofric's son, Ælfgar, succeeded him as earl of Mercia.

See E. A. Freeman, *The Norman Conquest*, vols. i. and ii. (1877).

LEOMINSTER, a market-town and municipal borough in the Leominster parliamentary division of Herefordshire, England, in a rich agricultural country on the Lugg, 157 m. W.N.W. of London and 12½ N. of Hereford on the Great Western and London & North-Western railways. Pop. (1901) 5826. Area, 8728 acres. Some fine old timber houses lend picturesqueness to the wide streets. The parish church, of mixed architecture, including the Norman nave of the old priory church, and containing some of the most beautiful examples of window tracery in England, was restored in 1866, and enlarged by the addition of a south nave in 1879. The Butter Cross, a beautiful example of timber work of the date 1633, was removed when the town-hall was building, and re-erected in the pleasure ground of the Grange. Trade is chiefly in agricultural produce, wool and cider, as the district is rich in orchards. Brewing (from the produce of local hop-gardens) and the manufacture of agricultural implements are also carried on. The town is under a mayor, four aldermen and twelve councillors.

Merewald, king of Mercia, is said to have founded a religious house in Leominster (Llanlieni, Leofminstre, Lempster) in 660, and a nunnery existed here until the Conquest, when the place became a royal demesne. It was granted by Henry I. to the monks of Reading, who built in it a cell of their abbey, and under whose protection the town grew up and was exempted from the sphere of the county and hundred courts. In 1539 it reverted to the crown; and in 1554 was incorporated, by a charter renewed in 1562, 1563, 1605, 1666, 1685 and 1786. The borough returned two members to the parliament of 1295 and to other parliaments, until by the Representation Act 1867 it lost one representative, and by the Redistribution of Seats Act 1885 separate representation. A fair was granted in the time of Henry II., and fairs in the seasons of Michaelmas and the feasts of St Philip and St James and of Edward the Confessor, in 1265, 1281 and 1290 respectively. Charters to the burghers authorized fairs on the days of St Peter and of St Simon and St Jude in 1554, on St Bartholomew’s day in 1605, in Mid-lent week in 1665, and on the feast of the Purification and on the 2nd of May in 1685; these fairs have modern representatives. A market was held by the abbey by a grant of Henry I.; Friday is now market day. Leominster was famous for wool from the 13th to the 18th century. There were gilds of mercers, tailors, drapers, dyers and glovers in the 16th century. In 1835 the wool trade was said to be dead; and that of glove-making, which had been important, was diminishing. Hops and apples were grown in 1715.

See G. Townsend, *The Town and Borough of Leominster* (1863), and John Price, *An Historical and Topographical Account of Leominster and its Vicinity* (Ludlow, 1715).

LEOMINSTER, a township of Worcester county, Massachusetts, U.S.A., about 45 m. N.W. of Boston and about 20 m. N. by E. of Worcester. Pop. (1890) 7269; (1900) 12,392, of whom 2827 were foreign-born; (1910 census) 17,580. It is a broken, hilly district, 26.48 sq. m. in area, traversed by the Nashua river, crossed by the Northern Division of the New York, New Haven & Hartford railroad, and by the Fitchburg Division of the Boston & Maine, and connected with Boston, Worcester and other cities by interurban electric lines. Along the N.E. border and mostly in the township of Lunenburg are Whalom Lake and Whalom Park, popular pleasure resorts. The principal villages are Leominster, 5 m. S.E. of Fitchburg, and North Leominster; the two adjoin and are virtually one. According to the Special U.S. Census of Manufactures of 1905 the township had in that year a greater diversity of important manufacturing industries than any place of its size in the state, or, probably, in the United States; its 65 manufactories, with a capital of $4,572,726 and with a product for the year valued at $7,501,720 (39% more than in 1900), produced celluloid and horn work (the manufacture of which is a more important industry here than elsewhere in the United States), celluloid combs, furniture, paper, buttons, pianos and piano-cases, children’s carriages and sleds, stationery, leatherboard, worsted, woollen and cotton goods, shirts, paper boxes, &c. Leominster owns and operates its water-works. The township was formed from a part of Lancaster township in 1740.

LEÓN, LUIS PONCE DE (1527-1591), Spanish poet and mystic, was born at Belmonte de Cuenca, entered the university of Salamanca at the age of fourteen, and in 1544 joined the Augustinian order. In 1561 he obtained a theological chair at Salamanca, to which in 1571 was added that of sacred literature. He was denounced to the Inquisition for translating the book of Canticles, and for criticizing the text of the Vulgate. He was consequently imprisoned at Valladolid from March 1572 till December 1576; the charges against him were then abandoned, and he was released with an admonition. He returned to Salamanca as professor of Biblical exegesis, and was again reported to the Inquisition in 1582, but without result. In 1583-1585 he published the three books of a celebrated mystic treatise, *Los Nombres de Cristo*, which he had written in prison. In 1583 also appeared the most popular of his prose works, a treatise entitled *La Perfecta Casada*, for the use of a lady newly married. Ten days before his death, which occurred at Madrigal on the 23rd of August 1591, he was elected vicar general of the Augustinian order. Luis de León is not only the greatest of Spanish mystics; he is among the greatest of Spanish lyrical poets. His translations of Euripides, Pindar, Virgil and Horace are singularly happy; his original pieces, whether devout like the ode *De la vida del cielo*, or secular like the ode *A Salinas*, are instinct with a serene sublimity unsurpassed in any literature, and their form is impeccable. Absorbed by less worldly interests, Fray Luis de León refrained from printing his poems, which were not issued till 1631, when Quevedo published them as a counterblast to *culteranismo*.

The best edition of Luis de León’s works is that of Merino (6 vols., Madrid, 1816); the reprint (Madrid, 1885) by

C. Muñoz Saenz is incorrect. The text of *La Perfecta Casada* has been well edited by Miss Elizabeth Wallace (Chicago, 1903). See *Coleccion de documentos inéditos para la historia de España*, vols. x.-xi.; F. H. Reusch, *Luis de León und die spanische Inquisition* (Bonn, 1873); M. Gutiérrez, *Fray Luis de León y la filosofía española* (Madrid, 1885); M. Menendez y Pelayo, *Estudios de crítica literaria* (Madrid, 1893), Primera série, pp. 1-72.

LEON, MOSES [Ben Shem-ṭob] **DE** (d. 1305), Jewish scholar, was born in Leon (Spain) in the middle of the 13th century and died at Arevalo. His fame is due to his authorship of the most influential Kabbalist work, the *Zohar* (see Kabbala), which was attributed to Simon b. Yoḥai, a Rabbi of the 2nd century. In modern times the discovery of the modernity of the *Zohar* has led to injustice to the author. Moses de Leon undoubtedly used old materials and out of them constructed a work of genius. The discredit into which he fell was due partly to the unedifying incidents of his personal career. He led a wandering life, and was more or less of an adventurer. But as to the greatness of his work, the profundity of his philosophy and the brilliance of his religious idealism, there can be no question.

See Graetz, *History of the Jews*, vol. iv. ch. i.; Geiger, *Leon de Modena*.

(I. A.)

LEON OF MODENA (1571-1648), Jewish scholar, was born in Venice, of a notable French family which had migrated to Italy after the expulsion of the Jews from France. He was a precocious child, but, as Graetz points out, his lack of stable character prevented his gifts from maturing. “He pursued all sorts of occupations to support himself, viz. those of preacher, teacher of Jews and Christians, reader of prayers, interpreter, writer, proof-reader, bookseller, broker, merchant, rabbi, musician, matchmaker and manufacturer of amulets.” Though he failed to rise to real distinction he earned a place by his criticism of the Talmud among those who prepared the way for the new learning in Judaism. One of Leon’s most effective works was his attack on the Kabbala (*‘Ari Nohem*, first published in 1840), for in it he demonstrated that the “Bible of the Kabbalists” (the *Zohar*) was a modern composition. He became best known, however, as the interpreter of Judaism to the Christian world. At the instance of an English nobleman he prepared an account of the religious customs of the Synagogue, *Riti Ebraici* (1637). This book was widely read by Christians; it was rendered into various languages, and in 1650 was translated into English by Edward Chilmead. At the time the Jewish question was coming to the fore in London, and Leon of Modena’s book did much to stimulate popular interest. He died at Venice.

See Graetz, *History of the Jews* (Eng. trans.), vol. v. ch. iii.; *Jewish Encyclopedia*, viii. 6; Geiger, *Leon de Modena*.

(I. A.)

LEÓN, or León de las Aldamas, a city of the state of Guanajuato, Mexico, 209 m. N.W. of the federal capital and 30 m. W. by N. of the city of Guanajuato. Pop. (1895) 90,978; (1900) 62,623, León ranking fourth in the latter year among the cities of Mexico. The Mexican Central gives it railway connexion with the national capital and other prominent cities of the Republic. León stands in a fertile plain on the banks of the Turbio, a tributary of the Rio Grande de Lerma, at an elevation of 5862 ft. above sea-level and in the midst of very attractive surroundings. The country about León is considered to be one of the richest cereal-producing districts of Mexico. The city itself is subject to disastrous floods, sometimes leading to loss of life as well as damage to property, as in the great flood of 1889. León is essentially a manufacturing and commercial city; it has a cathedral and a theatre, the latter one of the largest and finest in the republic. The city is regularly built, with wide streets and numerous shady parks and gardens. It manufactures saddlery and other leather work, gold and silver embroideries, cotton and woollen goods, especially *rebozos* (long shawls), soap and cutlery. There are also tanneries and flour mills. The city has a considerable trade in wheat and flour. The first settlement of León occurred in 1552, but its formal foundation was in 1576, and it did not reach the dignity of a city until 1836.

LEON, the capital of the department of Leon, Nicaragua, an episcopal see, and the largest city in the republic, situated midway between Lake Managua and the Pacific Ocean, 50 m. N.W. of Managua, on the railway from that city to the Pacific port of Corinto. Pop. (1905) about 45,000, including the Indian town of Subtiaba. Leon covers a very wide area, owing to its gardens and plantations. Its houses are usually one-storeyed, built of adobe and roofed with red tiles; its public buildings are among the finest in Central America. The massive and elaborately ornamented cathedral was built in the Renaissance style between 1746 and 1774; a Dominican church

in Subtiaba is little less striking. The old (1678) and new (1873) episcopal palaces, the hospital, the university and the barracks (formerly a Franciscan monastery) are noteworthy examples of Spanish colonial architecture. Leon has a large general trade, and manufactures cotton and woollen fabrics, ice, cigars, boots, shoes and saddlery; its tanneries supply large quantities of cheap leather for export. But its population (about 60,000 in 1850) tends to decrease.

At the time of the Spanish conquest Subtiaba was the residence of the great cacique of Nagrando, and contained an important Indian temple. The city of Leon, founded by Francisco Hernandez de Cordova in 1523, was originally situated at the head of the western bay of Lake Managua, and was not removed to its present position till 1610. Thomas Gage, who visited it in 1665, describes it as a splendid city; and in 1685 it yielded rich booty to William Dampier (*q.v.*). Until 1855 Leon was the capital of Nicaragua, although its great commercial rival Granada contested its claim to that position, and the jealousy between the two cities often resulted in bloodshed. Leon was identified with the interests of the democracy of Nicaragua, Granada with the clerical and aristocratic parties.

See NICARAGUA; E. G. Squier, *Central America*, vol. i. (1856); and T. Gage, *Through Mexico*, &c. (1665).

LEON, the name of a modern province and of an ancient kingdom, captaincy-general and province in north-western Spain. The modern province, founded in 1833, is bounded on the N. by Oviedo, N.E. by Santander, E. by Palencia, S. by Valladolid and Zamora and W. by Orense and Lugo. Pop. (1900) 386,083. Area, 5986 sq. m. The boundaries of the province on the north and west, formed respectively by the central ridge and southerly offshoots of the Cantabrian Mountains (*q.v.*), are strongly marked; towards the south-east the surface merges imperceptibly into the Castilian plateau, the line of demarcation being for the most part merely conventional. Leon belongs partly to the river system of the Miño (see SPAIN), partly to that of the Duero or Douro (*q.v.*), these being separated by the Montañas de Leon, which extend in a continuous wall (with passes at Manzanal and Poncebadon) from north to south-west. To the north-west of the Montañas de Leon is the richly wooded pastoral and highland district known as the Vierzo, which in its lower valleys produces grain, fruit, and wine in abundance. The Tierra del Campo in the west of the province is fairly productive, but in need of irrigation. The whole province is sparsely peopled. Apart from agriculture, stock-raising and mining, its commerce and industries are unimportant. Cattle, mules, butter, leather, coal and iron are exported. The hills of Leon were worked for gold in the time of the Romans; iron is still obtained, and coal-mining developed considerably towards the close of the 19th century. The only towns with more than 5000 inhabitants in 1900 were Leon (15,580) and Astorga (5573) (*q.v.*). The main railway from Madrid to Corunna passes through the province, and there are branches from the city of Leon to Vierzo, Oviedo, and the Biscayan port of Gijón.

At the time of the Roman conquest, the province was inhabited by the Vettones and Callaici; it afterwards formed part of Hispania Tarraconensis. Among the Christian kingdoms which arose in Spain as the Moorish invasion of the 8th century receded, Leon was one of the oldest. The title of king of Leon was first assumed by Ordoño in 913. Ferdinand I. (the Great) of Castile united the crowns of Castile and Leon in the 11th century; the two were again separated in the 12th, until a final union took place (1230) in the person of St Ferdinand. The limits of the kingdom varied with the vicissitudes of war, but roughly speaking it may be said to have embraced what are now the provinces of Leon, Palencia, Valladolid, Zamora and Salamanca. For a detailed account of this kingdom, see SPAIN: *History*. The captaincy-general of the province of Leon before 1833 included Leon, Zamora and Salamanca. The Leonese, or inhabitants of these three provinces, have less individuality, in character and physique, than the people of Galicia, Catalonia or Andalusia, who are quite distinct from what is usually regarded as the central or national Spanish type, *i.e.* the Castilian. The Leonese belong partly to the Castilian section of the Spaniards, partly to the north-western section which includes the Galicians and Asturians. They have comparatively few of the Moorish traits which are so marked in the south and east of Spain. Near Astorga there dwells a curious tribe, the Maragatos, sometimes considered to be a remnant of the original Celtiberian inhabitants. As a rule the Maragatos earn their living as muleteers or carriers; they wear a distinctive costume, mix as little as possible with their neighbours and do not marry outside their own tribe.

LEON, an episcopal see and the capital of the Spanish province of Leon, situated on a hill 2631 ft. above sea-level, in the angle made by the Torio and Bernesga, streams which unite on the south, and form the river Leon, a tributary of the Esla. Pop. (1900) 15,580. Leon is on the main railway from Madrid to Oviedo, and is connected with Astorga by a branch line. The older quarters of the city, which contain the cathedral and other medieval buildings, are surrounded by walls, and have lost little of their beauty and interest from the restoration carried out in the second half of the 19th century. During the same period new suburbs grew up outside the walls to house the industrial population which was attracted by the development of iron-founding and the manufacture of machinery, railway-plant, chemicals and leather. Leon thus comprises two towns—the old, which is mainly ecclesiastical in its character, and the new, which is industrial. The cathedral, founded in 1199 and only finished at the close of the 14th century, is built of a warm cream-coloured stone, and is remarkable for simplicity, lightness and strength. It is one of the finest examples of Spanish Gothic, smaller, indeed, than the cathedrals of Burgos and Toledo, but exquisite in design and workmanship. The chapter library contains some valuable manuscripts. The collegiate church of San Isidoro was founded by Ferdinand I. of Castile in 1063 and consecrated in 1149. Its architecture is Romanesque. The church contains some fine plate, including the silver reliquary in which the bones of St Isidore of Seville are preserved, and a silver processional cross dating from the 16th

century, which is one of the most beautiful in the country. The convent and church of San Marcos, planned in 1514 by Ferdinand the Catholic, founded by Charles V. in 1537, and consecrated in 1541, are Renaissance in style. They are built on the site of a hostel used by pilgrims on their way to Santiago de Compostela. The provincial museum occupies the chapterhouse and contains some interesting Roman monuments. The lower part of the city walls consists of Roman masonry dating from the 3rd century. Other buildings are the high school, ecclesiastical seminaries, hospital, episcopal palace and municipal and provincial halls.

Leon (Arab. *Liyun*) owes its name to the Legio Septima Gemina of Galba, which, under the later emperors, had its headquarters here. About 540 Leon fell into the hands of the Gothic king Leovigild, and in 717 it capitulated to the Moors. Retaken about 742, it ultimately, in the beginning of the 10th century, became the capital of the kingdom of Leon (see SPAIN: *History*). About 996 it was taken by Almansur, but on his death soon afterwards it reverted to the Spaniards. It was the seat of several ecclesiastical councils, the first of which was held under Alphonso V. in 1012 and the last in 1288.

LEONARDO DA VINCI

(1452-1519), the great Italian painter, sculptor, architect, musician, mechanician, engineer and natural philosopher, was the son of a Florentine lawyer, born out of wedlock by a mother in a humble station, variously described as a peasant and as of gentle birth. The place of his birth was Vinci, a *castello* or fortified hill village in the Florentine territory near Empoli, from which his father's family derived its name. The Christian name of the father was Piero (the son of Antonio the son of Piero the son of Guido, all of whom had been men of law like their descendant). Leonardo's mother was called Catarina. Her relations with Ser Piero da Vinci seem to have come to an end almost immediately upon the birth of their son. She was soon afterwards married to one Accattabriga di Piero del Vacca, of Vinci. Ser Piero on his part was four times married, and had by his last two wives nine sons and two daughters; but he had from the first acknowledged the boy Leonardo and brought him up in his own house, principally, no doubt, at Florence. In that city Ser Piero followed his profession with success, as notary to many of the chief families in the city, including the Medici, and afterwards to the signory or governing council of the state. The son born to him before marriage grew up into a youth of shining promise. To splendid beauty and activity of person he joined a winning charm of temper and manners, a tact for all societies, and an aptitude for all accomplishments. An inexhaustible intellectual energy and curiosity lay beneath this amiable surface. Among the multifarious pursuits to which the young Leonardo set his hand, the favourites at first were music, drawing and modelling. His father showed some of his drawings to an acquaintance, Andrea del Verrocchio, who at once recognized the boy's artistic vocation, and was selected by Ser Piero to be his master.

Verrocchio, although hardly one of the great creative or inventive forces in the art of his age at Florence, was a first-rate craftsman alike as goldsmith, sculptor and painter, and particularly distinguished as a teacher. In his studio Leonardo worked for several years (about 1470-1477) in the company of Lorenzo di Credi and other less celebrated pupils. Among his contemporaries he formed special ties of friendship with the painters Sandro Botticelli and Pietro Perugino. He had soon learnt all that Verrocchio had to teach—more than all, if we are to believe the oft-told tale of the figure, or figures, executed by the pupil in the picture of Christ's Baptism designed by the master for the monks of Vallombrosa. The work in question is now in the Academy at Florence. According to Vasari the angel kneeling on the left, with a drapery over the right arm, was put in by Leonardo, and when Verrocchio saw it his sense of its superiority to his own work caused him to forswear painting for ever after. The latter part of the story is certainly false. The picture, originally painted in tempera, has suffered much from later repaints in oil, rendering exact judgment difficult. The most competent opinion inclines to acknowledge the hand of Leonardo, not only in the face of the angel, but also in parts of the drapery and of the landscape background. The work was probably done in or about 1470, when Leonardo was eighteen years old. By 1472 we find him enrolled in the lists of the painters' gild at Florence. Here he continued to live and work for ten or eleven years longer. Up till 1477 he is still spoken of as a pupil or apprentice of Verrocchio; but in that year he seems to have been taken into special favour by Lorenzo the Magnificent, and to have worked as an independent artist under his patronage until 1482-1483. In 1478 we find him receiving an important commission from the signory, and in 1480 another from the monks of San Donato in Scopeto.

Leonardo was not one of those artists of the Renaissance who sought the means of reviving the ancient glories of art mainly in the imitation of ancient models. The antiques of the Medici gardens seem to have had little influence on him beyond that of generally stimulating his passion for perfection. By his own instincts he was an exclusive student of nature. From his earliest days he had flung himself upon that study with an unprecedented ardour of delight and curiosity. In drawing from life he had early found the way to unite precision with freedom and fire—the subtlest accuracy of expressive definition with vital movement and rhythm of line—as no draughtsman had been able to unite them before. He was the first painter to recognize the play of light and shade as among the most significant and attractive of the world's appearances, the earlier schools having with one consent subordinated light and shade to colour and outline. Nor was he a student of the broad, usual, patent appearances only of the world; its fugitive, fantastic, unaccustomed appearances attracted him most of all. Strange shapes of hills and rocks, rare plants and animals, unusual faces and figures of men, questionable smiles and expressions, whether beautiful or grotesque, far-fetched objects and curiosities, were things he loved to pore upon and keep in memory. Neither did he stop at mere appearances of any kind, but, having stamped the image of things upon his brain, went on indefatigably to probe their hidden laws and causes. He soon satisfied himself that the artist who was content to reproduce the external aspects of things without searching into the hidden workings of nature behind them, was one but half equipped for his calling. Every fresh artistic problem immediately became for him a far-reaching scientific problem as well. The laws of light and shade, the laws of "perspective," including optics and the physiology of the eye, the laws of human and animal anatomy and muscular movement, those of the growth and structure of plants and of the powers and properties of water, all these and much more furnished food almost from the beginning to his insatiable spirit of inquiry.

The evidence of the young man's predilections and curiosities is contained in the legends which tell of lost

works produced by him in youth. One of these was a cartoon or monochrome painting of Adam and Eve in tempera, and in this, besides the beauty of the figures, the infinite truth and elaboration of the foliage and animals in the background are celebrated in terms which bring to mind the treatment of the subject by Albrecht Dürer in his famous engraving done thirty years later. Again, a peasant of Vinci having in his simplicity asked Ser Piero to get a picture painted for him on a wooden shield, the father is said to have laughingly handed on the commission to his son, who thereupon shut himself up with all the noxious insects and grotesque reptiles he could find, observed and drew and dissected them assiduously, and produced at last a picture of a dragon compounded of their various shapes and aspects, which was so fierce and so life-like as to terrify all who saw it. With equal research and no less effect he painted on another occasion the head of a snaky-haired Medusa. (A picture of this subject which long did duty at the Uffizi for Leonardo's work is in all likelihood merely the production of some later artist to whom the descriptions of that work have given the cue.) Lastly, Leonardo is related to have begun work in sculpture about this time by modelling several heads of smiling women and children.

Of certified and accepted paintings produced by the young genius, whether during his apprentice or his independent years at Florence (about 1470-1482), very few are extant, and the two most important are incomplete. A small and charming strip of an oblong "Annunciation" at the Louvre is generally accepted as his work, done soon after 1470; a very highly wrought drawing at the Uffizi, corresponding on a larger scale to the head of the Virgin in the same picture, seems rather to be a copy by a later hand. This little Louvre "Annunciation" is not very compatible in style with another and larger, much-debated "Annunciation" at the Uffizi, which manifestly came from the workshop of Verrocchio about 1473-1474, and which many critics claim confidently for the young Leonardo. It may have been joint studio-work of Verrocchio and his pupils including Leonardo, who certainly was concerned in it, since a study for the sleeve of the angel, preserved at Christ Church, Oxford, is unquestionably by his hand. The landscape, with its mysterious spiry mountains and winding waters, is very Leonardesque both in this picture and in another contemporary product of the workshop, or as some think of Leonardo's hand, namely a very highly and coldly finished small "Madonna with a Pink" at Munich. The likeness he is recorded to have painted of Ginevra de' Benci used to be traditionally identified with the fine portrait of a matron at the Pitti absurdly known as *La Monaca*: more lately it has been recognized in a rather dull, expressionless Verrocchiesque portrait of a young woman with a fanciful background of pine-sprays in the Liechtenstein gallery at Vienna. Neither attribution can be counted convincing. Several works of sculpture, including a bas-relief at Pistoia and a small terra-cotta model of a St John at the Victoria and Albert Museum, have also been claimed, but without general consent, as the young master's handiwork. Of many brilliant early drawings by him, the first that can be dated is a study of landscape done in 1473. A magnificent silver-point head of a Roman warrior at the British Museum was clearly done, from or for a bas-relief, under the immediate influence of Verrocchio. A number of studies of heads in pen or silver point, with some sketches for Madonnas, including a charming series in the British Museum for a "Madonna with the Cat," may belong to the same years or the first years of his independence. A sheet with two studies of heads bears a MS. note of 1478, saying that in one of the last months of that year he began painting the "Two Maries." One of the two may have been a picture of the Virgin appearing to St Bernard, which we know he was commissioned to paint in that year for a chapel in the Palace of the Signory, but never finished: the commission was afterwards transferred to Filippino Lippi, whose performance is now in the Badia. One of the two heads on this dated sheet may probably have been a study for the same St Bernard; it was used afterwards by some follower for a St Leonard in a stiff and vapid "Ascension of Christ," wrongly attributed to the master himself in the Berlin Museum. A pen-drawing representing a ringleader of the Pazzi conspiracy, Bernardo Baroncelli, hung out of a window of the Bargello after his surrender by the sultan at Constantinople to the emissaries of Florence, can be dated from its subject as done in December 1479. A number of his best drawings of the next following years are preparatory pen-studies for an altar-piece of the "Adoration of the Magi," undertaken early in 1481 on the commission of the monks of S. Donato at Scopeto. The preparation in monochrome for this picture, a work of extraordinary power both of design and physiognomical expression, is preserved at the Uffizi, but the painting itself was never carried out, and after Leonardo's failure to fulfil his contract Filippino Lippi had once more to be employed in his place. Of equal or even more intense power, though of narrower scope, is an unfinished monochrome preparation for a St Jerome, found accidentally at Rome by Cardinal Fesch and now in the Vatican gallery; this also seems to belong to the first Florentine period, but is not mentioned in documents.

The tale of completed work for these twelve or fourteen years (1470-1483 or thereabouts) is thus very scanty. But it must be remembered that Leonardo was already full of projects in mechanics, hydraulics, architecture, and military and civil engineering, ardently feeling his way in the work of experimental study and observation in every branch of theoretical or applied science in which any beginning had been made in his age, as well as in some in which he was himself the first pioneer. He was full of new ideas concerning both the laws and the applications of mechanical forces. His architectural and engineering projects were of a daring which amazed even the fellow-citizens of Alberti and Brunelleschi. History presents few figures more attractive to the mind's eye than that of Leonardo during this period of his all-capable and dazzling youth. He did not indeed escape calumny, and was even denounced on a charge of immoral practices, but fully and honourably acquitted. There was nothing about him, as there was afterwards about Michelangelo, dark-tempered, secret or morose; he was open and genial with all men. He has indeed praised "the self-sufficing power of solitude" in almost the same phrase as Wordsworth, and from time to time would even in youth seclude himself for a season in complete intellectual absorption, as when he toiled among his bats and wasps and lizards, forgetful of rest and food, and insensible to the noisomeness of their corruption. But we have to picture him as anon coming out and gathering about him a tatterdemalion company, and jesting with them until they were in fits of laughter, for the sake of observing their burlesque physiognomies; anon as eagerly frequenting the society of men of science and learning of an older generation like the mathematician Benedetto Aritmetico, the physician, geographer and astronomer Paolo Toscanelli, the famous Greek Aristotelian Giovanni Argiropoulo; or as out-rivalling all the youth of the city now by charm of recitation, now by skill in music and now by feats of strength and horsemanship; or as stopping to buy caged birds in the market that he might set them free and watch them rejoicing in their flight; or again as standing radiant in his rose-coloured cloak and his rich gold hair among the throng of young and old on the piazza, and holding them spellbound while he expatiated on the great projects in art and mechanics that were teeming in his mind. Unluckily it is to written records and to imagination that we have to trust exclusively for our picture. No portrait of Leonardo as he appeared during this period of his life has come down to us.

But his far-reaching schemes and studies brought him no immediate gain, and diverted him from the tasks by which he should have supported himself. For all his shining power and promise he remained poor. Probably also his exclusive belief in experimental methods, and slight regard for mere authority whether in science or art made

the intellectual atmosphere of the Medicean circle, with its passionate mixed cult of the classic past and of a Christianity mystically blended and reconciled with Platonism, uncongenial to him. At any rate he was ready to leave Florence when the chance was offered him of fixed service at the court of Ludovico Sforza (il Moro) at Milan. Soon after that prince had firmly established his power as nominal guardian and protector of his nephew Gian Galeazzo but really as usurping ruler of the state, he revived a project previously mooted for the erection of an equestrian monument in honour of the founder of his house's greatness, Francesco Sforza, and consulted Lorenzo dei Medici on the choice of an artist. Lorenzo recommended the young Leonardo, who went to Milan accordingly (at some uncertain date in or about 1483), taking as a gift from Lorenzo and a token of his own skill a silver lute of wondrous sweetness fashioned in the likeness of a horse's head. Hostilities were at the moment imminent between Milan and Venice; it was doubtless on that account that in the letter commending himself to the duke, and setting forth his own capacities, Leonardo rests his title to patronage chiefly on his attainments and inventions in military engineering. After asserting these in detail under nine different heads, he speaks under a tenth of his proficiency as a civil engineer and architect, and adds lastly a brief paragraph with reference to what he can do in painting and sculpture, undertaking in particular to carry out in a fitting manner the monument to Francesco Sforza.

The first definite documentary evidence of Leonardo's employments at Milan dates from 1487. Some biographers have supposed that the interval, or part of it, between 1483 and that date was occupied by travels in the East. The grounds of the supposition are some drafts occurring among his MSS. of a letter addressed to the *diodario* or *diwâdar* of Syria, lieutenant of the sultan of Babylon (Babylon meaning according to a usage of that time Cairo). In these drafts Leonardo describes in the first person, with sketches, a traveller's strange experiences in Egypt, Cyprus, Constantinople, the Cilician coasts about Mount Taurus and Armenia. He relates the rise and persecution of a prophet and preacher, the catastrophe of a falling mountain and submergence of a great city, followed by a general inundation, and the claim of the prophet to have foretold these disasters; adding physical descriptions of the Euphrates river and the marvellous effects of sunset light on the Taurus range. No contemporary gives the least hint of Leonardo's having travelled in the East; to the places he mentions he gives their classical and not their current Oriental names; the catastrophes he describes are unattested from any other source; he confuses the Taurus and the Caucasus; some of the phenomena he mentions are repeated from Aristotle and Ptolemy; and there seems little reason to doubt that these passages in his MSS. are merely his drafts of a projected geographical treatise or perhaps romance. He had a passion for geography and travellers' tales, for descriptions of natural wonders and ruined cities, and was himself a practised fictitious narrator and fabulist, as other passages in his MSS. prove. Neither is the gap in the account of his doings after he first went to the court of Milan really so complete as has been represented. Ludovico was vehemently denounced and attacked during the earlier years of his usurpation, especially by the partisans of his sister-in-law Bona of Savoy, the mother of the rightful duke, young Gian Galeazzo. To repel these attacks he employed the talents of a number of court poets and artists, who in public recitation and pageant, in emblematic picture and banner and device, proclaimed the wisdom and kindness of his guardianship and the wickedness of his assailants. That Leonardo was among the artists thus employed is proved both by notes and projects among his MSS. and by allegoric sketches still extant. Several such sketches are at Christ Church, Oxford: one shows a horned hag or she-fiend urging her hounds to an attack on the state of Milan, and baffled by the Prudence and Justice of Il Moro (all this made clear by easily recognizable emblems). The allusion must almost certainly be to the attempted assassination of Ludovico by agents of the duchess Bona in 1484. Again, it must have been the pestilence decimating Milan in 1484-1485 which gave occasion to the projects submitted by Leonardo to Ludovico for breaking up the city and reconstructing it on improved sanitary principles. To 1485-1486 also appears to belong the inception of his elaborate though unfulfilled architectural plans for beautifying and strengthening the *Castello*, the great stronghold of the ruling power in the state. Very soon afterwards he must have begun work upon his plans and models, undertaken during an acute phase of the competition which the task had called forth between German and Italian architects, for another momentous enterprise, the completion of Milan cathedral. Extant records of payments made to him in connexion with these architectural plans extend from August 1487 to May 1490: in the upshot none of them was carried out. From the beginning of his residence with Ludovico his combination of unprecedented mechanical ingenuity with apt allegoric invention and courtly charm and eloquence had made him the directing spirit in all court ceremonies and festivities. On the occasion of the marriage of the young duke Gian Galeazzo with Isabella of Aragon in 1487, we find Leonardo devising all the mechanical and spectacular part of a masque of Paradise; and presently afterwards designing a bathing pavilion of unheard-of beauty and ingenuity for the young duchess. Meanwhile he was filling his note-books as busily as ever with the results of his studies in statics and dynamics, in human anatomy, geometry and the phenomena of light and shade. It is probable that from the first he had not forgotten his great task of the Sforza monument, with its attendant researches in equine movement and anatomy, and in the science and art of bronze casting on a great scale. The many existing sketches for the work (of which the chief collection is at Windsor) cannot be distinctly dated. In 1490, the seventh year of his residence at Milan, after some expressions of impatience on the part of his patron, he had all but got his model ready for display on the occasion of the marriage of Ludovico with Beatrice d'Este, but at the last moment was dissatisfied with what he had done and determined to begin all over again.

In the same year, 1490, Leonardo enjoyed some months of uninterrupted mathematical and physical research in the libraries and among the learned men of Pavia, whither he had been called to advise on some architectural difficulties concerning the cathedral. Here also the study of an ancient equestrian monument (the so-called *Regisole*, destroyed in 1796) gave him fresh ideas for his Francesco Sforza. In January 1491 a double Sforza-Este marriage (Ludovico Sforza himself with Beatrice d'Este, Alfonso d'Este with Anna Sforza the sister of Gian Galeazzo) again called forth his powers as a masque and pageant-master. For the next following years the ever-increasing gaiety and splendour of the Milanese court gave him continual employment in similar kinds, including the composition and recitation of jests, tales, fables and "prophecies" (*i.e.* moral and social satires and allegories cast in the future tense); among his MSS. occur the drafts of many such, some of them both profound and pungent. Meanwhile he was again at work upon the monument to Francesco Sforza, and this time to practical purpose. When ambassadors from Austria came to Milan towards the close of 1493 to escort the betrothed bride of their emperor Maximilian, Bianca Maria Sforza, away on her nuptial journey, the finished colossal model, 26 ft. high, was at last in its place for all to see in the courtyard of the Castello. Contemporary accounts attest the magnificence of the work and the enthusiasm it excited, but are not precise enough to enable us to judge to which of the two main groups of extant sketches its design corresponded. One of these groups shows the horse and rider in relatively tranquil march, in the manner of the Gattemalata monument put up fifty years before by Donatello at Padua and the Colleoni monument on which Verocchio was now engaged at Venice. Another group of

sketches shows the horse galloping or rearing in violent action, in some instances in the act of trampling a fallen enemy. Neither is it possible to discriminate with certainty the sketches intended for the Sforza monument from others which Leonardo may have done in view of another and later commission for an equestrian statue, namely, that in honour of Ludovico's great enemy, Gian Giacomo Trivulzio.

The year 1494 is a momentous one in the history of Italian politics. In that year the long ousted and secluded prince, Gian Galeazzo, died under circumstances more than suspicious. In that year Ludovico, now duke of Milan in his own right, for the strengthening of his power against Naples, first entered into those intrigues with Charles VIII. of France which later brought upon Italy successive floods of invasion, revolution and calamity. The same year was one of special importance in the prodigiously versatile activities of Leonardo da Vinci. Documents show him, among other things, planning during an absence of several months from the city vast new engineering works for improving the irrigation and water-ways of the Lomellina and adjacent regions of the Lombard plain; ardently studying phenomena of storm and lightning, of river action and of mountain structure; co-operating with his friend, Donato Bramante, the great architect, in fresh designs for the improvement and embellishment of the Castello at Milan; and petitioning the duke to secure him proper payment for a Madonna lately executed with the help of his pupil, Ambrogio de Predis, for the brotherhood of the Conception of St Francis at Milan. (This is almost certainly the fine, slightly altered second version of the "Virgin of the Rocks," now in the National Gallery, London. The original and earlier version is one of the glories of the Louvre, and shows far more of a Florentine and less of a Milanese character than the London picture.) In the same year, 1494, or early in the next, Leonardo, if Vasari is to be trusted, paid a visit to Florence to take part in deliberations concerning the projected new council-hall to be constructed in the palace of the Signory. Lastly, recent research has proved that it was in 1494 that Leonardo got to work in earnest on what was to prove not only by far his greatest but by far his most expeditiously and steadily executed work in painting. This was the "Last Supper" undertaken for the refectory of the convent church of Sta Maria delle Grazie at Milan on the joint commission (as it would appear) of Ludovico and of the monks themselves.

This picture, the world-famous "Cenacolo" of Leonardo, has been the subject of much erroneous legend and much misdirected experiment. Having through centuries undergone cruel injury, from technical imperfections at the outset, from disastrous atmospheric conditions, from vandalism and neglect, and most of all from unskilled repair, its remains have at last (1904-1908) been treated with a mastery of scientific resource and a tenderness of conscientious skill that have revived for ourselves and for posterity a great part of its power. At the same time its true history has been investigated and re-established. The intensity of intellectual and manual application which Leonardo threw into the work is proved by the fact that he finished it within four years, in spite of all his other avocations and of those prolonged pauses of concentrated imaginative effort and intense self-critical brooding to which we have direct contemporary witness. He painted the picture on the wall in tempera, not, according to the legend which sprung up within twenty years of its completion, in oil. The tempera vehicle, perhaps including new experimental ingredients, did not long hold firmly to its plaster ground, nor that to the wall. Flaking and scaling set in; hard crusts of mildew formed, dissolved and re-formed with changes of weather over both the loosened parts and those that remained firm. Decade after decade these processes went on, a rain of minute scales and grains falling, according to one witness, continually from the surface, till the picture seemed to be perishing altogether. In the 18th century attempts were first made at restoration. They all proceeded on the false assumption, dating from the early years of the 16th century, that the work had been executed in oil. With oil it was accordingly at one time saturated in hopes of reviving the colours. Other experimenters tried various "secrets," which for the most part meant deleterious glues and varnishes. Fortunately not very much of actual repainting was accomplished except on some parts of the garments. The chief operations were carried on by Bellotti in 1726, by Mazza in 1770, and by Barezzi in 1819 and the following years. None of them arrested, some actually accelerated, the natural agencies of damp and disintegration, decay and mildew. Yet this mere ghost of a picture, this evocation, half vanished as it was, by a great world-genius of a mighty spiritual world-event, remained a thing indescribably impressive. The ghost has now been brought back to much of true life again by the skill of the most scrupulous of all restorers, Cavaliere Cavenaghi, who, acting under the authority of a competent commission, and after long and patient experiment, found it possible to secure to the wall the innumerable blistered, mildewed and half-detached flakes and scales of the original work that yet remained, to clear the surface thus obtained of much of the obliterating accretions due to decay and mishandling, and to bring the whole to unity by touching tenderly in with tempera the spots and spaces actually left bare. A further gain obtained through these operations has been the uncovering, immediately above the main subject, of a beautiful scheme of painted lunettes and vaultings, the lunettes filled by Leonardo's hand with inscribed scutcheons and interlaced plait or knot ornaments (*intrecciamenti*), the vaultings with stars on a blue ground. The total result, if adequate steps can be taken to counteract the effects of atmospheric change in future, will remain a splendid gain for posterity and a happy refutation of D'Annunzio's despairing poem, the *Death of a Masterpiece*.

Leonardo's "Last Supper," for all its injuries, became from the first, and has ever since remained, for all Christendom the typical representation of the scene. Goethe in his famous criticism has said all that needs to be said of it. The painter has departed from precedent in grouping the disciples, with their Master in the midst, along the far side and the two ends of a long, narrow table, and in leaving the near or service side of the table towards the spectator free. The chamber is seen in a perfectly symmetrical perspective, its rear wall pierced by three plain openings which admit the sense of quiet distance and mystery from the open landscape beyond; by the central of these openings, which is the widest of the three, the head and shoulders of the Saviour are framed in. On His right and left are ranged the disciples in equal numbers. The furniture and accessories of the chamber, very simply conceived, have been rendered with scrupulous exactness and distinctness; yet they leave to the human and dramatic elements the absolute mastery of the scene. The serenity of the holy company has within a moment been broken by the words of their Master, "One of you shall betray Me." In the agitation of their consciences and affections, the disciples have started into groups or clusters along the table, some standing, some still remaining seated. There are four of these groups, of three disciples each, and each group is harmoniously interlinked by some natural connecting action with the next. Leonardo, though no special student of the Greeks, has perfectly carried out the Greek principle of expressive variety in particulars subordinated to general symmetry. He has used all his acquired science of linear and aerial perspective to create an almost complete illusion to the eye, but an illusion that has in it nothing trivial, and in heightening our sense of the material reality of the scene only heightens its profound spiritual impressiveness and gravity. The results of his intensest meditations on the psychology and the human and divine significance of the event (on which he has left some pregnant hints in written words of his own) are perfectly fused with those of his subtlest technical calculations on the rhythmical balancing of groups and arrangement of figures in space.

Of authentic preparatory studies for this work there remain but few. There is a sheet at the Louvre of much earlier date than the first idea or commission for this particular picture, containing some nude sketches for the arrangement of the subject; another later and farther advanced, but still probably anterior to the practical commission, at Venice, and a MS. sheet of great interest at the Victoria and Albert Museum, on which the painter has noted in writing the dramatic motives appropriate to the several disciples. At Windsor and Milan are a few finished studies in red chalk for the heads. A highly-reputed series of life-sized chalk drawings of the same heads, of which the greater portion is at Weimar, consists of early copies, and is interesting though having no just claim to originality. Scarcely less doubtful is the celebrated unfinished and injured study of the head of Christ at the Brera, Milan.

Leonardo's triumph with his "Last Supper" encouraged him in the hope of proceeding now to the casting of the Sforza monument or "Great Horse," the model of which had stood for the last three years the admiration of all beholders, in the Corte Vecchio of the Castello. He had formed a new and close friendship with Luca Pacioli of Borgo San Sepolcro, the great mathematician, whose *Summa de aritmetica*, *geometrica*, &c., he had eagerly bought at Pavia on its first appearance, and who arrived at the Court of Milan about the moment of the completion of the "Cenacolo." Pacioli was equally amazed and delighted at Leonardo's two great achievements in sculpture and painting, and still more at the genius for mathematical, physical and anatomical research shown in the collections of MS. notes which the master laid before him. The two began working together on the materials for Pacioli's next book, *De divina proportione*. Leonardo obtained Pacioli's help in calculations and measurements for the great task of casting the bronze horse and man. But he was soon called away by Ludovico to a different undertaking, the completion of the interior decorations, already begun by another hand and interrupted, of certain chambers of the Castello called the *Saletta Negra* and the *Sala Grande dell' Asse*, or *Sala della Torre*. When, in the last decade of the 19th century, works of thorough architectural investigation and repair were undertaken in that building under the superintendence of Professor Luca Beltrami, a devoted foreign student, Dr Paul Müller-Walde, obtained leave to scrape for traces of Leonardo's handiwork beneath the replastered and white-washed walls and ceilings of chambers that might be identified with these. In one small chamber there was cleared a frieze of cupids intermingled with foliage; but in this, after the first moments of illusion, it was only possible to acknowledge the hand of some unknown late and lax decorator of the school, influenced as much by Raphael as by Leonardo. In another room (*Sala del Tesoro*) was recovered a gigantic headless figure, in all probability of Mercury, also wrongly claimed at first for Leonardo, and afterwards, to all appearance rightly, for Bramante. But in the great *Sala dell' Asse* (or *della Torre*) abundant traces of Leonardo's own hand were found, in the shape of a decoration of intricate geometrical knot or plait work combined with natural leafage; the abstract puzzle-pattern, of a kind in which Leonardo took peculiar pleasure, intermingling in cunning play and contrast with a pattern of living boughs and leaves exquisitely drawn in free and vital growth. Sufficient portions of this design were found in good preservation to enable the whole to be accurately restored—a process as legitimate in such a case as censurable in the case of a figure-painting. For these and other artistic labours Leonardo was rewarded in 1498 (ready money being with difficulty forthcoming and his salary being long in arrears) by the gift of a suburban garden outside the Porta Vercelli.

But again he could not get leave to complete the task in hand. He was called away on duty as chief military engineer (*ingegnere camerale*) with the special charge of inspecting and maintaining all the canals and waterways of the duchy. Dangers were accumulating upon Ludovico and the state of Milan. France had become Ludovico's enemy; and Louis XII., the pope and Venice had formed a league to divide his principality among them. He counted on baffling them by forming a counter league of the principalities of northern Italy, and by raising the Turks against Venice, and the Germans and Swiss against France. Germans and Swiss, however, inopportunely fell to war against each other. Ludovico travelled to Innsbruck, the better to push his interests (September 1499). In his absence Louis XII. invaded the Milanese, and the officers left in charge of the city surrendered it without striking a blow. The invading sovereign, going to Sta Maria delle Grazie with his retinue to admire the renowned painting of the "Last Supper," asked if it could not be detached from the wall and transported to France. The French lieutenant in Milan, Gian Giacomo Trivulzio, the embittered enemy of Ludovico, began exercising a vindictive tyranny over the city which had so long accepted the sway of the usurper. Great artists were usually exempt from the consequences of political revolutions, and Trivulzio, now or later, commissioned Leonardo to design an equestrian monument to himself. Leonardo, having remained unmolested at Milan for two months under the new régime, but knowing that Ludovico was preparing a great stroke for the re-establishment of his power, and that fresh convulsions must ensue, thought it best to provide for his own security. In December he left Milan with his friend Luca Pacioli, having first sent some of his modest savings to Florence for investment. His intention was to watch events. They took a turn which made him a stranger to Milan for the next seven years. Ludovico, at the head of an army of Swiss mercenaries, returned victoriously in February 1500, and was welcomed by a population disgusted with the oppression of the invaders. But in April he was once more overthrown by the French in a battle fought at Novara, his Swiss clamouring at the last moment for their overdue pay, and treacherously refusing to fight against a force of their own countrymen led by La Trémouille. Ludovico was taken prisoner and carried to France; the city, which had been strictly spared on the first entry of Louis XII., was entered and sacked; and the model of Leonardo's great statue made a butt (as eye witnesses tell) for Gascon archers. Two years later we find the duke Ercole of Ferrara begging the French king's lieutenant in Milan to let him have the model, injured as it was, for the adornment of his own city; but nothing came of the petition, and within a short time it seems to have been totally broken up.

Thus, of Leonardo's sixteen years' work at Milan (1483-1499) the results actually remaining are as follows: The Louvre "Virgin of the Rocks" possibly, *i.e.* as to its execution; the conception and style are essentially Florentine, carried out by Leonardo to a point of intense and almost glittering finish, of quintessential, almost overstrained, refinement in design and expression, and invested with a new element of romance by the landscape in which the scene is set—a strange watered country of basaltic caves and arches, with the lights and shadows striking sharply and yet mysteriously among rocks, some upright, some jutting, some pendent, all tufted here and there with exquisite growths of shrub and flower. The National Gallery "Virgin of the Rocks" certainly, with help from Ambrogio de Predis; in this the Florentine character of the original is modified by an admixture of Milanese elements, the tendency to harshness and over-elaboration of detail softened, the strained action of the angel's pointing hand altogether dropped, while in many places pupils' work seems recognizable beside that of the master. The "Last Supper" of Sta Maria delle Grazie, his masterpiece; as to its history and present condition enough has been said. The decorations of the ceiling of the Sala della Torre in the Castello. Other paintings done by him at Milan are mentioned, and attempts have been made to identify them with works still existing. He is known to have painted portraits of two of the king's mistresses, Cecilia Gallerani and Lucrezia Crivelli. Cecilia

Gallerani used to be identified as a lady with ringlets and a lute, depicted in a portrait at Milan, now rightly assigned to Bartolommeo Veneto. More lately she has by some been conjecturally recognized in a doubtful, though Leonardesque, portrait of a lady with a weasel in the Czartoryski collection at Prague. Lucrezia Crivelli has, with no better reason, been identified with the famous “Belle Ferronnière” (a mere misnomer, caught from the true name of another portrait which used to hang near it) at the Louvre; this last is either a genuine Milanese portrait by Leonardo himself or an extraordinarily fine work of his pupil Boltraffio. Strong claims have also been made on behalf of a fine profile portrait resembling Beatrice d’Este in the Ambrosiana; but this the best judges are agreed in regarding as a work, done in a lucky hour, of Ambrogio de Predis. A portrait of a musician in the same gallery is in like manner contested between the master and the pupil. Mention is made of a “Nativity” painted for and sent to the emperor Maximilian, and also apparently of some picture painted for Matthias Corvinus, king of Hungary; both are lost or at least unidentified. The painters especially recorded as Leonardo’s immediate pupils during this part of his life at Milan are the two before mentioned, Giovanni Antonio Boltraffio and Ambrogio Preda or de Predis, with Marco d’Oggionno and Andrea Salai, the last apparently less a fully-trained painter than a studio assistant and personal attendant, devotedly attached and faithful in both capacities. Leonardo’s own native Florentine manner had at first been not a little modified by that of the Milanese school as he found it represented in the works of such men as Bramantino, Borgognone and Zenale; but his genius had in its turn reacted far more strongly upon the younger members of the school, and exercised, now or later, a transforming and dominating influence not only upon his immediate pupils, but upon men like Luini, Giampetrino, Bazzi, Cesare da Sesto and indeed the whole Lombard school in the early 15th century. Of sculpture done by him during this period we have no remains, only the tragically tantalizing history of the Sforza monument. Of drawings there are very many, including few only for the “Last Supper,” many for the Sforza monument, as well as the multitude of sketches, scientific and other, which we find intermingled among the vast body of his miscellaneous MSS., notes and records. In mechanical, scientific and theoretical studies of all kinds it was a period, as these MSS. attest, of extraordinary activity and self-development. At Pavia in 1494 we find him taking up literary and grammatical studies, both in Latin and the vernacular; the former, no doubt, in order the more easily to read those among the ancients who had laboured in the fields that were his own, as Euclid, Galen, Celsus, Ptolemy, Pliny, Vitruvius and, above all, Archimedes; the latter with a growing hope of some day getting into proper form and order the mass of materials he was daily accumulating for treatises on all his manifold subjects of enquiry. He had been much helped by his opportunities of intercourse with the great architects, engineers and mathematicians who frequented the court of Milan—Bramante, Alberghetti, Andrea di Ferrara, Pietro Monti, Fazio Cardano and, above all, Luca Pacioli. The knowledge of Leonardo’s position among and familiarity with such men early helped to spread the idea that he had been at the head of a regularly constituted academy of arts and sciences at Milan. The occurrence of the words “Achademia Leonardi Vinci” on certain engravings, done after his drawings, of geometric “knots” or puzzle-patterns (things for which we have already learned his partiality), helped to give currency to this impression not only in Italy but in the North, where the same engravings were copied by Albrecht Dürer. The whole notion has been proved mistaken. There existed no such academy at Milan, with Leonardo as president. The academies of the day represented the prevailing intellectual tendency of Renaissance humanism, namely, an absorbing enthusiasm for classic letters and for the transcendental speculations of Platonic and neo-Platonic mysticism, not unmixed with the traditions and practice of medieval alchemy, astrology and necromantics. For these last pursuits Leonardo had nothing but contempt. His many-sided and far-reaching studies in experimental science were mainly his own, conceived and carried out long in advance of his time, and in communion with only such more or less isolated spirits as were advancing along one or another of the same paths of knowledge. He learnt indeed on these lines eagerly wherever he could, and in learning imparted knowledge to others. But he had no school in any proper sense except his studio, and his only scholars were those who painted there. Of these one or two, as we have evidence, tried their hands at engraving; among their engravings were these “knots,” which, being things of use for decorative craftsmen to copy, were inscribed for identification, and perhaps for protection, as coming from the Achademia Leonardi Vinci; a trifling matter altogether, and quite unfit to sustain the elaborate structure of conjecture which has been built on it.

To return to the master: when he and Luca Pacioli left Milan in December 1499, their destination was Venice. They made a brief stay at Mantua, where Leonardo was graciously received by the duchess Isabella Gonzaga, the most cultured of the many cultured great ladies of her time, whose portrait he promised to paint on a future day; meantime he made the fine chalk drawing of her now at the Louvre. Arrived at Venice, he seems to have occupied himself chiefly with studies in mathematics and cosmography. In April the friends heard of the second and final overthrow of Ludovico il Moro, and at that news, giving up all idea of a return to Milan, moved on to Florence, which they found depressed both by internal troubles and by the protraction of the indecisive and inglorious war with Pisa. Here Leonardo undertook to paint an altar-piece for the Church of the Annunziata, Filippino Lippi, who had already received the commission, courteously retiring from it in his favour. A year passed by, and no progress had been made with the painting. Questions of physical geography and engineering engrossed him as much as ever. He writes to correspondents making enquiries about the tides in the Euxine and Caspian Seas. He reports for the information of the *Arte de’ Mercanti* on the precautions to be taken against a threatening landslip on the hill of S. Salvatore dell’ Osservanza. He submits drawings and models for the canalization and control of the waters of the Arno, and propounds, with compulsive eloquence and conviction, a scheme for transporting the Baptistery of St John, the “bel San Giovanni” of Dante, to another part of the city, and elevating it on a stately basement of marble. Meantime the Servite brothers of the Annunziata were growing impatient for the completion of their altar-piece. In April 1501 Leonardo had only finished the cartoon, and this all Florence flocked to see and admire. Isabella Gonzaga, who cherished the hope that he might be induced permanently to attach himself to the court of Mantua, wrote about this time to ask news of him, and to beg for a painting from him for her study, already adorned with masterpieces by the first hands of Italy, or at least for a “small Madonna, devout and sweet as is natural to him.” In reply her correspondent says that the master is wholly taken up with geometry and very impatient of the brush, but at the same time tells her all about his just completed cartoon for the Annunziata. The subject was the Virgin seated in the lap of St Anne, bending forward to hold her child who had half escaped from her embrace to play with a lamb upon the ground. The description answers exactly to the composition of the celebrated picture of the Virgin and St Anne at the Louvre. A cartoon of this composition in the Esterhazy collection at Vienna is held to be only a copy, and the original cartoon must be regarded as lost. But another of kindred though not identical motive has come down to us and is preserved in the Diploma Gallery at the Royal Academy. In this incomparable work St Anne, pointing upward with her left hand, smiles with an intense look of wondering, questioning, inward sweetness into the face of the Virgin, who in her turn smiles down upon her child as He leans from her lap to give the blessing to the little St John standing beside her. Evidently two different though nearly related designs had been maturing in Leonardo’s mind. A rough first sketch for the motive of the

Academy cartoon is in the British Museum; one for the motive of the lost cartoon and of the Louvre picture is at Venice. No painting by Leonardo from the Academy cartoon exists, but in the Ambrosiana at Milan there is one by Luini, with the figure of St Joseph added. It remains a matter of debate whether the Academy cartoon or that shown by Leonardo at the Annunziata in 1501 was the earlier. The probabilities seem in favour of the Academy cartoon. This, whether done at Milan or at Florence, is in any case a typically perfect and harmonious example of the master's Milanese manner; while in the other composition with the lamb the action and attitude of the Virgin are somewhat strained, and the original relation between her head and her mother's, lovely both in design and expression, is lost.

In spite of the universal praise of his cartoon, Leonardo did not persevere with the picture, and the monks of the Annunziata had to give back the commission to Filippino Lippi, at whose death the task was completed by Perugino. It remains uncertain whether a small Madonna with distaff and spindle, which the correspondent of Isabella Gonzaga reports Leonardo as having begun for one Robertet, a favourite of the king of France, was ever finished. He painted one portrait, it is said, at this time, that of Ginevra Benci, a kinswoman, perhaps sister, of a youth Giovanni di Amerigo Benci, who shared his passion for cosmographical studies; and probably began another, the famous "La Gioconda," which was only finished four years afterwards. The gonfalionere Soderini offered him in vain, to do with it what he would, the huge half-spoiled block of marble out of which Michelangelo three years later wrought his "David." Isabella Gonzaga again begged, in an autograph letter, that she might have a painting by his hand, but her request was put off; he did her, however, one small service by examining and reporting on some jewelled vases, formerly the property of Lorenzo de' Medici, which had been offered her. The importunate expectations of a masterpiece or masterpieces in painting or sculpture, which beset him on all hands in Florence, inclined him to take service again with some princely patron, if possible of a genius commensurate with his own, who would give him scope to carry out engineering schemes on a vast scale. Accordingly he suddenly took service, in the spring of 1502, with Cesare Borgia, duke of Valentinois, then almost within sight of the realization of his huge ambitions, and meanwhile occupied in consolidating his recent conquests in the Romagna. Between May 1502 and March 1503 Leonardo travelled as chief engineer to Duke Caesar over a great part of central Italy. Starting with a visit to Piombino, on the coast opposite Elba, he went by way of Siena to Urbino, where he made drawings and began works; was thence hastily summoned by way of Pesaro and Rimini to Cesena; spent two months between there and Cesenatico, projecting and directing canal and harbour works, and planning the restoration of the palace of Frederic II.; thence hurriedly joined his master, momentarily besieged by enemies at Imola; followed him probably to Sinigaglia and Perugia, through the whirl of storms and surprises, vengeances and treasons, which marked his course that winter, and finally, by way of Chiusi and Acquapendente, as far as Orvieto and probably to Rome, where Caesar arrived on the 14th of February 1503. The pope's death and Caesar's own downfall were not destined to be long delayed. But Leonardo apparently had already had enough of that service, and was back at Florence in March. He has left dated notes and drawings made at most of the stations we have named, besides a set of six large-scale maps drawn minutely with his own hand, and including nearly the whole territory of the Maremma, Tuscany and Umbria between the Apennines and the Tyrrhene Sea.

At Florence he was at last persuaded, on the initiative of Piero Soderini, to undertake for his native city a work of painting as great as that with which he had adorned Milan. This was a battle-piece to decorate one of the walls of the new council-hall in the palace of the signory. He chose an episode in the victory won by the generals of the republic in 1440 over Niccolo Piccinino near a bridge at Anghiari, in the upper valley of the Tiber. To the young Michelangelo was presently entrusted a rival battle-piece to be painted on another wall of the same apartment; he chose, as is well known, a surprise of the Florentine forces in the act of bathing near Pisa. About the same time Leonardo took part in the debate on the proper site for Michelangelo's newly finished colossal "David," and voted in favour of the Loggia dei Lanzi, against a majority which included Michelangelo himself. Neither Leonardo's genius nor his noble manners could soften the rude and taunting temper of the younger man, whose style as an artist, nevertheless, in subjects both of tenderness and terror, underwent at this time a profound modification from Leonardo's example.

In one of the sections of his projected *Treatise on Painting*, Leonardo has detailed at length, and obviously from his own observation, the pictorial aspects of a battle. His choice of subject in this instance was certainly not made from any love of warfare or indifference to its horrors. In his MSS. there occur almost as many trenchant sayings on life and human affairs as on art and natural law; and of war he has disposed in two words as a "bestial frenzy" (*pazzia bestialissima*). In his design for the Hall of Council he set himself to depict this frenzy at its fiercest. He chose the moment of a terrific struggle for the colours between the opposing sides; hence the work became commonly known as the "Battle of the Standard." Judging by the accounts of those who saw it, and the fragmentary evidences which remain, the tumultuous medley of men and horses, and the expressions of martial fury and despair, must have been conceived and rendered with a mastery not less commanding than had been the looks and gestures of bodeful sorrow and soul's perplexity among the quiet company on the convent wall at Milan. The place assigned to Leonardo for the preparation of his cartoon was the Sala del Papa at Santa Maria Novella. He for once worked steadily and unremittingly at his task. His accounts with the signory enable us to follow its progress step by step. He had finished the cartoon in less than two years (1504-1505), and when it was exhibited along with that of Michelangelo, the two rival works seemed to all men a new revelation of the powers of art, and served as a model and example of the students of that generation, as the frescoes of Masaccio in the Carmine had served to those of two generations earlier. The young Raphael, whose incomparable instinct for rhythmical design had been trained hitherto on subjects of holy quietude and rapt contemplation according to the traditions of Umbrian art, learnt from Leonardo's example to apply the same instinct to themes of violent action and strife. From the same example Fra Bartolommeo and a crowd of other Florentine painters of the rising or risen generation took in like manner a new impulse. The master lost no time in proceeding to the execution of his design upon the mural surface; this time he had devised a technical method of which, after a preliminary trial in the Sala del Papa, he regarded the success as certain; the colours, whether tempera or other remains in doubt, were to be laid on a specially prepared ground, and then both colours and ground made secure upon the wall by the application of heat. When the central group was done the heat was applied, but it was found to take effect unequally; the colours in the upper part ran or scaled from the wall, and the result was a failure more or less complete. The unfinished and decayed painting remained for some fifty years on the wall, but after 1560 was covered over with new frescoes by Vasari. The cartoon did not last so long. After doing its work as the most inspiring of all examples for students it seems to have been cut up. When Leonardo left Italy for good in 1516 he is recorded to have left "the greater part of it" in deposit at the hospital of S. Maria Nuova, where he was accustomed also to deposit his moneys, and whence it seems before long to have disappeared. Our only existing

memorials of the great work are a number of small pen-studies of fighting men and horses, three splendid studies in red chalk at Budapest for heads in the principal group, one head at Oxford copied by a contemporary of the size of the original cartoon (above life); a tiny sketch, also at Oxford, by Raphael after the principal group; an engraving done by Zacchia of Lucca in 1558 not after the original but after a copy; a 16th-century Flemish drawing of the principal group, and another, splendidly spirited, by Rubens, both copies of copies; with Edelinck's fine engraving after the Rubens drawing.

During these years, 1503-1506, Leonardo also resumed (if it is true that he had already begun it before his travels with Cesare Borgia) the portrait of Madonna Lisa, the Neapolitan wife of Zanobi del Giocondo, and finished it to the last pitch of his powers. In this lady he had found a sitter whose face and smile possessed in a singular degree the haunting, enigmatic charm in which he delighted. He worked, it is said, at her portrait during some portion of four successive years, causing music to be played during the sittings that the rapt expression might not fade from off her countenance. The picture was bought afterwards by Francis I. for four thousand gold florins, and is now one of the glories of the Louvre. The richness of colouring on which Vasari expatiates has indeed flown, partly from injury, partly because in striving for effects of light and shade the painter was accustomed to model his figures on a dark ground, and in this as in his other oil-pictures the ground has to a large extent come through. Nevertheless, in its dimmed and blackened state, the portrait casts an irresistible spell alike by subtlety of expression, by refinement and precision of drawing, and by the romantic invention of its background. It has been the theme of endless critical rhapsodies, among which that of Pater is perhaps the most imaginative as it is the best known.

In the spring of 1506 Leonardo, moved perhaps by chagrin at the failure of his work in the Hall of Council, accepted a pressing invitation to Milan, from Charles d'Amboise, Maréchal de Chaumont, the lieutenant of the French king in Lombardy. The leave of absence granted to him by the signory on the request of the French viceroy was for three months only. The period was several times extended, at first grudgingly, Soderini complaining that Leonardo had treated the republic ill in the matter of the battle picture; whereupon the painter honourably offered to refund the money paid, an offer which the signory as honourably refused. Louis XII. sent messages urgently desiring that Leonardo should await his own arrival in Milan, having seen a small Madonna by him in France (probably that painted for Robertet) and hoping to obtain from him works of the same class and perhaps a portrait. The king arrived in May 1507, and soon afterwards Leonardo's services were formally and amicably transferred from the signory of Florence to Louis, who gave him the title of painter and engineer in ordinary. In September of the same year troublesome private affairs called him to Florence. His father had died in 1504, apparently intestate. After his death Leonardo experienced unkindness from his seven half-brothers, Ser Piero's legitimate sons. They were all much younger than himself. One of them, who followed his father's profession, made himself the champion of the others in disputing Leonardo's claim to his share, first in the paternal inheritance, and then in that which had been left to be divided between the brothers and sisters by an uncle. The litigation that ensued dragged on for several years, and forced upon Leonardo frequent visits to Florence and interruptions of his work at Milan, in spite of pressing letters to the authorities of the republic from Charles d'Amboise, from the French king himself, and from others of his powerful friends and patrons, begging that the proceedings might be accelerated. There are traces of work done during these intervals of compulsory residence at Florence. A sheet of sketches drawn there in 1508 shows the beginning of a Madonna now lost except in the form of copies, one of which (known as the "Madonna Litta") is at St Petersburg, another in the Poldi-Pezzoli Museum at Milan. A letter from Leonardo to Charles d'Amboise in 1511, announcing the end of his law troubles, speaks of two Madonnas of different sizes that he means to bring with him to Milan. One was no doubt that just mentioned; can the other have been the Louvre "Virgin with St Anne and St John," now at last completed from the cartoon exhibited in 1501? Meantime the master's main home and business were at Milan. Few works of painting and none of sculpture (unless the unfulfilled commission for the Trivulzio monument belongs to this time) are recorded as occupying him during the seven years of his second residence in that city (1506-1513). He had attached to himself a new and devoted young friend and pupil of noble birth, Francesco Melzi. At the villa of the Melzi family at Vaprio, where Leonardo was a frequent visitor, a colossal Madonna on one of the walls is traditionally ascribed to him, but is rather the work of Sodoma or of Melzi himself working under the master's eye. Another painter in the service of the French king, Jehan Perréal or Jehan de Paris, visited Milan, and consultations on technical points were held between him and Leonardo. But Leonardo's chief practical employments were evidently on the continuation of his great hydraulic and irrigation works in Lombardy. His old trivial office of pageant-master and inventor of scientific toys was revived on the occasion of Louis XII.'s triumphal entry after the victory of Agnadello in 1509, and gave intense delight to the French retinue of the king. He was consulted on the construction of new choir-stalls for the cathedral. He laboured in the natural sciences as ardently as ever, especially at anatomy in company with the famous professor of Pavia, Marcantonio della Torre. To about this time, when he was approaching his sixtieth year, may belong the noble portrait-drawing of himself in red chalk at Turin. He looks too old for his years, but quite unbroken; the character of a veteran sage has fully imprinted itself on his countenance; the features are grand, clear and deeply lined, the mouth firmly set and almost stern, the eyes strong and intent beneath their bushy eyebrows, the hair flows untrimmed over his shoulders and commingles with a majestic beard.

Returning to Milan with his law-suits ended in 1511, Leonardo might have looked forward to an old age of contented labour, the chief task of which, had he had his will, would undoubtedly have been to put in order the vast mass of observations and speculations accumulated in his note-books, and to prepare some of them for publication. But as his star seemed rising that of his royal protector declined. The hold of the French on Lombardy was rudely shaken by hostile political powers, then confirmed again for a while by the victories of Gaston de Foix, and finally destroyed by the battle in which that hero fell under the walls of Ravenna. In June 1512 a coalition between Spain, Venice and the pope re-established the Sforza dynasty in power at Milan in the person of Ludovico's son Massimiliano. This prince must have been familiar with Leonardo as a child, but perhaps resented the ready transfer of his allegiance to the French, and at any rate gave him no employment. Within a few months the ageing master uprooted himself from Milan, and moved with his chattels and retinue of pupils to Rome, into the service of the house that first befriended him, the Medici. The vast enterprises of Pope Julius II. had already made Rome the chief seat and centre of Italian art. The accession of Giulio de' Medici in 1513 under the title of Leo X. raised on all hands hopes of still ampler and more sympathetic patronage. Leonardo's special friend at the papal court was the pope's youngest brother, Giuliano de' Medici, a youth who combined dissipated habits with thoughtful culture and a genuine interest in arts and sciences. By his influence Leonardo and his train were accommodated with apartments in the Belvedere of the Vatican. But the conditions of the time and place proved adverse. The young generation held the field. Michelangelo and Raphael, who had both, as we have seen,

risen to greatness partly on Leonardo's shoulders, were fresh from the glory of their great achievements in the Sistine Chapel and the Stanze. Their rival factions hated each other, but both, especially the faction of Michelangelo, turned bitterly against the veteran newcomer. The pope, indeed, is said to have been delighted with Leonardo's minor experiments and ingenuities in science, and especially by a kind of zoological toys which he had invented by way of pastime, as well as mechanical tricks played upon living animals. But for the master's graver researches and projects he cared little, and was far more interested in the dreams of astrologers and alchemists. When Leonardo, having received a commission for a picture, was found distilling for himself a new medium of oils and herbs before he had begun the design, the pope was convinced, not quite unreasonably, that nothing serious would come of it. The only paintings positively recorded as done by him at Rome are two small panels for an official of the papal court, one of a child, the other of a Madonna, both now lost or unrecognized. To this time may also belong a lost Leda, standing upright with the god in swan's guise at her side and the four children near their feet. This picture was at Fontainebleau in the 16th century and is known from several copies, the finest of them at the Borghese gallery, as well as from one or two preliminary sketches by the master himself and a small sketch copy by Raphael. A portrait of a Florentine lady, said to have been painted for Giuliano de' Medici and seen afterwards in France, may also have been done at Rome; or may what we learn of this be only a confused account of the Monna Lisa? Tradition ascribes to Leonardo an attractive fresco of a Madonna with a donor in the convent of St Onofrio, but this seems to be clearly the work of Boltraffio. The only engineering works we hear of at this time are some on the harbour and defences of Cività Vecchia. On the whole the master in these Roman days found himself slighted for the first and only time in his life. He was, moreover, plagued by insubordination and malignity on the part of two German assistant craftsmen lodged in his apartments. Charges of impiety and body-snatching laid by these men in connexion with his anatomical studies caused the favour of the pope to be for a time withdrawn. After a stay of less than two years, Leonardo left Rome under the following circumstances. Louis XII. of France had died in the last days of 1514. His young and brilliant successor, Francis I., surprised Europe by making a sudden dash at the head of an army across the Alps to vindicate his rights in Italy. After much hesitation Leo X. in the summer of 1515 ordered Giuliano de' Medici, as gonfalonier of the Church, to lead a papal force into the Emilia and watch the movements of the invader. Leonardo accompanied his protector on the march, and remained with the headquarters of the papal army at Piacenza when Giuliano fell ill and retired to Florence. After the battle of Marignano it was arranged that Francis and the pope should meet in December at Bologna. The pope, travelling by way of Florence and discussing there the great new scheme of the Laurentian library, entertained the idea of giving the commission to Leonardo; but Michelangelo came in hot haste from Rome and succeeded in securing it for himself. As the time for the meeting of the potentates at Bologna drew near, Leonardo proceeded thither from Piacenza, and in due course was presented to the king. Between the brilliant young sovereign and the grand old sage an immediate and strong sympathy sprang up; Leonardo accompanied Francis on his homeward march as far as Milan, and there determined to accept the royal invitation to France, where a new home was offered him with every assurance of honour and regard.

The remaining two and a half years of Leonardo's life were spent at the Castle of Cloux near Amboise, which was assigned, with a handsome pension, to his use. The court came often to Amboise, and the king delighted in his company, declaring his knowledge both of the fine arts and of philosophy to be beyond those of all mortal men. In the spring of 1518 Leonardo had occasion to exercise his old talents as a festival-master when the dauphin was christened and a Medici-Bourbon marriage celebrated. He drew the designs for a new palace at Amboise, and was much engaged with the project of a great canal to connect the Loire and Saône. An ingenious attempt has been made to prove, in the absence of records, that the famous spiral staircase at Blois was also of his designing.

Among his visitors was a fellow-countryman, Cardinal Louis of Aragon, whose secretary has left an account of the day. Leonardo, it seems, was suffering from some form of slight paralysis which impaired his power of hand. But he showed the cardinal three pictures, the portrait of a Florentine lady done for Giuliano de' Medici (the Gioconda?), the Virgin in the lap of St Anne (the Louvre picture; finished at Florence or Milan 1507-1513?), and a youthful John the Baptist. The last, which may have been done since he settled in France, is the darkened and partly repainted, but still powerful and haunting half-length figure in the Louvre, with the smile of inward ravishment and the prophetic finger beckoning skyward like that of St Anne in the Academy cartoon. Of the "Pomona" mentioned by Lomazzo as a work of the Amboise time his visitor says nothing, nor yet of the Louvre "Bacchus," which tradition ascribes to Leonardo but which is clearly pupil's work. Besides pictures, the master seems also to have shown and explained to his visitors some of his vast store of notes and observations on anatomy and physics. He kept hoping to get some order among his papers, the accumulation of more than forty years, and perhaps to give the world some portion of the studies they contained. But his strength was nearly exhausted. On Easter Eve 1519, feeling that the end was near, he made his will. It made provision, as became a great servant of the most Christian king, for masses to be said and candles to be offered in three different churches of Amboise, first among them that of St Florentin, where he desired to be buried, as well as for sixty poor men to serve as torch-bearers at his funeral. Vasari babbles of a death-bed conversion and repentance. But Leonardo had never been either a friend or an enemy of the Church. Sometimes, indeed, he denounces fiercely enough the arts and pretensions of priests; but no one has embodied with such profound spiritual insight some of the most vital moments of the Christian story. His insatiable researches into natural fact brought upon him among the vulgar some suspicion of practising those magic arts which of all things he scouted and despised. The bent of his mind was all towards the teachings of experience and against those of authority, and laws of nature certainly occupied far more of his thoughts than dogmas of religion; but when he mentions these it is with respect as throwing light on the truth of things from a side which was not his own. His conformity at the end had in it nothing contradictory of his past. He received the sacraments of the Church and died on the 2nd of May 1519. King Francis, then at his court of St Germain-en-Laye, is said to have wept for the loss of such a servant; that he was present beside the death-bed and held the dying painter in his arms is a familiar but an untrue tale. After a temporary sepulture elsewhere his remains were transported on the 12th of August to the cloister of St Florentin according to his wish. He left all his MSS. and apparently all the contents of his studio, with other gifts, to the devoted Melzi, whom he named executor; to Salai and to his servant Battista Villanis a half each of his vineyard outside Milan; gifts of money and clothes to his maid Maturina; one of money to the poor of the hospital in Amboise; and to his unbrotherly half-brothers a sum of four hundred ducats lying to his credit at Florence.

History tells of no man gifted in the same degree as Leonardo was at once for art and science. In art he was an inheritor and perfecter, born in a day of great and many-sided endeavours on which he put the crown, surpassing both predecessors and contemporaries. In science, on the other hand, he was a pioneer, working wholly for the future, and in great part alone. That the two stupendous gifts should in some degree neutralize each other was

inevitable. No imaginable strength of any single man would have sufficed to carry out a hundredth part of what Leonardo essayed. The mere attempt to conquer the kingdom of light and shade for the art of painting was destined to tax the skill of generations, and is perhaps not wholly and finally accomplished yet. Leonardo sought to achieve that conquest and at the same time to carry the old Florentine excellences of linear drawing and psychological expression to a perfection of which other men had not dreamed. The result, though marvellous in quality, is in quantity lamentably meagre. Knowing and doing allured him equally, and in art, which consists in doing, his efforts were often paralysed by his strained desire to know. The thirst for knowledge had first been aroused in him by the desire of perfecting the images of beauty and power which it was his business to create.

Thence there grew upon him the passion of knowledge for its own sake. In the splendid balance of his nature the Virgilian longing, *rerum cognoscere causas*, could never indeed wholly silence the call to exercise his active powers. But the powers he cared most to exercise ceased by degree to be those of imaginative creation, and came to be those of turning to practical human use the mastery which his studies had taught him over the forces of nature. In science he was the first among modern men to set himself most of those problems which unnumbered searchers of later generations have laboured severally or in concert to solve. Florence had had other sons of comprehensive genius, artistic and mechanical, Leon Battista Alberti perhaps the chief. But the more the range and character of Leonardo's studies becomes ascertained the more his greatness dwarfs them all. A hundred years before Bacon, say those who can judge best, he showed a firmer grasp of the principles of experimental science than Bacon showed, fortified by a far wider range of actual experiment and observation. Not in his actual conclusions, though many of these point with surprising accuracy in the direction of truths established by later generations, but in the soundness, the wisdom, the tenacity of his methods lies his great title to glory. Had the Catholic reaction not fatally discouraged the pursuit of the natural sciences in Italy, had Leonardo even left behind him any one with zeal and knowledge enough to extract from the mass of his MSS. some portion of his labours in those sciences and give them to the world, an incalculable impulse would have been given to all those enquiries by which mankind has since been striving to understand the laws of its being and control the conditions of its environment,—to mathematics and astronomy, to mechanics, hydraulics, and physics generally, to geology, geography, and cosmology, to anatomy and the sciences of life. As it was, these studies of Leonardo—"studies intense of strong and stern delight"—seemed to his trivial followers and biographers merely his whims and fancies, *ghiribizzi*, things to be spoken of slightingly and with apology. The MSS., with the single exception of some of those relating to painting, lay unheeded and undivulged until the present generation; and it is only now that the true range of Leonardo's powers is beginning to be fully discerned.

So much for the intellectual side of Leonardo's character and career. As a moral being we are less able to discern what he was like. The man who carried in his brain so many images of subtle beauty, as well as so much of the hidden science of the future, must have lived spiritually, in the main, alone. Of things communicable he was at the same time, as we have said, communicative—a genial companion, a generous and loyal friend, ready and eloquent of discourse, impressing all with whom he was brought in contact by the power and the charm of genius, and inspiring fervent devotion and attachment in friends and pupils. We see him living on terms of constant affection with his father, and in disputes with his brothers not the aggressor but the sufferer from aggression. We see him full of tenderness to animals, a virtue not common in Italy in spite of the example of St Francis; open-handed in giving, not eager in getting—"poor," he says, "is the man of many wants"; not prone to resentment—"the best shield against injustice is to double the cloak of long-suffering"; zealous in labour above all men—"as a day well spent gives joyful sleep, so does a life well spent give joyful death." With these instincts and maxims, and with his strength, granting it almost more than human, spent ever tunnelling in abstruse mines of knowledge, his moral experience is not likely to have been deeply troubled. In religion, he regarded the faith of his age and country at least with imaginative sympathy and intellectual acquiescence, if no more. On the political storms which shook his country and drove him from one employment to another, he seems to have looked not with the passionate participation of a Dante or a Michelangelo but rather with the serene detachment of a Goethe. In matters of the heart, if any consoling or any disturbing passion played a great part in his life, we do not know it; we know only (apart from a few passing shadows cast by calumny and envy) of affectionate and dignified relations with friends, patrons and pupils, of public and private regard mixed in the days of his youth with dazzled admiration, and in those of his age with something of reverential awe.

The Drawings of Leonardo.—These are among the greatest treasures ever given to the world by the human spirit expressing itself in pen and pencil. Apart from the many hundreds of illustrative pen-sketches scattered through his autobiographic and scientific MSS., the principal collection is at Windsor Castle (partly derived from the Arundel collection); others of importance are in the British Museum; at Christ Church, Oxford; in the Louvre, at Chantilly, in the Uffizi, the Venice Academy, the Royal Library at Turin, the Museum of Budapest, and in the collections of M. Bonnat, Mrs Mond, and Captain Holford. Leonardo's chief implements were pen, silver-point, and red and black chalk (red chalk especially). In silver-point there are many beautiful drawings of his earlier time, and some of his later; but of the charming heads of women and young men in this material attributed to him in various collections, comparatively few are his own work, the majority being drawings in his spirit by his pupils Ambrogio Preda or Boltraffio. Leonardo appears to have been left-handed. There is some doubt on the point; but a contemporary and intimate friend, Luca Pacioli, speaks of his "ineffable left hand"; all the best of his drawings are shaded downward from left to right, which would be the readiest way for a left-handed man; and his habitual eccentric practice of writing from right to left is much more likely to have been due to natural left-handedness than to any desire of mystery or concealment. A full critical discussion and catalogue of the extant drawings of Leonardo are to be found in Berenson's *Drawings of the Florentine Painters*.

The Writings of Leonardo.—The only printed book bearing Leonardo's name until the recent issues of transcripts from his MSS. was the celebrated *Treatise on Painting* (*Trattato della pittura, Traité de la peinture*). This consists of brief didactic chapters, or more properly paragraphs, of practical direction or critical remark on all the branches and conditions of a painter's practice. The original MS. draft of Leonardo has been lost, though a great number of notes for it are scattered through the various extant volumes of his MSS. The work has been printed in two different forms; one of these is an abridged version consisting of 365 sections; the first edition of it was published in Paris in 1551, by Raphael Dufresne, from a MS. which he found in the Barberini library; the last, translated into English by J. F. Rigaud, in London, 1877. The other is a more extended version, in 912 sections, divided into eight books; this was printed in 1817 by Guglielmo Manzi at Rome, from two MSS. which he had discovered in the Vatican library; a German translation from the same MS. has been edited by G. H. Ludwig in Eitelberger's series of *Quellenschriften für Kunstgeschichte* (Vienna, 1882; Stuttgart, 1885). On the history of the book in general see Max Jordan, *Das Malerbuch des Leonardo da Vinci* (Leipzig, 1873). The unknown compilers of the Vatican MSS. must have had before them much more of Leonardo's original text than is now extant. Only

about a quarter of the total number of paragraphs are identical with passages to be found in the master's existing autograph note-books. It is indeed doubtful whether Leonardo himself ever completed the MS. treatise (or treatises) on painting and kindred subjects mentioned by Fra Luca Pacioli and by Vasari, and probable that the form and order, and perhaps some of the substance, of the *Trattato* as we have it was due to compilers and not to the master himself.

In recent years a whole body of scholars and editors have been engaged in giving to the world the texts of Leonardo's existing MSS. The history of these is too complicated to be told here in any detail. Francesco Melzi (d. 1570) kept the greater part of his master's bequest together as a sacred trust as long as he lived, though even in his time some MSS. on the art of painting seem to have passed into other hands. But his descendants suffered the treasure to be recklessly dispersed. The chief agents in their dispersal were the Doctor Orazio Melzi who possessed them in the last quarter of the 16th century; the members of a Milanese family called Mazzenta, into whose hands they passed in Orazio Melzi's lifetime; and the sculptor Pompeo Leoni, who at one time entertained the design of procuring their presentation to Philip II. of Spain, and who cut up a number of the note-books to form the great miscellaneous single volume called the *Codice Atlantico*, now at Milan. This volume, with a large proportion of the total number of other Leonardo MSS. then existing, passed into the hands of a Count Arconati, who presented them to the Ambrosian library at Milan in 1636. In the meantime the earl of Arundel had made a vain attempt to purchase one of these volumes (the *Codice Atlantico*?) at a great price for the king of England. Some stray parts of the collection, including the MSS. now at Windsor, did evidently come into Lord Arundel's possession, and the history of some other parts can be followed; while much, it is evident, was lost for good. In 1796 Napoleon swept away to Paris, along with the other art treasures of Italy, the whole of the Leonardo MSS. at the Ambrosiana: only the *Codice Atlantico* was afterwards restored, the other volumes remaining the property of the Institut de France. These also have had their adventures, two of them having been stolen by Count Libri and passed temporarily into the collection of Lord Ashburnham, whence they were in recent years made over again to the Institute. The first important step towards a better knowledge of the MSS. was made by the beginning, in 1880, of the great series of publications from the MSS. of the Institut de France undertaken by C. Ravaisson-Mollien; the next by the publication in 1883 of Dr J. P. Richter's *Literary Works of Leonardo da Vinci* (see Bibliography): this work included, besides a history and analytical index of the MSS., facsimiles of a number of selected pages containing matter of autobiographical, artistic, or literary interest, with transcripts and translations of their MS. contexts. Since then much progress has been made in the publication of the complete MSS., scientific and other, whether with adequate critical apparatus or in the form of mere facsimile without transliteration or comment.

A brief statement follows of the present distribution of the several MSS. and of the form in which they are severally published:—

England.—*Windsor*: Nine MSS., chiefly on anatomy, published entire in simple facsimile by Rouveyre (Paris, 1901); partially, with transliterations and introduction by Piumati and Sabachnikoff (Paris, 1898, foll.); *British Museum*: one MS., miscellaneous, unpublished; *Victoria and Albert Museum*: ten note-books bound in 3 vols.; facsimile by Rouveyre, *Holkham* (collection of Lord Leicester), 1 vol., on hydraulics and the action of water; published in facsimile with transliteration and notes by Gerolamo Calvi. **France.**—*Institut de France*: seventeen MSS., all published with transliteration and notes by C. Ravaisson-Mollien (6 vols., Paris, 1880-1891). **Italy.**—*Milan*, *Ambrosiana*: the *Codice Atlantico*, the huge miscellany, of vital importance for the study of the master, put together by Pompeo Leoni; published in facsimile, with transliteration, by the Accademia dei Lincei (1894, foll.); *Milan*: collection of Count Trivulzio; 1 vol., miscellaneous; published and edited by L. Beltrami (1892); *Rome*: collection of Count Marszolini; *Treatise on the Flight of Birds*, published and edited by Piumati and Sabachnikoff (Paris, 1492).

Bibliography.—The principal authorities are:—"Il libro di Antonio Billi," edited from MS. by G. de Fabriazy in *Archivio Storico Ital.* ser. v. vol. 7; "Breve vita di Leonardo da Vinci, scritto da un adnonimo del 1500" (known as the Anonimo Gaddiano), printed by G. Milanesi in *Archivio Storico Ital.* t. xvi. (1872), translated with notes by H. P. Horne in series published by the Unicorn Library (1903); Paolo Giovio, "Leonardi Vincii vita," in his *Elogia*, printed in Tiraboschi, *Storia della Lett. Ital.* t. vii. pt. 4, and in *Classici Italiani*, vol. 314; Vasari, in his celebrated *Lives of the Painters* (1st ed., Florence, 1550; 2nd ed. *ibid.* 1568; ed. Milanesi, with notes and supplements, 1878-1885); Sabba da Castiglione, *Ricordi* (Venice, 1565); G. P. Lomazzo, *Trattato dell' arte della pittura*, &c. (Milan, 1584-1585); *Id., Idea del tempio della pittura* (Milan, 1591); Le Père Dan, *Le Trésor ... de Fontainebleau* (1642); J. B. Venturi, *Essai sur les ouvrages physico-mathématiques de L. da V.* (Paris, 1797); C. Amoretti, *Memorie storiche sulla vita, &c. di L. da V.* (Milan, 1804), a work which laid the foundation of all future researches; Giuseppe Bossi, *Del Cenacolo di L. da V.* (Milan, 1810); C. Fumagalli, *Scuola di Leonardo da Vinci* (1811); Gaye, *Carteggia d'artisti* (1839-1841); G. Uzielli, *Ricerche intorno a L. da V.*, series 1, 2 (Florence, 1872; Rome, 1884; series 1 revised, Turin, 1896), documentary researches of the first importance for the study; C. L. Calvi, *Notizie dei principali professori di belle arti* (Milan, 1869); Arsène Houssaye, *Histoire de L. de V.* (Paris, 1869 and 1876, an agreeable literary biography of the pre-critical kind); Mrs Heaton, *Life of L. da V.* (London, 1872), a work also made obsolete by recent research; Hermann Grothe, *L. da V. als Ingenieur und Philosoph* (Berlin, 1874); A. Marks, the *S. Anne of L. da V.* (London, 1882); J. P. Richter, *The Literary Works of L. da V.* (2 vols., London, 1883), this is the very important and valuable history of and selection from the texts mentioned above under MSS.; Ch. Ravaisson-Mollien, *Les Écrits de L. da V.* (Paris, 1881); Paul Müller Walde, *L. da V., Lebensskizze und Forschungen* (Munich, 1889-1890); *Id.*, "Beiträge zur Kenntniss des L. da V.," *in Jahrbuch der k. Preussischen Kunstsammlungen* (1897-1899), the first immature and incomplete, the second of high value: the whole life of this writer has been devoted to the study of L. da V., but it is uncertain whether the vast mass of material collected by him will ever take shape or see the light; G. Gronau, *L. da V.* (London, 1902); Bernhard Berenson, *The Drawings of the Florentine Painters* (London, 1903); Edmondo Solmi, *Studi sulla filosofia naturale di L. da V.* (Modena, 1898); *Id., Leonardo* (Florence, 1st ed. 1900, 2nd ed. 1907; this last edition of Solmi's work is by far the most complete and satisfactory critical biography of the master which yet exists); A. Rosenberg, *L. da V.*, in Knackfuss's series of art biographies (Leipzig, 1898); Gabriel Séailles, *L. da V. l'artiste et le savant* (1st ed. 1892, 2nd ed. 1906), a lucid and careful general estimate of great value, especially in reference to Leonardo's relations to modern science; Edward McCurdy, *L. da V.*, in Bell's "Great Masters" series (1904 and 1907), a very sound and trustworthy summary of the master's career as an artist; *Id., L. da V.'s Note-Books* (1908), a selection from the passages of chief general interest in the master's MSS., very well chosen, arranged, and translated, with a useful history of the MSS. prefixed, *Le Vicende del Cenacolo di L. da V. nel secolo XIX.* (Milan, 1906), an official account of the later history and vicissitudes of the "Last Supper" previous to its final repair; Luca Beltrami, *Il Castello di Milano* (1894); *Id., L. da V. et la Sala dell' Asse* (1902); Id., "Il Cenacolo di Leonardo," in *Raccolta Vinciana* (Milan, 1908), the official account of the successful work of repair carried out by Signor Cavenaghi in the preceding years; Woldemar von Seidlitz, *Leonardo da Vinci, der Wendepunkt der Renaissance* (2 vols., 1909), a comprehensive and careful work by an accomplished and veteran critic, inclined to give perhaps an excessive share in the reputed works of Leonardo to

a single pupil, Ambrogio Preda. It seems needless to give references to the voluminous discussion in newspapers and periodicals concerning the authenticity of a wax bust of Flora acquired in 1909 for the Berlin Museum and unfortunately ascribed to Leonardo da Vinci, its real author having been proved by external and internal evidence to be the Englishman Richard Cockle Lucas, and its date 1846.

(S. C.)

LEONARDO OF PISA (Leonardus Pisanus or Fibonacci), Italian mathematician of the 13th century. Of his personal history few particulars are known. His father was called Bonaccio, most probably a nickname with the ironical meaning of "a good, stupid fellow," while to Leonardo himself another nickname, Bigollone (dunce, blockhead), seems to have been given. The father was secretary in one of the numerous factories erected on the southern and eastern coasts of the Mediterranean by the warlike and enterprising merchants of Pisa. Leonardo was educated at Bugia, and afterwards toured the Mediterranean. In 1202 he was again in Italy and published his great work, *Liber abaci*, which probably procured him access to the learned and refined court of the emperor Frederick II. Leonardo certainly was in relation with some persons belonging to that circle when he published in 1220 another more extensive work, *De practica geometriae*, which he dedicated to the imperial astronomer Dominicus Hispanus. Some years afterwards (perhaps in 1228) Leonardo dedicated to the well-known astrologer Michael Scott the second edition of his *Liber abaci*, which was printed with Leonardo's other works by Prince Bald. Boncompagni (Rome, 1857-1862, 2 vols.). The other works consist of the *Practica geometriae* and some most striking papers of the greatest scientific importance, amongst which the *Liber quadratorum* may be specially signalized. It bears the notice that the author wrote it in 1225, and in the introduction Leonardo tells us the occasion of its being written. Dominicus had presented Leonardo to Frederick II. The presentation was accompanied by a kind of mathematical performance, in which Leonardo solved several hard problems proposed to him by John of Palermo, an imperial notary, whose name is met with in several documents dated between 1221 and 1240. The methods which Leonardo made use of in solving those problems fill the *Liber quadratorum*, the *Flos*, and a *Letter to Magister Theodore*. All these treatises seem to have been written nearly at the same period, and certainly before the publication of the second edition of the *Liber abaci*, in which the *Liber quadratorum* is expressly mentioned. We know nothing of Leonardo's fate after he issued that second edition.

Leonardo's works are mainly developments of the results obtained by his predecessors; the influences of Greek, Arabian, and Indian mathematicians may be clearly discerned in his methods. In his *Practica geometriae* plain traces of the use of the Roman *agrimensores* are met with; in his *Liber abaci* old Egyptian problems reveal their origin by the reappearance of the very numbers in which the problem is given, though one cannot guess through what channel they came to Leonardo's knowledge. Leonardo cannot be regarded as the inventor of that very great variety of truths for which he mentions no earlier source.

The *Liber abaci*, which fills 459 printed pages, contains the most perfect methods of calculating with whole numbers and with fractions, practice, extraction of the square and cube roots, proportion, chain rule, finding of proportional parts, averages, progressions, even compound interest, just as in the completest mercantile arithmetics of our days. They teach further the solution of problems leading to equations of the first and second degree, to determinate and indeterminate equations, not by single and double position only, but by real algebra, proved by means of geometric constructions, and including the use of letters as symbols for known numbers, the unknown quantity being called *res* and its square *census*.

The second work of Leonardo, his *Practica geometriae* (1220) requires readers already acquainted with Euclid's planimetry, who are able to follow rigorous demonstrations and feel the necessity for them. Among the contents of this book we simply mention a trigonometrical chapter, in which the words *sinus versus arcus* occur, the approximate extraction of cube roots shown more at large than in the *Liber abaci*, and a very curious problem, which nobody would search for in a geometrical work, viz.—To find a square number remaining so after the addition of 5. This problem evidently suggested the first question, viz.—To find a square number which remains a square after the addition and subtraction of 5, put to our mathematician in presence of the emperor by John of Palermo, who, perhaps, was quite enough Leonardo's friend to set him such problems only as he had himself asked for. Leonardo gave as solution the numbers $11\frac{97}{144}$, $16\frac{97}{144}$, and $6\frac{97}{144}$,—the squares of $3\frac{5}{12}$, $4\frac{1}{12}$ and $2\frac{7}{12}$; and the method of finding them is given in the *Liber quadratorum*. We observe, however, that this kind of problem was not new. Arabian authors already had found three square numbers of equal difference, but the difference itself had not been assigned in proposing the question. Leonardo's method, therefore, when the difference was a fixed condition of the problem, was necessarily very different from the Arabian, and, in all probability, was his own discovery. The *Flos* of Leonardo turns on the second question set by John of Palermo, which required the solution of the cubic equation $x^3 + 2x^2 + 10x = 20$. Leonardo, making use of fractions of the sexagesimal scale, gives $x = 1^0\ 22^{i}\ 7^{ii}\ 42^{iii}\ 33^{iv}\ 4^{v}\ 40^{vi}$, after having demonstrated, by a discussion founded on the 10th book of Euclid, that a solution by square roots is impossible. It is much to be deplored that Leonardo does not give the least intimation how he found his approximative value, outrunning by this result more than three centuries. Genocchi believes Leonardo to have been in possession of a certain method called *regula aurea* by H. Cardan in the 16th century, but this is a mere hypothesis without solid foundation. In the *Flos* equations with negative values of the unknown quantity are also to be met with, and Leonardo perfectly understands the meaning of these negative solutions. In the *Letter to Magister Theodore* indeterminate problems are chiefly worked, and Leonardo hints at his being able to solve by a general method any problem of this kind not exceeding the first degree.

As for the influence he exercised on posterity, it is enough to say that Luca Pacioli, about 1500, in his celebrated *Summa*, leans so exclusively to Leonardo's works (at that time known in manuscript only) that he frankly acknowledges his dependence on them, and states that wherever no other author is quoted all belongs to Leonardus Pisanus.

Fibonacci's series is a sequence of numbers such that any term is the sum of the two preceding terms; also known as *Lamé's series*.

(M. Ca.)

LEONCAVALLO, RUGGIERO (1858-), Italian operatic composer, was born at Naples and educated for music at the conservatoire. After some years spent in teaching and in ineffectual attempts to obtain the production of more than one opera, his *Pagliacci* was performed at Milan in 1892 with immediate success; and next year his *Medici* was also produced there. But neither the latter nor *Chatterton* (1896)—both early works—obtained any favour; and it was not till *La Bohème* was performed in 1897 at Venice that his talent obtained public confirmation. Subsequent operas by Leoncavallo were *Zaza* (1900), and *Der Roland* (1904). In all these operas he was his own librettist.

LEONIDAS, king of Sparta, the seventeenth of the Agiad line. He succeeded, probably in 489 or 488 B.C., his half-brother Cleomenes, whose daughter Gorgo he married. In 480 he was sent with about 7000 men to hold the pass of Thermopylae against the army of Xerxes. The smallness of the force was, according to a current story, due to the fact that he was deliberately going to his doom, an oracle having foretold that Sparta could be saved only by the death of one of its kings: in reality it seems rather that the ephors supported the scheme half-heartedly, their policy being to concentrate the Greek forces at the Isthmus. Leonidas repulsed the frontal attacks of the Persians, but when the Malian Ephialtes led the Persian general Hydarnes by a mountain track to the rear of the Greeks he divided his army, himself remaining in the pass with 300 Spartiates, 700 Thespians and 400 Thebans. Perhaps he hoped to surround Hydarnes' force: if so, the movement failed, and the little Greek army, attacked from both sides, was cut down to a man save the Thebans, who are said to have surrendered. Leonidas fell in the thickest of the fight; his head was afterwards cut off by Xerxes' order and his body crucified. Our knowledge of the circumstances is too slight to enable us to judge of Leonidas's strategy, but his heroism and devotion secured him an almost unique place in the imagination not only of his own but also of succeeding times.

See Herodotus v. 39-41, vii. 202-225, 238, ix. 10; Diodorus xi. 4-11; Plutarch, *Apophthegm. Lacon.; de malignitate Herodoti*, 28-33; Pausanias i. 13, iii. 3, 4; Isocrates, *Paneg.* 92; Lycurgus, *c. Leocr.* 110, 111; Strabo i. 10, ix. 429; Aelian, *Var. hist.* iii. 25; Cicero, *Tusc. disput.* i. 42, 49; *de Finibus*, ii. 30; Cornelius Nepos, *Themistocles*, 3; Valerius Maximus iii. 2; Justin ii. 11. For modern criticism on the battle of Thermopylae see G. B. Grundy, *The Great Persian War* (1901); G. Grote, *History of Greece*, part ii., c. 40; E. Meyer, *Geschichte des Altertums*, iii., §§ 219, 220; G. Busolt, *Griechische Geschichte*, 2nd ed., ii. 666-688; J. B. Bury, "The Campaign of Artemisium and Thermopylae," in *British School Annual*, ii. 83 seq.; J. A. R. Munro, "Some Observations on the Persian Wars, II.," in *Journal of Hellenic Studies*, xxii. 294-332.

(M. N. T.)

LEONTIASIS OSSEA, a rare disease characterized by an overgrowth of the facial and cranial bones. The common form is that in which one or other maxilla is affected, its size progressively increasing both regularly and irregularly, and thus encroaching on the cavities of the orbit, the mouth, the nose and its accessory sinuses. Exophthalmos gradually develops, going on later to a complete loss of sight due to compression of the optic nerve by the overgrowth of bone. There may also be interference with the nasal respiration and with the taking of food. In the somewhat less common form of this rare disease the overgrowth of bone affects all the cranial bones as well as those of the face, the senses being lost one by one and death finally resulting from cerebral pressure. There is no treatment other than exposing the overgrown bone, and chipping away pieces, or excising entirely where possible.

LEONTINI (mod. *Lentini*), an ancient town in the south-east of Sicily, 22 m. N.N.W. of Syracuse direct, founded by Chalcidians from Naxos in 729 B.C. It is almost the only Greek settlement not on the coast, from which it is 6 m. distant. The site, originally held by the Sicels, was seized by the Greeks owing to its command of the fertile plain on the north. It was reduced to subjection in 498 B.C. by Hippocrates of Gela, and in 476 Hieron of Syracuse established here the inhabitants of Catana and Naxos. Later on Leontini regained its independence, but in its efforts to retain it, the intervention of Athens was more than once invoked. It was mainly the eloquence of Gorgias (*q.v.*) of Leontini which led to the abortive Athenian expedition of 427. In 422 Syracuse supported the oligarchs against the people and received them as citizens, Leontini itself being forsaken. This led to renewed Athenian intervention, at first mainly diplomatic; but the exiles of Leontini joined the envoys of Segesta in persuading Athens to undertake the great expedition of 415. After its failure, Leontini became subject to Syracuse once more (see Strabo vi. 272). Its independence was guaranteed by the treaty of 405 between Dionysius and the Carthaginians, but it very soon lost it again. It was finally stormed by M. Claudius Marcellus in 214 B.C. In Roman times it seems to have been of small importance. It was destroyed by the Saracens A.D. 848, and almost totally ruined by the earthquake of 1698. The ancient city is described by Polybius (vii. 6) as lying in a bottom between

two hills, and facing north. On the western side of this bottom ran a river with a row of houses on its western bank under the hill. At each end was a gate, the northern leading to the plain, the southern, at the upper end, to Syracuse. There was an acropolis on each side of the valley, which lies between precipitous hills with flat tops, over which buildings had extended. The eastern hill[1] still has considerable remains of a strongly fortified medieval castle, in which some writers are inclined (though wrongly) to recognize portions of Greek masonry. See G. M. Columba, in *Archeologia di Leontinoi* (Palermo, 1891), reprinted from *Archivio Storico Siciliano*, xi.; P. Orsi in *Römische Mitteilungen* (1900), 61 seq. Excavations were made in 1899 in one of the ravines in a Sicel necropolis of the third period; explorations in the various Greek cemeteries resulted in the discovery of some fine bronzes, notably a fine bronze *lebes*, now in the Berlin museum.

(T. As.)

1 As a fact there are two flat valleys, up both of which the modern Lentini extends; and hence there is difficulty in fitting Polybius's account to the site.

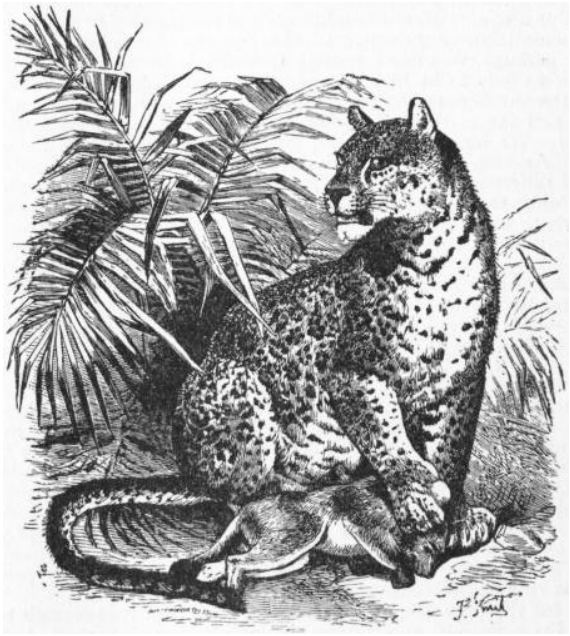
LEONTIUS, theological writer, born at Byzantium, flourished during the 6th century. He is variously styled 456
Byzantinus, Hierosolymitanus (as an inmate of the monastery of St Saba near Jerusalem) and Scholasticus (the first "schoolman," as the introducer of the Aristotelian definitions into theology; according to others, he had been an advocate, a special meaning of the word *scholasticus*). He himself states that in his early years he belonged to a Nestorian community. Nothing else is known of his life; he is frequently confused with others of the same name, and it is uncertain which of the works bearing the name Leontius are really by him. Most scholars regard as genuine the polemical treatises *Contra Nestorianos et Eutychianos*, *Contra Nestorianos*, *Contra Monophysitas*, *Contra Severum* (patriarch of Antioch); and the Σχόλια, generally called *De Sectis*. An essay *Adversus fraudes Apollinaristarum* and two homilies are referred to other hands, the homilies to a Leontius, presbyter of Constantinople.

Collected works in J. P. Migne, *Patrologia Graeca*, lxxxvi.; for the various questions connected with Leontius see F. Loops, *Das Leben und die polemischen Werke des Leontios von Byzanz* (Leipzig, 1887); W. Rügamer, *Leontius von Byzanz* (1894); V. Ermoni, *De Leontio Byzantino* (Paris, 1895); C. Krumbacher, *Geschichte der byzantinischen Litteratur* (1897); J. P. Junglas, *Leontius von Byzanz* (1908). For other persons of the name see Fabricius, *Bibliotheca Graeca* (ed. Harles), viii. 323.

LEOPARD,[1] Pard or Panther (*Felis pardus*), the largest spotted true cat of the Old World, with the exception of the snow-leopard, which is, however, inferior in point of size to the largest leopard. (See Carnivora and Snow-Leopard.) Leopards, known in India as *cheeta* (*chita*), are characterized by the rosette-like form of the black spots on the greater part of the body, and the absence of a central spot from each rosette. Towards the head and on the limbs the spots tend to become solid, but there is great local variation in regard to their form and arrangement. In the Indian leopard, the true *Felis pardus*, the spots are large and rosette-like, and the same is the case with the long-haired Persian leopard (*F. pardus tulliana*). On the other hand the heavily built and thick-haired Manchurian *F. p. villosa* has more consolidated spots. African leopards, again, to one of which the name *F. p. leopardus* is applicable, show a decided tendency to a breaking-up of the spots; West African animals being much darker-coloured than those from the east side of the continent.

Both as regards structure and habits, the leopard may be reckoned as one of the more typical representatives of the genus *Felis*, belonging to that section in which the hyoid bone is loosely connected with the skull, owing to imperfect ossification of its anterior arch, and the pupil of the eye when contracted under the influence of light is circular, not linear as in the smaller cats.

The size of leopards varies greatly, the head and body usually measuring from 3½ to 4½ ft. in length, and the tail from 2½ to 3 ft., but some specimens exceed these limits, while the Somali leopard (*F. p. nanopardus*) falls considerably short of them. The ground-colour of the fur varies from a pale fawn to a rufous buff, graduating in the Indian race into pure white on the under-parts and inside of the limbs. Generally speaking, the spots on the under parts and limbs are simple and blacker than those on the other parts of the body. The bases of the ears behind are black, the tips buff. The upper side of the tail is buff, spotted with broken rings like the back, its under surface white with simple spots. The hair of the cubs is longer than that of the adults, its ground-colour less bright, and its spots less distinct. Perfectly black leopards, which in certain lights show the characteristic markings on the fur, are not uncommon, and are examples of *melanism*, occurring as individual variations, sometimes in one cub out of a litter of which the rest are normally coloured, and therefore not indicating a distinct race, much less a species. These are met with chiefly in southern Asia; melanism among African leopards taking the form of an excessive breaking-up of the spots, which finally show a tendency to coalesce.



The Leopard (*Felis pardus*).

In habits the leopard resembles the other large cat-like animals, yielding to none in the ferocity of its disposition. It is exceedingly quick in its movements, but seizes its prey by waiting in ambush or stealthily approaching to within springing distance, when it suddenly rushes upon it and tears it to ground with its powerful claws and teeth. It preys upon almost any animal it can overcome, such as antelopes, deer, sheep, goats, monkeys, peafowl, and has a special liking for dogs. It not unfrequently attacks human beings in India, chiefly children and old women, but instances have been known of a leopard becoming a regular “man-eater.” When favourable opportunities occur, it often kills many more victims than it can devour at once, either to gratify its propensity for killing or for the sake of their fresh blood. It generally inhabits woody districts, and can climb trees with facility when hunted, but usually lives on or near the ground, among rocks, bushes and roots and low branches of large trees.

The geographical range of the leopard embraces practically all Africa, and Asia from Palestine to China and Manchuria, inclusive of Ceylon and the great Malay Islands as far as Java. Fossil bones and teeth, indistinguishable from those of existing leopards, have been found in cave-deposits of Pleistocene age in Spain, France, Germany and England.

(R. L.*; W. H. F.)

1 The name (Late Lat. *leopardus*, Late Gr. λεόπαρδος) was given by the ancients to an animal supposed to have been a cross between a lion (Lat. *leo*, Gr. λὲων) and a pard (Gr. πάρδος, Pers. *pars*) or panther. Medieval heralds made no distinction in shape between a lion and a leopard, but marked the difference by drawing the leopard showing the full face (see Heraldry: § *Beasts and Birds*).

LEOPARDI, GIACOMO, Count (1798-1837), Italian poet, was born at Recanati in the March of Ancona, on the 29th of June 1798. All the circumstances of his parentage and education conspired to foster his precocious and sensitive genius at the expense of his physical and mental health. His family was ancient and patrician, but so deeply embarrassed as to be only rescued from ruin by the energy of his mother, who had taken the control of business matters entirely into her own hands, and whose engrossing devotion to her undertaking seems to have almost dried up the springs of maternal tenderness. Count Monaldo Leopardi, the father, a mere nullity in his own household, secluded himself in his extensive library, to which his nervous, sickly and deformed son had free access, and which absorbed him exclusively in the absence of any intelligent sympathy from his parents, any companionship except that of his brothers and sister, or any recreation in the dullest of Italian towns. The lad spent his days over grammars and dictionaries, learning Latin with little assistance, and Greek and the principal modern languages with none at all. Any ordinarily clever boy would have emerged from this discipline a mere pedant and bookworm. Leopardi came forth a Hellene, not merely a consummate Greek scholar, but penetrated with the classical conception of life, and a master of antique form and style. At sixteen he composed a Latin treatise on the Roman rhetoricians of the 2nd century, a commentary on Porphyry’s life of Plotinus and a history of astronomy; at seventeen he wrote on the popular errors of the ancients, citing more than four hundred authors. A little later he imposed upon the first scholars of Italy by two odes in the manner of Anacreon. At eighteen he produced a poem of considerable length, the *Appressamento alla Morte*, which, after being lost for many years, was discovered and published by Zanino Volta. It is a vision of the omnipotence of death, modelled upon Petrarch, but more truly inspired by Dante, and in its conception, machinery and general tone offering a remarkable resemblance to Shelley’s *Triumph of Life* (1822), of which Leopardi probably never heard. This juvenile work was succeeded (1819) by two lyrical compositions which at once placed the author upon the height which he maintained ever afterwards. The ode to Italy, and that on the monument to Dante erected at Florence, gave voice to the dismay and affliction with which Italy, aroused by the French Revolution from the torpor of the 17th and 18th centuries, contemplated her forlorn and degraded condition, her political impotence, her degeneracy in arts and arms and the frivolity or stagnation of her intellectual life. They were the outcry of a student who had found an ideal of national existence in his books, and to whose disappointment everything in his own circumstances lent

additional poignancy. But there is nothing unmanly or morbid in the expression of these sentiments, and the odes are surprisingly exempt from the failings characteristic of young poets. They are remarkably chaste in diction, close and nervous in style, sparing in fancy and almost destitute of simile and metaphor, antique in spirit, yet pervaded by modern ideas, combining Landor's dignity with a considerable infusion of the passion of Byron. These qualities continued to characterize Leopardi's poetical writings throughout his life. A third ode, on Cardinal Mai's discoveries of ancient MSS., lamented in the same spirit of indignant sorrow the decadence of Italian literature. The publication of these pieces widened the breach between Leopardi and his father, a well-meaning but apparently dull and apathetic man, who had lived into the 19th century without imbibing any of its spirit, and who provoked his son's contempt by a superstition unpardonable in a scholar of real learning. Very probably from a mistaken idea of duty to his son, very probably, too, from his own entire dependence in pecuniary matters upon his wife, he for a long time obstinately refused Leopardi funds, recreation, change of scene, everything that could have contributed to combat the growing pessimism which eventually became nothing less than monomaniacal. The affection of his brothers and sister afforded him some consolation, and he found intellectual sympathy in the eminent scholar and patriot Pietro Giordani, with whom he assiduously corresponded at this period, partly on the ways and means of escaping from "this hermitage, or rather seraglio, where the delights of civil society and the advantages of solitary life are alike wanting." This forms the keynote of numerous letters of complaint and lamentation, as touching but as effeminate in their pathos as those of the banished Ovid. It must be remembered in fairness that the weakness of Leopardi's eyesight frequently deprived him for months together of the resource of study. At length (1822) his father allowed him to repair to Rome, where, though cheered by the encouragement of C. C. J. Bunsen and Niebuhr, he found little satisfaction in the trifling pedantry that passed for philology and archaeology, while his sceptical opinions prevented his taking orders, the indispensable condition of public employment in the Papal States. Dispirited and with exhausted means, he returned to Recanati, where he spent three miserable years, brightened only by the production of several lyrical masterpieces, which appeared in 1824. The most remarkable is perhaps the *Bruto Minore*, the condensation of his philosophy of despair. In 1825 he accepted an engagement to edit Cicero and Petrarch for the publisher Stella at Milan, and took up his residence at Bologna, where his life was for a time made almost cheerful by the friendship of the countess Malvezzi. In 1827 appeared the *Operette Morali*, consisting principally of dialogues and his imaginary biography of Filippo Ottonieri, which have given Leopardi a fame as a prose writer hardly inferior to his celebrity as a poet. Modern literature has few productions so eminently classical in form and spirit, so symmetrical in construction and faultless in style. Lucian is evidently the model; but the wit and irony which were playthings to Lucian are terribly earnest with Leopardi. Leopardi's invention is equal to Lucian's and his only drawback in comparison with his exemplar is that, while the latter's campaign against pretence and imposture commands hearty sympathy, Leopardi's philosophical creed is a repulsive hedonism in the disguise of austere stoicism. The chief interlocutors in his dialogues all profess the same unmitigated pessimism, claim emancipation from every illusion that renders life tolerable to the vulgar, and assert or imply a vast moral and intellectual superiority over unenlightened mankind. When, however, we come to inquire what renders them miserable, we find it is nothing but the privation of pleasurable sensation, fame, fortune or some other external thing which a lofty code of ethics would deny to be either indefeasibly due to man or essential to his felicity. A page of *Sartor Resartus* scatters Leopardi's sophistry to the winds, and leaves nothing of his dialogues but the consummate literary skill that would render the least fragment precious. As works of art they are a possession for ever, as contributions to moral philosophy they are worthless, and apart from their literary qualities can only escape condemnation if regarded as lyrical expressions of emotion, the wail extorted from a diseased mind by a diseased body. *Filippo Ottonieri* is a portrait of an imaginary philosopher, imitated from the biography of a real sage in Lucian's *Demonax*. Lucian has shown us the philosopher he wished to copy, Leopardi has truly depicted the philosopher he was. Nothing can be more striking or more tragical than the picture of the man superior to his fellows in every quality of head and heart, and yet condemned to sterility and impotence because he has, as he imagines, gone a step too far on the road to truth, and illusions exist for him no more. The little tract is full of remarks on life and character of surprising depth and justice, manifesting what powers of observation as well as reflection were possessed by the sickly youth who had seen so little of the world.

Want of means soon drove Leopardi back to Recanati, where, deaf, half-blind, sleepless, tortured by incessant pain, at war with himself and every one around him except his sister, he spent the two most unhappy years of his unhappy life. In May 1831 he escaped to Florence, where he formed the acquaintance of a young Swiss philologist, M. de Sinner. To him he confided his unpublished philological writings, with a view to their appearance in Germany. A selection appeared under the title *Excerpta ex schedis criticis J. Leopardi* (Bonn, 1834). The remaining MSS. were purchased after Sinner's death by the Italian government, and, together with Leopardi's correspondence with the Swiss philologist, were partially edited by Aulard. In 1831 appeared a new edition of Leopardi's poems, comprising several new pieces of the highest merit. These are in general less austerely classical than his earlier compositions, and evince a greater tendency to description, and a keener interest in the works and ways of ordinary mankind. *The Resurrection*, composed on occasion of his unexpected recovery, is a model of concentrated energy of diction, and *The Song of the Wandering Shepherd in Asia* is one of the highest flights of modern lyric poetry. The range of the author's ideas is still restricted, but his style and melody are unsurpassable. Shortly after the publication of these pieces (October 1831) Leopardi was driven from Florence to Rome by an unhappy attachment. His feelings are powerfully expressed in two poems, *To Himself* and *Aspasia*, which seem to breathe wounded pride at least as much as wounded love. In 1832 Leopardi returned to Florence, and there formed acquaintance with a young Neapolitan, Antonio Ranieri, himself an author of merit, and destined to enact towards him the part performed by Severn towards Keats, an enviable title to renown if Ranieri had not in his old age tarnished it by assuming the relation of Trelawny to the dead Byron. Leopardi accompanied Ranieri and his sister to Naples, and under their care enjoyed four years of comparative tranquillity. He made the acquaintance of the German poet Platen, his sole modern rival in the classical perfection of form, and composed *La Ginestra*, the most consummate of all his lyrical masterpieces, strongly resembling Shelley's *Mont Blanc*, but more perfect in expression. He also wrote at Naples *The Sequel to the Battle of the Frogs and Mice*, a satire in *ottava rima* on the abortive Neapolitan revolution of 1820, clever and humorous, but obscure from the local character of the allusions. The more painful details of his Neapolitan residence may be found by those who care to seek for them in the deplorable publication of Ranieri's peevish old age (*Sette anni di sodalizio*). The decay of Leopardi's constitution continued; he became dropsical; and a sudden crisis of his malady, unanticipated by himself alone, put an end to his life-long sufferings on the 15th of June 1837.

The poems which constitute Leopardi's principal title to immortality are only forty-one in number, and some of these are merely fragmentary. They may for the most part be described as odes, meditative soliloquies, or

impassioned addresses, generally couched in a lyrical form, although a few are in magnificent blank verse. Some idea of the style and spirit of the former might be obtained by imagining the thoughts of the last book of Spenser's *Faerie Queene* in the metre of his *Epithalamium*. They were first edited complete by Ranieri at Florence in 1845, forming, along with the *Operette Morali*, the first volume of an edition of Leopardi's works, which does not, however, include *The Sequel to the Battle of the Frogs and Mice*, first printed at Paris in 1842, nor the afterwards discovered writings. Vols. ii.-iv. contain the philological essays and translations, with some letters, and vols. v. and vi. the remainder of the correspondence. Later editions are those of G. Chiarini and G. Mestica. The juvenile essays preserved in his father's library at Recanati were edited by Cugnoni (*Opere inedite*) in 1879, with the consent of the family. See Cappelleti, *Bibliografia Leopardiana* (Parma, 1882). Leopardi's biography is mainly in his letters (*Epistolario*, 1st ed., 1849, 5th ed., 1892), to which his later biographers (Brandes, Bouché-Leclercq, Rosa) have merely added criticisms, excellent in their way, more particularly Brandes's, but generally over-rating Leopardi's significance in the history of human thought. W. E. Gladstone's essay (*Quart. Rev.*, 1850), reprinted in vol. ii. of the author's *Gleanings*, is too much pervaded by the theological spirit, but is in the main a pattern of generous and discriminating eulogy. There are excellent German translations of the poems by Heyse and Brandes. An English translation of the essays and dialogues by C. Edwards appeared in 1882, and most of the dialogues were translated with extraordinary felicity by James Thomson, author of *The City of Dreadful Night*, and originally published in the *National Reformer*.

(R. G.)

LEOPARDO, ALESSANDRO (d. *c.* 1512), Italian sculptor, was born and died at Venice. His first known work is the imposing mausoleum of the doge Andrea Vendramini, now in the church of San Giovanni e Paolo; in this he had the co-operation of Tullio Lombardo, but the finest parts are Leopardo's. Some of the figures have been taken away, and two in the Berlin museum are considered to be certainly his work. He was exiled on a charge of fraud in 1487, and recalled in 1490 by the senate to finish Verrocchio's colossal statue of Bartolommeo Colleoni. He worked between 1503 and 1505 on the tomb of Cardinal Zeno at St Mark's, which was finished in 1515 by Pietro Lombardo; and in 1505 he designed and cast the bronze sockets for the three flagstaffs in the square of St Mark's, the antique character of the decorations suggesting some Greek model. (See VENICE.)

LEOPOLD (M.H. Ger. *Liupolt*, O.H. Ger. *Liupald*, from *liut*, Mod. Ger. *Leute*, "people," and *pald*, "bold," *i.e.* "bold for the people"), the name which has been that of several European sovereigns.

LEOPOLD I. (1640-1705), Roman emperor, the second son of the emperor Ferdinand III. and his first wife Maria Anna, daughter of Philip III. of Spain, was born on the 9th of June 1640. Intended for the Church, he received a good education, but his prospects were changed by the death of his elder brother, the German king Ferdinand IV., in July 1654, when he became his father's heir. In 1655 he was chosen king of Hungary and in 1656 king of Bohemia, and in July 1658, more than a year after his father's death, he was elected emperor at Frankfort, in spite of the intrigues of Cardinal Mazarin, who wished to place on the imperial throne Ferdinand, elector of Bavaria, or some other prince whose elevation would break the Habsburg succession. Mazarin, however, obtained a promise from the new emperor that he would not send assistance to Spain, then at war with France, and, by joining a confederation of German princes, called the league of the Rhine, France secured a certain influence in the internal affairs of Germany. Leopold's long reign covers one of the most important periods of European history; for nearly the whole of its forty-seven years he was pitted against Louis XIV. of France, whose dominant personality completely overshadowed Leopold. The emperor was a man of peace and never led his troops in person; yet the greater part of his public life was spent in arranging and directing wars. The first was with Sweden, whose king Charles X. found a useful ally in the prince of Transylvania, George II. Rakocky, a rebellious vassal of the Hungarian crown. This war, a legacy of the last reign, was waged by Leopold as the ally of Poland until peace was made at Oliva in 1660. A more dangerous foe next entered the lists. The Turks interfered in the affairs of Transylvania, always an unruly district, and this interference brought on a war with the Empire, which after some desultory operations really began in 1663. By a personal appeal to the diet at Regensburg Leopold induced the princes to send assistance for the campaign; troops were also sent by France, and in August 1664 the great imperialist general, Montecucculi, gained a notable victory at St Gotthard. By the peace of Vasvar the emperor made a twenty years' truce with the sultan, granting more generous terms than his recent victory seemed to render necessary.

After a few years of peace began the first of three wars between France and the Empire. The aggressive policy pursued by Louis XIV. towards Holland had aroused the serious attention of Europe, and steps had been taken to check it. Although the French king had sought the alliance of several German princes and encouraged the Turks in their attacks on Austria the emperor at first took no part in this movement. He was on friendly terms with Louis, to whom he was closely related and with whom he had already discussed the partition of the lands of the Spanish monarchy; moreover, in 1671 he arranged with him a treaty of neutrality. In 1672, however, he was forced to take action. He entered into an alliance for the defence of Holland and war broke out; then, after this

league had collapsed owing to the defection of the elector of Brandenburg, another and more durable alliance was formed for the same purpose, including, besides the emperor, the king of Spain and several German princes, and the war was renewed. At this time, twenty-five years after the peace of Westphalia, the Empire was virtually a confederation of independent princes, and it was very difficult for its head to conduct any war with vigour and success, some of its members being in alliance with the enemy and others being only lukewarm in their support of the imperial interests. Thus this struggle, which lasted until the end of 1678, was on the whole unfavourable to Germany, and the advantages of the treaty of Nijmwegen (February 1679) were with France.

Almost immediately after the conclusion of peace Louis renewed his aggressions on the German frontier. Engaged in a serious struggle with Turkey, the emperor was again slow to move, and although he joined a league against France in 1682 he was glad to make a truce at Regensburg two years later. In 1686 the league of Augsburg was formed by the emperor and the imperial princes, to preserve the terms of the treaties of Westphalia and of Nijmwegen. The whole European position was now bound up with events in England, and the tension lasted until 1688, when William of Orange won the English crown and Louis invaded Germany. In May 1689 the grand alliance was formed, including the emperor, the kings of England, Spain and Denmark, the elector of Brandenburg and others, and a fierce struggle against France was waged throughout almost the whole of western Europe. In general the several campaigns were favourable to the allies, and in September 1697 England and Holland made peace with Louis at Ryswick. To this treaty Leopold refused to assent, as he considered that his allies had somewhat neglected his interests, but in the following month he came to terms and a number of places were transferred from France to Germany. The peace with France lasted for about four years and then Europe was involved in the War of the Spanish Succession. The king of Spain, Charles II., was a Habsburg by descent and was related by marriage to the Austrian branch, while a similar tie bound him to the royal house of France. He was feeble and childless, and attempts had been made by the European powers to arrange for a peaceable division of his extensive kingdom. Leopold refused to consent to any partition, and when in November 1700 Charles died, leaving his crown to Philip, duke of Anjou, a grandson of Louis XIV., all hopes of a peaceable settlement vanished. Under the guidance of William III. a powerful league, the grand alliance, was formed against France; of this the emperor was a prominent member, and in 1703 he transferred his claim on the Spanish monarchy to his second son, the archduke Charles. The early course of the war was not favourable to the imperialists, but the tide of defeat had been rolled back by the great victory of Blenheim before Leopold died on the 5th of May 1705.

In governing his own lands Leopold found his chief difficulties in Hungary, where unrest was caused partly by his desire to crush Protestantism. A rising was suppressed in 1671 and for some years Hungary was treated with great severity. In 1681, after another rising, some grievances were removed and a less repressive policy was adopted, but this did not deter the Hungarians from revolting again. Espousing the cause of the rebels the sultan sent an enormous army into Austria early in 1683; this advanced almost unchecked to Vienna, which was besieged from July to September, while Leopold took refuge at Passau. Realizing the gravity of the situation somewhat tardily, some of the German princes, among them the electors of Saxony and Bavaria, led their contingents to the imperial army which was commanded by the emperor’s brother-in-law, Charles, duke of Lorraine, but the most redoubtable of Leopold’s allies was the king of Poland, John Sobieski, who was already dreaded by the Turks. On the 12th of September 1683 the allied army fell upon the enemy, who was completely routed, and Vienna was saved. The imperialists, among whom Prince Eugene of Savoy was rapidly becoming prominent, followed up the victory with others, notably one near Mohacz in 1687 and another at Zenta in 1697, and in January 1699 the sultan signed the treaty of Karlowitz by which he admitted the sovereign rights of the house of Habsburg over nearly the whole of Hungary. Before the conclusion of the war, however, Leopold had taken measures to strengthen his hold upon this country. In 1687 at the diet of Pressburg the constitution was changed, the right of the Habsburgs to succeed to the throne without election was admitted and the emperor’s elder son Joseph was crowned hereditary king of Hungary.

During this reign some important changes were made in the constitution of the Empire. In 1663 the imperial diet entered upon the last stage of its existence, and became a body permanently in session at Regensburg; in 1692 the duke of Hanover was raised to the rank of an elector, becoming the ninth member of the electoral college; and in 1700 Leopold, greatly in need of help for the impending war with France, granted the title of king of Prussia to the elector of Brandenburg. The net result of these and similar changes was to weaken the authority of the emperor over the members of the Empire, and to compel him to rely more and more upon his position as ruler of the Austrian archduchies and of Hungary and Bohemia, and Leopold was the first who really appears to have realized this altered state of affairs and to have acted in accordance therewith.

The emperor was married three times. His first wife was Margaret Theresa (d. 1673), daughter of Philip IV. of Spain; his second Claudia Felicitas (d. 1676), the heiress of Tirol; and his third Eleanora, a princess of the Palatinate. By his first two wives he had no sons, but his third wife bore him two, Joseph and Charles, both of whom became emperors. He had also four daughters.

Leopold was a man of industry and education, and during his later years he showed some political ability. Extremely tenacious of his rights, and regarding himself as an absolute sovereign, he was also very intolerant and was greatly influenced by the Jesuits. In person he was short, but strong and healthy. Although he had no inclination for a military life he loved exercises in the open air, such as hunting and riding; he had also a taste for music.

Leopold’s letters to Marco d’Aviano from 1680 to 1699 were edited by O. Klopp and published at Graz in 1888. Other letters are found in the *Fontes rerum Austriacarum*, Bände 56 and 57 (Vienna, 1903-1904). See also F. Krones, *Handbuch der Geschichte Österreichs* (Berlin, 1876-1879); R. Baumstark, *Kaiser Leopold I.* (1873); and A. F. Pribram, *Zur Wahl Leopolds I.* (Vienna, 1888).

(A. W. H.*)

LEOPOLD II. (1747-1792), Roman emperor, and grand-duke of Tuscany, son of the empress Maria Theresa

and her husband, Francis I., was born in Vienna on the 5th of May 1747. He was a third son, and was at first educated for the priesthood, but the theological studies to which he was forced to apply himself are believed to have influenced his mind in a way unfavourable to the Church. On the death of his elder brother Charles in 1761 it was decided that he should succeed to his father's grand duchy of Tuscany, which was erected into a "secundogeniture" or apanage for a second son. This settlement was the condition of his marriage on the 5th of August 1764 with Maria Louisa, daughter of Charles III. of Spain, and on the death of his father Francis I. (13th August 1765) he succeeded to the grand duchy. For five years he exercised little more than nominal authority under the supervision of counsellors appointed by his mother. In 1770 he made a journey to Vienna to secure the removal of this vexatious guardianship, and returned to Florence with a free hand. During the twenty years which elapsed between his return to Florence and the death of his eldest brother Joseph II. in 1790 he was employed in reforming the administration of his small state. The reformation was carried out by the removal of the ruinous restrictions on industry and personal freedom imposed by his predecessors of the house of Medici, and left untouched during his father's life; by the introduction of a rational system of taxation; and by the execution of profitable public works, such as the drainage of the Val di Chiana. As he had no army to maintain, and as he suppressed the small naval force kept up by the Medici, the whole of his revenue was left free for the improvement of his state. Leopold was never popular with his Italian subjects. His disposition was cold and retiring. His habits were simple to the verge of sordidness, though he could display splendour on occasion, and he could not help offending those of his subjects who had profited by the abuses of the Medicean régime. But his steady, consistent and intelligent administration, which advanced step by step, making the second only when the first had been justified by results, brought the grand duchy to a high level of material prosperity. His ecclesiastical policy, which disturbed the deeply rooted convictions of his people, and brought him into collision with the pope, was not successful. He was unable to secularize the property of the religious houses, or to put the clergy entirely under the control of the lay power.

During the last few years of his rule in Tuscany Leopold had begun to be frightened by the increasing disorders in the German and Hungarian dominions of his family, which were the direct result of his brother's headlong methods. He and Joseph II. were tenderly attached to one another, and met frequently both before and after the death of their mother, while the portrait by Pompeo Baltoni in which they appear together shows that they bore a strong personal resemblance to one another. But it may be said of Leopold, as of Fontenelle, that his heart was made of brains. He knew that he must succeed his childless eldest brother in Austria, and he was unwilling to inherit his unpopularity. When, therefore, in 1789 Joseph, who knew himself to be dying, asked him to come to Vienna, and become co-regent, Leopold coldly evaded the request. He was still in Florence when Joseph II. died at Vienna on the 20th of February 1790, and he did not leave his Italian capital till the 3rd of March. Leopold, during his government in Tuscany, had shown a speculative tendency to grant his subjects a constitution. When he succeeded to the Austrian lands he began by making large concessions to the interests offended by his brother's innovations. He recognized the Estates of his different dominions as "the pillars of the monarchy," pacified the Hungarians and divided the Belgian insurgents by concessions. When these failed to restore order, he marched troops into the country, and re-established at the same time his own authority, and the historic franchises of the Flemings. Yet he did not surrender any part that could be retained of what Maria Theresa and Joseph had done to strengthen the hands of the state. He continued, for instance, to insist that no papal bull could be published in his dominions without his consent (*placetum regium*).

If Leopold's reign as emperor, and king of Hungary and Bohemia, had been prolonged during years of peace, it is probable that he would have repeated his successes as a reforming ruler in Tuscany on a far larger scale. But he lived for barely two years, and during that period he was hard pressed by peril from west and east alike. The growing revolutionary disorders in France endangered the life of his sister Marie Antoinette, the queen of Louis XVI., and also threatened his own dominions with the spread of a subversive agitation. His sister sent him passionate appeals for help, and he was pestered by the royalist emigrants, who were intriguing both to bring about an armed intervention in France, and against Louis XVI. From the east he was threatened by the aggressive ambition of Catherine II. of Russia, and by the unscrupulous policy of Prussia. Catherine would have been delighted to see Austria and Prussia embark on a crusade in the cause of kings against the Revolution. While they were busy beyond the Rhine, she would have annexed what remained of Poland, and would have made conquests in Turkey. Leopold II. had no difficulty in seeing through the rather transparent cunning of the Russian empress, and he refused to be misled. To his sister he gave good advice and promises of help if she and her husband could escape from Paris. The emigrants who followed him pertinaciously were refused audience, or when they forced themselves on him were peremptorily denied all help. Leopold was too purely a politician not to be secretly pleased at the destruction of the power of France and of her influence in Europe by her internal disorders. Within six weeks of his accession he displayed his contempt for her weakness by practically tearing up the treaty of alliance made by Maria Theresa in 1756 and opening negotiations with England to impose a check on Russia and Prussia. He was able to put pressure on England by threatening to cede his part of the Low Countries to France, and then, when secure of English support, he was in a position to baffle the intrigues of Prussia. A personal appeal to Frederick William II. led to a conference between them at Reichenbach in July 1790, and to an arrangement which was in fact a defeat for Prussia. Leopold's coronation as king of Hungary on the 15th of November 1790, was preceded by a settlement with the diet in which he recognized the dominant position of the Magyars. He had already made an eight months' truce with the Turks in September, which prepared the way for the termination of the war begun by Joseph II., the peace of Sistova being signed in August 1791. The pacification of his eastern dominions left Leopold free to re-establish order in Belgium and to confirm friendly relations with England and Holland.

During 1791 the emperor continued to be increasingly preoccupied with the affairs of France. In January he had to dismiss the count of Artois, afterwards Charles X., king of France, in a very peremptory way. His good sense was revolted by the folly of the French emigrants, and he did his utmost to avoid being entangled in the affairs of that country. The insults inflicted on Louis XVI. and Marie Antoinette, however, at the time of their attempted flight to Varennes in June, stirred his indignation, and he made a general appeal to the sovereigns of Europe to take common measures in view of events which "immediately compromised the honour of all sovereigns, and the security of all governments." Yet he was most directly interested in the conference at Sistova, which in June led to a final peace with Turkey. On the 25th of August he met the king of Prussia at Pillnitz, near Dresden, and they drew up a declaration of their readiness to intervene in France if and when their assistance was called for by the other powers. The declaration was a mere formality, for, as Leopold knew, neither Russia nor England was prepared to act, and he endeavoured to guard against the use which he foresaw the emigrants would endeavour to make of it. In face of the agitation caused by the Pillnitz declaration in France, the intrigues of the emigrants,

and the attacks made by the French revolutionists on the rights of the German princes in Alsace, Leopold continued to hope that intervention might not be required. When Louis XVI. swore to observe the constitution of September 1791, the emperor professed to think that a settlement had been reached in France. The attacks on the rights of the German princes on the left bank of the Rhine, and the increasing violence of the parties in Paris which were agitating to bring about war, soon showed, however, that this hope was vain. Leopold met the threatening language of the revolutionists with dignity and temper. His sudden death on the 1st of March 1792 was an irreparable loss to Austria.

Leopold had sixteen children, the eldest of his eight sons being his successor, the emperor Francis II. Some of his other sons were prominent personages in their day. Among them were: Ferdinand III., grand duke of Tuscany; the archduke Charles, a celebrated soldier; the archduke John, also a soldier; the archduke Joseph, palatine of Hungary; and the archduke Rainer, viceroy of Lombardy-Venetia.

Several volumes containing the emperor's correspondence have been published. Among these are: *Joseph II. und Leopold von Toskana. Ihr Briefwechsel 1781-1790* (Vienna, 1872), and *Marie Antoinette, Joseph II. und Leopold II. Ihr Briefwechsel* (Vienna, 1866), both edited by A. Ritter von Arneth; *Joseph II., Leopold II. und Kaunitz. Ihr Briefwechsel* (Vienna, 1873); and *Leopold II., Franz II. und Catharina. Ihre Correspondenz nebst einer Einleitung: Zur Geschichte der Politik Leopolds II.* (Leipzig, 1874), both edited by A. Beer; and *Leopold II. und Marie Christine. Ihrand Briefwechsel 1781-1792*, edited by A. Wolf (Vienna, 1867). See also H. von Sybel, *Über die Regierung Kaiser Leopolds II.* (Munich, 1860); A. Schultze, *Kaiser Leopold II. und die französische Revolution* (Leipzig, 1899); and A. Wolf and H. von Zwiedeneck-Südenhorst, *Österreich unter Maria Theresa, Joseph II. und Leopold II.* (Berlin, 1882-1884).

LEOPOLD I. (1790-1865), king of the Belgians, fourth son of Francis, duke of Saxe-Coburg-Saalfeld, and uncle of Queen Victoria of England, was born at Coburg on the 18th of December 1790. At the age of eighteen he entered the military service of Russia, and accompanied the emperor Alexander to Erfurt as a member of his staff. He was required by Napoleon to quit the Russian army, and spent some years in travelling. In 1813 he accepted from the emperor Alexander the post of a cavalry general in the army of invasion, and he took part in the whole of the campaign of that and the following year, distinguishing himself in the battles of Leipzig, Lützen and Bautzen. He entered Paris with the allied sovereigns, and accompanied them to England. He married in May 1816 Charlotte, only child of George, prince regent, afterwards George IV., heiress-presumptive to the British throne, and was created duke of Kendal in the British peerage and given an annuity of £50,000. The death of the princess in the following year was a heavy blow to his hopes, but he continued to reside in England. In 1830 he declined the offer of the crown of Greece, owing to the refusal of the powers to grant conditions which he considered essential to the welfare of the new kingdom, but was in the following year elected king of the Belgians (4th June 1831). After some hesitation he accepted the crown, having previously ascertained that he would have the support of the great powers on entering upon his difficult task, and on the 12th of July he made his entry into Brussels and took the oath to observe the constitution. During the first eight years of his reign he was confronted with the resolute hostility of King William I. of Holland, and it was not until 1839 that the differences between the two states, which until 1830 had formed the kingdom of the Netherlands, were finally settled at the conference of London by the treaty of the 24 Articles (see Belgium). From this date until his death, King Leopold spent all his energies in the wise administration of the affairs of the newly formed kingdom, which may be said to owe in a large measure its first consolidation and constant prosperity to the care and skill of his discreet and fatherly government. In 1848 the throne of Belgium stood unshaken amidst the revolutions which marked that year in almost every European country. On the 8th of August 1832 Leopold married, as his second wife, Louise of Orleans, daughter of Louis Philippe, king of the French. Queen Louise endeared herself to the Belgian people, and her death in 1850 was felt as a national loss. This union produced two sons and one daughter—(1) Leopold, afterwards king of the Belgians; (2) Philip, count of Flanders; (3) Marie Charlotte, who married Maximilian of Austria, the unfortunate emperor of Mexico. Leopold I. died at Laeken on the 10th of December 1865. He was a most cultured man and a great reader, and did his utmost during his reign to encourage art, science and education. His judgment was universally respected by contemporary sovereigns and statesmen, and he was frequently spoken of as "the Nestor of Europe" (see also Victoria, Queen).

See Th. Juste, *Léopold Ier, roi des Belges d'après des doc. inéd. 1793-1865* (2 vols., Brussels, 1868), and *Les Fondateurs de la monarchie Belge* (22 vols., Brussels, 1878-1880); J. J. Thonissen, *La Belgique sous le règne de Léopold Ier* (Louvain, 1862).

LEOPOLD II. [Leopold Louis Philippe Marie Victor] (1835-1909), king of the Belgians, son of the preceding, was born at Brussels on the 9th of April 1835. In 1846 he was created duke of Brabant and appointed a sub-lieutenant in the army, in which he served until his accession, by which time he had reached the rank of lieutenant-general. On attaining his majority he was made a member of the senate, in whose proceedings he took a lively interest, especially in matters concerning the development of Belgium and its trade. On the 22nd of August 1853 Leopold married Marie Henriette (1836-1902), daughter of the archduke Joseph of Austria, palatine of Hungary, by his wife Marie Dorothea, duchess of Württemberg. This princess, who was a great-granddaughter of the empress Maria Theresa, and a great-niece of Marie Antoinette, endeared herself to the people by her elevated character and indefatigable benevolence, while her beauty gained for her the sobriquet of "The Rose of Brabant"; she was also an accomplished artist and musician, and a fine horsewoman. Between the years 1854 and

1865 Leopold travelled much abroad, visiting India and China as well as Egypt and the countries on the Mediterranean coast of Africa. On the 10th of December 1865 he succeeded his father. On the 28th of January 1869 he lost his only son, Leopold (b. 1859), duke of Hainaut. The king's brother Philip, count of Flanders (1837-1905), then became heir to the throne; and on his death his son Albert (b. 1875) became heir-presumptive. During the Franco-Prussian War (1870-1871) the king of the Belgians preserved neutrality in a period of unusual difficulty and danger. But the most notable event in Leopold's career was the foundation of the Congo Free State (*q.v.*). While still duke of Brabant he had been the first to call the attention of the Belgians to the need of enlarging their horizon beyond sea, and after his accession to the throne he gave the first impulse towards the development of this idea by founding in 1876 the *Association Internationale Africaine*. He enlisted the services of H. M. Stanley, who visited Brussels in 1878 after exploring the Congo river, and returned in 1879 to the Congo as agent of the *Comité d'Études du Haut Congo*, soon afterwards reorganized as the "International Association of the Congo." This association was, in 1884-1885, recognized by the powers as a sovereign state under the name of the *État Indépendant du Congo*. Leopold's exploitation of this vast territory, which he administered autocratically, and in which he associated himself personally with various financial schemes, was understood to bring him an enormous fortune; it was the subject of acutely hostile criticism, to a large extent substantiated by the report of a commission of inquiry instituted by the king himself in 1904, and followed in 1908 by the annexation of the state to Belgium (see Congo Free State: *History*). In 1880 Leopold sought an interview with General C. G. Gordon and obtained his promise, subject to the approval of the British government, to enter the Belgian service on the Congo. Three years later Leopold claimed fulfilment of the promise, and Gordon was about to proceed to the Congo when the British government required his services for the Sudan. On the 15th of November 1902 King Leopold's life was attempted in Brussels by an Italian anarchist named Rubino. Queen Marie Henriette died at Spa on the 19th of September of the same year. Besides the son already mentioned she had borne to Leopold three daughters—Louise Marie Amélie (b. 1858), who in 1875 married Philip of Saxe-Coburg and Gotha, and was divorced in 1906; Stéphanie (b. 1864), who married Rudolph, crown prince of Austria, in 1881, and after his death in 1889 married, against her father's wishes, Elemer, Count Lonyay, in 1900; and Clémentine (b. 1872). At the time of the queen's death an unseemly incident was occasioned by Leopold's refusal to see his daughter Stéphanie, who in consequence was not present at her mother's funeral. The disagreeable impression on the public mind thus created was deepened by an unfortunate litigation, lasting for two years (1904-1906), over the deceased queen's will, in which the creditors of the princess Louise, together with princess Stéphanie (Countess Lonyay), claimed that under the Belgian law the queen's estate was entitled to half of her husband's property. This claim was disallowed by the Belgian courts. The king died at Laeken, near Brussels, on the 17th of December 1909. On the 23rd of that month his nephew took the oath to observe the constitution, assuming the title of Albert I. King Leopold was personally a man of considerable attainments and much strength of character, but he was a notoriously dissolute monarch, who even to the last offended decent opinion by his indulgences at Paris and on the Riviera. The wealth he amassed from the Congo he spent, no doubt, royally not only in this way but also on public improvements in Belgium; but he had a hard heart towards the natives of his distant possession.

LEOPOLD II. (1797-1870), of Habsburg-Lorraine, grand-duke of Tuscany, was born on the 3rd of October 1797, the son of the grand-duke Ferdinand III., whom he succeeded in 1824. During the first twenty years of his reign he devoted himself to the internal development of the state. His was the mildest and least reactionary of all the Italian despotisms of the day, and although always subject to Austrian influence he refused to adopt the Austrian methods of government, allowed a fair measure of liberty to the press, and permitted many political exiles from other states to dwell in Tuscany undisturbed. But when in the early 'forties a feeling of unrest spread throughout Italy, even in Tuscany demands for a constitution and other political reforms were advanced; in 1845-1846 riots broke out in various parts of the country, and Leopold granted a number of administrative reforms. But Austrian influence prevented him from going further, even had he wished to do so. The election of Pope Pius IX. gave fresh impulse to the Liberal movement, and on the 4th of September 1847 Leopold instituted the National Guard—a first step towards the constitution; shortly after the marchese Cosimo Ridolfi was appointed prime minister. The granting of the Neapolitan and Piedmontese constitutions was followed (17th February 1848) by that of Tuscany, drawn up by Gino Capponi. The revolution in Milan and Vienna aroused a fever of patriotic enthusiasm in Tuscany, where war against Austria was demanded; Leopold, giving way to popular pressure, sent a force of regulars and volunteers to co-operate with Piedmont in the Lombard campaign. His speech on their departure was uncompromisingly Italian and Liberal. "Soldiers," he said, "the holy cause of Italian freedom is being decided to-day on the fields of Lombardy. Already the citizens of Milan have purchased their liberty with their blood and with a heroism of which history offers few examples.... Honour to the arms of Italy! Long live Italian independence!" The Tuscan contingent fought bravely, if unsuccessfully, at Curtatone and Montanara. On the 26th of June the first Tuscan parliament assembled, but the disturbances consequent on the failure of the campaign in Lombardy led to the resignation of the Ridolfi ministry, which was succeeded by that of Gino Capponi. The riots continued, especially at Leghorn, which was a prey to actual civil war, and the democratic party of which F. D. Guerrazzi and G. Montanelli were leading lights became every day more influential. Capponi resigned, and Leopold reluctantly agreed to a Montanelli-Guerrazzi ministry, which in its turn had to fight against the extreme republican party. New elections in the autumn of 1848 returned a constitutional majority, but it ended by voting in favour of a constituent assembly. There was talk of instituting a central Italian kingdom with Leopold as king, to form part of a larger Italian federation, but in the meanwhile the grand-duke, alarmed at the revolutionary and republican agitations in Tuscany and encouraged by the success of the Austrian arms, was, according to Montanelli, negotiating with Field-Marshal Radetzky and with Pius IX., who had now abandoned his Liberal tendencies, and fled to Gaeta. Leopold had left Florence for Siena, and eventually for Porto S. Stefano, leaving a letter to Guerrazzi in which, on account of a protest from the pope, he declared that he could not agree to the proposed constituent assembly. The utmost confusion prevailed in Florence and other parts of Tuscany. On the 9th of February 1849 the republic was proclaimed, largely as a result of Mazzini's exhortations, and on the 18th Leopold sailed for Gaeta. A third parliament was elected and Guerrazzi appointed dictator. But there was great discontent, and the defeat of Charles Albert at Novara caused consternation among the Liberals. The

majority, while fearing an Austrian invasion, desired the return of the grand-duke who had never been unpopular, and in April 1849 the municipal council usurped the powers of the assembly and invited him to return, "to save us by means of the restoration of the constitutional monarchy surrounded by popular institutions, from the shame and ruin of a foreign invasion." Leopold accepted, although he said nothing about the foreign invasion, and on the 1st of May sent Count Luigi Serristori to Tuscany with full powers. But at the same time the Austrians occupied Lucca and Leghorn, and although Leopold simulated surprise at their action it has since been proved, as the Austrian general d'Aspre declared at the time, that Austrian intervention was due to the request of the grand-duke. On the 24th of May the latter appointed G. Baldasseroni prime minister, on the 25th the Austrians entered Florence and on the 28th of July Leopold himself returned. In April 1850 he concluded a treaty with Austria sanctioning the continuation for an indefinite period of the Austrian occupation with 10,000 men; in September he dismissed parliament, and the following year established a concordat with the Church of a very clerical character. He feebly asked Austria if he might maintain the constitution, and the Austrian premier, Prince Schwarzenberg, advised him to consult the pope, the king of Naples and the dukes of Parma and Modena. On their advice he formally revoked the constitution (1852). Political trials were held, Guerrazzi and many others being condemned to long terms of imprisonment, and although in 1855 the Austrian troops left Tuscany, Leopold's popularity was gone. A part of the Liberals, however, still believed in the possibility of a constitutional grand-duke who could be induced for a second time to join Piedmont in a war against Austria, whereas the popular party headed by F. Bartolommei and G. Dolfi realized that only by the expulsion of Leopold could the national aspirations be realized. When in 1859 France and Piedmont made war on Austria, Leopold's government failed to prevent numbers of young Tuscan volunteers from joining the Franco-Piedmontese forces. Finally an agreement was arrived at between the aristocratic constitutionalists and the popular party, as a result of which the grand-duke's participation in the war was formally demanded. Leopold at first gave way, and entrusted Don Neri Corsini with the formation of a ministry. The popular demands presented by Corsini were for the abdication of Leopold in favour of his son, an alliance with Piedmont and the reorganization of Tuscany in accordance with the eventual and definite reorganization of Italy. Leopold hesitated and finally rejected the proposals as derogatory to his dignity. On the 27th of April there was great excitement in Florence, Italian colours appeared everywhere, but order was maintained, and the grand-duke and his family departed for Bologna undisturbed. Thus the revolution was accomplished without a drop of blood being shed, and after a period of provisional government Tuscany was incorporated in the kingdom of Italy. On the 21st of July Leopold abdicated in favour of his son Ferdinand IV., who never reigned, but issued a protest from Dresden (26th March 1860). He spent his last years in Austria, and died in Rome on the 29th of January 1870.

Leopold of Tuscany was a well-meaning, not unkindly man, and fonder of his subjects than were the other Italian despots, but he was weak, and too closely bound by family ties and Habsburg traditions ever to become a real Liberal. Had he not joined the conclave of autocrats at Gaeta, and, above all, had he not summoned Austrian assistance while denying that he had done so, in 1849, he might yet have preserved his throne, and even changed the whole course of Italian history. At the same time his rule, if not harsh, was enervating and demoralizing.

See G. Baldasseroni, *Leopoldo II.* (Florence, 1871), useful but reactionary in tendency, the author having been Leopold's minister, G. Montanelli, *Memorie sull' Italia* (Turin, 1853); F. D. Guerrazzi, *Memorie* (Leghorn, 1848); Zobi, *Storia civile della Toscana*, vols. iv.-v. (Florence, 1850-1852); A. von Reumont, *Geschichte Toscanas* (2 vols., Gotha, 1876-1877); M. Bartolommei-Gioli, *Il Rivolgimento Toscano e L'azione popolare* (Florence, 1905); C. Tivaroni, *L' Italia durante il dominio Austriaco*, vol. i. (Turin, 1892), and *L' Italia degli Italiani*, vol. i. (Turin, 1895). See also Ricasoli; Bartolommei; Capponi, Gino; &c.

(L. V.*)

LEOPOLD II., a lake of Central Africa in the basin of the Kasai affluent of the Congo, cut by 2° S. and 18° 10′ E. It has a length N. to S. of about 75 m., is 30 m. across at its northern end, tapering towards its southern end. Numerous bays and gulfs render its outline highly irregular. Its shores are flat and marshy, the lake being (in all probability) simply the lowest part of a vast lake which existed here before the Kasai system breached the barrier—at Kwa mouth—separating it from the Congo. The lake is fed by the Lokoro (about 300 m. long) and smaller streams from the east. Its northern and western affluents are comparatively unimportant. It discharges its waters (at its southern end) into the Mfini, which is in reality the lower course of the Lukenye. The lake is gradually diminishing in area; in the rainy season it overflows its banks. The surrounding country is very flat and densely wooded.

See Kasai; and articles and maps in *Le Mouvement géog.*, specially vol. xiv., No. 29 (1897) and vol. xxiv., No. 38 (1907).

LEOTYCHIDES, Spartan king, of the Eurypontid family, was descended from Theopompus through his younger son Anaxandridas (Herod. viii. 131), and in 491 B.C. succeeded Demaratus (*q.v.*), whose title to the throne he had with Cleomenes' aid successfully challenged. He took part in Cleomenes' second expedition to Aegina, on which ten hostages were seized and handed over to the Athenians for safe custody: for this he narrowly escaped being surrendered to the Aeginetans after Cleomenes' death. In the spring of 479 we find him in command of the Greek fleet of 110 ships, first at Aegina and afterwards at Delos. In August he attacked the Persian position at Mycale on the coast of Asia Minor opposite Samos, inflicted a crushing defeat on the land-army, and annihilated the fleet which was drawn up on the shore. Soon afterwards he sailed home with the Peloponnesians, leaving the Athenians to prosecute the siege of Sestos. In 476 he led an army to Thessaly to punish the Aleuadae of Larisa for

the aid they had rendered to the Persians and to strengthen Spartan influence in northern Greece. After a series of successful engagements he accepted a bribe from the enemy to withdraw. For this he was brought to trial at Sparta, and to save his life fled to the temple of Athena Alea at Tegea. Sentence of exile was passed, his house was razed and his grandson Archidamus II. ascended the throne (Herod. vi. 65-87, ix. 90-114; Thucydides i. 89; Pausanias iii. 4. 3. 7. 9-10; Plutarch, *De malignitate Herodoti*, 21, p. 859 D; Diodorus xi. 34-37).

According to Diodorus (xi. 48) Leotychides reigned twenty-two, his successor Archidamus forty-two years. The total duration of the two reigns, sixty-four years, we know to be correct, for Leotychides came to the throne in 491 and Archidamus (*q.v.*) died in 427. On this basis, then, Leotychides's exile would fall in 469 and the Thessalian expedition in that or the preceding year (so E. Meyer, *Geschichte des Altertums*, iii. § 287). But Diodorus is not consistent with himself; he attributes (xi. 48) Leotychides's death to the year 476-475 and he records (xii. 35) Archidamus's death in 434-433, though he introduces him in the following years at the head of the Peloponnesian army (xii. 42, 47, 52). Further, he says expressly that Leotychides ἐτελεύτησεν ἄρξας ἔτη εἴκοσι καὶ δύο, *i.e.* he lived twenty-two years after his accession. The twenty-two years, then, may include the time which elapsed between his exile and his death. In that case Leotychides died in 469, and 476-475 may be the year in which his reign, though not his life, ended. This date seems, from what we know of the political situation in general, to be more probable than the later one for the Thessalian campaign.

G. Busolt, *Griech. Geschichte*, iii. 83, note; J. B. Bury, *History of Greece*, p. 326; G. Grote, *History of Greece*, new edition 1888, iv. 349, note; also abridged edition 1907, p. 273, note 3. Beloch's view (*Griech. Geschichte*, i. 455, note 2) that the expedition took place in 476, the trial and flight in 469, is not generally accepted.

(M. N. T.)

LEOVIGILD, or Löwenheld (d. 586), king of the Visigoths, became king in 568 after the short period of anarchy which followed the death of King Athanagild, whose widow, Goisvintha, he married. At first he ruled that part of the Visigothic kingdom which lay to the south of the Pyrenees, his brother Liuva or Leova governing the small part to the north of these mountains; but in 572 Liuva died and Leovigild became sole king. At this time the Visigoths who settled in Spain early in the 5th century were menaced by two powerful enemies, the Suevi who had a small kingdom in the north-west of the peninsula, and the Byzantines who had answered Athanagild's appeal for help by taking possession of a stretch of country in the south-east. Their kingdom, too, was divided and weakened by the fierce hostility between the orthodox Christians and those who professed Arianism. Internal and external dangers alike, however, failed to daunt Leovigild, who may fairly be called the restorer of the Visigothic kingdom. He turned first against the Byzantines, who were defeated several times; he took Cordova and chastised the Suevi; and then by stern measures he destroyed the power of those unruly and rebellious chieftains who had reduced former kings to the position of ciphers. The chronicler tells how, having given peace to his people, he, first of the Visigothic sovereigns, assumed the attire of a king and made Toledo his capital. He strengthened the position of his family and provided for the security of his kingdom by associating his two sons, Recared and Hermenegild, with himself in the kingly office and placing parts of the land under their rule. Leovigild himself was an Arian, being the last of the Visigothic kings to hold that creed; but he was not a bitter foe of the orthodox Christians, although he was obliged to punish them when they conspired against him with his external enemies. His son Hermenegild, however, was converted to the orthodox faith through the influence of his Frankish wife, Ingundis, daughter of King Sigebert I., and of Leander, metropolitan of Seville. Allying himself with the Byzantines and other enemies of the Visigoths, and supported by most of the orthodox Christians he headed a formidable insurrection. The struggle was fierce; but at length, employing persuasion as well as force, the old king triumphed. Hermenegild was captured; he refused to give up his faith and in March or April 585 he was executed. He was canonized at the request of Philip II., king of Spain, by Pope Sixtus V. About this time Leovigild put an end to the kingdom of the Suevi. During his last years he was engaged in a war with the Franks. He died at Toledo on the 21st of April 586 and was succeeded by his son Recared.

LEPANTO,[1] BATTLE OF, fought on the 7th of October 1571. The conquest of Cyprus by the Turks, and their aggressions on the Christian powers, frightened the states of the Mediterranean into forming a holy league for their common defence. The main promoter of the league was Pope Pius V., but the bulk of the forces was supplied by the republic of Venice and Philip II. of Spain, who was peculiarly interested in checking the Turks both because of the Moorish element in the population of Spain, and because he was also sovereign of Naples and Sicily. In compliment to King Philip, the general command of the league's fleet was given to his natural brother, Don John of Austria. It included, however, only twenty-four Spanish ships. The great majority of the two hundred galleys and eight galeasses, of which the fleet was composed, came from Venice, under the command of the proveditore Barbarigo; from Genoa, which was in close alliance with Spain, under Gianandrea Doria; and from the Pope whose squadron was commanded by Marc Antonio Colonna. The Sicilian and Neapolitan contingents were commanded by the marquess of Santa Cruz, and Cardona, Spanish officers. Eight thousand Spanish soldiers were embarked. The allied fleet was collected slowly at Messina, from whence it advanced by the passage between Ithaca and Cephalonia to Cape Marathia near Dragonera. The Turkish fleet which had come up from Cyprus and Crete anchored in the Gulf of Patras. It consisted in all of 273 galleys which were of lighter build than the Christians', and less well supplied with cannon or small arms. The Turks still relied mainly on the bow and arrow. Ali, the capitan pasha, was commander-in-chief, and he had with him Chulouk Bey of Alexandria, commonly called Scirocco, and Uluch Ali, dey of Algiers. On the 7th of October the Christian fleet advanced to the neighbourhood of Cape Scropha. It was formed in the traditional order of the galleys—a long line abreast, subdivided into the centre or "battle" commanded by Don John in person, the left wing under the proveditore Barbarigo, and the right

under Gianandrea Doria. But a reserve squadron was placed behind the centre under the marquess of Santa Cruz, and the eight lumbering galeasses were stationed at intervals in front of the line to break the formation of the Turks. The capitan pasha left his anchorage in the Gulf of Patras with his fleet in a single line, without reserve or advance-guard. He was himself in the centre, with Scirocco on his right and Uluch Ali on his left. The two fleets met south of Cape Scropha, both drawn up from north to south, the land being close to the left flank of the Christians, and the right of the Turks. To the left of the Turks and the right of the Christians, there was open sea. Ali Pasha's greater numbers enabled him to outflank his enemy. The Turks charged through the intervals between the galeasses, which proved to be of no value. On their right Scirocco outflanked the Venetians of Barbarigo, but the better build of the galleys of Saint Mark and the admirable discipline of their crews gave them the victory. The Turks were almost all sunk or driven on shore. Scirocco and Barbarigo both lost their lives. On the centre Don John and the capitan pasha met prow to prow—the Christians reserving the fire of their bow guns (called *di cursia*) till the moment of impact, and then boarding. Ali Pasha was slain and his galley taken. Everywhere on the centre the Christians gained the upper hand, but their victory was almost turned into a defeat by the mistaken manœuvres of Doria. In fear lest he should be outflanked by Uluch Ali, he stood out to sea, leaving a gap between himself and the centre. The dey of Algiers, who saw the opening, reversed the order of his squadron, and fell on the right of the centre. The galleys of the Order of Malta, which were stationed at this point, suffered severely, and their flagship was taken with great slaughter. A disaster was averted by the marquess of Santa Cruz, who brought up the reserve. Uluch Ali then retreated with sail and oar, bringing most of his division off in good order.

The loss of life in the battle was enormous, being put at 20,000 for the Turks and 8000 for the Christians. The battle of Lepanto was of immense political importance. It gave the naval power of the Turks a blow from which it never recovered, and put a stop to their aggression in the Eastern Mediterranean. Historically the battle is interesting because it was the last example of an encounter on a great scale between fleets of galleys and also because it was the last crusade. The Christian powers of the Mediterranean did really combine to avert the ruin of Christendom. Hardly a noble house of Spain or Italy was not represented in the fleet, and the princes headed the boarders. Volunteers came from all parts of Europe, and it is said that among them was Sir Richard Grenville, afterwards famous for his fight in the "Revenge" off Flores in the Azores. Cervantes was undoubtedly present, and had his left hand shattered by a Turkish bullet.

For full accounts of the battle, with copious references to authorities and to ancient controversies, mostly arising out of the conduct of Doria, see Sir W. Stirling Maxwell, *Don John of Austria* (1883); and Jurien de la Gravière, *La Guerre de Chypre et la bataille de Lepanto* (1888).

(D. H.)

1 For Lepanto see NAUPACTUS.

LE PAUTRE, JEAN (1618-1682), French designer and engraver. He was apprenticed to a carpenter and builder and in addition to learning mechanical and constructive work developed considerable facility with the pencil. His designs, which were innumerable in quantity and exuberant in fancy, consisted mainly of ceilings, friezes, chimney-pieces, doorways and mural decorations; he also devised fire-dogs, sideboards, cabinets, console tables, mirrors and other pieces of furniture; he was long employed at the Gobelins. His work is often excessively flamboyant and over-elaborate; he revelled in amorini and swags, arabesques and cartouches. His chimney-pieces, however, were frequently simple and elegant. His engraved plates, almost entirely original, are something like 1500 in number and include a portrait of himself. He became a member of the academy of Paris in 1677.

LEPCHA, the name of the aboriginal inhabitants of Sikkim (*q.v.*). A peace-loving people, the Lepchas have been repeatedly conquered by surrounding hill-tribes, and their ancient patriarchal customs are dying out. The total number of speakers of Lepcha, or Rong, in all India in 1901, was only 19,291. Their rich and beautiful language has been preserved from extinction by the efforts of General Mainwaring and others; but their literature was almost entirely destroyed by the Tibetans, and their traditions are being rapidly forgotten. Once free and independent, they are now the poorest people in Sikkim, and it is from them that the coolie class is drawn. They are above all things woodmen, knowing the ways of beasts and birds, and possessing an extensive zoological and botanical nomenclature of their own.

See Florence Donaldson, *Lepcha Land* (1900).

LE PELETIER (or LEPELLETIER), DE SAINT-FARGEAU, LOUIS MICHEL (1760-1793), French politician, was born on the 29th of May 1760 at Paris. He belonged to a well-known family, his great-grandfather, Michel Robert Le Peletier des Forts, count of Saint-Fargeau, having been controller-general of finance. He inherited a great fortune, and soon became president of the parlement of Paris and in 1789 he was a deputy of

the *noblesse* to the States-General. At this time he shared the conservative views of the majority of his class; but by slow degrees his ideas changed and became very advanced. On the 13th of July 1789 he demanded the recall of Necker, whose dismissal by the king had aroused great excitement in Paris; and in the Constituent Assembly he had moved the abolition of the penalty of death, of the galleys and of branding, and the substitution of beheading for hanging. This attitude won him great popularity, and on the 21st of June 1790 he was made president of the Constituent Assembly. During the existence of the Legislative Assembly, he was president of the general council for the department of the Yonne, and was afterwards elected by this department as a deputy to the Convention. Here he was in favour of the trial of Louis XVI. by the assembly and voted for the death of the king. This vote, together with his ideas in general, won him the hatred of the royalists, and on the 20th of January 1793, the eve of the execution of the king, he was assassinated in the Palais Royal at Paris by a member of the king's body-guard. The Convention honoured Le Peletier by a magnificent funeral, and the painter J. L. David represented his death in a famous picture, which was later destroyed by his daughter. Towards the end of his life, Le Peletier had interested himself in the question of public education; he left fragments of a plan, the ideas contained in which were borrowed in later schemes. His assassin fled to Normandy, where, on the point of being discovered, he blew out his brains. Le Peletier had a brother, Félix (1769-1837), well known for his advanced ideas. His daughter, Suzanne Louise, was "adopted" by the French nation.

See *Œuvres de M. le Peletier de Saint-Fargeau* (Brussels, 1826) with a life by his brother Félix; E. Le Blant, "Le Peletier de St-Fargeau, et son meurtrier," in the *Correspondant* review (1874); F. Clerembray, *Épisodes de la Révolution* (Rouen, 1891); Brette, "La Réforme de la législation universelle, et le plan de Lepelletier Saint-Fargeau," in *La Révolution française*, xlii. (1902); and M. Tourneux, *Bibliog. de l'hist. de Paris ...* (vol. i., 1890, Nos. 3896-3910, and vol. iv., 1906, *s.v.* Lepeletier).

LEPIDOLITE

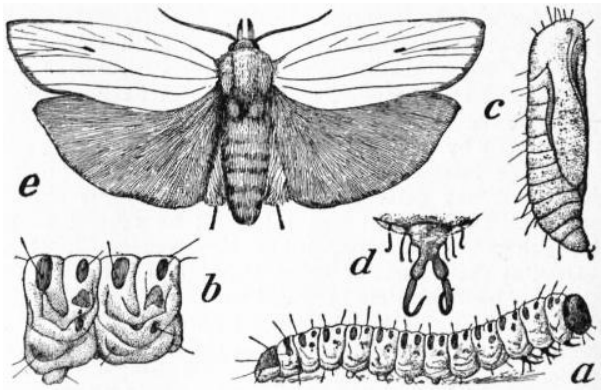
, or Lithia-Mica, a mineral of the mica group (see Mica). It is a basic aluminium, potassium and lithium fluo-silicate, with the approximate formula KLi $[Al(OH, F)_2]$ $Al(SiO_3)_3$. Lithia and fluorine are each present to the extent of about 5%; rubidium and caesium are sometimes present in small amounts. Distinctly developed monoclinic crystals or cleavage sheets of large size are of rare occurrence, the mineral being usually found as scaly aggregates, and on this account was named lepidolite (from Gr. λεπίς, scale) by M. H. Klaproth in 1792. It is usually of a lilac or peach-blossom colour, but is sometimes greyish-white, and has a pearly lustre on the cleavage surfaces. The hardness is 2½-4 and the sp. gr. 2.8-2.9, the optic axial angle measures 50°-70°. It is found in pegmatite-veins, often in association with pink tourmaline (rubellite) and sometimes intergrown in parallel position with muscovite. Scaly masses of considerable extent are found at Rozena near Bystrzitz in Moravia and at Pala in San Diego county, California. The material from Rozena has been known since 1791, and has sometimes been cut and polished for ornamental purposes: it has a pretty colour and spangled appearance and takes a good polish, but is rather soft. At Pala it has been extensively mined for the preparation of lithium and rubidium salts. Other localities for the mineral are the island of Utö in Sweden, and Auburn and Paris in Maine, U.S.A.; at Alabashka near Mursinka in the Urals large isolated crystals have been found, and from Central Australia transparent cleavage sheets of a fine lilac colour are known.

The lithium-iron mica *zinnwaldite* or *lithionite* is closely allied to lepidolite, differing from it in containing some ferrous iron in addition to the constituents mentioned above. It occurs as greyish silvery scales with hexagonal outlines in the tin-bearing granites of Zinnwald in the Erzgebirge, Bohemia and of Cornwall.

(L. J. S.)

LEPIDOPTERA

(Gr. λεπίς, a scale or husk, and πτερόν, a wing), a term used in zoological classification for one of the largest and best-known orders of the class Hexapoda (*q.v.*), in order that comprises the insects popularly called butterflies and moths. The term was first used by Linnaeus (1735) in the sense still accepted by modern zoologists, and there are few groups of animals as to whose limits and distinguishing characters less controversy has arisen.

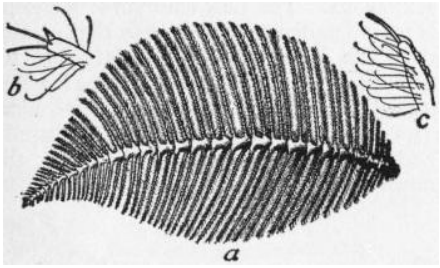


After Edwards, Riley and Howard's *Insect Life*, vol. 3 (U.S. Dept. Agr.).

Fig. 1.—*e*, *Crytophasa unipuctata*, Donov., Australia. *a*, Larva; *c*, pupa, natural size; *b*, 2nd and 3rd abdominal segments of larva; *d*, cremaster of pupa, magnified.

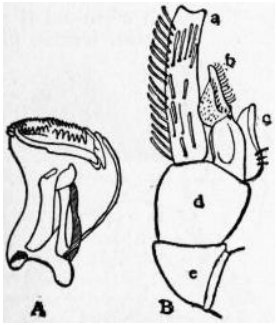
Characters.—The name of the order indicates the fact that the wings (and other parts of the body) are clothed with flattened cuticular structures—the scales (fig. 7)—that may be regarded as modified arthropodan "hairs." Such scales are not peculiar to the Lepidoptera—they are found also on many of the Aptera, on the Psocidae, a family of Corrodentia, on some Coleoptera (beetles) and on the gnats (Culicidae), a family of Diptera. The most distinctive structural features of the Lepidoptera are to be found in the jaws. The mandibles are mere vestiges or entirely absent; the second maxillae are usually reduced to a narrow transverse mentum which bears the scale-covered labial palps, between which project the elongate first maxillae, grooved on their inner faces, so as to form when apposed a tubular proboscis adapted for sucking liquid food.

All Lepidoptera are hatched as the eruciform soft-bodied type of larva (fig. 1, *a*) known as the caterpillar, with biting mandibles, three pairs of thoracic legs and with a variable number (usually five pairs) of abdominal prolegs, which carry complete or incomplete circles of hooklets. The pupa in a single family only is free (*i.e.* with the appendages free from the body), and mandibulate. In the vast majority of the order it is more or less obtect (*i.e.* with the appendages fixed to the cuticle of the body) and without mandibles (fig. 1, *c*).



From Riley and Howard, *Insect Life*, vol. 7 (U.S. Dept. Agr.).

FIG. 2.—*a*, Feeler of Saturniid Moth (*Telea polyphemus*). *b, c*, Tips of branches, highly magnified.



After A. Walter (*Jen. Zeits. f. Naturw.* vol. 18).

FIG. 3.—A, Mandible, and B, 1st maxilla of *Micropteryx* (*Eriocephala*). Magnified.

a, Palp.
b, Galea.
c, Lacinia.
d, Stipes.
e, Cardo of maxilla.

Structure.—The head in the Lepidoptera is sub-globular in shape with the compound eyes exceedingly well developed, and with a pair of ocelli or "simple eyes" often present on the vertex. It is connected to the thorax by a relatively broad and membranous "neck." The feelers are many-jointed, often they are complex, the segments bearing processes arranged in a comb-like manner and furnished with numerous sensory hairs (fig. 2). The complexity of the feelers is carried to its highest development in certain male moths that have a wonderful power of discovering their females by smell or some analogous sense. Often the feelers are excessively complex in male moths whose maxillae are so reduced that they take no food in the imaginal state. The nature of the jaws has already been briefly described. Functional mandibles of peculiar form (fig. 3, A) are present in the remarkable small moths of the genus *Micropteryx* (or *Eriocephala*), and there are vestiges of these jaws in other moths of low type, but the minute structures in the higher Lepidoptera that were formerly described as mandibles are now believed to belong to the labrum, the true mandibles being perhaps represented by rounded prominences, not articulated with the head-capsule. Throughout the order, as a whole, the jaws are adapted for sucking liquid food, and the suctorial proboscis (often erroneously called a "tongue") is formed as was shown by J. C. Savigny in 1816 by two elongated and flexible outgrowths of the first maxillae, usually regarded as representing the outer lobes or galeae (fig. 4, A, B, *g*). These structures are grooved along their inner faces and by means of a series of interlocking hair-like bristles can be joined together so as to form a tubular sucker (fig. 4, C). At their extremities they are beset with club-like sense-organs, whose apparent function is that of taste. The proboscis when in use is stretched out in front of the head and inserted into the corolla of a flower or elsewhere, for the absorption of liquid nourishment. When at rest, the proboscis is rolled up into a close spiral beneath the head and between the labial palps (fig. 4, A, *p*). Only in the genus *Micropteryx* mentioned above is the lacinia of the maxilla (as A. Walter has shown) developed (fig. 3, B, *c*). The maxillary palp is usually a mere vestige (fig. 4, B, *p*) though it is conspicuous in a few families of small moths. A considerable number of Lepidoptera take no food in the imaginal state; in these the maxillae are reduced or altogether atrophied. The second maxillae are intimately fused together to form the labium, which consists only of a reduced mentum, bearing sometimes vestigial lobes and always a pair of palps. These have two or three segments and are clothed with scales. The form and direction of the terminal segment of the labial palp afford valuable characters in classification.

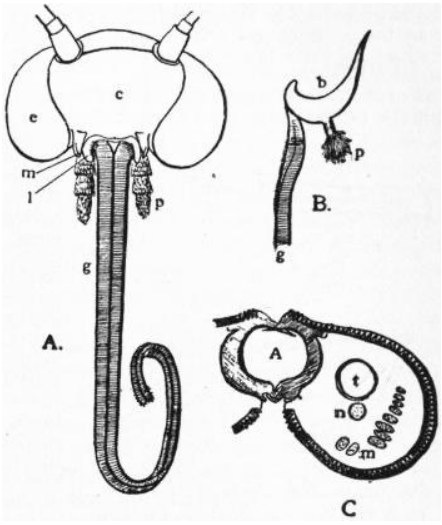
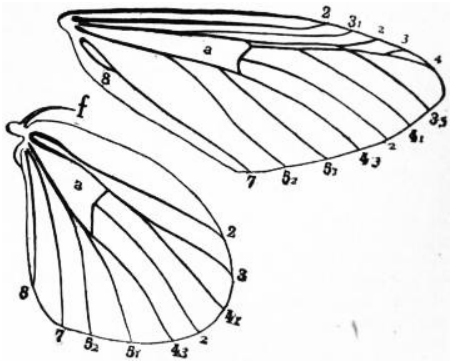


Fig. 4.—Arrangement of the jaws in a typical Moth. Somewhat diagrammatic and in part after E. Burgess and V. L. Kellogg (*Amer. Nat.* xiv. xxix.).

A, Front view of head.
c, Clypeus.
e, Compound eye.
m, Vestigial mandible.
l, Labrum.
g, Galeae of 1st maxillae.
p, Labial palp. Magnified, B.
b, Base of first maxilla dissected out of the head.
p, Vestigial palp.
g, Galea. Further magnified.
C, Part transverse section showing how the channel (A) of the proboscis is formed by the interlocking of the grooved inner faces of the flexible maxillae.
t, Air-tube.
n, Nerve.
m, Muscle-fibres. Highly magnified.

In the thorax of the Lepidoptera the foremost segment or prothorax is very small, and not movable on the mesothorax. In many families it carries a pair of small erectile plates—the patagia—which have been regarded as serially homologous with the wings. The mesothorax is extensive; its scutum forming most of the dorsal thoracic area and small plates—tegulae—are often present at the base of the forewings, as in Hymenoptera. The tegulae which are beset with long hair-like scales are often conspicuous. The metathorax is smaller than the mesothorax. The legs are of the typical hexapodan form with five-segmented feet; the shins often bear terminal and median spurs articulated at their bases and the entire limbs are clothed with scales.



After A. S. Packard, *Mem. Nat. Acad. Sci.* vol. vii.

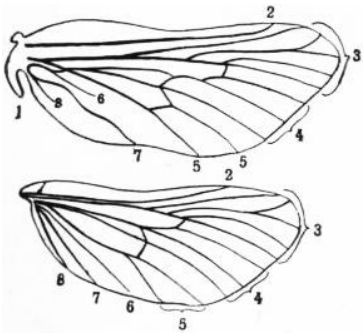
Fig. 5.—Wing-neuration of a Notodont Moth. 2, Sub-costal; 3, radial; 4, median; 5, cubital; 7, 8, anal nervures. *a*, Discoidal areolet or "cell"; *f*, frenulum. Note that the forewing has five branches (1-5) of the radial nervure, the hindwing one only. The first anal nervure (No. 6) is absent.

The wings of the Lepidoptera may be said to dominate the structure of the insect; only exceptionally, in certain female moths, are they vestigial or absent (fig. 17). The forewing, with its prominent apex, is longer than the hindwing, and the neuration in both (see figs. 5 and 6) is for the most part longitudinal, only a few transverse nervures, which are, in fact, branches of the median trunk, marking off a discoidal areolet or "cell" (fig. 5, *a*). The five branches of the radial nervure (figs. 5, 6, *3*) (see Hexapoda) are usually present in the forewing, but the hindwing, in most families, has only a single radial nervure; its anal area is, however, often more strongly developed than that of the forewing. The two wings of a side are usually kept together during flight by a few stout bristles—the frenulum—(fig. 5, *f*) projecting from the base of the costa of the hindwing and fitting beneath a membranous fold or a few thickened scales—the retinaculum—on the under surface of the forewing. In butterflies there is no frenulum, but a costal outgrowth of the hindwing subserves the same function. In the most primitive moths a small lobate outgrowth—the jugum (fig. 6, *j*.)—from the dorsum of the forewing is present, but it can be of little service in keeping the two wings together. A jugum may be also present on the hindwing. The legs, which are generally used for clinging rather than for walking, have five-segmented feet and are covered with scales. In some families the front pair are reduced and without tarsal segments.

Ten abdominal segments are recognizable in many Lepidoptera, but the terminal segments are reduced or modified to form external

organs of reproduction. In the male, according to the interpretation of C. Peytoureau, the lateral plates belonging to the ninth segment form paired claspers beset with harpes, or series of ridges or teeth, while the tergum of the tenth segment forms a dorsal hook—the uncus—and its sternum a ventral process or scaphium. In the female the terminal segments form, in some cases, a protrusible ovipositor, but the typical hexapodan ovipositor with its three pairs of processes is undeveloped in the Lepidoptera.

As already mentioned, the characteristic scales on the wings, legs and body of the Lepidoptera are cuticular structures. A complete series of transitional forms can be traced between the most elaborate flattened scales (fig. 7, B) with numerous longitudinal striae and a simple arthropod "hair." Either a "hair" or a scale owes its origin to a special cell of the ectoderm (hypodermis), a process from which grows through the general cuticle and forms around itself the substance of the cuticular appendage. The scales on the wings are arranged in regular rows (fig. 7, A), and the general cuticle is drawn out into a narrow neck or collar around the base of each scale. The scales can be easily rubbed from the surface of the wing, and the series of collars in which the scales rest are then evident (fig. 7, A, *c*) on the wing-membrane. On the wings of many male butterflies there are specially modified scales—the androconia (fig. 7, C)—which are formed by glandular cells and diffuse a scented secretion. In some cases, the androconia are mixed among the ordinary scales; in others they are associated into conspicuous "brands" (see fig. 66). The admirable colours of the wings of the Lepidoptera are due partly to pigment in the scales—as in the case of yellows, browns, reds and blacks—partly to "interference" effects from the fine striae on the scales—as with the blues, purples and greens.



After Packard, *Mem. Nat. Acad. Sci.* vol. vii.

FIG. 6.—Wing neuration of a Swift Moth (Hepialid). *j*, Jugum. Nervures numbered as in fig. 5. Note that there are five branches to the radial nervure (No. 3) in both fore- and hindwing, and that the median trunk nervures (No. 4) traverse the discoidal areolet.

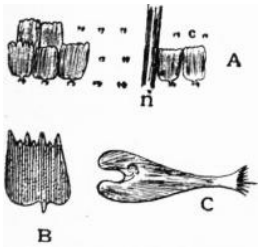


FIG. 7.—A, Arrangement of scales in rows on wing of Butterfly. *n*, Nervure; *c*, collar-like outgrowths of cuticle. Magnified. B, single scale, and C, an androconium more highly magnified.

A few points of interest in the internal structure of the Lepidoptera deserve mention. The mouth opens into a sub-globular, muscular pharynx which is believed to suck the liquid food through the proboscis, and force it along the slender gullet into a crop-like enlargement or diverticulum of the fore-gut known as a "food-reservoir" or "sucking-stomach." The true stomach is tubular, and beyond it lies the intestine into which open the three pairs of excretory (Malpighian) tubes. The terminal part of the intestine is of wide diameter, and in some cases gives off a short caecum. The brain and the sub-oesophageal ganglia are closely approximated; there are two or three thoracic and four (rarely five) abdominal ganglia. In the female each ovary has four ovarian tubes, in which the large egg-cells are enclosed in follicles and associated with nutritive cells. There is a special bursa which in the Hepialidae opens with the vagina on the eighth abdominal sternum. In the Micropterygidae, Enocraniidae and the lower Tineides, the duct of the bursa leads into the vagina, which still opens on the eighth sternum. But in most Lepidoptera, the bursa opens by a vestibule on the eighth sternum, distinct from the vagina, whose opening shifts back to the ninth, the duct of the bursa being connected with the vagina by a canal which opens opposite to the spermatheca. In the male, the two testes are usually fused into a single mass, and a pair of tubular accessory glands open into the vasa deferentia or into the ejaculatory duct. In a few families—the Hepialidae and Saturniidae for example—the testes retain the primitive paired arrangement. These details have been worked out by various students, among whom W. H. Jackson and W. Petersen deserve special mention. Summing up the developmental history of the genital ducts, Jackson remarks that there is "an Ephemeridal stage, which ends towards the close of larval life, an Orthopteran stage, indicated during the quiescent period preceding pupation, and a Lepidopteran stage which begins with the commencement of pupal life."

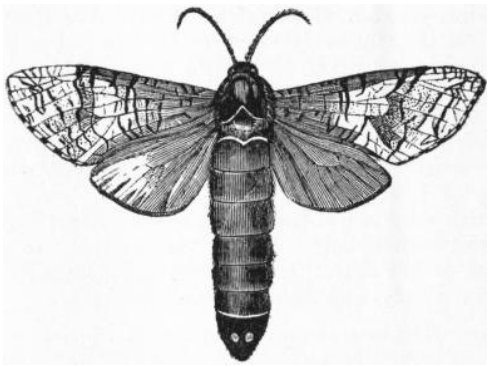


FIG. 8 A.—*Cossus macmurtrei.* (MacMurtrie's Goat Moth.) N. America.

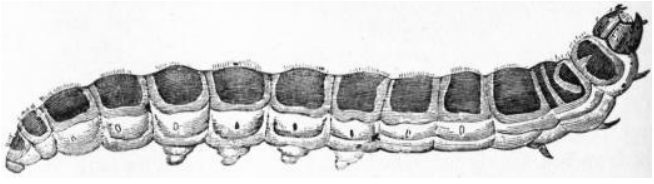


FIG. 8 B.—Larva of *Cossus cossus.* (Goat Moth.) Europe.

Development.—Many observations have been made on the embryology of the Lepidoptera; for some of the more important results of these see HEXAPODA. The post-embryonic development of Lepidoptera is more familiar,

perhaps, than that of any other group of animals. The egg shows great variation in its outward form, the outer envelope or chorion being in some families globular, in others flattened, in others again erect and sub-conical or cylindrical; while its surface often exhibits a beautifully regular series of ribs and furrows. Throughout the order the larva is of the form known as the caterpillar (fig. 1, *a*, *b*, fig. 8 B) characterized by the presence of three pairs of jointed and clawed legs on the thorax and a variable number of pairs of abdominal "prolegs"—sub-cylindrical outgrowths of the abdominal segments, provided with a complete or incomplete circle of hooklets at the extremity.

There are ten abdominal segments—the ninth often small and concealed; prolegs are usually present on the third, fourth, fifth, sixth and tenth of these segments. The head of the caterpillar (fig. 9) is large with firmly chitinized cuticle; it carries usually twelve simple eyes or ocelli, a pair of short feelers (fig. 9 *At*) and a pair of strong mandibles (fig. 9, *Mn*), for the caterpillar feeds by biting leaves or other plant-tissues. The first maxillae, so highly developed in the imago, are in the larva small and inconspicuous appendages, each bearing two short jointed processes,—the galea and the palp (fig. 9, *Mx*). The second maxillae form a plate-like labium on whose surface projects the spinneret which is usually regarded as a modified hypopharynx (fig. 9, *Lm*). The silk-glands whose ducts open on this spinneret are paired convoluted tubes lying alongside the elongate cylindrical stomach. In the common "silkworm" these glands are five times as long as the body of the caterpillar. They are regarded as modified salivary glands, though the correspondence has been doubted by some students. The body of the caterpillar is usually cylindrical and wormlike, with the segmentation well marked and the cuticle feebly chitinized and flexible. Firm chitinous plates are, however, not seldom present on the prothorax and on the hindmost abdominal segment. The segments are mostly provided with bristle or spine-bearing tubercles, whose arrangement has lately been shown by H. G. Dyar to give partially trustworthy indications of relationship. On either side of the median line we find two dorsal or trapezoidal tubercles (Nos. 1 and 2), while around the spiracle are grouped (Nos. 3, 4 and 5) supra-, post-, and pre-spiracular tubercles; below are the sub-spiraculars, of which there may be two (Nos. 6, 7). The last-named is situated on the base of the abdominal proleg, and yet another tubercle (No. 8) may be present on the inner aspect of the proleg. The spiracles are very conspicuous on the body of a caterpillar, occurring on the prothorax and on the first eight abdominal segments. Various tubercles may become coalesced or aborted (fig. 10, B); often, in conjunction with the spines that they bear, the tubercles serve as a valuable protective armature for the caterpillar. Much discussion has taken place as to whether the abdominal prolegs are or are not developed directly from the embryonic abdominal appendages. In the more lowly families of Lepidoptera, these organs are provided at the extremity with a complete circle of hooklets, but in the more highly organized families, only the inner half of this circle is retained.

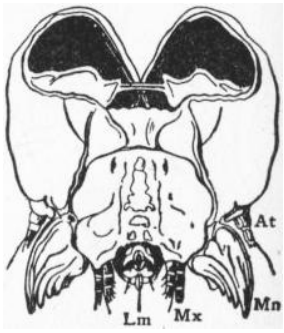
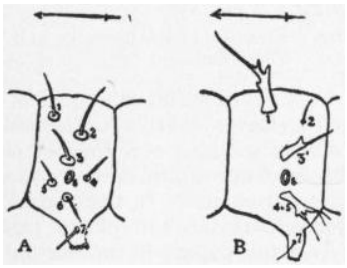


FIG. 9.—Head of Goat Moth Caterpillar (*Cossus*) from behind. Magnified. (From Miall and Denny after Lyonnet.)

At, Feeler.
Mn, Mandible.
Mx, First maxilla.
Lm, Second maxillae (Labium) with spinneret.



B, after Grote, *Mitt. aus dem Roemer Museum*, No. 6.

FIG. 10.—Abdominal segments of Caterpillars, to show arrangement of tubercles; the arrows point anteriorly. A, Generalized condition; B, specialized condition in the Saturniidae. s, Spiracle; the numbering of the tubercles is explained in the text. Note that in B No. 2 is much reduced and disappears after the first moult. 4 and 5 are coalesced, and 6 is absent.

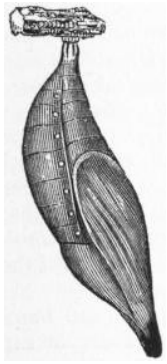


FIG. 11.—Pupa of a Butterfly (*Amathusia phidippus*).

The typical Lepidopteran pupa, or "chrysalis," as shown in the higher families, is an obtect pupa (fig. 11) with no trace of mandibles, the appendages being glued to the body by an exudation, and motion being possible only at three of the abdominal intersegmental regions, the fifth and sixth abdominal segments at most being "free." A flattened or pointed process—the cremaster—often prominent at the tail-end, may carry one or several hooks (fig. 1, *d*) which serve to anchor the pupa to its cocoon or to suspend butterfly-pupae from their pad of silk (fig. 11). In the lower families the pupa (fig. 1, *c*) is only incompletely obtect, and a greater number of abdominal segments can move on one another. The seventh abdominal segment is, in all female lepidopterous pupae, fused with those behind it; in the male "incomplete" pupa this becomes "free" and so may the segments anterior to it, in both sexes, forward to and including the third. The presence of circles of spines on the abdominal segments enables the "incomplete" pupa as a whole to work its way partly out of the cocoon when the time for the emergence of the imago draws near. In the family of the Eriocraniidae (often called the Micropterygidae) the pupa resembles that of a caddis-fly (*Trichopteron*) being active before the emergence of the imago and provided with strong mandibles by means of which it bites its way out of the cocoon. The importance of the pupa in the phylogeny and classification of the Lepidoptera has lately been demonstrated by T. A. Chapman in a valuable series of papers. Sometimes organs are present in the pupa which are undeveloped in the imago, such as the maxillary palps of the Sesiidae (clearwing moths) and the pectination on the feelers of female Saturniids. E. B. Poulton has drawn attention to the ancestral value of such characters.

Habits and Life-Relations.—The attractiveness of the Lepidoptera and the conspicuous appearance of many of them have led to numerous observations on their habits. The method of feeding of the imago by the suction of

liquids has already been mentioned in connexion with the structure of the maxillae and the food-canal. Nectar from flowers is the usual food of moths and butterflies, most of which alight on a blossom before thrusting the proboscis into the corolla of the flower, while others—the hawk moths (Sphingidae) for example—remain poised in the air in front of the flower by means of excessively rapid vibration of the wings, and quickly unrolling the proboscis sip the nectar. Certain flowers with remarkably long tubular corollas seem to be specially adapted for the visits of hawk moths. Some Lepidoptera have other sources of food-supply. The juices of fruit are often sought for, and certain moths can pierce the envelope of a succulent fruit with the rough cuticular outgrowths at the tips of the maxillae, so as to reach the soft tissue within. Animal juices attract other Lepidoptera, which have been observed to suck blood from a wounded mammal; while putrid meat is a familiar "lure" for the gorgeous "purple emperor" butterfly (*Apatura iris*). The water of streams or the dew on leaves may be frequently sought by Lepidoptera desirous of quenching their thirst, possibly with fatal results, the insects being sometimes drowned in rivers in large numbers. Members of several families of the Lepidoptera—the Hepialidae, Lasiocampidae and Saturniidae, for example—have the maxillae vestigial or aborted, and take no food at all after attaining the winged condition. In such insects there is a complete "division of labour" between the larval and the imaginal instars, the former being entirely devoted to nutritive, the latter to reproductive functions.

Of much interest is the variety displayed among the Lepidoptera in the season and the duration of the various instars. The brightly coloured vanessid butterflies, for example, emerge from the pupa in the late summer and live through the winter in sheltered situations, reappearing to lay their eggs in the succeeding spring. Many species, such as the vapourer moths (*Orgyia*), lay eggs in the autumn, which remain unhatched through the winter. The eggs of the well-known magpie moths (*Abraxas*) hatch in autumn and the caterpillar hibernates while still quite small, awaiting for its growth the abundant food-supply to be afforded by the next year's foliage. The codlin moths (*Carpocapsa*) pass the winter as resting full-grown larvae, which seek shelter and spin cocoons in autumn, but do not pupate until the succeeding spring. Lastly, many of the Lepidoptera hibernate in the pupal stage; the death's head moth (*Acherontia*) and the cabbage-white butterflies (*Pieris*) are familiar examples of such. The last-named insects afford instances of the "double-brooded" condition, two complete life-cycles being passed through in the year. The flour moth (*Ephestia kühniella*) is said to have five successive generations in a twelvemonth. On the other hand, certain species whose larvae feed in wood or on roots take two or three years to reach the adult stage.

The rate of growth of the larva depends to a great extent on the nature of its food, and the feeding-habits of caterpillars afford much of interest and variety to the student. The contrast among the Lepidoptera between the suctorial mouth of the imago and the biting jaws of the caterpillar is very striking (cf. figs. 4 and 9), and the profound transformation in structure which takes place is necessarily accompanied by the change from solid to liquid food. The first meal of a young caterpillar is well known to be often its empty egg-shell; from this it turns to feed upon the leaves whereon its provident parent has laid her eggs. But in a few cases hatching takes place in winter or early spring, and the young larvae have then to find a temporary food until their own special plant is available. For example, the caterpillars of some species of *Xanthia* and other noctuid moths feed at first upon willow-catkins. On the other hand, the caterpillars of the pith moth (*Blastodacna*) hatched at midsummer, feed on leaves when young, and burrow into woody shoots in autumn. All who have tried to rear caterpillars know that, while those of some species will feed only on one particular species of plant, others will eat several species of the same genus or family, while others again are still less particular, some being able to feed on almost any green herb. It is curious to note how certain species change their food in different localities, a caterpillar confined to one plant in some localities being less particular elsewhere. Individual aberrations in food are of special interest in suggesting the starting-point for a change in the race. When we consider the vast numbers of the Lepidoptera and the structural modifications which they have undergone, their generally faithful adherence to a vegetable diet is remarkable. The vast majority of caterpillars eat leaves, usually devouring them openly, and, if of large size, quickly reducing the amount of foliage on the plant. But many small caterpillars keep, apparently for the sake of concealment, to the under surface of the leaf, while others burrow into the green tissue, forming a characteristic sinuous "mine" between the two leaf-skins. In several families we find the habit of burrowing in woody stems,—the "goat" (*Cossus*, fig. 8) and the clearwings (Sesiidae), for example, while others, like the larvae of the swift moths (Hepialidae) live underground devouring roots (fig. 12). The richer nutrition in the green food is usually shown by the quicker growth of the numerous caterpillars that feed on it, as compared with the slower development of the wood and root-feeding species. Aquatic larvae are very rare among the Lepidoptera. The caterpillars of the pyralid "china-mark" moths (*Hydrocampa*, fig. 13), however, live under water, feeding on duckweed (*Lemna*) and breathing atmospheric air, a film of which is enclosed in a spun-up shelter beneath the leaves, while the larvae of *Paraponyx*, which feed on *Stratiotes*, have closed spiracles and breathe dissolved air by means of branchial filaments along the sides of the body.

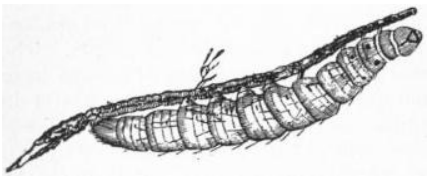
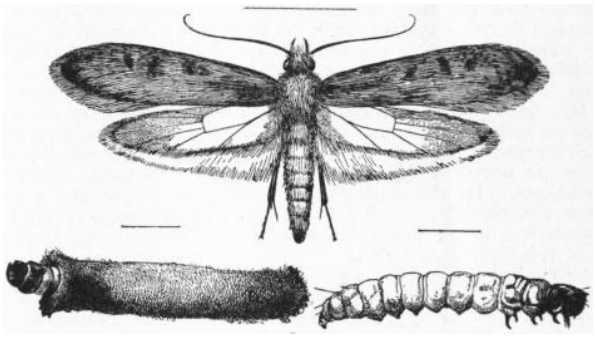


FIG. 12.—Larva of *Hepialus humuli* (ghost moth).

FIG. 13.—*Hydrocampa aquatilis* (water moth).

We may now turn to instances of more anomalous modes of feeding. The clothes moths (Tineids) have invaded our dwellings and found a congenial food-stuff for their larvae in our garments. A few small species of the same group are reared in meal and other human food-stores; so are the caterpillars of some pyralid moths (*Ephestia*), while others (*Asopia*, *Aglossa*) feed upon kitchen refuse. Two species of crambid moths (*Aphomia sociella* and *Galleria melonella*) find a home in bee-hives, where their caterpillars feed upon the wax, while the waxy secretion from the body of the great American lantern-fly (*Fulgora candelaria*) serves both as shelter and food for the caterpillar of the moth *Epipyrops anomala*. Very few caterpillars have developed a thoroughly carnivorous habit. That of *Cosmia trapezina* feeds on oak and other leaves, but devours smaller caterpillars which happen to get in its way, and if shaken from the tree, eats other larvae while climbing the trunk. *Xylina ornithopus* and a few other species are said to be always carnivorous when opportunity offers; the small looping caterpillar of a "pug" moth (*Eupithecia coronata*) has been observed to eat a larva three times as big as itself. The caterpillars of *Orthosia pistacina* live together in peace while their food is moist, but devour each other when it dries up; this is true

cannibalism—a term which should not be applied to the habit of preying on another species. A few carnivorous caterpillars do not attack other caterpillars, but prey upon insects of another order; among these *Fenescia tarquinius*, which eats aphides, and *Erastria scitula*, which feeds upon scale insects, must be reckoned as benefactors to mankind. The life-history of the latter moth has been worked out by H. Rouzaud. It inhabits the shores of the Mediterranean, and its caterpillar devours the coccids upon various fruit-trees, especially the black-scale (*Lecanium oleae*) of the olive. The moth, which is a small noctuid, the white markings on whose wings give it the appearance of a bird-dropping when at rest in the daytime, appears in May, and lays her eggs, singly and far apart, upon the trees infested by the coccids. when hatched, the young caterpillar selects a large female coccid, eats its way through the scale, and devours the insect beneath; having done this it makes its way to a fresh victim. As it increases in size it forms a case for itself made of the scales of its victims, excrement, &c., bound together by silk which it spins, and, protected by this covering, which closely resembles the smut-covered bark of the tree, it roams about during its later stages, devouring several coccids every day. So nutritious is the food, that four or five successive broods follow each other through the summer.



After Marlatt (after Riley), *Bull. 4, Div. Ent. U.S. Dept. Agr.*
Fig. 14.—Clothes Moth (*Tinea pellionella*), with larva in and out of its case. Magnified.

The habit just mentioned of forming some kind of protective covering out of foreign substances spun together by silk is practised by caterpillars of different families. The clothes moth larvae (*Tinea*, fig. 14), for example, make a tubular dwelling out of the pellets of wool passed from their own intestines, while the allied Tortricid caterpillars roll up leaves and spin for themselves cylindrical shelters. The habit of spinning over the food plant a protective mass of web, whereon the caterpillars of a family can live together socially is not uncommon. In the case of the small ermine moths (*Hyponomeuta*) the caterpillars remain associated throughout their lives and pupate in cocoons on the mass of web produced by their common labour. But the larger, spiny caterpillars of the vanessid butterflies usually scatter away from the nest of their infancy when they have attained a certain size.

Spines and hairs seem to be often effective protections for caterpillars; the experiments of E. B. Poulton and others tend to show that hairy caterpillars (fig. 15) are distasteful to birds. Many caterpillars are protected by the harmony of their general green coloration with their surroundings. When the insect attains a large size—as in the case of the hawk moth (Sphingid) caterpillars —the extensive green surface becomes broken up by diagonal dark markings (fig. 46*b*), thus simulating the effect of light and shade among the foliage. A remarkable result of Poulton's experiments has been the establishment of a reflex effect through the skin on the colour of a caterpillar. Some species of "loopers" (Geometridae, fig. 43) for example, if placed when young among surroundings of a certain colour, become closely assimilated thereto—dark brown among dark twigs, green among green leaves. These colour-reflexes in conjunction with the elongate twig-like shape of the caterpillars and their habit of stretching themselves straight out from a branch, afford some of the best and most familiar examples of "protective resemblance." The "terrifying attitude" of caterpillars, and the supposed resemblance borne by some of them to serpents and other formidable vertebrates or arthropods, are discussed in the article Mimicry.

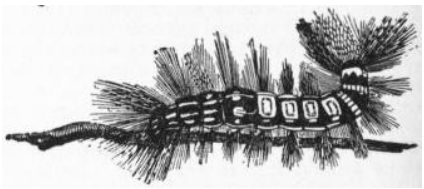
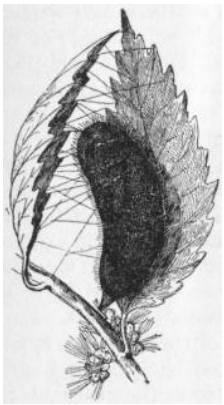


Fig. 15.—Larva of *Orgyia gonostigma*. Europe.



After Ratzeburg, *Insect Life*, vol. 2 (U.S. Dept. Agr.).

Fig. 16.—Pupa of Gypsy Moth (*Porthetria dispar*) sheltered in leaves joined by silken threads. Below is the

The silk produced by a caterpillar is, as we have seen, often advantageous in its own life-relations, but its great use is in connexion with the pupal stage. In the life-history of many Lepidoptera, the last act of the caterpillar is to spin a cocoon which may afford protection to the pupa. In some cases this is formed entirely of the silk produced by the spinning-glands, and may vary from the loose meshwork that clothes the pupa of the diamond-back moth (*Plutella cruciferarum*) to the densely woven cocoon of the silkworms (Bombycidae and Saturniidae) or the hard shell-like covering of the eggars (Lasiocampidae). Frequently foreign substances are worked up with the silk and serve to strengthen the cocoon, such as hairs from the body of the caterpillar itself, as among the "tigers" (Arctiidae) or chips of wood, as with the timber-burrowing larva of the "goat" (*Cossus*). In many families of Lepidoptera we can trace a degeneration of the cocoon. Thus, the pupae of most owl moths (Noctuidae) and hawk moths (Sphingidae) lie buried in an earthen cell. Among the butterflies we find that the cocoon is reduced to a pad of silk which gives attachment to the cremaster; in the Pieridae there is in addition a girdle of silk around the waist-region of the pupa, but the pupae of the Nymphalidae (figs. 11, 65) simply hang from the supporting pad by the tail-end. Poulton has shown that the colours of some exposed pupae vary with the nature of the surroundings of the larva during the final stage.

When the pupal stage is complete the insect has to make its way out of the cocoon. In the lower families of moths it is the pupa which comes out at least partially, working itself onwards by the spines on its abdominal segments; the pupa of the primitive *Micropteryx* has functional mandibles with which it bites through the cocoon. In the higher Lepidoptera the pupa is immovable, and the imago, after the

cast larval cuticle.

ecdysis of the pupal cuticle, must emerge. This emergence is in some cases facilitated by the secretion of an acid or alkaline solvent discharged from the mouth or from the hind-gut, which weakens the cocoon—so that the delicate moth can break through without injury.

As might be expected, the conditions to which larva and pupa are subjected have often a marked influence on the nature of the imago. An indifferent food-supply for the larva leads to a dwarfing of the moth or butterfly. Many converging lines of experiment and observation tend to show that cool conditions during the pupal stage frequently induce darkening of pigment in the imago, while a warm temperature brightens the colours of the perfect insect. For example, in many species of butterfly that are double-brooded, the spring brood emerging from the wintering pupae are more darkly coloured than the summer brood, but if the pupae producing the latter be subjected artificially to cold conditions, the winter form of imago results. It is usually impossible, however, to produce the summer form of the species from wintering pupae by artificial heat. From this A. Weismann argued that the more stable winter form must be regarded as representing the ancestral race of the species. Further examples of this "seasonal dimorphism" are afforded by many tropical butterflies which possess a darker "wet-season" and a brighter "dry-season" generation. So different in appearance are often these two seasonal forms that before their true relationship was worked out they had been naturally regarded as independent species. The darkening of wing-patterns in many species of Lepidoptera has been carefully studied in our own British fauna. Melanic or melanochroic varieties are specially characteristic of western and hilly regions, and some remarkable dark races (fig. 43) of certain geometrid moths have arisen and become perpetuated in the manufacturing districts of the north of England. The production of these melanic forms is explained by J. W. Tutt and others as largely due to the action of natural selection, the damp and sooty conditions of the districts where they occur rendering unusually dark the surfaces—such as rocks, tree-trunks and palings—on which moths habitually rest and so favouring the survival of dark, and the elimination of pale varieties, as the latter would be conspicuous to their enemies. Breeding experiments have shown that these melanic races are sometimes "dominant" to their parent-stock. An evidently adaptive connexion can be frequently traced between the resting situation and attitude of the insect and the colour and pattern of its wings. Moths that rest with the hindwings concealed beneath the forewings (fig. 34, *f*) often have the latter dull and mottled, while the former are sometimes highly coloured. Butterflies whose normal resting attitude is with the wings closed vertically over the back (fig. 63) so that the under surface is exposed to view, often have this under surface mottled and inconspicuous although the upper surface may be bright with flashing colours. Various degrees of such "protective resemblance" can be traced, culminating in the wonderful "imitation" of its surroundings shown by the tropical "leaf-butterflies" (*Kallima*), the under surfaces of whose wings, though varying greatly, yet form in every case a perfect representation of a leaf in some stage or other of decay, the butterfly at the same time disposing of the rest of its body so as to bear out the deception. How this is effected is best told by A. R. Wallace, who was the first to observe it, in his work *The Malay Archipelago*:—

> "The habit of the species is always to rest on a twig and among dead or dried leaves, and in this position, with the wings closely pressed together, their outline is exactly that of a moderately sized leaf slightly curved or shrivelled. The tail of the hindwings forms a perfect stalk and touches the stick, while the insect is supported by the middle pair of legs, which are not noticed among the twigs and fibres that surround it. The head and antennae are drawn back between the wings so as to be quite concealed, and there is a little notch hollowed out at the very base of the wings, which allows the head to be retracted sufficiently."

But the British Vanessids often rest on a bare patch of ground with the brightly coloured upper surface of their wings fully exposed to view, and even make themselves still more conspicuous by fanning their wings up and down. Some genera and families of Lepidoptera, believed to secrete noxious juices that render them distasteful, are adorned with the staring contrasts of colour usually regarded as "warning," while other genera, belonging to harmless families sought for as food by birds and lizards, are believed to obtain complete or partial immunity by their likeness to the conspicuous noxious groups. (See Mimicry.)

Sexual dimorphism is frequent among the Lepidoptera. In many families this takes the form of more elaborate feelers in the male than in the female moth. Such complex feelers (fig. 2) bear numerous sensory (olfactory) nerve-endings and give to the males that possess them a wonderful power of discovering their mates. A single captive female of the Endromidae or Lasiocampidae often causes hundreds of males of her species to "assemble" around her prison, and this character is made use of by collectors who want to secure specimens. In many butterflies—notably the "blues" (Lycaenidae)—the male is brilliant while the female is dull, and in other groups (the Danainae for example) he is provided with scent-producing glands believed to be "alluring" in function. The apparent evidence given by the sexual differences among the Lepidoptera in favour of C. Darwin's theory of sexual selection finds no support from a study of their habits. The male indeed usually seeks the female, but she appears to exercise no choice in pairing. In some cases the female is attracted by the male, and here a modified form of sexual selection appears to be operative. The ghost swift moth (*Hepialus humuli*) affords a curious and interesting example of this condition, the female showing the usual brown and buff coloration of her genus, while the wings of the male are pure white, rendering him conspicuous in the dusky evening when pairing takes place. But in the northernmost haunts of the species, where there is no midsummer night, the male closely resembles the female in wing patterns, the development of the conspicuous white being needless. A very interesting sexual dimorphism is seen in the wingless condition of several female moths—the winter moths (*Hybernia* and *Cheimatobia*) among the Geometridae and the vapourers (*Orgyia* and *Ocneria*) among the Lymantriidae for example (fig. 17). It might be thought that the loss of power of flight by the female would seriously restrict the range of the species. In such insects, however, the caterpillars are often active and travel far.

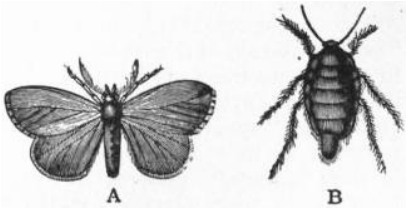


Fig. 17.—Vapourer Moth (*Ocneria detrita*). S. Europe. A, Male; B, Female.

Distribution and Migration.—The range of the Lepidoptera is practically world-wide; they are absent from the most remote and inhospitable of the arctic and antarctic lands, but even Kerguelen possesses a few small indigenous moths. Many of the large and dominant families have a range wide as that of the order, and certain species that have attached themselves to man—like the meal moths and the clothes moths—have become almost cosmopolitan. Interesting and suggestive restrictions of range can, however, be often traced. Although butterflies have been found in 82° N. latitude in Greenland, they are unknown in Iceland, and only a few species of the group reach New Zealand. Three large sections—the Ithomiinae, Heliconiinae and Brassolinae—of the great butterfly

family Nymphalidae are peculiar to the Neotropical region, while the Morphinae, a characteristically South American group, have a few Oriental genera in India and Indo-Malaya. The Acraeinae, another section of the same family, have the vast majority of their species in Ethiopian Africa, but are represented eastwards in the Oriental and Australian regions and westwards in South America. A comparison of the lepidopterous faunas of Ireland, Great Britain and the European continent is very instructive, and suggests strongly that, despite their power of flight the Lepidoptera are mostly dependent on land-connexions for the extension of their range. For example, Ireland has only forty of the seventy species of British butterflies. The range of many Lepidoptera is of course determined by the distribution of the plants on which their larvae feed.

Nevertheless certain species of powerful flight, and some that might be thought feeble on the wing, often cross sea-channels and establish or reinforce distant colonies. Caterpillars of the great death's head moth (*Acherontia atropos*) are found every summer feeding in British and Irish potato fields, but it is doubtful if any of the pupae resulting from them survive the winter in our climate. It is believed by Tutt that the species is only maintained by a fresh immigration of moths from the South each summer. Hosts of white butterflies (*Pieris*) have been frequently observed crossing the English Channel from France to Kent. Migrating swarms of Lepidoptera have often been met by sailors in mid-ocean; thus, Tutt records the presence around a sailing ship in the Atlantic of such a swarm of the rather feeble moth *Deiopeia pulchella*, nearly 1000 m. from its nearest known habitat. This migratory instinct is connected with the gregarious habits of many Lepidoptera. For example, H. W. Bates states that at one place in South America he noticed eighty different species flying about in enormous numbers in the sunshine, and these, with few exceptions, were males, the females remaining within the forest shades. Darwin describes a "butterfly shower," which he observed 10 m. off the South American coast, extending as far as the eye could reach; "even by the aid of the telescope," he adds, "it was not possible to see a space free from butterflies." Sir J. Emerson Tennent, witnessed in Ceylon a mighty host of butterflies of white or pale yellow hue, "apparently miles in breadth and of such prodigious extension as to occupy hours and even days uninterruptedly in their passage." Observations at Heligoland by H. Gätke have shown that migrating moths "travel under the same conditions as migrating birds, and for the most part in their company, in an east to west direction; they fly in swarms, the numbers of which defy all attempts at computation and can only be expressed by millions." The painted lady butterfly (*Pyrameis cardui*) comes in repeated swarms from the Mediterranean region into northern and western Europe, while in North America companies of the monarch (*Anosia archippus*) invade Canada every summer from the United States, and are believed to return southwards in autumn. This latter species has, during the last half-century, extended its range south-westwards across the Pacific and reached the Austro-Malayan islands, while several specimens have occurred in southern and western England, though it has not established itself on this side of the Atlantic. It is noteworthy that the introduction of its food-plant—*Asclepias*—into the Sandwich Islands in 1850 apparently enabled it to spread across the Pacific.

Fossil History.—Our knowledge of the geological history of the Lepidoptera is but scanty. Certain Oolitic fossil insects from the lithographic stone of Solenhofen, Bavaria, have been described as moths, but it is only in Tertiary deposits that undoubted Lepidoptera occur, and these, all referable to existing families, are very scarce. Most of them come from the Oligocene beds of Florissant, Colorado, and have been described by S. H. Scudder. The paucity of Lepidoptera among the fossils is not surprising when we consider the delicacy of their structure, and though their past history cannot be traced back beyond early Cainozoic times, we can have little doubt from the geographical distribution of some of the families that the order originated with the other higher Endopterygota in the Mesozoic epoch.

Classification.—The order Lepidoptera contains more than fifty families, the discussion of whose mutual relationships has given rise to much difference of opinion. The generally received distinction is between butterflies or *Rhopalocera* (Lepidoptera with clubbed feelers, whose habit is to fly by day) and moths or *Heterocera* (Lepidoptera with variously shaped feelers, mostly crepuscular or nocturnal in habit). This distinction is quite untenable as a zoological conception, for the relationship of butterflies to some moths is closer than that of many families of Heterocera to each other. Still more objectionable is the division of the order into *Macrolepidoptera* (including the butterflies and large moths) and the *Microlepidoptera* (comprising the smaller moths). Most of the recent suggestions for the division of the Lepidoptera into sub-orders depend upon some single character. Thus J. H. Comstock has proposed to separate the three lowest families, which have—like caddis-flies (Trichoptera)—a jugum on each forewing, as a suborder *Jugatae*, distinct from all the rest of the Lepidoptera—the *Frenatae*, mostly possessing a frenulum on the hindwing. A. S. Packard places one family (Micropterygidae) with functional mandibles and a lacinia in the first maxilla alone in a suborder *Laciniata*, all the rest of the order forming the suborder *Haustellata*. T. A. Chapman divides the families with free or incompletely obtect and mobile pupae (*Incompletae*) from those with obtect pupae which never leave the cocoon (*Obtectae*), and this is probably the most natural primary division of the Lepidoptera that has as yet been suggested. Dyar puts forward a classification founded entirely on the structure of the larva, while Tutt divides the Lepidoptera into three great stirps characterized by the shape of the chorion of the egg. The primitive form of the egg is oval, globular, or flattened with the micropyle at one end; from this has apparently been derived the upright form of egg with the micropyle on top which characterizes the butterflies and the higher moths. These schemes, though helpful in pointing out important differences, are unnatural in that they lay stress on single, often adaptive, characters to the exclusion of others equally important. Although it is perhaps best to establish no division among the Lepidoptera between the order and the family, an attempt has been made in the classification adopted in this article to group the families into tribes or super-families which may indicate their probable affinities. The systematic work of G. F. Hampson, A. R. Grote and E. Meyrick has done much to place the classification of the Lepidoptera on a sound basis, so far as the characters of the imago are concerned, but attention must also be paid to the preparatory stages if a truly natural system is to be reached.

Jugatae.

Three families are included in this group having in common certain primitive characters of the wings and neuration (see fig. 6), as well as of the larva and pupa. There is a membranous lobe or jugum near the base of the wing, and the neuration of the hindwing is closely like that of the forewing, the radial nervure being five-branched in both. The pupa has four or five movable segments, and the larval prolegs have complete circles of hooklets.

The three families of the Jugatae are not very closely related to each other. The *Micropterygidae* (often known as *Eriocephalidae*), comprising a few small moths with metallic wings, are the most primitive of all Lepidoptera. They are provided with functional mandibles, while the maxillae have distinct laciniae, well-developed palps and galeae not modified for suction (see fig. 3). The larva is remarkable on account of its long feelers, the presence of

pairs of jointed prolegs on the first eight abdominal segments, an anal sucker beneath the last segment and bladder-like outgrowths on the cuticle. These curious larvae feed on wet moss. The family has only a few genera scattered widely over the earth's surface (Europe, America, Australia, New Zealand).

The *Eriocraniidae* resemble the Micropterygidae in appearance, but the imago has no mandibles, and the maxillae, though short and provided with conspicuous palps, have no laciniae and form a proboscis as in Lepidoptera generally. The abdomen of the female carries a serrate piercing process, and the eggs are laid in the leaves of deciduous trees, the white larvae, with aborted legs, mining in the leaf tissue. The fully-fed larva winters in an underground cocoon and then changes into the most remarkable of all known lepidopterous pupae, with relatively enormous toothed mandibles which bite a way out of the cocoon in preparation for the final change. These pupal mandibles of the Eriocraniidae, together with the nature of the imaginal maxillae in the Micropterygidae (Eriocephalidae) and the wing-neuration in both families, point strongly to a relationship between the Lepidoptera and the Trichoptera.

The *Hepialidae* or swift moths—the third family of the Jugatae—are in some respects specialized. The moths are of large or moderate size with the maxillae in a vestigial condition, no food being taken after the attainment of the perfect state. The larvae (fig. 12) feed either on roots or in the wood of trees and shrubs, not attaining their growth in less than a year and some large exotic species living for two or three. The family is world-wide in range, and Australia possesses some almost gigantic and strangely coloured genera.

Tineides.

A large assemblage of moths, mostly of small size, are included in this group. The wings have no jugum, but there is a frenulum on the hindwing, which has, as in all the groups above the Jugatae, only a single radial nervure. Three anal nervures are present in the hindwing in those families whose wings are well developed, but in several families of small moths the wings of both pairs are very narrow and pointed, and the neuration is consequently reduced. The sub-costal nervure of the hindwing is usually present and distinct from the radial nervure. The egg is flat except in the Cossidae and Castniidae in which it is upright. The larval prolegs, with few exceptions, have a complete circle of hooklets, and the larvae usually feed in some concealed situation. The pupa is incompletely obtect, with three (in some females only two) to five free abdominal segments, and emerges partly from the cocoon before the moth appears. The cremaster serves to anchor the pupa to its cocoon at the correct degree of emergence, and thus facilitates the eclosion of the imago.

FIG. 18.—*Stygia australis.* S. Europe.

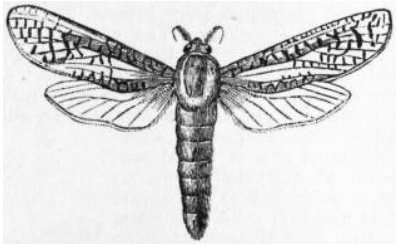


FIG. 19.—*Zeuzera scalaris.* India.

The *Cossidae* are a small family of large moths (figs. 8, 18, 19) belonging to this section, characterized by their heads with erect rough scales or hairs, the pectinate feelers of the males, their reduced maxillae so that no food is taken in the perfect state, and their wings with the fifth radial nervure arising from the third, and the main median nervure forking in the discoidal areolet. The larvae feed in plant stems, often in the wood of trees, forming tunnels and galleries, and usually taking a year or more to reach maturity. The pupa which has three or four free segments in the male and four or five in the female, rests in a cocoon within the food plant, often strengthened by chips of wood, or in a subterranean cocoon. The family is fairly well represented in the tropics; the British fauna possesses only three species, of which the "goat" (*Cossus cossus*) and the "leopard" (*Zeuzera pyrina*) are well known, the caterpillars of both being often injurious to timber and fruit trees.

The *Tortricidae* are a large family of small moths (see fig. 1), nearly allied to the Cossidae. The fifth radial nervure does not arise from the third, the maxillae are well developed, but their palps are obsolete; the head is densely clothed with erect scales; the terminal segment of the labial palp is short and obtuse. The female pupa has three, the male four, free segments. All the larvae of these moths have some method of concealing themselves while feeding. A frequent plan is to roll up a leaf of the food-plant, fastening the twisted portion with silken threads so as to make a tubular retreat; this is the habit of the caterpillar of the green bell moth (*Tortrix viridana*) which often ravages the foliage of oak plantations. The larvae of the pine-shoot moths (*Retinia*) shelter in solidified resinous exudations from their coniferous food-plants, while the codlin-moth caterpillar (*Carpocapsa pomonella*) feeds in apples and pears, growing with the growth of the fruit which affords them both provender and home. The antics of "jumping-beans" are due to the movements of tortricid caterpillars within the substance of the seed.

The *Psychidae* are a small but widely-distributed family of moths whose males have the head, densely clothed with rough hairs, bearing complex, bipectinated feelers, but with the maxillae reduced and useless. The larvae live in portable cases made of grass, pieces of leaf or stick, with a silken lining, and these cases serve as cocoons for the pupae which agree in structure with those of the Tortricidae. But the most remarkable feature of the family is the extreme degradation of the female, which, wingless, legless and without jaws or feelers, never emerges from the cocoon.

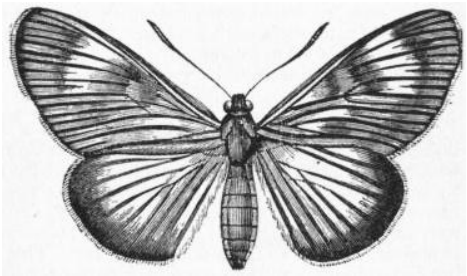


Fig. 20.—*Castnia acraeoides.* Brazil. Fig. 21.—*Neurosymploca concinna.* S. Africa.

The *Castniidae* are a small family of large, conspicuous, day-flying exotic moths (fig. 20) whose clubbed feelers and bright colours give them a resemblance to butterflies, although their wing-neuration is of the primitive tineoid type; the smooth larvae feed on the stems or roots of plants and the pupal structure agrees with that of the Tortricidae and Psychidae. The distribution of the family is confined to Tropical America and the Indo-Malayan and Australian regions.

The *Zygaenidae* (burnet moths) are a large family of day-flying moths (fig. 21) adorned with brilliant metallic colours. The feelers are long, stout in the middle and tapering, bearing numerous long or short pectinations. The well-developed maxillae have vestigial palps. The larvae—often very conspicuously coloured—are remarkable among the Tineides in having incomplete circles of hooks on the prolegs, and they feed exposed on the leaves of various plants. The pupa, enclosed in a silken cocoon, has four or five free segments. The *Limacodidae* are a small family of brownish nocturnal moths, allied to the Zygaenidae and agreeing with them in the structure of the pupa. The larva in this family also is an exposed feeder, but it is remarkable in form, being flattened and slug-like, without prolegs and adorned with curious spinous processes.

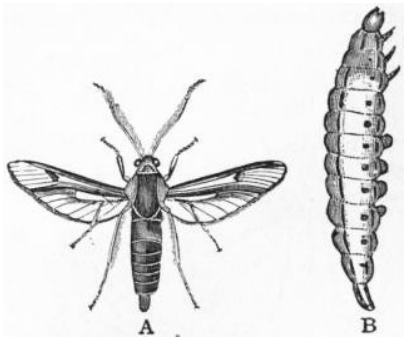


Fig. 22.—A, *Sesia asiliformis* (Gad-fly Hawk Moth). Europe. B, Larva.

The *Sesiidae* are a large family of small, narrow-winged moths, the sub-costal nervure of the hindwing being absent and the wings being for the most part destitute of scales (fig. 22). The maxillae are developed but their palps are vestigial, while the terminal segment of the labial palp is short and pointed. Many of these insects have their bodies banded with black and yellow; this in conjunction with the transparent wings makes some of them like wasps or hornets in appearance. The larvae feed in the woody stems of various plants. The pupa, with three or four free abdominal segments, remains within its cocoon, formed with chips of wood, until the time for its final change draws near; then it works itself partly out of the tree by means of the spines on its abdominal segments.

The *Nepticulidae* are the smallest of all the Lepidoptera, measuring only 3-8 mm. across the outspread wings, which are all lanceolate and pointed at the tip. The sucking portions of the maxillae are vestigial, but the palps are long and jointed. The larvae, without thoracic limbs or prolegs, but sometimes with paired rudimentary processes on some of the segments, mine in the leaves of plants. The pupa, with four free abdominal segments in the female and five in the male, rests in a cocoon usually outside the mine.

Fig. 23.—*Adela degeerella.* Europe.

Fig. 24.—*Euplocampus anthracinus.* Europe.

Fig. 25.—*Tinea tapetzella* (Clothes Moth). Europe.

The *Adelidae* are a family of delicate, but larger, moths with very long feelers (fig. 23) especially in the males. The larvae feed, when young, in flowers; later, protected by a flat case, they devour leaves; the pupa resembles that of the Nepticulidae in structure. The female has an ovipositor adapted for piercing plant tissues.

The *Tineidae* are a large and important family of small moths (figs. 14, 24, 25) with rough-haired heads, and with the maxillae and their palps usually well developed. Many of the genera have narrow pointed wings with degraded neuration. The larvae differ in their habits, some—*Gracilaria* for example—mine in leaves, while others, like the well-known caterpillars of the clothes moth (*Tinea*) surround themselves with portable cases (fig. 14) formed by spinning together their own excrement. The female pupa has three, the male four free abdominal segments.

Plutellides.

This group includes a few large families of small moths that are linked by their imaginal and larval structure to the Tineidae (in which they have often been included) and by their pupal structure to the higher groups that have yet to be considered. The moths have labial palps with slender pointed terminal segments, and narrow pointed wings, but the neuration (except in the Elachistidae) is less degenerate than in most Tineidae. The hairy covering of the head is smooth, and the maxillary palps are usually vestigial. The egg is flat, and the larval prolegs have complete circles of hooklets. The pupa is obtect with only two free abdominal segments (fifth and sixth) in both sexes and does not move out of the cocoon.

Fig. 26.—*Cerostoma asperella.* Europe.

Fig. 27.—*Psecadia pusiella.*

Four families are included in this group. The *Plutellidae* (fig. 26) have the maxillary palps developed, in some genera, as slender threadlike appendages directed straight forward. The larvae do not usually mine in leaves, but feed openly, keeping to the underside for protection (*Plutella*), or spinning by their united labour a mass of web

over the food-plant (*Hyponomeuta*). In the other three families the maxillary palps are vestigial or obsolete. The *Elachistidae* have remarkably narrow, pointed wings and their larvae mine in leaves or form portable cases and feed among seeds. In the *Oecophoridae* (fig. 27) the sub-costal nervure of the hindwing is free and distinct throughout its length, and the larvae usually feed among spun leaves or seeds, or in decayed wood. The *Gelechiidae* are a large family with similar larval habits; the moths are distinguished by the sinuate termen of the hindwing and the connexion of its sub-costal nervure with the discoidal areolet.

Pyralides.

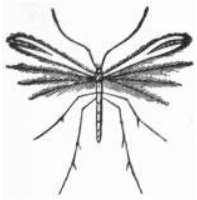


FIG. 28.—*Pterophorus spilodactylus.* Europe.

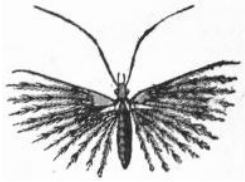
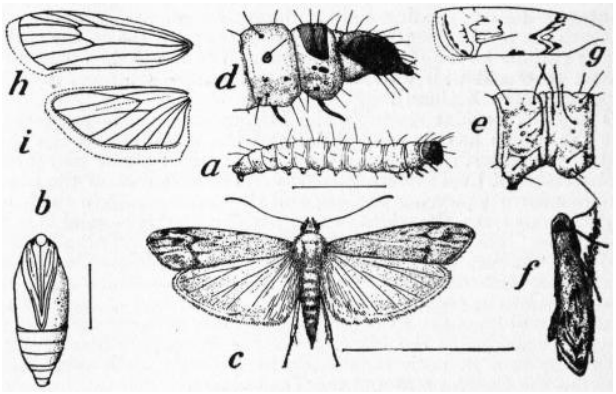


FIG. 29.—*Orneodes hexadactylus* (24-plumed Moth). Europe.

This group includes a number of moths of delicate build with elongate legs, the maxillae and their palps being usually well developed. The forewings have two anal nervures, the hindwings three (fig. 30, *h*, *i*); in the hindwing the sub-costal nervure bends towards and often connects with the radial, and the frenulum is usually present. The egg is flat. The larva has complete circles of hooklets on its five pairs of prolegs, and the pupa (usually completely obtect) does not move at all from its cocoon. This group includes the only Lepidoptera that have aquatic larvae.

Of the families comprised in this division three deserve special mention. The *Pterophoridae* (plume moths, fig. 28) usually have the wings deeply cleft—a single cleft in the forewing and two in the hindwing. The hairy larvae feed openly on leaves, while the soft and hairy pupa remains attached to its cocoon by the cremaster, although it is incompletely obtect and has three or four free abdominal segments. The *Orneodidae* (multiplume moths) have all the wings six-cleft. Our British species, *Orneodes hexadactyla* (fig. 29), is an exquisite little insect, whose larva feeds on the blossoms of honeysuckle. The pupa is completely obtect, with only two free abdominal segments. The *Pyralidae* (figs. 13, 30), a large family with numerous divisions, have entire wings, and their pupae are obtect. The caterpillars feed in some kind of shelter, some spinning a loose case among the leaves of their food-plant, others burrowing into dry vegetable substances or eating the waxen cells of bees. Several species of this group, such as the Mediterranean flour moth, *Ephestia kühniella* (fig. 30), become serious pests in storehouses and granaries, their larvae devouring flour and similar food-stuffs.



After Riley and Howard, *Insect Life*, vol. 2 (U.S. Dept. Agr.).

FIG. 30.—Flour Moth (*Ephestia kühniella*).

c, With wings spread.
f, At rest.
g, *h*, *i*, Marking and neuration of wings.
a, Larva.
b, Pupa.
d, Head and front body-segments of larva.
e, 2nd and 3rd abdominal segments.

Noctuides.

In this group may be included a number of families of moths with the second median nervure of the forewing arising close to the third. This feature of neuration characterizes also the Jugatae (see fig. 6), Tineides, Plutellides and Pyralides. But the Noctuides differ from these groups in having only two anal nervures in the hindwing. The maxillary palps are absent or vestigial, and a frenulum is usually present on the hindwing. The larva has usually ten prolegs, whose hooklets are arranged only along the inner edge, while the immobile pupa is always obtect with only two free abdominal segments (the fifth and sixth). The Lasiocampidae and their allies have flat eggs, but in the Noctuidae, Arctiidae and their allies the egg is upright.

The *Lasiocampidae*, together with a few small families, differ from the majority of this group in wanting a frenulum. The maxillae of the Lasiocampidae are so reduced that no food is taken in the imaginal state, and in correlation with this condition the feelers of the male are strongly (those of the female more feebly) bipectinated. The moths are stout, hairy insects, usually brown or yellow in the pattern of their wings. The caterpillars are densely hairy and many species hibernate in the larval stage. The pupa is enclosed in a hard, dense cocoon, whence the name “eggars” is often applied to the family, which has a wide distribution, but is absent from New Zealand. The *Drepanulidae* are an allied family, in

which the frenulum is usually present, while the hindmost pair of larval prolegs are absent, their segment being prolonged into a pointed process which is raised up when the caterpillar is at rest. The hook-tip moths represent this family in the British fauna.

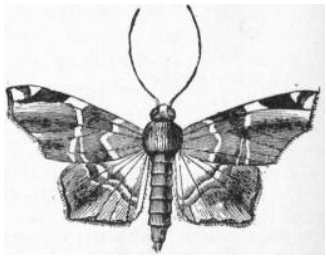


Fig. 31.—*Claterna cydonia.* India.

The *Lymantriidae* resemble the Lasiocampidae in their hairy bodies ana vestigial maxillae, but the frenulum is usually present on the hindwing and the feelers are bipectinate only in the males. Some females of this family—the vapourer moths (*Orgyia* and allies, fig. 17), for example—are degenerate creatures with vestigial wings. The larvae (fig. 15) are very hairy, and often carry dense tufts on some of their segments; hence the name of "tussocks" frequently applied to them. The pupae are also often hairy (fig. 16)—an exceptional condition—and are protected by a cocoon of silk mixed with some of the larval hairs, while the female sheds some hairs from her own abdomen to cover the eggs. The family is widely distributed, its headquarters being the eastern tropics. To that part of the world is restricted the allied family of the *Hypsidae*, distinguished from the "tussocks" by the slender upturned terminal segment of the labial palps and by the development of the maxillae.

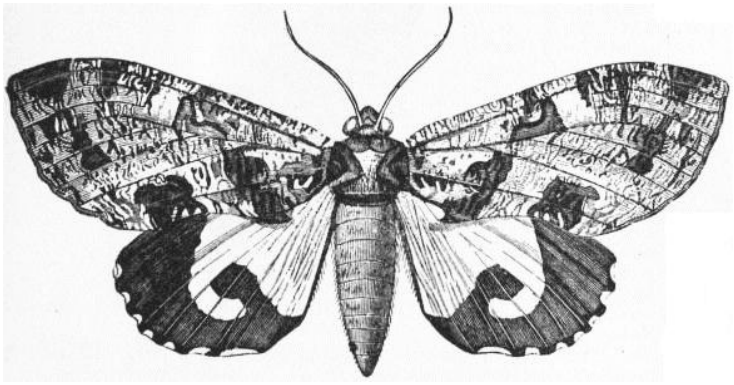


Fig. 32.—*Ophideres imperator*. Madagascar.

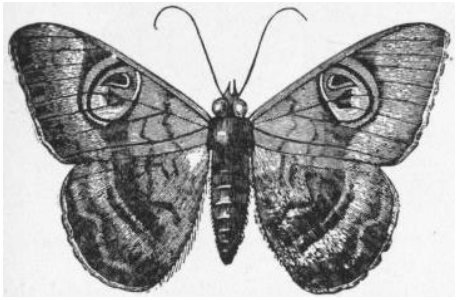
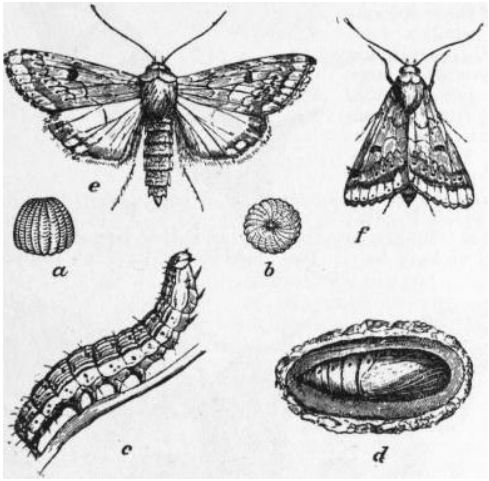


Fig. 33.—*Cyligramma fluctuosa.* W. Africa.



From Mally, *Bull.* 24, *Div. Ent. U.S. Dept. Agr.*

Fig. 34.—*e*, *f*, *Heliothis armigera.* Europe, *c*, Larva; *d*, pupa in cell. Natural size. *a*, *b*, Egg, highly magnified.

The *Noctuidae* are the largest and most dominant family of the Lepidoptera, comprising some 10,000 known species. They are mostly moths of dull coloration, flying at dusk or by night. The maxillae are well developed, the hindwing has a frenulum, and its sub-costal nervure touches the radial near the base. The larvae of the Noctuidae (fig. 34, *c*) are rarely hairy and the pupa (fig. 34, *d*) usually rests in an earthen cell, being often the wintering stage for the species; sometimes the pupa is enclosed in a loose cocoon of silk and leaves. In some Noctuidae (fig. 32) the hindwings are brightly coloured, but these are concealed beneath the dull, inconspicuous forewings when the insect rests (fig. 34, *f*). Nearly allied to the Noctuidae, but very different in appearance, are the gaily-coloured *Agaristidae*, a family of day-flying moths (figs. 35, 36), confined to the warmer regions of the globe and distinguished by their thickened feelers, those of the Noctuids being thread-like or slightly pectinate.

The *Arctiidae* (tiger moths, footmen, &c.) are allied to the Noctuidae, but their wing-neuration is more specialized, the sub-costal nervure of the hindwing being confluent with the radial for the basal part of its course.

These moths (fig. 37) have gaily coloured wings, and the caterpillars are often densely covered with long smooth hairs. The pupae are enclosed in silken cocoons (fig. 38). The highest specialization of structure in this group of the Lepidoptera is reached by the *Syntomidae*, a family nearly allied to the Arctiidae, but with the sub-costal nervure in the hindwing absent. The Syntomidae have elongate narrow forewings and short hindwings, usually dark in colour with clear spots and dashes destitute of scales (fig. 40). The body, on the other hand, is often brilliantly adorned. The family, abundant in the tropics of the Old World, has only two European species.

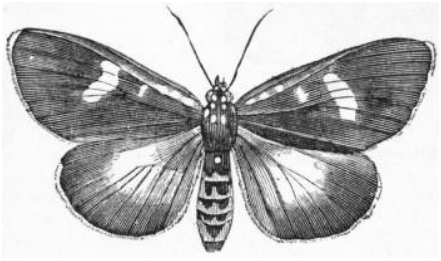


FIG. 35.—*Rothia pales.* Madagascar.

Sphingides.

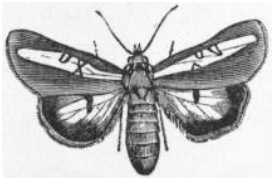


FIG. 36.—*Aegocera rectilinea.* Tropical Africa.

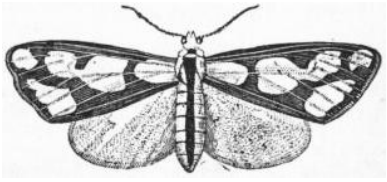
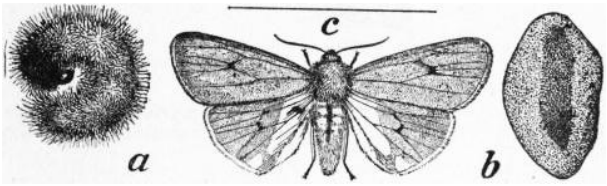


FIG. 37.—*Haploa Lecontei.* N. America.



After Lugger, Riley and Howard, *Insect Life*, vol. 2 (U.S. Dept. Agr.).

FIG. 38.—*c*, Tiger Moth (*Phragmatobia fuliginosa*, Linn.). Europe. *a*, Caterpillar; *b*, cocoon with pupa. Slightly enlarged.

This group includes a series of families which agree with the Noctuides in most points, but are distinguished by the origin of the second median nervure of the forewing close to the first, or from the discocellular nervure midway between the first and third medians (see fig. 5). These neurational characters may appear somewhat insignificant, but such slight though constant distinctions in structures of no adaptational value may be safely regarded as truly significant of relationship. Several of the families in this group have lost the frenulum. In larval and pupal characters the Sphingides generally resemble the Noctuides, but in some families there is a reduction in the number of the larval prolegs. The egg is spherical or flat, upright only in the Notodontidae.

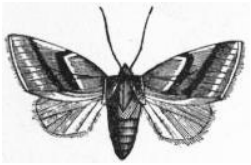


FIG. 39.—*Halias prasinana.* Europe.

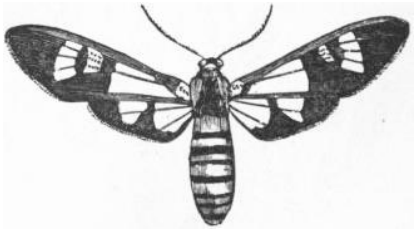


FIG. 40.—*Euchromia formosa.* S. Africa.

The Notodontidae are stout, hairy moths (figs. 5, 41, 42 *a*) with maxillae and frenulum developed. In the larva the prolegs on the hindmost segment are sometimes modified into pointed outgrowths which are carried erect when the caterpillar moves about. From these structures whip-like, coloured processes are protruded by the caterpillar (fig. 42 *b*) of the puss moth (*Cerura*) when alarmed; these processes are believed to help in "terrifying" the caterpillar's enemies. Allied to the Notodontidae are the *Cymatophoridae*—a family of moths agreeing with the Noctuidae in appearance and habits—and the large and important family of the *Geometridae*. The moths (fig. 43) of this family are distinguished from the Notodontidae by their delicate build and elongate feet, the caterpillars (fig. 43, *c*) by the absence or vestigial condition of the three anterior pairs of prolegs. The two hinder pairs of prolegs are therefore alone functional and the larva progresses by "looping," *i.e.* bending the body so as to bring these prolegs close up to the thoracic legs, and then, taking a fresh grip on the twig whereon it walks, stretching the body straight out again. Many of these larvae have a striking resemblance both in form and colour to the twigs of their food-plant. In some of the species the female has the wings reduced to useless vestiges. The family is world-wide in its range. The tropical *Uraniidae* are large handsome moths (figs. 44, 45), often with exquisite wing-patterns, allied to the Geometridae, but distinguished by the absence of a frenulum in the moth and the presence of the normal ten prolegs in the larva.

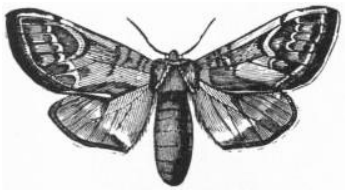


FIG. 41.—*Notodonta ziczac* (Pebble Prominent Moth). Europe.

FIG. 42*a*.—*Cerura borealis.* N. America.

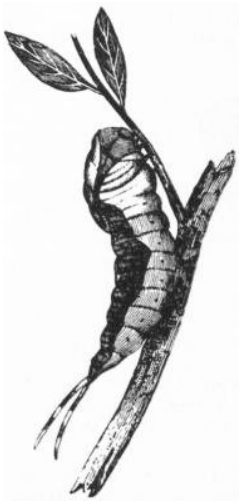
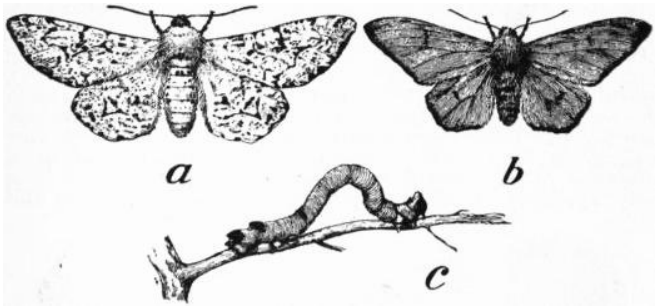


FIG. 42*b*.—Larva of *Cerura* (Puss Moth).



After Grote, *Natural Science* (J. M. Dent & Co.).

FIG. 43.—Geometrid Moth (*Amphidasys betularia*, Linn.). Europe. *a*, Large grey type; *b*, dark variety; *c*, caterpillar in looping attitude.

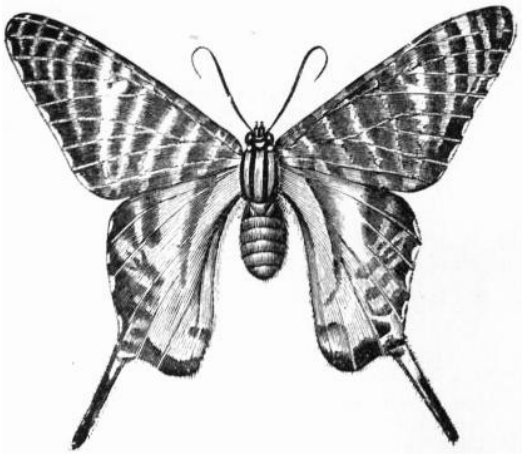


FIG. 44.—*Urania boisduvalii.* Cuba.

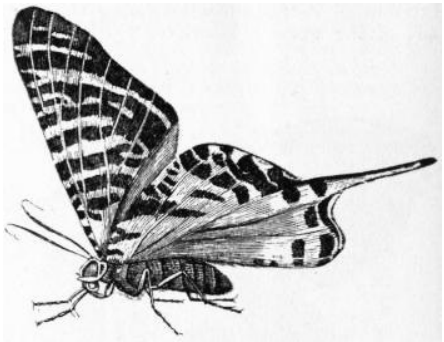


FIG. 45.—*Urania boisduvalii* at rest, showing under surface of wings.

The *Sphingidae* (hawk moths) are insects often of large size (figs. 46*a*, 47), with spindle-shaped feelers, elongate and powerful forewings and the maxillae very well developed. The hindwing carries a frenulum and has its sub-costal nervure connected with the radial by a short bar. The caterpillars have the full number of prolegs, and, in many genera, carry a prominent dorsal horn on the eighth abdominal segment (fig. 46*b*). The pupa lies in an earthen cell. On account of their powerful flight the moths of this family have a wide range; certain species—like *Acherontia atropos* and *Protoparce convolvuli*—migrate into the British Islands in numbers almost every summer.

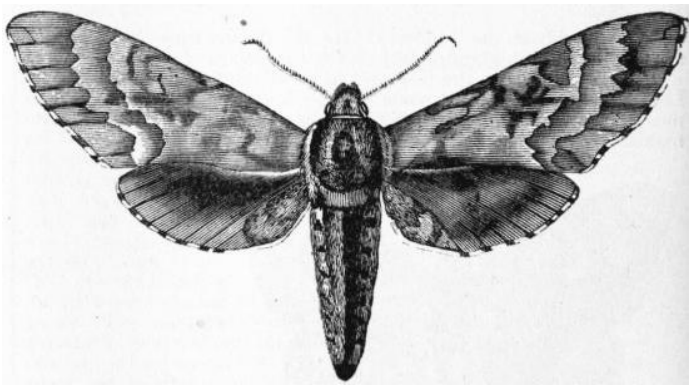


Fig. 46*a*.—*Chlaenogramma jasminearum* (Jessamine Sphinx). N. America.

Fig. 46*b*.—Larva.

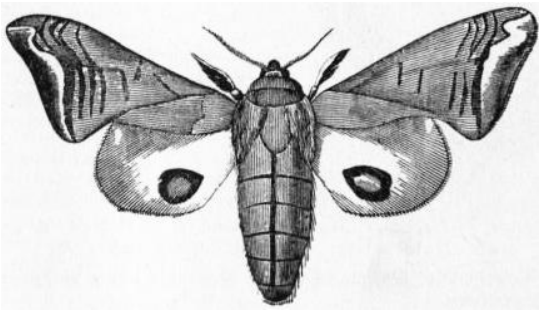
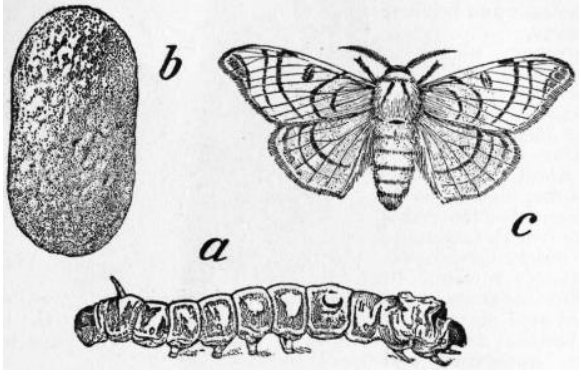


Fig. 47.—*Smerinthus ocellatus* (Eyed Hawk moth). Europe.

A group of families in which the first maxillae are vestigial, the feelers bipectinate and the pupa enclosed in a dense silken cocoon, have been regarded as the most highly specialized of all the moths, though according to other views the whole series of the Lepidoptera culminates in the Syntomidae. Of these cocoon-spinning families may be specially mentioned the *Eupterotidae*, large brown or yellow moths inhabiting tropical Asia and Africa, and represented in Europe only by the "processionary moth" (*Cnethocampa processionea*). In this family the frenulum is present, and the larvae are protected with tufts of long hair. The *Bombycidae* have no frenulum, and the larvae are smooth, with some of the segments humped and the eighth abdominal often carrying a dorsal spine. The family is tropical in its distribution, but the common silkworm (*Bombyx mori*, fig. 48) has become acclimatized in southern Europe and is the source of most of the silk used in manufacture and art. Of commercial value also is the silk spun by the great moths of the family *Saturniidae*, well represented in warm countries and contributing a single species (*Saturnia pavonia-minor*) to the British fauna. These moths (fig. 49) have but a single anal nervure in the hindwing and only three radial nervures in the forewing. The wing-patterns are handsome and striking; usually an unsealed "eyespot" is conspicuous at the end of each discoidal areolet. The caterpillars are protected by remarkable spine-bearing tubercles (fig. 10, B).



After C.V. Riley, *Bull.* 14, *Div. Ent. U.S. Dept. Agr.*

Fig. 48.—*Bombyx mori.* China. *a*, Caterpillar (the common silkworm); *b*, cocoon; *c*, male moth.

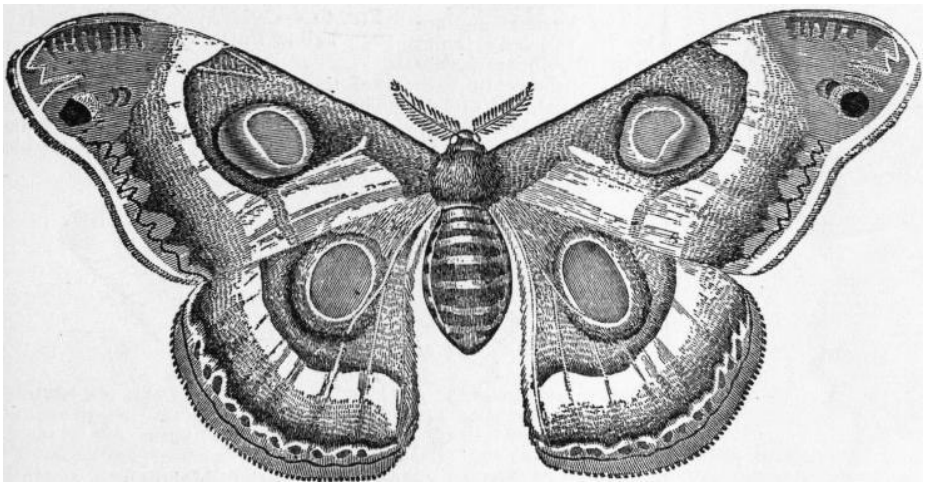


FIG. 49.—*Epiphora bouhiniae.* W. Africa.

Grypocera.

This group stands at the base of the series of families that are usually distinguished as "butterflies." The feelers are recurved at the tip, and thickened just before the extremity. The forewing has the full number of radial nervures, distinct and evenly spaced, and two anal nervures; the frenulum is usually absent. The larvae (fig. 51) have prolegs with complete circles of hooklets, and often feed in concealed situations, while the pupa is protected by a light cocoon. The affinities of this group are clearly not with the higher groups of moths just described, but with some of the lower families. According to Meyrick they are most closely related to the Pyralidae, but Hampson and most other students would derive them (through the Castniidae) from a primitive Tineoid stock allied to the Cossidae and Zygaenidae.

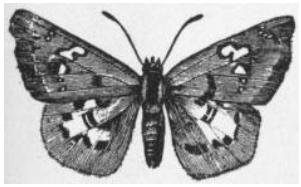


FIG. 50.—*Tagiades sabadius.* S. Africa.

Three families are included in the section. The North American *Megathymidae* and the Australian *Euschemonidae* have a frenulum and are usually reckoned among the "moths." The *Hesperiidae* in which the frenulum is wanting form the large family of the skipper butterflies, represented in our own fauna by several species. They are insects with broad head—the feelers being widely separated—usually brown or grey wings (fig. 50) and a peculiar jerky flight. The family has an extensive range but is unknown in Greenland, New Zealand, and in many oceanic islands.

Rhopalocera.

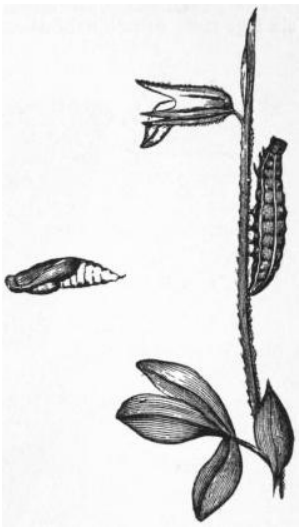


FIG. 51.—Chrysalis and Larva of *Nisoniadestages* (dingy skipper). Europe.

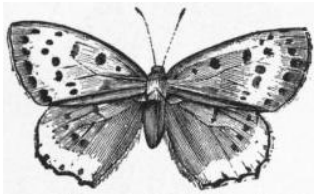


FIG. 52.—*Chrysophanus thoe.* N. America.

This group comprises the typical butterflies which are much more highly specialized than the Grypocera, and may be readily distinguished by the knobbed or clubbed feelers and by the absence of a frenulum. Two or more of the radial nervures in the forewing arise from a common stalk or are suppressed. The egg is "upright." The larvae have hooklets only on the inner edges of the prolegs. The pupa is very highly modified, only two free abdominal segments are ever recognizable, and in some genera even these have become consolidated. The cocoon is reduced to a pad of silk, to which the pupa is attached, suspended by the cremastral hooks; in some families there is also a silken girdle around the waist-region. In correlation with the exposed condition of the pupa, we find the presence of a specially developed "head-piece" or "nose-horn" to protect the head-region of the contained imago. Their bright colours and conspicuous flight in the sunshine has made the Rhopalocera the most admired of all insects by the casual observer.

A modification that has taken place in several families of butterflies is the reduction of the first pair of legs. H. W. Bates arranged the families in a series depending on this character, but neurational and pupal features must be taken into account as well, and the sequence followed here is modified from that proposed by A. R. Grote and J. W. Tutt.

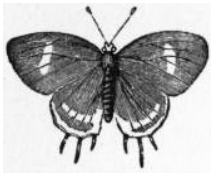


FIG. 53.—*Rathinda amor.* India.

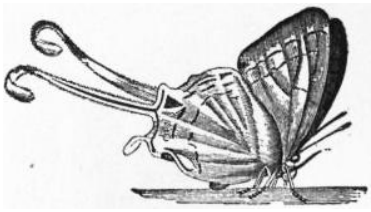
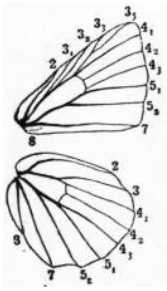


FIG. 54.—*Cheritra freja.* India.

The *Lycaenidae* are a large family including the small butterflies (figs. 52, 53, 54) popularly known as blues, coppers and hairstreaks. The forelegs in the female are normal, but in the male the tarsal segments are shortened and the claws sometimes are absent. The forewing has only three or four radial nervures (fig. 55), the last two of which arise from a common stalk; the feelers are inserted close together on the head. The larva is short and hairy, somewhat like a woodlouse in shape, the broad sides concealing the legs and prolegs, while the pupa, which is also hairy or bristly, is attached by the cremaster to a silken pad and cinctured with a silken thread. The upper surfaces of the wings of these insects are usually of a bright metallic hue—blue or coppery—while beneath there are often numerous dark centred "eye-spots." The family is widely distributed. Nearly related are the *Lemoniidae*, a family abundantly represented in the Neotropical Region, but scarce in the Old World and having only a single European species (*Nemeobius lucinia*) which occurs also in England. In the Lemoniidae (figs. 56, 57) the forelegs of the male are reduced and useless for walking. The *Libytheidae* may be recognized by the elongate snout-like palps, the five-branched radial nervure of the forewing, the cylindrical hairy larva, and the pupa attached only by the cremaster.



After Grote, *Natural Science*, vol. 12 (J. M. Dent & Co.).

FIG. 55.—Neuration of Wings in *Lycaena*.

2, Sub-costal.
3, Radial.
4, Median.
5, Cubital.
7, 8, Anal nervures.

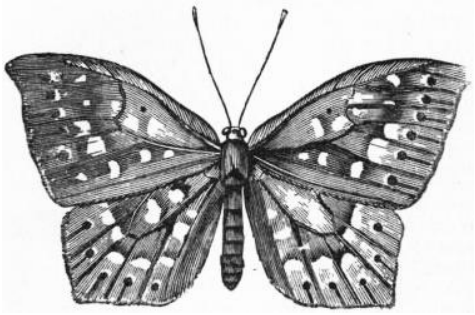


FIG. 56.—*Eurybia carolina.* Brazil.

FIG. 57.—*Calephelis caenius.* N. America.

FIG. 58.—*Papilio machaon* (Swallow-tail.). Europe.

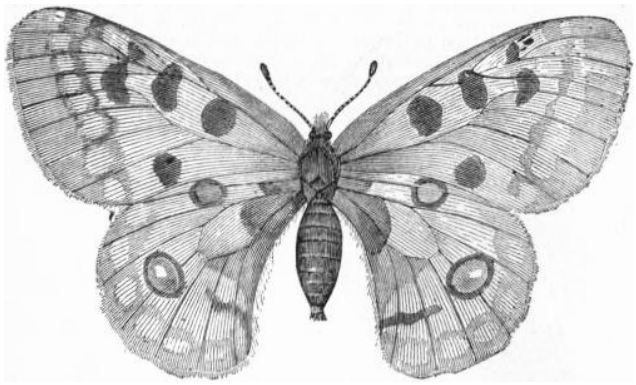


FIG. 59.—*Parnassius apollo* (Apollo). European Alps.

The *Papilionidae* are large butterflies with ample wings, and all six legs fully developed in both sexes. The forewing has five radial and two anal nervures, the second of the latter being free from the first and running to the dorsum of the wing, while the hindwing has but a single anal, and is frequently prolonged into a "tail" at the third median nervure (fig. 58). The larva is cylindrical, never hairy but often tuberculate and provided with a dorsal retractile tentacle (osmaterium) on the prothorax. The pupa, which has a double "nose-horn," is attached by the cremaster and a waist-girdle to the food-plant in the Papilioninae (fig. 58), but lies in a web on the ground among the Parnasiinae (figs. 59, 60). The latter sub-family includes the well-known Apollo butterflies of the Alps. The former is represented in the British fauna by the East Anglian swallow-tail (*Papilio machaon*), and is very abundant in the warmer regions of the world, including some of the most magnificent and brilliant of insects.

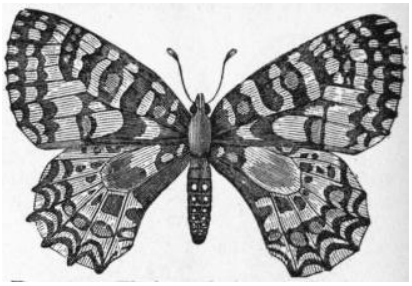


FIG. 60.—*Thais medesicaste.* S. France.

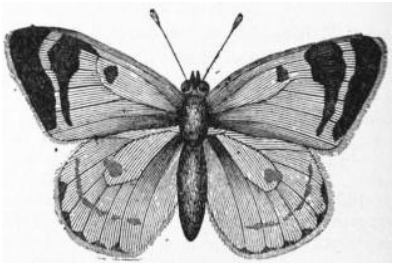


FIG. 61.—*Colias hyale* (Pale clouded Yellow Butterfly). Europe.

Agreeing with the Papilionidae in the six perfect legs of both sexes and the cincture-support of the pupa we find the *Pieridae*—the family of the white and yellow butterflies (figs. 61, 62)—represented by ten species in the British fauna and very widely spread over the earth's surface. In the *Pieridae* there are two anal nervures in the hindwing, while the second anal nervure in the forewing runs into the first; the larva is cylindrical and hairy without an osmaterium. The pupa has a single "nose-horn," and in the more highly organized genera there is no mobility whatever between its abdominal segments. The wintering pupae of the common cabbage butterflies (*Pieris brassicae* and *P. rapae*) are common objects attached to walls and fences and their colour harmonizes, to a great extent, with that of their surroundings.

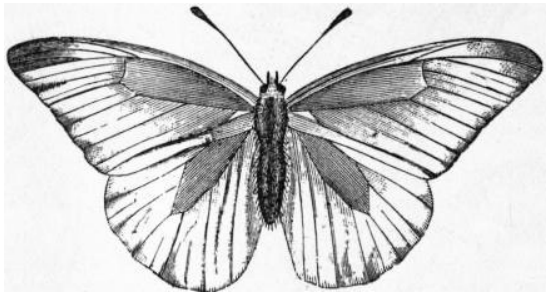


FIG. 62.—*Appias nero* (male). Malaya.

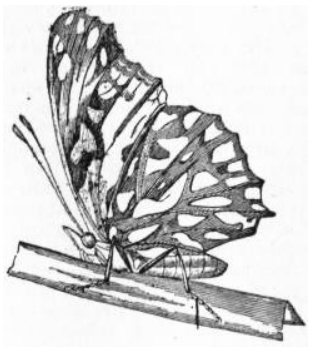


FIG. 63.—*Dione moneta.* Brazil.

FIG. 64.—Larva of *Argynnis paphia* (Silver-washed Fritillary). Europe.

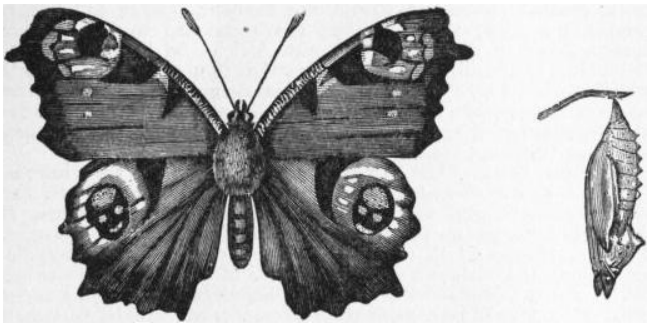


FIG. 65.—*Vanessa io* (Peacock) and its pupa.

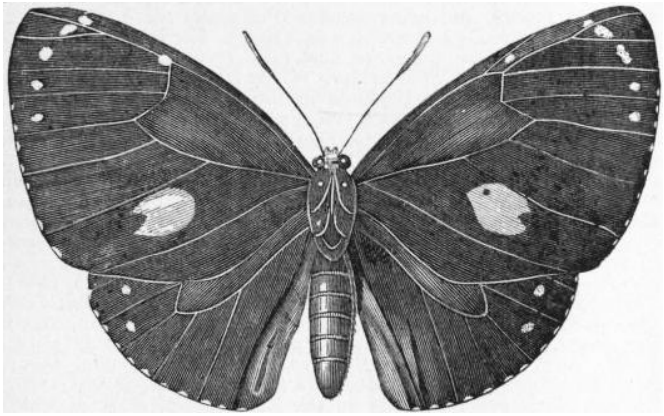
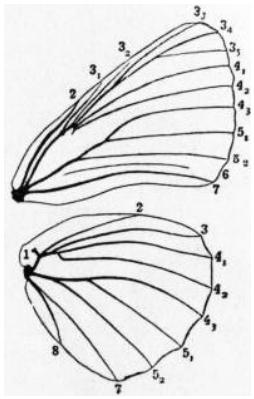


FIG. 66.—*Euploea leucostictos* (male). Malaya.



After A. R. Grote, *Natural Science*, vol. 12 (J. M. Dent & Co.).

FIG. 67.—Neuration of Wings in a Nymphaline Butterfly.

2, Sub-costal.
3, Radial.
4, Median.
5, Cubital.
6, 7, 8, Anal nervures.

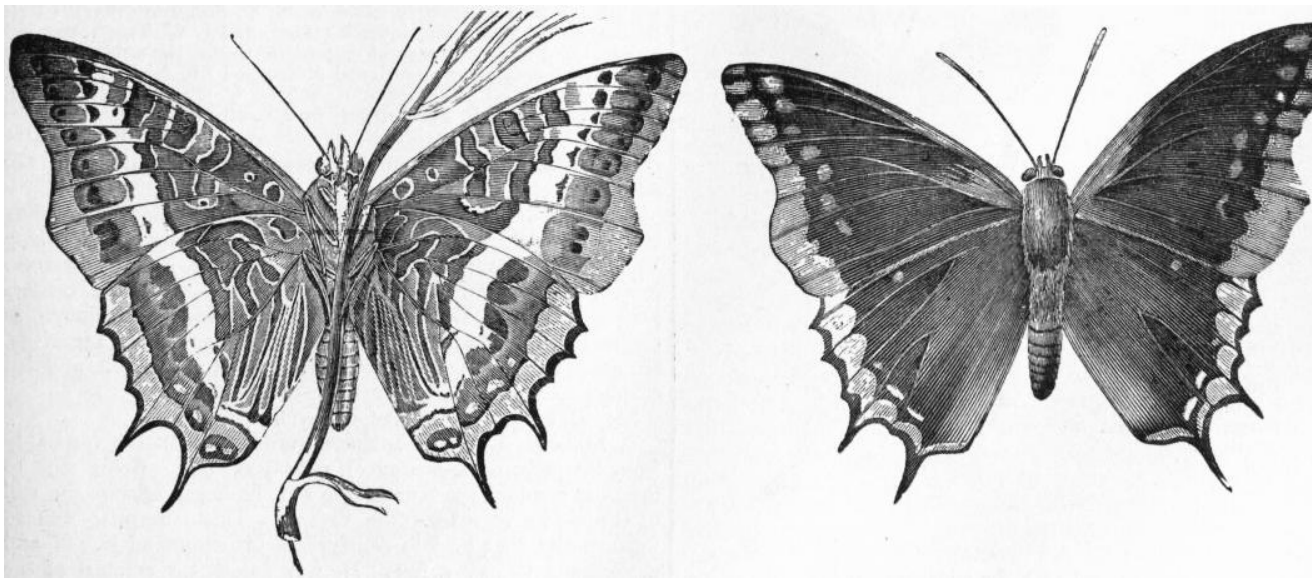


FIG. 68.—*Nymphalis jason.* W. Africa. Upper and under surface.

FIG. 69.—Larva and Pupa of *Apatura ilia*.

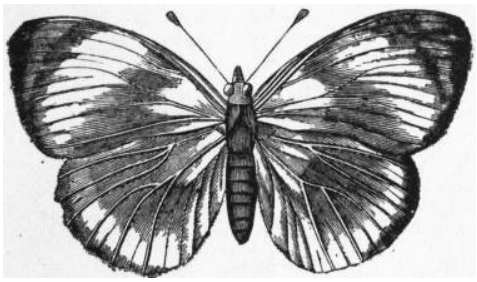


FIG. 70.—*Callithea sapphira*. Brazil.

The *Nymphalidae* are by far the largest and most dominant family of butterflies. In both sexes the forelegs are useless for walking (fig. 63), the tarsal segments being absent and the short shins clothed with long hairs, whence the name of brush-footed butterflies is often applied to the family. The neuration of the wings resembles that found among the Pieridae, but in the Nymphalidae the pupa, which has a double nose-horn (fig. 65)—as in *Papilio*—is suspended from the cremaster only, no girdling thread being present, or it lies simply on the ground. The egg is elongate and sub-conical in form and ornamented with numerous ribs, while the larva is usually protected by numerous spines (fig. 64) arising from the segmental tubercles. To this family belong our common gaily-coloured butterflies—the tortoiseshells, peacock (fig. 65), admirals, fritillaries and emperors. In most cases the bright 477
colouring is confined to the upper surface of the wings, the under-side being mottled and often inconspicuous. Most members of the group Vanessidi—the peacock and tortoiseshells (*Vanessa*) and the red admiral (*Pyrameis*) for example—hibernate in the imaginal state. This large family is divided into several sub-families whose characters may be briefly given, as they are considered to be distinct families by many entomologists. The *Danainae* (or *Euploeinae*, fig. 66) have the anal nervures of the forewing arising from a common stalk, the discoidal areolets in both wings closed, and the front feet of the female thickened; their larvae are smooth with fleshy processes. The danaine butterflies range over all the warmer parts of the world, becoming most numerous in the eastern tropics, where flourish the handsome purple *Euploeae* whose males often have "brands" on the wings; these insects are conspicuously marked and are believed to be distasteful to birds and lizards. So are the South American *Ithomiinae*, distinguished from the Danainae by the slender feet of the females; the narrow winged, tawny *Acraeinae*, with simple anal nervures, thick hairy palps and spiny larvae; and the *Heliconiinae* whose palps are compressed, scaly at the sides and hairy in front. This last named sub-family is confined to the Neotropical Region, while the Acraeinae are most numerous in the Ethiopian. The *Nymphalinae* include the British vanessids (fig. 65), and a vast assemblage of exotic genera (figs. 68, 70), characterized by the "open" discoidal areolets (fig. 67) owing to the absence of the transverse "disco-cellular" nervules. In the *Morphinae*—including some magnificent South American insects with deep or azure blue wings, and a few rather dull-coloured Oriental genera—the areolets are closed in the forewings and often in the hindwings. The larvae of the Morphinae (fig. 71) are smooth or hairy with a curiously forked tail-segment. A similar larva characterizes the South 478
American *Brassolinae* or owl-butterflies—robust insects (figs. 72, 73) with the areolets closed in both wings, which are adorned with large "eye-spots" beneath. The *Satyrinae*, including our native browns and the Alpine *Erebiae*, resemble the foregoing group in many respects of structure, but the sub-costal nervure is greatly thickened at the base (fig. 74). This sub-family is world-wide in its distribution. One genus (*Oeneis*, fig. 75) is found in high northern latitudes, but reappears in South America. The dark, spotted species of *Erebia* are familiar insects to travellers among the Alps; yet butterflies nearly related to these Alpine insects occur in Patagonia, in South Africa and in New Zealand. Such facts of distribution clearly show that though the Nymphalidae have attained a high degree of specialization among the Lepidoptera, some of their genera have a history which goes back to a time when the distribution of land and water on the earth's surface must have been very different from what it is to-day.

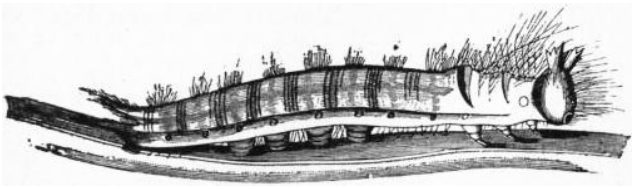


FIG. 71.—Larva of *Amathusia phidippus*.

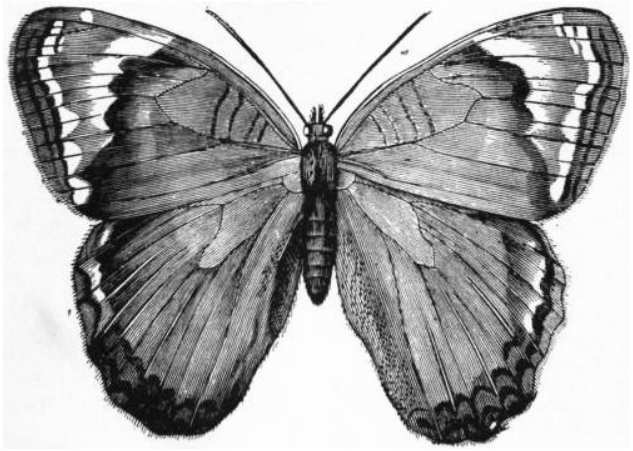


FIG. 72.—*Opsiphanes syme*. Brazil.

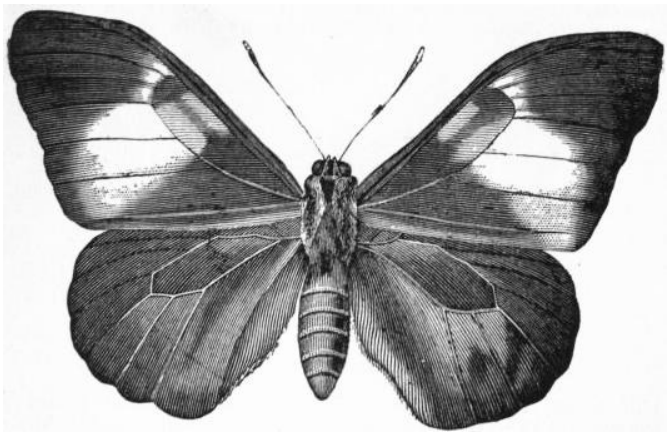
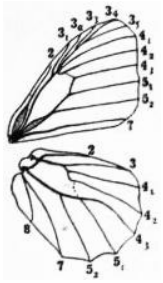


FIG. 73.—*Brassolis astyra.* Brazil.



After A. R. Grote, *Natural Science*, vol. 12 (J. M. Dent & Co.).

FIG. 74.—Neuration of wings in *Pararge*, a satyrid butterfly.

2, Sub-costal.
3, Radial.
4, Median.
5, Cubital.
7, 8, Anal nervures.

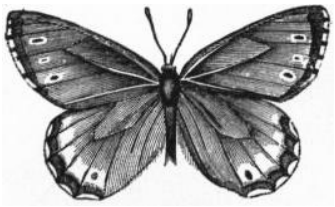


FIG. 75.—*Oeneis jutta.* Arctic Regions.

FIG. 76.—*Bia actorion.* Brazil.

BIBLIOGRAPHY.—The handsome Lepidoptera, with their interesting and easily observed life-histories, have naturally attracted many students, and the literature of the order is enormous. M. Malpighi's treatise on the anatomy of the silkworm (*De Bombycibus*, London, 1669) and P. Lyonnet's memoir on the Goat-caterpillar, are among the earliest and most famous of entomological writings. W. F. Kirby's *Handbook to the Order Lepidoptera* (5 vols., London, 1894-1897) should be consulted for references to the older systematic writers such as Linnaeus, J. C. Fabricius, J. Hübner, P. Cramer, E. Doubleday and W. C. Hewitson. Kirby's *Catalogues* are also invaluable for the systematist. For the jaws of the Lepidoptera see F. Darwin, *Quart. Journ. Mic. Sci.* xv. (1875); E. Burgess, *Amer. Nat.* xiv. (1880); A. Walter, *Jen. Zeits. f. Naturw.* xviii. (1885); W. Breitenbach, Ib. xv. (1882); V. L. Kellogg, *Amer. Nat.* xxix. (1895). The last-named deals also with wing structure, which is further described by A. Spuler, *Zeits. wiss. Zool.* liii. (1892) and *Zool. Jahrb. Anat.* viii. (1895); A. R. Grote, *Mitt. aus dem Roemer-Museum* (Hildesheim, 1896-1897); G. Enderlein, *Zool. Jahrb. Anat.* xvi. (1903), and many others. For scales see A. G. Mayer, *Bull. Mus. Comp. Zool. Harvard*, xxix. (1896). For internal anatomy W. H. Jackson, *Trans. Linn. Soc. Zool.* (2) v. (1891), and W. Petersen, *Mem. Acad. Imp. Sci. St Petersburg* (8) ix. (1900). The early stages and transformations of Lepidoptera are described by J. Gonin, *Bull. Soc. Vaud. Sci. Nat.* xxx. (1894); E. B. Poulton, *Trans. Linn. Soc. Zool.* (2) v. (1891); H. G. Dyar, *Ann. New York Acad. Sci.* viii. (1894); T. A. Chapman, *Trans. Entom. Soc. Lond.* (1893), &c. For habits and life-relations see A. Seitz, *Zool. Jahrb. Syst.* v., vii. (1890, 1894); A. Weismann, *Studies in the Theory of Descent* (London, 1882) and *Entomologist*, xxix. (1896); F. Merrifield, *Trans. Entom. Soc. Lond.* (1890, 1893, 1905); M. Standfuss, *Handbuch der paläarktischen Gross-schmetterlinge* (Jena, 1896); R. Trimen, *Proc. Ent. Soc. Lond.* (1898); E. B. Poulton, *Colours of Animals* (London, 1890); *Trans. Entom. Soc.* (1892 and 1903), and *Journ. Linn. Soc. Zool.* xxvi. (1898); F. E. Beddard, *Animal Coloration* (London, 1892). For distribution see H. J. Elwes, *Proc. Entom. Soc. Lond.* (1894); J. W. Tutt, *Migration and Dispersal of Insects* (London, 1902); Fossil Lepidoptera, S. H. Scudder, *8th Rep. U.S. Geol. Survey* (1889). Among recent general works on the Lepidoptera, most of which contain numerous references to the older literature, may be mentioned A. S. Packard's unfinished work on the Bombycine Moths of N. America, *Mem. Nat. Acad. Sci. Philadelphia*, vii. (1895), and *Mem. Acad. Sci. Washington*, lx. (1905); D. Sharp's chapter in *Cambridge Nat. Hist.* vi. (London, 1898); G. F. Hampson, *Moths of India* (4 vols., London, 1892-1896), and *Catalogue of the Lepidoptera Phalaenae* (1895) and onwards; S. H. Scudder, *Butterflies of New England* (3 vols., Cambridge, Mass., 1888-1889); W. J. Holland, *Butterfly Book* (New York, 1899). Works on the British Lepidoptera are numerous, for example, those of H. T. Stainton (1851), C. G. Barrett (1893-1907), E. Meyrick (1895), and J. W. Tutt (1899 and onwards). For recent general systematic works, the student should consult the catalogues mentioned above and the *Zoological Record*. The writings of O. Staudinger, E. Schatz, C. Oberthür, K. Jordan, C. Aurivillius and P. Mabille may be specially mentioned.

LEPIDUS, the name of a Roman patrician family in the Aemilian gens.

1. Marcus Aemilius Lepidus, one of the three ambassadors sent to Egypt in 201 B.C. as guardians of the infant king Ptolemy V. He was consul in 187 and 175, censor 179, *pontifex maximus* from 180 onwards, and was six times chosen by the censors *princeps senatus*. He died in 152. He distinguished himself in the war with Antiochus III. of Syria, and against the Ligurians. He made the Via Aemilia from Ariminum to Placentia, and led colonies to Mutina and Parma.

Livy xl. 42-46, *epit.* 48; Polybius xvi. 34.

2. Marcus Aemilius Lepidus, surnamed Porcina (probably from his personal appearance), consul 137 B.C. Being sent to Spain to conduct the Numantine war, he began against the will of the senate to attack the Vaccaei. This enterprise was so unsuccessful that he was deprived of his command in 136 and condemned to pay a fine. He was among the greatest of the earlier Roman orators, and Cicero praises him for having introduced the well-constructed sentence and even flow of language from Greek into Roman oratory. 479

Cicero, *Brutus*, 25, 27, 86, 97; Vell. Pat. ii. 10; Appian, *Hisp.* 80-83; Livy, *epit.* 56.

3. Marcus Aemilius Lepidus, father of the triumvir. In 81 B.C. he was praetor of Sicily, where he made himself detested by oppression and extortion. In the civil wars he sided with Sulla and bought much of the confiscated property of the Marian partisans. Afterwards he became leader of the popular party, and with the help of Pompey was elected consul for 78, in spite of the opposition of Sulla. When the dictator died, Lepidus tried in vain to prevent the burial of his body in the Campus Martius, and to alter the constitution established by him. His colleague Lutatius Catulus found a tribune to place his veto on Lepidus's proposals; and the quarrel between the two parties in the state became so acute that the senate made the consuls swear not to take up arms. Lepidus was then ordered by the senate to go to his province, Transalpine Gaul; but he stopped in Etruria on his way from the city and began to levy an army. He was declared a public enemy early in 77, and forthwith marched against Rome. A battle took place in the Campus Martius, Pompey and Catulus commanding the senatorial army, and Lepidus was defeated. He sailed to Sardinia, in order to put himself into connexion with Sertorius in Spain, but here also suffered a repulse, and died shortly afterwards.

Plutarch, *Sulla*, 34, 38, *Pompey*, 15; Appian, *B.C.* i. 105, 107; Livy, *epit.* 90; Florus iii. 23; Cicero, *Balbus*, 15.

4. Marcus Aemilius Lepidus, the triumvir. He joined the party of Julius Caesar in the civil wars, and was by the dictator thrice nominated *magister equitum* and raised to the consulship in 46 B.C. He was a man of great wealth and influence, and it was probably more on this ground than on account of his ability that Caesar raised him to such honours. In the beginning of 44 B.C. he was sent to Gallia Narbonensis, but before he had left the city with his army Caesar was murdered. Lepidus, as commander of the only army near Rome, became a man of great importance in the troubles which followed. Taking part with Marcus Antonius (Mark Antony), he joined in the reconciliation which the latter effected with the senatorial party, and afterwards sided with him when open war broke out. Antony, after his defeat at Mutina, joined Lepidus in Gaul, and in August 43 Octavian (afterwards the emperor Augustus), who had forced the senate to make him consul, effected an arrangement with Antony and Lepidus, and their triumvirate was organized at Bononia. Antony and Octavian soon reduced Lepidus to an inferior position. His province of Gaul and Spain was taken from him; and, though he was included in the triumvirate when it was renewed in 37, his power was only nominal. He made an effort in the following year to regain some reality of power, conquered part of Sicily, and claimed the whole island as his province, but Octavian found means to sap the fidelity of his soldiers, and he was obliged to supplicate for his life. He was allowed to retain his fortune and the office of *pontifex maximus* to which he had been appointed in 44, but had to retire into private life. According to Suetonius (*Augustus*, 16) he died at Circeii in the year 13.

See Rome: *History* ii., "The Republic," Period C, *ad fin.*; Appian, *Bell. Civ.* ii.-v.; Dio Cassius xli.-xlix.; Vell. Pat. ii. 64, 80; Orelli's *Onomasticon* to Cicero.

LE PLAY, PIERRE GUILLAUME FRÉDÉRIC (1806-1882), French engineer and economist, was born at La Rivière-Saint-Sauveur (Calvados) on the 11th of April 1806, the son of a custom-house official. He was educated at the École Polytechnique, and from there passed into the State Department of Mines. In 1834 he was appointed head of the permanent committee of mining statistics, and in 1840 engineer-in-chief and professor of metallurgy at the school of mines, where he became inspector in 1848. For nearly a quarter of a century Le Play spent his vacations travelling in the various countries of Europe, and collected a vast quantity of material bearing upon the social condition of the working classes. In 1855 he published *Les Ouvriers européens*, which comprised a series of thirty-six monographs on the budgets of typical families selected from the most diverse industries. The Académie des Sciences conferred on him the Montyon prize. Napoleon III., who held him in high esteem, entrusted him with the organization of the Exhibition of 1855, and appointed him counsellor of state, commissioner general of the Exhibition of 1867, senator of the empire and grand officer of the Legion of Honour. He died in Paris on the 5th of April 1882.

In 1856 Le Play founded the *Société internationale des études pratiques d'Économie sociale*, which has devoted its energies principally to forwarding social studies on the lines laid down by its founder. The journal of the society, *La Réforme sociale*, founded in 1881, is published fortnightly. Other works of Le Play are *La Réforme*

sociale (2 vols., 1864; 7th ed., 3 vols., 1887); *L'Organisation de la famille* (1871); *La Constitution de l'Angleterre* (in collaboration with M. Delaire, 1875). See article in *Harvard Quarterly Journal of Economics* (June 1890), by H. Higgs.

LEPROSY (*Lepra Arabum*, *Elephantiasis Graecorum*, *Aussatz*, *Spedalskhed*), the greatest disease of medieval Christendom, identified, on the one hand, with a disease endemic from the earliest historical times (1500 B.C.) in the delta and valley of the Nile, and, on the other hand, with a disease now common in Asia, Africa, South America, the West Indies, and certain isolated localities of Europe. An authentic representation of the leprosy of the middle ages exists in a picture at Munich by Holbein, painted at Augsburg in 1516; St Elizabeth gives bread and wine to a prostrate group of lepers, including a bearded man whose face is covered with large round reddish knobs, an old woman whose arm is covered with brown blotches, the leg swathed in bandages through which matter oozes, the bare knee also marked with discoloured spots, and on the head a white rag or plaster, and, thirdly, a young man whose neck and face (especially round the somewhat hairless eyebrows) are spotted with brown patches of various size. It is conjectured by Virchow that the painter had made studies of lepers from the leper-houses then existing at Augsburg. These external characters of medieval leprosy agree with the descriptions of it by the ancients, and with the pictures of modern leprosy given by Danielssen and Boeck for Norway, by various authors for sporadic European cases, by Anderson for Malacca, by Carter for India, by Wolff for Madeira and by Hillis for British Guiana. There has been some confusion in the technical naming of the disease; it is called *Elephantiasis* (*Leontiasis*, *Satyriasis*) by the Greek writers, and *Lepra* by the Arabians.

Leprosy is now included among the parasitic diseases (see PARASITIC DISEASES). The cause is believed to be infection by the bacillus leprae, a specific microbe discovered by Armauer Hansen in 1871. It is worthy of note that tuberculosis is very common among lepers, and especially attacks the serous membranes. The essential character of leprosy is a great multiplication of cells, resembling the "granulation cells" of lupus and syphilis, in the tissues affected, which become infiltrated and thickened, with degeneration and destruction of their normal elements. The new cells vary in size from ordinary leucocytes to giant cells three or four times larger. The bacilli are found in these cells, sometimes in small numbers, sometimes in masses. The structures most affected are the skin, nerves, mucous membranes and lymphatic glands.

The symptoms arise from the anatomical changes indicated, and they vary according to the parts attacked. Three types of disease are usually described—(1) nodular, (2) smooth or anaesthetic, (3) mixed. In the first the skin is chiefly affected, in the second the nerves; the third combines the features of both. It should be understood that this classification is purely a matter of convenience, and is based on the relative prominence of symptoms, which may be combined in all degrees. The incubation period of leprosy—assuming it to be due to infection—is unknown, but cases are on record which can only be explained on the hypothesis that it may be many years. The invasion is usually slow and intermittent. There are occasional feverish attacks, with the usual constitutional disturbance and other slight premonitory signs, such as changes in the colour of the skin and in its sensibility. Sometimes, but rarely, the onset is acute and the characteristic symptoms develop rapidly. These begin with an eruption which differs markedly according to the type of disease. In the nodular form dark red or coppery patches appear on the face, backs of the hands, and feet or on the body; they are generally symmetrical, and vary from the size of a shilling upwards. They come with one of the feverish attacks and fade away when it has gone, but only to return. After a time infiltration and thickening of the skin become noticeable, and the nodules appear. They are lumpy excrescences, at first pink but changing to brown. Thickening of the skin of the face produces a highly characteristic appearance, recalling the aspect of a lion. The tissues of the eye undergo degenerative changes; the mucous membrane of the nose and throat is thickened, impairing the breathing and the voice; the eyebrows fall off; the ears and nose become thickened and enlarged. As the disease progresses the nodules tend to break down and ulcerate, leaving open sores. The patient, whose condition is extremely wretched, gradually becomes weaker, and eventually succumbs to exhaustion or is carried off by some intercurrent disease, usually inflammation of the kidneys or tuberculosis. A severe case may end fatally in two years, but, as a rule, when patients are well cared for the illness lasts several years. There is often temporary improvement, but complete recovery from this form of leprosy rarely or never occurs. The smooth type is less severe and more chronic. The eruption consists of patches of dry, slightly discoloured skin, not elevated above the surface. These patches are the result of morbid changes affecting the cutaneous nerves, and are accompanied by diminished sensibility over the areas of skin affected. At the same time certain nerve trunks in the arm and leg, and particularly the ulnar nerve, are found to be thickened. In the further stages the symptoms are those of increasing degeneration of the nerves. Bullae form on the skin, and the discoloured patches become enlarged; sensation is lost, muscular power diminished, with wasting, contraction of tendons, and all the signs of impaired nutrition. The nails become hard and clawed; perforating ulcers of the feet are common; portions of the extremities, including whole fingers and toes, die and drop off. Later, paralysis becomes more marked, affecting the muscles of the face and limbs. The disease runs a very chronic course, and may last twenty or thirty years. Recovery occasionally occurs. In the mixed form, which is probably the most common, the symptoms described are combined in varying degrees. Leprosy may be mistaken for syphilis, tuberculosis, ainhum (an obscure disease affecting negroes, in which the little toe drops off), and several affections of the skin. Diagnosis is established by the presence of the bacillus leprae in the nodules or bullae, and by the signs of nerve degeneration exhibited in the anaesthetic patches of skin and the thickened nerve trunks.

In former times leprosy was often confounded with other skin diseases, especially psoriasis and leucoderma; the white leprosy of the Old Testament was probably a form of the latter. But there is no doubt that true leprosy has existed from time immemorial. Prescriptions for treating it have been found in Egypt, to which a date of about 4600 B.C. is assigned. The disease is described by Aristotle and by later Greek writers, but not by Hippocrates, though leprosy derives its name from his "lepra" or "scaly" disease, which was no doubt psoriasis. In ancient times it was widely prevalent throughout Asia as well as in Egypt, and among the Greeks and Romans. In the middle ages it became extensively diffused in Europe, and in some countries—France, England, Germany and Spain—every considerable town had its leper-house, in which the patients were segregated. The total number of

such houses has been reckoned at 19,000. The earliest one in England was established at Canterbury in 1096, and the latest at Highgate in 1472. At one time there were at least 95 religious hospitals for lepers in Great Britain and 14 in Ireland (Sir James Simpson). During the 15th century the disease underwent a remarkable diminution. It practically disappeared in the civilized parts of Europe, and the leper-houses were given up. It is a singular fact that this diminution was coincident with the great extension of syphilis (see Prostitution). The general disappearance of leprosy at this time is the more unintelligible because it did not take effect everywhere. In Scotland the disease lingered until the 19th century, and in some other parts it has never died out at all. At the present time it still exists in Norway, Iceland, along the shores of the Baltic, in South Russia, Greece, Turkey, several Mediterranean islands, the Riviera, Spain and Portugal. Isolated cases occasionally occur elsewhere, but they are usually imported. The Teutonic races seem to be especially free from the taint. Leper asylums are maintained in Norway and at two or three places in the Baltic, San Remo, Cyprus, Constantinople, Alicante and Lisbon. Except in Spain, where some increase has taken place, the disease is dying out. The number of lepers in Norway was 3000 in 1856, but has now dwindled to a few hundreds. They are no longer numerous in any part of Europe. On the other hand, leprosy prevails extensively throughout Asia, from the Mediterranean to Japan, and from Arabia to Siberia. It is also found in nearly all parts of Africa, particularly on the east and west coasts near the equator. In South Africa it has greatly increased, and attacks the Dutch as well as natives. Leper asylums have been established at Robben Island near Cape Town, and in Tembuland. In Australia, where it was introduced by Chinese, it has also spread to Europeans. In New Zealand the Maoris are affected; but the amount of leprosy is not large in either country. A much more remarkable case is that of the Hawaiian Islands, where the disease is believed to have been imported by Chinese. It was unknown before 1848, but in 1866 the number of lepers had risen to 230 and in 1882 to 4000 (Liveing). All attempts to stop it by segregating lepers in the settlement of Molokai appear to have been fruitless. In the West Indies and on the American continent, again, leprosy has a wide distribution. It is found in nearly all parts of South and Central America, and in certain parts of North America—namely, Louisiana, California (among Chinese), Minnesota, Wisconsin and North and South Dakota (Norwegians), New Brunswick (French Canadians).

It is difficult to find any explanation of the geographical distribution and behaviour of leprosy. It seems to affect islands and the sea-coast more than the interior, and to some extent this gives colour to the old belief that it is caused or fostered by a fish diet, which has been revived by Mr Jonathan Hutchinson, but is not generally accepted. Leprosy is found in interiors where fish is not an article of diet. Climate, again, has obviously little, if any, influence. The theory of heredity is equally at fault, whether it be applied to account for the spread of the disease by transmission or for its disappearance by the elimination of susceptible persons. The latter is the manner in which heredity might be expected to act, if at all, for lepers are remarkably sterile. But we see the disease persisting among the Eastern races, who have been continuously exposed to its selective influence from the earliest times, while it has disappeared among the Europeans, who were affected very much later. The opposite theory of hereditary transmission from parents to offspring is also at variance with many observed facts. Leprosy is very rarely congenital, and no cases have occurred among the descendants to the third generation of 160 Norwegian lepers settled in the United States. Again, if hereditary transmission were an effective influence, the disease could hardly have died down so rapidly as it did in Europe in the 15th century. Then we have the theory of contagion. There is no doubt that human beings are inoculable with leprosy, and that the disease may be communicated by close contact. Cases have been recorded which prove it conclusively; for instance, that of a man who had never been out of the British islands, but developed leprosy after sharing for a time the bed and clothes of his brother, who had contracted the disease in the West Indies. Some of the facts noted, such as the extensive dissemination of the disease in Europe during the middle ages, and its subsequent rapid decline, suggest the existence of some unknown epidemic factor. Poverty and insanitation are said to go with the prevalence of leprosy, but they go with every malady, and there is nothing to show that they have any special influence. Vaccination has been blamed for spreading it, and a few cases of communication by arm-to-arm inoculation are recorded. The influence of this factor, however, can only be trifling. Vaccination is a new thing, leprosy a very old one; where there is most vaccination there is no leprosy, and where there is most leprosy there is little or no vaccination. In India 78% of the lepers are unvaccinated, and in Canton since vaccination was introduced leprosy has declined (Cantlie). On the whole we must conclude that there is still much to be learnt about the conditions which govern the prevalence of leprosy.

With regard to prevention, the isolation of patients is obviously desirable, especially in the later stages, when open sores may disseminate the bacilli; but complete segregation, which has been urged, is regarded as impracticable by those who have had most experience in leprous districts. Scrupulous cleanliness should be exercised by persons attending on lepers or brought into close contact with them. In treatment the most essential thing is general care of the health, with good food and clothing. The tendency of modern therapeutics to attach increasing importance to nutrition in various morbid states, and notably in diseases of degeneration, such as tuberculosis and affections of the nervous system, is borne out by experience in leprosy, which has affinities to both; and this suggests the application to it of modern methods for improving local as well as general nutrition by physical means. A large number of internal remedies have been tried with varying results; those most recommended are chaulmoogra oil, arsenic, salicylate of soda, salol and chlorate of potash. Vergueira uses Collargol intravenously and subcutaneously, and states that in all the cases treated there was marked improvement, and hair that had been lost grew again. Calmette's Anterenene injected subcutaneously has been followed by good results. Deycke together with R. Bey isolated from a non-ulcerated leprous nodule a streptothrix which they call S. leproides. Its relation to the bacillus is uncertain. They found that injections of this organism had marked curative effects, due to a neutral fat which they named "Nastin." Injections of Nastin together with Benzoyl Chloride directly act on the lepra bacilli. Some cases were unaffected by this treatment, but with others the effect was marvellous. Dr W. A. Pusey of Chicago uses applications of carbon dioxide snow with good effect. In the later stages of the disease there is a wide field for surgery, which is able to give much relief to sufferers.

Literature.—For history and geographical distribution, see Hirsch, *Handbuch der historisch-geographischen Pathologie* (1st ed., Erlangen, 1860, with exhaustive literature). For pathology, Virchow, *Die krankhaften Geschwülste* (Berlin, 1863-1867), vol. ii. For clinical histories, R. Liveing, *Elephantiasis Graecorum or True Leprosy* (London, 1873), ch. iv. For medieval leprosy—in Germany, Virchow, in *Virchow's Archiv*, five articles, vols. xviii.-xx. (1860-1861); in the Netherlands, Israëls, in *Nederl. Tijdschr. voor Geneeskunde*, vol. i. (1857); in Britain, J. Y. Simpson, *Edin. Med. and Surg. Journ.*, three articles, vols. lxvi. and lxvii. (1846-1847). Treatises on modern leprosy in particular localities: Danielssen and Boeck (Norway), *Traité de la Spédalskhed*, with atlas of twenty-four coloured plates (Paris, 1848); A. F. Anderson, *Leprosy as met with in the Straits Settlements*, coloured photographs with explanatory notes (London, 1872); H. Vandyke Carter (Bombay), *On Leprosy and Elephantiasis*,

with coloured plates (London, 1874); Hillis, *Leprosy in British Guiana*, an account of West Indian leprosy, with twenty-two coloured plates (London, 1882). See also the dermatological works of Hebra, Erasmus Wilson, Bazin and Jonathan Hutchinson (also the latter's letters to *The Times* of the 11th of April and the 25th of May 1903); *British Medical Journal* (April 1, 1908); *American Journal of Dermatology* (Dec. 1907); *The Practitioner* (February 1910). An important early work is that of P. G. Hensler, *Vom abendländischen Aussatze im Mittelalter* (Hamburg, 1790).

LEPSIUS, KARL RICHARD (1810-1884), German Egyptologist, was born at Naumburg-am-Saale on the 23rd of December 1810, and in 1823 was sent to the "Schulpforta" school near Naumburg, where he came under the influence of Professor Lange. In 1829 he entered the university of Leipzig, and one year later that of Göttingen, where, under the influence of Otfried Müller, he finally decided to devote himself to the archaeological side of philology. From Göttingen he proceeded to Berlin, where he graduated in 1833 as doctor with the thesis *De tabulis Eugubinis*. In the same year he proceeded to study in Paris, and was commissioned by the duc de Luynes to collect material from the Greek and Latin writers for his work on the weapons of the ancients. In 1834 he took the Volney prize with his *Paläographie als Mittel der Sprachforschung*. Befriended by Bunsen and Humboldt, Lepsius threw himself with great ardour into Egyptological studies, which, since the death of Champollion in 1832, had attracted no scholar of eminence and weight. Here Lepsius found an ample field for his powers. After four years spent in visiting the Egyptian collections of Italy, Holland and England, he returned to Germany, where Humboldt and Bunsen united their influence to make his projected visit to Egypt a scientific expedition with royal support. For three years Lepsius and his party explored the whole of the region in which monuments of ancient Egyptian and Ethiopian occupation are found, from the Sudan above Khartum to the Syrian coast. At the end of 1845 they returned home, and the results of the expedition, consisting of casts, drawings and squeezes of inscriptions and scenes, maps and plans collected with the utmost thoroughness, as well as antiquities and papyri, far surpassed expectations. In 1846 he married Elisabeth Klein, and his appointment to a professorship in Berlin University in the following August afforded him the leisure necessary for the completion of his work. In 1859 the twelve volumes of his vast *Denkmäler aus Ägypten und Äthiopien* were finished, supplemented later by a text prepared from the note-books of the expedition; they comprise its entire archaeological, palaeographical and historical results. In 1866 Lepsius again went to Egypt, and discovered the famous Decree of Tanis or Table of Canopus, an inscription of the same character as the Rosetta Stone, in hieroglyphic, demotic and Greek. In 1873 he was appointed keeper of the Royal Library, Berlin, which, like the Berlin Museum, owes much to his care. About ten years later he was appointed Geheimer Oberregierungsrath. He died at Berlin on the 10th of July 1884. Besides the colossal *Denkmäler* and other publications of texts such as the *Todtenbuch der Ägypter* (*Book of the Dead*, 1842) his other works, amongst which may be specially named his *Königsbuch der Ägypter* (1858) and *Chronologie der Ägypter* (1849), are characterized by a quality of permanence that is very remarkable in a subject of such rapid development as Egyptology. In spite of his scientific training in philology Lepsius left behind few translations of inscriptions or discussions of the meanings of words: by preference he attacked historical and archaeological problems connected with the ancient texts, the alphabet, the metrology, the names of metals and minerals, the chronology, the royal names. On the other hand one of his latest works, the *Nubische Grammatik* (1880), is an elaborate grammar of the then little-known Nubian language, preceded by a linguistic sketch of the African continent. Throughout his life he profited by the gift of attaching to himself the right men, whether as patrons or, like Weidenbach and Stern, as assistants. Lepsius was a fine specimen of the best type of German scholar.

See *Richard Lepsius*, by Georg Ebers (New York, 1887), and art. Egypt, section *Exploration and Research*.

LEPTINES, an Athenian orator, known as the proposer of a law that no Athenian, whether citizen or resident alien (with the sole exception of the descendants of Harmodius and Aristogeiton), should be exempt from the public charges (λειτουργίαι) for the state festivals. The object was to provide funds for the festivals and public spectacles at a time when both the treasury and the citizens generally were short of money. It was further asserted that many of the recipients of immunity were really unworthy of it. Against this law Demosthenes delivered (354 B.C.) his well-known speech *Against Leptines* in support of the proposal of Ctesippus that all the cases of immunity should be carefully investigated. Great stress is laid on the reputation for ingratitude and breach of faith which the abolition of immunities would bring upon the state. Besides, the law itself had been passed unconstitutionally, for an existing law confirmed these privileges, and by the constitution of Solon no law could be enacted until any existing law which it contravened had been repealed. The law was probably condemned. Nothing further is known of Leptines.

See the edition of the speech by J. E. Sandys (1890).

LEPTIS, the name of two towns in ancient Africa. The first, Leptis Magna (Λεπτίμαγνα), the modern Lebda,

was in Tripolitana between Tripolis and Mesrata at the mouth of the Cinyps; the second, Leptis Parva (Λέπτις ἡ μικρά), known also as Leptiminus or Leptis minor, the modern Lamta, was a small harbour of Byzacena between Ruspina (Monastir) and Thapsus (Dimas).

1. Leptis Magna was one of the oldest and most flourishing of the Phoenician emporia established on the coasts of the greater Syrtis, the chief commercial entrepot for the interior of the African continent. It was founded by the Sidonians (Sallust, *Jug.* 78) who were joined later by people of Tyre (Pliny, *Hist. Nat.* v. 17). Herodotus enlarges on the fertility of its territory (iv. 175, v. 42). It was tributary to Carthage to which it paid a contribution of a talent a day (Livy xxxiv. 62). After the Second Punic War Massinissa made himself master of it (Sallust, *Jug.* 78; Livy xxxiv. 62; Appian viii. 106). During the Jugurthine War it appealed for protection to Rome (Sallust, *Jug.* 78). Though captured and plundered by Juba, it maintained its allegiance to Rome, supported the senatorial cause, received Cato the younger with the remains of the Pompeian forces after Pharsalus 48 B.C. After his victory Julius Caesar imposed upon it an annual contribution of 300,000 measures of oil. Nevertheless, it preserved its position as a free city governed by its own magistrates (*C.I.L.* viii. 7). It received the title of *municipium* (*C.I.L.* viii. 8), and was subsequently made a *colonia* by Trajan (*C.I.L.* viii. 10). Septimius Severus, who was born there, beautified the place and conferred upon it the *Ius Italicum*. Leptis Magna was the limit of the Roman state, the last station of the *limes Tripolitanus*; hence, especially during the last centuries of the Empire, it suffered much from the Nomads of the desert, the Garamantes, the Austuriani and the Levathae (Ammian. Marc. xxviii. 6; Procop. *De Aedif.* vi. 4). Its commerce declined and its harbour silted up. Justinian made a vain attempt to rebuild it (Procop. *ibid.*; Ch. Diehl, *L'Afrique byzantine*, p. 388). It was the seat of a bishopric, but no mention is made of its bishops after 462.

Leptis Magna had a citadel which protected the commercial city which was generally called Neapolis, the situation of which may be compared with that of Carthage at the foot of Byrsa. Its ruins are still imposing; remains of ramparts and docks, a theatre, a circus and various buildings of the Roman period still exist. Inscriptions show that the current pronunciation of the name was Lepcis, Lepcitana, instead of Leptis, Leptitana (Tissot, *Géogr. comp. de la prov. d'Afrique*, ii. 219; Clermont-Ganneau, *Recueil d'archéologie orientale*, vi. 41; *Comptes rendus de l'Acad. des Inscr. et B.-Lettres*, 1903, p. 333; Cagnat, *C.R. Acad.*, 1905, p. 531). The coins of Leptis Magna, like the majority of the emporia in the neighbourhood, present a series from the Punic period. They are of bronze with the legend לפקי (*Lepqi*). They have on one side the head of Bacchus, Hercules or Cybele, and on the other various emblems of these deities. From the Roman period we have also coins bearing the heads of Augustus, Livia and Tiberius, which still have the name of the town in Neo-Punic script (Lud. Müller, *Numism. de l'anc. Afrique*, ii. 3).

The ruins of Leptis Magna have been visited by numerous travellers since the time of Frederick William and Henry William Beechey (*Travels*, pp. 51 and 74) and Heinrich Barth (*Wanderungen*, pp. 306, 360); they are described by Ch. Tissot (*Géogr. comp.* ii. 219 et seq.); Cl. Perroud, *De Syrticis emporiis*, p. 33 (Paris, 1881, in 8°); see also a description in the New York journal, *The Nation* (1877), vol. xxvii. No. 683. M. Méhier de Mathuisieulx explored the site afresh in 1901; his account is inserted in the *Nouvelles Archives des missions*, x. 245-277; cf. vol. xii. See also J. Toutain, "Le Limes Tripolitanus en Tripolitaine," in the *Bulletin archéologique áu comité des travaux historiques* (1905).

2. Leptis Parva (Lamta), 7½ m. from Monastir, which is often confused by modern writers with Leptis Magna in their interpretations of ancient texts (Tissot, *Géogr. comp.* ii. 169), was, according to the *Tabula Peutingeriana*, 18 m. south of Hadrumetum. Evidently Phoenician in origin like Leptis Magna, it was in the Punic period of comparatively slight importance. Nevertheless, it had fortifications, and the French engineer, A. Daux, has discovered a probable line of ramparts. Like its neighbour Hadrumetum, Leptis Parva declared for Rome after the last Punic War. Also after the fall of Carthage in 146 it preserved its autonomy and was declared a *civitas libera et immunis* (Appian, *Punica*, 94; *C.I.L.* i. 200; *De bell. Afric.* c. xii.). Julius Caesar made it the base of his operations before the battle of Thapsus in 46 (Ch. Tissot, *Géogr. comp.* ii. 728). Under the Empire Leptis Parva became extremely prosperous; its bishops appeared in the African councils from 258 onwards. In Justinian's reorganization of Africa we find that Leptis Parva was with Capsa one of the two residences of the *Dux Byzacenae* (Tissot, *op. cit.* p. 171). The town had coins under Augustus and Tiberius. On the obverse is the imperial effigy with a Latin legend, and on the reverse the Greek legend ΛΕΠΤΙϹ with the bust of Mercury (Lud. Müller, *Numism. de l'anc. Afrique*, ii. 49). The ruins extend along the sea-coast to the north-west of Lemta; the remains of docks, the amphitheatre and the acropolis can be distinguished; a Christian cemetery has furnished tombs adorned with curious mosaics.

See *Comptes rendus de l'Acad. des Inscrip. et B.-Lettres* (1883), p. 189; Cagnat and Saladin, "Notes d'archéol. tunisiennes," in the *Bulletin monumental* of 1884; *Archives des missions*, xii. 111; Cagnat, *Explorations archéol. en Tunisie*, 3me fasc. pp. 9-16, and *Tour du monde* (1881), i. 292; Saladin, *Rapport sur une mission en Tunisie* (1886), pp. 9-20; *Bulletin archéol. du comité de travaux historiques* (1895), pp. 69-71 (inscriptions of Lamta); *Bulletin de la Soc. archéol. de Sousse* (1905; plan of the ruins of Lamta).

(E. B.*)

LE PUY, or Le Puy en Velay, a town of south-eastern France, capital of the department of Haute-Loire, 90 m. S.W. of Lyons on the Paris-Lyon railway. Pop. (1906) town, 17,291; commune, 21,420. Le Puy rises in the form of an amphitheatre from a height of 2050 ft. above sea-level upon Mont Anis, a hill that divides the left bank of the Dolézon from the right bank of the Borne (a rapid stream joining the Loire 3 m. below). From the new town, which lies east and west in the valley of the Dolézon, the traveller ascends the old feudal and ecclesiastical town through narrow steep streets, paved with pebbles of lava, to the cathedral commanded by the fantastic pinnacle of Mont Corneille. Mont Corneille, which is 433 ft. above the Place de Breuil (in the lower town), is a steep rock of volcanic breccia, surmounted by an iron statue of the Virgin (53 ft. high) cast, after a model by Bonassieux, out of guns taken at Sebastopol. Another statue, that of Msgr de Morlhon, bishop of Le Puy, also sculptured by Bonassieux, faces that of the Virgin. From the platform of Mont Corneille a magnificent panoramic view is obtained of the town and of the volcanic mountains, which make this region one of the most interesting parts of France.

The Romanesque cathedral (Notre-Dame), dating chiefly from the first half of the 12th century, has a particoloured façade of white sandstone and black volcanic breccia, which is reached by a flight of sixty steps, and consists of three tiers, the lowest composed of three high arcades opening into the porch, which extends beneath the first bays of the nave; above are three windows lighting the nave; and these in turn are surmounted by three gables, two of which, those to the right and the left, are of open work. The staircase continues within the porch, where it divides, leading on the left to the cloister, on the right into the church. The doorway of the south transept is sheltered by a fine Romanesque porch. The isolated bell-tower (184 ft.), which rises behind the choir in seven storeys, is one of the most beautiful examples of the Romanesque transition period. The bays of the nave are covered in by octagonal cupolas, the central cupola forming a lantern. The choir and transepts are barrel-vaulted. Much veneration is paid to a small image of the Virgin on the high altar, a modern copy of the medieval image destroyed at the Revolution. The cloister, to the north of the choir, is striking, owing to its variously-coloured materials and elegant shafts. Viollet-le-Duc considered one of its galleries to belong to the oldest known type of cathedral cloister (8th or 9th century). Connected with the cloister are remains of fortifications of the 13th century, by which it was separated from the rest of the city. Near the cathedral the baptistery of St John (11th century), built on the foundations of a Roman building, is surrounded by walls and numerous remains of the period, partly uncovered by excavations. The church of St Lawrence (14th century) contains the tomb and statue of Bertrand du Guesclin, whose ashes were afterwards carried to St Denis.

Le Puy possesses fragmentary remains of its old line of fortifications, among them a machicolated tower, which has been restored, and a few curious old houses dating from the 12th to the 17th century. In front of the hospital there is a fine medieval porch under which a street passes. Of the modern monuments the statue of Marie Joseph Paul, marquis of La Fayette, and a fountain in the Place de Breuil, executed in marble, bronze and syenite, may be specially mentioned. The museum, named after Charles Crozatier, a native sculptor and metal-worker to whose munificence it principally owes its existence, contains antiquities, engravings, a collection of lace, and ethnographical and natural history collections. Among the curiosities of Le Puy should be noted the church of St Michel d'Aiguilhe, beside the gate of the town, perched on an isolated rock like Mont Corneille, the top of which is reached by a staircase of 271 steps. The church dates from the end of the 10th century and its chancel is still older. The steeple is of the same type as that of the cathedral. Three miles from Le Puy are the ruins of the Château de Polignac, one of the most important feudal strongholds of France.

Le Puy is the seat of a bishopric, a prefect and a court of assizes, and has tribunals of first instance and of commerce, a board of trade arbitration, a chamber of commerce, and a branch of the Bank of France. Its educational institutions include ecclesiastical seminaries, lycées and training colleges for both sexes and municipal industrial schools of drawing, architecture and mathematics applied to arts and industries. The principal manufacture is that of lace and guipure (in woollen, linen, cotton, silk and gold and silver threads), and distilling, leather-dressing, malting and the manufacture of chocolate and cloth are carried on. Cattle, woollens, grain and vegetables are the chief articles of trade.

It is not known whether Le Puy existed previously to the Roman invasion. Towards the end of the 4th or beginning of the 5th century it became the capital of the country of the Vellavi, at which period the bishopric, originally at Revession, now St Paulien, was transferred hither. Gregory of Tours speaks of it by the name of Anicium, because a chapel "ad Deum" had been built on the mountain, whence the name of Mont Adidon or Anis, which it still retains. In the 10th century it was called Podium Sanctae Mariae, whence Le Puy. In the middle ages there was a double enclosure, one for the cloister, the other for the town. The sanctuary of Nôtre Dame was much frequented by pilgrims, and the city grew famous and populous. Rivalries between the bishops who held directly of the see of Rome and had the right of coining money, and the lords of Polignac, revolts of the town against the royal authority, and the encroachments of the feudal superiors on municipal prerogatives often disturbed the quiet of the town. The Saracens in the 8th century, the Routiers in the 12th, the English in the 14th, the Burgundians in the 15th, successively ravaged the neighbourhood. Le Puy sent the flower of its chivalry to the Crusades in 1096, and Raymond d'Aiguille, called d'Agiles, one of its sons, was their historian. Many councils and various assemblies of the states of Languedoc met within its walls; popes and sovereigns, among the latter Charlemagne and Francis I., visited its sanctuary. Pestilence and the religious wars put an end to its prosperity. Long occupied by the Leaguers, it did not submit to Henry IV. until many years after his accession.

LERDO DE TEJADA, SEBASTIAN

(1825-1889), president of Mexico, was born at Jalapa on the 25th of April 1825. He was educated as a lawyer and became a member of the supreme court. He became known as a liberal leader and a supporter of President Juarez. He was minister of foreign affairs for three months in 1857, and became president of the Chamber of Deputies in 1861. During the French intervention and the reign of the emperor Maximilian he continued loyal to the patriotic party, and had an active share in conducting the national resistance. He was minister of foreign affairs to President Juarez, and he showed an implacable resolution in carrying out the execution of Maximilian at Querétaro. When Juarez died in 1872 Lerdo succeeded him in office in the midst of a confused civil war. He achieved some success in pacifying the country and began the construction of railways. He was re-elected on the 24th of July 1876, but was expelled in January of the following year by Porfirio Diaz. He had made himself unpopular by the means he took to secure his re-election and by his disposition to limit state rights in favour of a strongly centralized government. He fled to the United States and died in obscurity at New York in 1889.

See H. H. Bancroft, *Pacific States*, vol. 9 (San Francisco, 1882-1890).

LERICI, a village of Liguria, Italy, situated on the N.E. side of the Gulf of Spezia, about 12 m. E.S.E. of Spezia, and 4 m. W.S.W. of Sarzana by road, 17 ft. above sea-level. Pop. (1901) 9326. Its small harbour is guarded by an old castle, said to have been built by Tancred; in the middle ages it was the chief place on the gulf. S. Terenzo, a hamlet belonging to Lerici, was the residence of Shelley during his last days. Farther north-west is the Bay of Pertusola, with its large lead-smelting works.

LÉRIDA, a province of northern Spain, formed in 1833 of districts previously included in the ancient province of Catalonia, and bounded on the N. by France and Andorra, E. by Gerona and Barcelona, S. by Tarragona and W. by Saragossa and Huesca. Pop. (1900) 274,590; area 4690 sq. m. The northern half of Lérida belongs entirely to the Mediterranean or eastern section of the Pyrenees, and comprises some of the finest scenery in the whole chain, including the valleys of Aran and La Cerdaña, and large tracts of forest. It is watered by many rivers, the largest of which is the Segre, a left-hand tributary of the Ebro. South of the point at which the Segre is joined on the right by the Noguera Pallaresa, the character of the country completely alters. The Llaños de Urgel, which comprise the greater part of southern Lérida, are extensive plains forming part of the Ebro valley, but redeemed by an elaborate system of canals from the sterility which characterizes so much of that region in Aragon. Lérida is traversed by the main railway from Barcelona to Saragossa, and by a line from Tarragona to the city of Lérida. In 1904 the Spanish government agreed with France to carry another line to the mouth of an international tunnel through the Pyrenees. Industries are in a more backward condition than in any other province of Catalonia, despite the abundance of water-power. There are, however, many saw-mills, flour-mills, and distilleries of alcohol and liqueurs, besides a smaller number of cotton and linen factories, paper-mills, soap-works, and oil and leather factories. Zinc, lignite and common salt are mined, but the output is small and of slight value. There is a thriving trade in wine, oil, wool, timber, cattle, mules, horses and sheep, but agriculture is far less prosperous than in the maritime provinces of Catalonia. Lérida (*q.v.*) is the capital (pop. 21,432), and the only town with more than 5000 inhabitants. Séo de Urgel, near the headwaters of the Segre, is a fortified city which has been an episcopal see since 840, and has had a close historical connexion with Andorra (*q.v.*). Solsona, on a small tributary of the Cardoner, which flows through Barcelona to the Mediterranean, is the *Setelix* of the Romans, and contains in its parish church an image of the Virgin said to possess miraculous powers, and visited every year by many hundreds of pilgrims. Cervera, on a small river of the same name, contains the buildings of a university which Philip V. established here in 1717. This university had originally been founded at Barcelona in the 15th century, and was reopened there in 1842. In character, and especially in their industry, intelligence and keen local patriotism, the inhabitants of Lérida are typical Catalans. (See CATALONIA.)

LÉRIDA, the capital of the Spanish province of Lérida, on the river Segre and the Barcelona-Saragossa and Lérida-Tarragona railways. Pop. (1900) 21,432. The older parts of the city, on the right bank of the river, are a maze of narrow and crooked streets, surrounded by ruined walls and a moat, and commanded by the ancient citadel, which stands on a height overlooking the plains of Noguera on the north and of Urgel on the south. On the left bank, connected with the older quarters by a fine stone bridge and an iron railway bridge, are the suburbs, laid out after 1880 in broad and regular avenues of modern houses. The old cathedral, last used for public worship in 1707, is a very interesting late Romanesque building, with Gothic and Mauresque additions; but the interior was much defaced by its conversion into barracks after 1717. It was founded in 1203 by Pedro II. of Aragon, and consecrated in 1278. The fine octagonal belfry was built early in the 15th century. A second cathedral, with a Corinthian façade, was completed in 1781. The church of San Lorenzo (1270-1300) is noteworthy for the beautiful tracery of its Gothic windows; its nave is said to have been a Roman temple, converted by the Moors into a mosque and by Ramon Berenguer IV., last count of Barcelona, into a church. Other interesting buildings are the Romanesque town hall, founded in the 13th century but several times restored, the bishop's palace and the military hospital, formerly a convent. The museum contains a good collection of Roman and Romanesque antiquities; and there are a school for teachers, a theological seminary and academies of literature and science. Leather, paper, glass, silk, linen and cloth are manufactured in the city, which has also some trade in agricultural produce.

Lérida is the *Ilerda* of the Romans, and was the capital of the people whom they called *Ilerdenses* (Pliny) or *Ilergetes* (Ptolemy). By situation the key of Catalonia and Aragon, it was from a very early period an important military station. In the Punic wars it sided with the Carthaginians and suffered much from the Roman arms. In its immediate neighbourhood Hanno was defeated by Scipio in 216 B.C., and it afterwards became famous as the scene of Caesar's arduous struggle with Pompey's generals Afranius and Petreius in the first year of the civil war (49 B.C.). It was already a *municipium* in the time of Augustus, and enjoyed great prosperity under later emperors. Under the Visigoths it became an episcopal see, and at least one ecclesiastical council is recorded to have met here (in 546). Under the Moors *Lareda* became one of the principal cities of the province of Saragossa; it became tributary to the Franks in 793, but was reconquered in 797. In 1149 it fell into the hands of Ramon Berenguer IV. In modern times it has come through numerous sieges, having been taken by the French in November 1707 during the War of Succession, and again in 1810. In 1300 James II. of Aragon founded a university at Lérida, which achieved some repute in its day, but was suppressed in 1717, when the university of Cervera was founded.

LERMA, FRANCISCO DE SANDOVAL Y ROJAS, Duke of (1552-1625), Spanish minister, was born in 1552. At the age of thirteen he entered the royal palace as a page. The family of Sandoval was ancient and powerful, but under Philip II. (1556-1598) the nobles, with the exception of a few who held viceroyalties or commanded armies abroad, had little share in the government. The future duke of Lerma, who was by descent marquis of Denia, passed his life as a courtier, and possessed no political power till the accession of Philip III. in 1598. He had already made himself a favourite with the prince, and was in fact one of the incapable men who, as the dying king Philip II. foresaw, were likely to mislead the new sovereign. The old king's fears were fully justified. No sooner was Philip III. king than he entrusted all authority to his favourite, whom he created duke of Lerma in 1599 and on whom he lavished an immense list of offices and grants. The favour of Lerma lasted for twenty years, till it was destroyed by a palace intrigue carried out by his own son. Philip III. not only entrusted the entire direction of his government to Lerma, but authorized him to affix the royal signature to documents, and to take whatever presents were made to him. No royal favourite was ever more amply trusted, or made a worse use of power. At a time when the state was practically bankrupt, he encouraged the king in extravagance, and accumulated for himself a fortune estimated by contemporaries at forty-four millions of ducats. Lerma was pious withal, spending largely on religious houses, and he carried out the ruinous measures for the expulsion of the Moriscoes in 1610—a policy which secured him the admiration of the clergy and was popular with the mass of the nation. He persisted in costly and useless hostilities with England till, in 1604, Spain was forced by exhaustion to make peace, and he used all his influence against a recognition of the independence of the Low Countries. The fleet was neglected, the army reduced to a remnant, and the finances ruined beyond recovery. His only resources as a finance minister were the debasing of the coinage, and foolish edicts against luxury and the making of silver plate. Yet it is probable that he would never have lost the confidence of Philip III., who divided his life between festivals and prayers, but for the domestic treachery of his son, the duke of Uceda, who combined with the king's confessor, Aliaga, whom Lerma had introduced to the place, to turn him out. After a long intrigue in which the king was all but entirely dumb and passive, Lerma was at last compelled to leave the court, on the 4th of October 1618. As a protection, and as a means of retaining some measure of power in case he fell from favour, he had persuaded Pope Paul V. to create him cardinal, in the year of his fall. He retired to the town of Lerma in Old Castile, where he had built himself a splendid palace, and then to Valladolid. Under the reign of Philip IV., which began in 1621 he was despoiled of part of his wealth, and he died in 1625.

The history of Lerma's tenure of office is in vol. xv. of the *Historia General de España* of Modesto Lafuente (Madrid, 1855)—with references to contemporary authorities.

LERMONTOV, MIKHAIL YUREVICH (1814-1841), Russian poet and novelist, often styled the poet of the Caucasus, was born in Moscow, of Scottish descent, but belonged to a respectable family of the Tula government, and was brought up in the village of Tarkhanui (in the Penzensk government), which now preserves his dust. By his grandmother—on whom the whole care of his childhood was devolved by his mother's early death and his father's military service—no cost nor pains was spared to give him the best education she could think of. The intellectual atmosphere which he breathed in his youth differed little from that in which Pushkin had grown up, though the domination of French had begun to give way before the fancy for English, and Lamartine shared his popularity with Byron. From the academic gymnasium in Moscow Lermontov passed in 1830 to the university, but there his career came to an untimely close through the part he took in some acts of insubordination to an obnoxious teacher. From 1830 to 1834 he attended the school of cadets at St Petersburg, and in due course he became an officer in the guards. To his own and the nation's anger at the loss of Pushkin (1837) the young soldier gave vent in a passionate poem addressed to the tsar, and the very voice which proclaimed that, if Russia took no vengeance on the assassin of her poet, no second poet would be given her, was itself an intimation that a poet had come already. The tsar, however, seems to have found more impertinence than inspiration in the address, for Lermontov was forthwith sent off to the Caucasus as an officer of dragoons. He had been in the Caucasus with his grandmother as a boy of ten, and he found himself at home by yet deeper sympathies than those of childish recollection. The stern and rocky virtues of the mountaineers against whom he had to fight, no less than the scenery of the rocks and mountains themselves, proved akin to his heart; the emperor had exiled him to his native land. He was in St Petersburg in 1838 and 1839, and in the latter year wrote the novel, *A Hero of Our Time*, which is said to have been the occasion of the duel in which he lost his life in July 1841. In this contest he had purposely selected the edge of a precipice, so that if either combatant was wounded so as to fall his fate should be sealed.

Lermontov published only one small collection of poems in 1840. Three volumes, much mutilated by the censorship, were issued in 1842 by Glazounov; and there have been full editions of his works in 1860 and 1863. To Bodenstedt's German translation of his poems (*Michail Lermontov's poetischer Nachlass*, Berlin, 1842, 2 vols.), which indeed was the first satisfactory collection, he is indebted for a wide reputation outside of Russia. His novel has found several translators (August Boltz, Berlin, 1852, &c.). Among his best-known pieces are "Ismail-Bey," "Hadji Abrek," "Walerik," "The Novice," and, remarkable as an imitation of the old Russian ballad, "The song of the tsar Ivan Vasilivitch, his young bodyguard, and the bold merchant Kalashnikov."

See Taillandier, "Le Poète du Caucase," in *Revue des deux mondes* (February 1855), reprinted in *Allemagne et Russie* (Paris, 1856); Duduishkin's "Materials for the Biography of Lermontov," prefixed to the 1863 edition of his works. *The Demon*, translated by Sir Alexander Condie Stephen (1875), is an English version of one of his longer poems.

(W. R. S. R.)

LEROUX, PIERRE (1798-1871), French philosopher and economist, was born at Bercy near Paris on the 7th of April 1798, the son of an artisan. His education was interrupted by the death of his father, which compelled him to support his mother and family. Having worked first as a mason and then as a compositor, he joined P. Dubois in the foundation of *Le Globe* which became in 1831 the official organ of the Saint-Simonian community, of which he became a prominent member. In November of the same year, when Enfantin preached the enfranchisement of women and the functions of the *couple-prêtre*, Leroux separated himself from the sect. In 1838, with J. Regnaud, who had seceded with him, he founded the *Encyclopédie nouvelle* (eds. 1838-1841). Amongst the articles which he inserted in it were *De l'égalité* and *Réfutation de l'éclectisme*, which afterwards appeared as separate works. In 1840 he published his treatise *De l'humanité* (2nd ed. 1845), which contains the fullest exposition of his system, and was regarded as the philosophical manifesto of the Humanitarians. In 1841 he established the *Revue indépendante*, with the aid of George Sand, over whom he had great influence. Her *Spiridion*, which was dedicated to him, *Sept cordes de la lyre*, *Consuelo*, and *La Comtesse de Rudolstadt*, were written under the Humanitarian inspiration. In 1843 he established at Boussac (Creuse) a printing association organized according to his systematic ideas, and founded the *Revue sociale*. After the outbreak of the revolution of 1848 he was elected to the Constituent Assembly, and in 1849 to the Legislative Assembly, but his speeches on behalf of the extreme socialist wing were of so abstract and mystical a character that they had no effect. After the *coup d'état* of 1851 he settled with his family in Jersey, where he pursued agricultural experiments and wrote his socialist poem *La Grève de Samarez*. On the definitive amnesty of 1869 he returned to Paris, where he died in April 1871, during the Commune.

The writings of Leroux have no permanent significance in the history of thought. He was the propagandist of sentiments and aspirations rather than the expounder of a systematic theory. He has, indeed, a system, but it is a singular medley of doctrines borrowed, not only from Saint-Simonian, but from Pythagorean and Buddhistic sources. In philosophy his fundamental principle is that of what he calls the "triad"—a triplicity which he finds to pervade all things, which in God is "power, intelligence and love," in man "sensation, sentiment and knowledge." His religious doctrine is Pantheistic; and, rejecting the belief in a future life as commonly conceived, he substitutes for it a theory of metempsychosis. In social economy his views are very vague; he preserves the family, country and property, but finds in all three, as they now are, a despotism which must be eliminated. He imagines certain combinations by which this triple tyranny can be abolished, but his solution seems to require the creation of families without heads, countries without governments and property without rights of possession. In politics he advocates absolute equality—a democracy pushed to anarchy.

See Raillard, *Pierre Leroux et ses œuvres* (Paris, 1899); Thomas, *Pierre Leroux: sa vie, son œuvre, sa doctrine* (Paris, 1904); L. Reybaud, *Études sur les réformateurs et socialistes modernes*; article in R. H. Inglis Palgrave's *Dictionary of Pol. Econ.*

LEROY-BEAULIEU, HENRI JEAN BAPTISTE ANATOLE (1842-), French publicist, was born at Lisieux, on the 12th of February 1842. In 1866 he published *Une troupe de comédiens*, and afterwards *Essai sur la restauration de nos monuments historiques devant l'art et devant le budget*, which deals particularly with the restoration of the cathedral of Evreux. He visited Russia in order to collect documents on the political and economic organization of the Slav nations, and on his return published in the *Revue des deux mondes* (1882-1889) a series of articles, which appeared shortly afterwards in book form under the title *L'Empire des tsars et les Russes* (4th ed., revised in 3 vols., 1897-1898). The work entitled *Un empereur, un roi, un pape, une restauration*. published in 1879, was an analysis and criticism of the politics of the Second Empire. *Un homme d'état russe* (1884) gave the history of the emancipation of the serfs by Alexander II. Other works are *Les Catholiques libéraux, l'église et le libéralisme* (1890), *La Papauté, le socialisme et la démocracie* (1892), *Les Juifs et l'antisémitisme; Israël chez les nations* (1893), *Les Arméniens et la question arménienne* (1896), *L'Antisémitisme* (1897), *Études russes et européennes* (1897). These writings, mainly collections of articles and lectures intended for the general public, display enlightened views and wide information. In 1881 Leroy-Beaulieu was elected professor of contemporary history and eastern affairs at the École Libre des Sciences Politiques, becoming director of this institution on the death of Albert Sorel in 1906, and in 1887 he became a member of the Académie des Sciences Morales et Politiques.

Two of Leroy-Beaulieu's works have been translated into English: one as the *Empire of the Tsars and the Russians*, by Z. A. Regozin (New York, 1893-1896), and another as *Papacy, Socialism, Democracy*, by B. L. O'Donnell (1892). See W. E. H. Lecky, *Historical and Political Essays* (1908).

LEROY-BEAULIEU, PIERRE PAUL (1843-), French economist, brother of the preceding, was born at Saumur on the 9th of December 1843, and educated in Paris at the Lycée Bonaparte and the École de Droit. He afterwards studied at Bonn and Berlin, and on his return to Paris began to write for *Le Temps*, *Revue nationale* and *Revue contemporaine*. In 1867 he won a prize offered by the Academy of Moral Science with an essay entitled "L'Influence de l'état moral et intellectuel des populations ouvrières sur le taux des salaires." In 1870 he gained three prizes for essays on "La Colonization chez les peuples modernes," "L'Administration en France et en Angleterre," and "L'Impôt foncier et ses conséquences économiques." In 1872 Leroy-Beaulieu

became professor of finance at the newly-founded École Libre des Sciences Politiques, and in 1880 he succeeded his father-in-law, Michel Chevalier, in the chair of political economy in the Collège de France. Several of his works have made their mark beyond the borders of his own country. Among these may be mentioned his *Recherches économiques, historiques et statistiques sur les guerres contemporaines*, a series of studies published between 1863 and 1869, in which he calculated the loss of men and capital caused by the great European conflicts. Other works by him are—*La Question monnaie au dix-neuvième siècle* (1861), *Le Travail des femmes au dix-neuvième siècle* (1873), *Traité de la science des finances* (1877), *Essai sur la repartition des richesses* (1882), *L'Algérie et la Tunisie* (1888), *Précis d'économie politique* (1888), and *L'État moderne et ses fonctions* (1889). He also founded in 1873 the *Économiste français*, on the model of the English *Economist*. Leroy-Beaulieu may be regarded as the leading representative in France of orthodox political economy, and the most pronounced opponent of protectionist and collectivist doctrines.

LERWICK, a municipal and police burgh of Shetland, Scotland, the most northerly town in the British Isles. Pop. (1901) 4281. It is situated on Brassay Sound, a fine natural harbour, on the east coast of the island called Mainland, 115 m. N.E. of Kirkwall, in Orkney, and 340 m. from Leith by steamer. The town dates from the beginning of the 17th century, and the older part consists of a flagged causeway called Commercial Street, running for 1 m. parallel with the sea (in which the gable ends of several of the quaint-looking houses stand), and so narrow in places as not to allow of two vehicles passing each other. At right angles to this street lanes ascend the hill-side to Hillhead, where the more modern structures and villas have been built. At the north end stands Fort Charlotte, erected by Cromwell, repaired in 1665 by Charles II. and altered in 1781 by George III., after whose queen it was named. It is now used as a depôt for the Naval Reserve, for whom a large drill hall was added. The Anderson Institute, at the south end, was constructed as a secondary school in 1862 by Arthur Anderson, a native, who also presented the Widows' Asylum in the same quarter, an institution intended by preference for widows of Shetland sailors. The town-hall, built in 1881, contains several stained-glass windows, two of which were the gift of citizens of Amsterdam and Hamburg, in gratitude for services rendered by the islanders to fishermen and seamen of those ports. Lerwick's main industries are connected with the fisheries, of which it is an important centre. Docks, wharves, piers, curing stations and warehouses have been provided or enlarged to cope with the growth of the trade, and an esplanade has been constructed along the front. The town is also the chief distributing agency for the islands, and carries on some business in knitted woollen goods. One mile west of Lerwick is Clickimin Loch, separated from the sea by a narrow strip of land. On an islet in the lake stands a ruined "broch" or round tower.

LE SAGE, ALAIN RENÉ (1668-1747), French novelist and dramatist, was born at Sarzeau in the peninsula of Rhuys, between the Morbihan and the sea, on the 13th of December 1668. Rhuys was a legal district, and Claude le Sage, the father of the novelist, held the united positions of advocate, notary and registrar of its royal court. His wife's name was Jeanne Brenugat. Both father and mother died when Le Sage was very young, and his property was wasted or embezzled by his guardians. Little is known of his youth except that he went to school with the Jesuits at Vannes until he was eighteen. Conjecture has it that he continued his studies at Paris, and it is certain that he was called to the bar at the capital in 1692. In August 1694 he married the daughter of a joiner, Marie Elizabeth Huyard. She was beautiful but had no fortune, and Le Sage had little practice. About this time he met his old schoolfellow, the dramatist Danchet, and is said to have been advised by him to betake himself to literature. He began modestly as a translator, and published in 1695 a French version of the *Epistles* of Aristaenetus, which was not successful. Shortly afterwards he found a valuable patron and adviser in the abbé de Lyonne, who bestowed on him an annuity of 600 livres, and recommended him to exchange the classics for Spanish literature, of which he was himself a student and collector.

Le Sage began by translating plays chiefly from Rojas and Lope de Vega. *Le Traitre puni* and *Le Point d'honneur* from the former, *Don Félix de Mendoce* from the latter, were acted or published in the first two or three years of the 18th century. In 1704 he translated the continuation of *Don Quixote* by Avellaneda, and soon afterwards adapted a play from Calderon, *Don César Ursin*, which had a divided fate, being successful at court and damned in the city. He was, however, nearly forty before he obtained anything like decided success. But in 1707 his admirable farce of *Crispin rival de son maître* was acted with great applause, and *Le Diable boiteux* was published. This latter went through several editions in the same year, and was frequently reprinted till 1725, when Le Sage altered and improved it considerably, giving it its present form. Notwithstanding the success of *Crispin*, the actors did not like Le Sage, and refused a small piece of his called *Les Étrennes* (1707). He thereupon altered it into *Turcaret*, his theatrical masterpiece, and one of the best comedies in French literature. This appeared in 1709. Some years passed before he again attempted romance writing, and then the first two parts of *Gil Blas de Santillane* appeared in 1715. Strange to say, it was not so popular as *Le Diable boiteux*. Le Sage worked at it for a long time, and did not bring out the third part till 1724, nor the fourth till 1735. For this last he had been part paid to the extent of a hundred pistoles some years before its appearance. During these twenty years he was, however, continually busy. Notwithstanding the great merit and success of *Turcaret* and *Crispin*, the Théâtre Français did not welcome him, and in the year of the publication of *Gil Blas* he began to write for the Théâtre de la Foire—the comic opera held in booths at festival time. This, though not a very dignified occupation, was followed by many writers of distinction at this date, and by none more assiduously than by Le Sage. According to one computation he produced, either alone or with others, about a hundred pieces, varying from strings of songs with no regular dialogues, to comediettas only distinguished from regular plays by the

introduction of music. He was also industrious in prose fiction. Besides finishing *Gil Blas* he translated the *Orlando innamorato* (1721), rearranged *Guzman d'Alfarache* (1732), published two more or less original novels, *Le Bachelier de Salamanque* and *Estévanille Gonzales*, and in 1733 produced the *Vie et aventures de M. de Beauchesne*, which is curiously like certain works of Defoe. Besides all this, Le Sage was also the author of *La Valise trouvée*, a collection of imaginary letters, and of some minor pieces, of which *Une journée des parques* is the most remarkable. This laborious life he continued until 1740, when he was more than seventy years of age. His eldest son had become an actor, and Le Sage had disowned him, but the second was a canon at Boulogne in comfortable circumstances. In the year just mentioned his father and mother went to live with him. At Boulogne Le Sage spent the last seven years of his life, dying on the 17th of November 1747. His last work, *Mélange amusant de saillies d'esprit et de traits historiques les plus frappants*, had appeared in 1743.

Not much is known of Le Sage's life and personality, and the foregoing paragraph contains not only the most important but almost the only facts available for it. The few anecdotes which we have of him represent him as a man of very independent temper, declining to accept the condescending patronage which in the earlier part of the century was still the portion of men of letters. Thus it is said that, on being remonstrated with, as he thought impolitely, for an unavoidable delay in appearing at the duchess of Bouillon's house to read *Turcaret*, he at once put the play in his pocket and retired, refusing absolutely to return. It may, however, be said that as in time so in position he occupies a place apart from most of the great writers of the 17th and 18th centuries respectively. He was not the object of royal patronage like the first, nor the pet of *salons* and coteries like the second. Indeed, he seems all his life to have been purely domestic in his habits, and purely literary in his interests.

The importance of Le Sage in French and in European literature is not entirely the same, and he has the rare distinction of being more important in the latter than in the former. His literary work may be divided into three parts. The first contains his Théâtre de la Foire and his few miscellaneous writings, the second his two remarkable plays *Crispin* and *Turcaret*, the third his prose fictions. In the first two he swims within the general literary current in France; he can be and must be compared with others of his own nation. But in the third he emerges altogether from merely national comparison. It is not with Frenchmen that he is to be measured. He formed no school in France; he followed no French models. His work, admirable as it is from the mere point of view of style and form, is a parenthesis in the general development of the French novel. That product works its way from Madame de la Fayette through Marivaux and Prévost, not through Le Sage. His literary ancestors are Spaniards, his literary contemporaries and successors are Englishmen. The position is almost unique; it is certainly interesting and remarkable in the highest degree.

Of Le Sage's miscellaneous work, including his numerous farce-operettas, there is not much to be said except that they are the very best kind of literary hack-work. The pure and original style of the author, his abundant wit, his cool, humoristic attitude towards human life, which wanted only greater earnestness and a wider conception of that life to turn it into true humour, are discernible throughout. But this portion of his work is practically forgotten, and its examination is incumbent only on the critic. *Crispin* and *Turcaret* show a stronger and more deeply marked genius, which, but for the ill-will of the actors, might have gone far in this direction. But Le Sage's peculiar unwillingness to attempt anything absolutely new discovered itself here. Even when he had devoted himself to the Foire theatre, it seems that he was unwilling to attempt, when occasion called for it, the absolute innovation of a piece with only one actor, a crux which Alexis Piron, a lesser but a bolder genius, accepted and carried through. *Crispin* and *Turcaret* are unquestionably Molièresque, though they are perhaps more original in their following of Molière than any other plays that can be named. For this also was part of Le Sage's idiosyncrasy that, while he was apparently unable or unwilling to strike out an entirely novel line for himself, he had no sooner entered upon the beaten path than he left it to follow his own devices. *Crispin rival de son maître* is a farce in one act and many scenes, after the earlier manner of motion. Its plot is somewhat extravagant, inasmuch as it lies in the effort of a knavish valet, not as usual to further his master's interests, but to supplant that master in love and gain. But the charm of the piece consists first in the lively bustling action of the short scenes which take each other up so promptly and smartly that the spectator has not time to cavil at the improbability of the action, and secondly in the abundant wit of the dialogue. *Turcaret* is a far more important piece of work and ranks high among comedies dealing with the actual society of their time. The only thing which prevents it from holding the very highest place is a certain want of unity in the plot. This want, however, is compensated in *Turcaret* by the most masterly profusion of character-drawing in the separate parts. Turcaret, the ruthless, dishonest and dissolute financier, his vulgar wife as dissolute as himself, the harebrained marquis, the knavish chevalier, the baroness (a coquette with the finer edge taken off her fine-ladyhood, yet by no means unlovable), are each and all finished portraits of the best comic type, while almost as much may be said of the minor characters. The style and dialogue are also worthy of the highest praise; the wit never degenerates into mere "wit-combats."

It is, however, as a novelist that the world has agreed to remember Le Sage. A great deal of unnecessary labour has been spent on the discussion of his claims to originality. What has been already said will give a sufficient clue through this thorny ground. In mere form Le Sage is not original. He does little more than adopt that of the Spanish picaroon romance of the 16th and 17th century. Often, too, he prefers merely to rearrange and adapt existing work, and still oftener to give himself a kind of start by adopting the work of a preceding writer as a basis. But it may be laid down as a positive truth that he never, in any work that pretends to originality at all, is guilty of anything that can fairly be called plagiarism. Indeed we may go further, and say that he is very fond of asserting or suggesting his indebtedness when he is really dealing with his own funds. Thus the *Diable boiteux* borrows the title, and for a chapter or two the plan and almost the words, of the *Diablo Cojuelo* of Luis Velez de Guevara. But after a few pages Le Sage leaves his predecessor alone. Even the plan of the Spanish original is entirely discarded, and the incidents, the episodes, the style, are as independent as if such a book as the *Diablo Cojuelo* had never existed. The case of *Gil Blas* is still more remarkable. It was at first alleged that Le Sage had borrowed it from the *Marcos de Obregon* of Vincent Espinel, a curiously rash assertion, inasmuch as that work exists and is easily accessible, and as the slightest consultation of it proves that, though it furnished Le Sage with separate incidents and hints for more than one of his books, *Gil Blas* as a whole is not in the least indebted to it. Afterwards Father Isla asserted that *Gil Blas* was a mere translation from an actual Spanish book—an assertion at once incapable of proof and disproof, inasmuch as there is no trace whatever of any such book. A third hypothesis is that there was some manuscript original which Le Sage may have worked up in his usual way, in the same way, for instance, as he professes himself to have worked up the *Bachelor of Salamanca*. This also is in the nature of it incapable of refutation, though the argument from the *Bachelor* is strong against it, for there could be no reason why Le Sage should be more reticent of his obligations in the one case than in the other. Except, however, for historical reasons, the controversy is one which may be safely neglected, nor is there very much importance in

the more impartial indication of sources—chiefly works on the history of Olivares—which has sometimes been attempted. That Le Sage knew Spanish literature well is of course obvious; but there is as little doubt (with the limitations already laid down) of his real originality as of that of any great writer in the world. *Gil Blas* then remains his property, and it is admittedly the capital example of its own style. For Le Sage has not only the characteristic, which Homer and Shakespeare have, of absolute truth to human nature as distinguished from truth to this or that national character, but he has what has been called the quality of detachment, which they also have. He never takes sides with his characters as Fielding (whose master, with Cervantes, he certainly was) sometimes does. Asmodeus and Don Cleofas, Gil Blas and the Archbishop and Doctor Sangrado, are produced by him with exactly the same impartiality of attitude. Except that he brought into novel writing this highest quality of artistic truth, it perhaps cannot be said that he did much to advance prose fiction in itself. He invented, as has been said, no new *genre*; he did not, as Marivaux and Prévost did, help on the novel as distinguished from the romance. In form his books are undistinguishable, not merely from the Spanish romances which are, as has been said, their direct originals, but from the medieval *romans d'aventures* and the Greek prose romances. But in individual excellence they have few rivals. Nor should it be forgotten, as it sometimes is, that Le Sage was a great master of French style, the greatest unquestionably between the classics of the 17th century and the classics of the 18th. He is perhaps the last great writer before the decadence (for since the time of Paul Louis Courier it has not been denied that the *philosophe* period is in point of style a period of decadence). His style is perfectly easy at the same time that it is often admirably epigrammatic. It has plenty of colour, plenty of flexibility, and may be said to be exceptionally well fitted for general literary work.

The dates of the original editions of Le Sage's most important works have already been given. He published during his life a collection of his regular dramatic works, and also one of his pieces for the Foire, but the latter is far from exhaustive; nor is there any edition which can be called so, though the *Œuvres choisies* of 1782 and 1818 are useful, and there are so-called *Œuvres complètes* of 1821 and 1840. Besides critical articles by the chief literary critics and historians, the work of Eugène Lintilhac, in the Grands *écrivains français* (1893), should be consulted. The *Diable boiteux* and *Gil Blas* have been reprinted and translated numberless times. Both will be found conveniently printed, together with *Estévanille Gonzales* and *Guzman d'Alfarache*, the best of the minor novels, in four volumes of Garnier's *Bibliothèque amusante* (Paris, 1865). *Turcaret* and *Crispin* are to be found in all collected editions of the French drama. There is a useful edition of them, with ample specimens of Le Sage's work for the Foire, in two volumes (Paris, 1821).

(G. Sa.)

LES ANDELYS, a town of northern France, capital of an arrondissement in the department of Eure about 30 m. S.E. of Rouen by rail. Pop. (1906) 3955. Les Andelys is formed by the union of Le Grand Andely and Le Petit Andely, the latter situated on the right bank of the Seine, the former about half a mile from the river. Grand Andely, founded, according to tradition, in the 6th century, has a church (13th, 14th and 15th centuries) parts of which are of fine late Gothic and Renaissance architecture. The works of art in the interior include beautiful stained glass of the latter period. Other interesting buildings are the hôtel du Grand Cerf dating from the first half of the 16th century, and the chapel of Sainte-Clotilde, close by a spring which, owing to its supposed healing powers, is the object of a pilgrimage. Grand Andely has a statue of Nicolas Poussin, a native of the place. Petit Andely sprang up at the foot of the eminence on which stands the château Gaillard, now in ruins, but formerly one of the strongest fortresses in France (see Fortification and Siegecraft and Castle). It was built by Richard Cœur de Lion at the end of the 12th century to protect the Norman frontier, was captured by the French in 1204 and passed finally into their possession in 1449. The church of St Sauveur at Petit Andely also dates from the end of the 12th century. Les Andelys is the seat of a sub-prefect and of a tribunal of first instance, has a preparatory infantry school; it carries on silk milling, and the manufacture of leather, organs and sugar. It has trade in cattle, grain, flour, &c.

LES BAUX, a village of south-eastern France, in the department of Bouches-du-Rhône, 11 m. N.E. of Arles by road. Pop. (1906) 111. Les Baux, which in the middle ages was a flourishing town, is now almost deserted. Apart from a few inhabited dwellings, it consists of an assemblage of ruined towers, fallen walls and other débris, which cover the slope of a hill crowned by the remains of a huge château, once the seat of a celebrated "court of love." The ramparts, a medieval church, the château, parts of which date to the 11th century, and many of the dwellings are, in great part, hollowed out of the white friable limestone on which they stand. Here and there may be found houses preserving carved façades of Renaissance workmanship. Les Baux has given its name to the reddish rock (bauxite) which is plentiful in the neighbourhood and from which aluminium is obtained. In the middle ages Les Baux was the seat of a powerful family which owned the Terre Baussenques, extensive domains in Provence and Dauphiné. The influence of the seigneurs de Baux in Provence declined before the power of the house of Anjou, to which they abandoned many of their possessions. In 1632 the château and the ramparts were dismantled.

LESBONAX, of Mytilene, Greek sophist and rhetorician, flourished in the time of Augustus. According to Photius (*cod.* 74) he was the author of sixteen political speeches, of which two are extant, a hortatory speech after the style of Thucydides, and a speech on the Corinthian War. In the first he exhorts the Athenians against the Spartans, in the second (the title of which is misleading) against the Thebans (edition by F. Kiehr, *Lesbonactis quae supersunt*, Leipzig, 1907). Some erotic letters are also attributed to him.

The Lesbonax described in Suidas as the author of a large number of philosophical works is probably of much earlier date; on the other hand, the author of a small treatise Περὶ Σχημάτων on grammatical figures (ed. Rudolf Müller, Leipzig, 1900), is probably later.

LESBOS (Mytilene, Turk. *Midullu*), an island in the Aegean sea, off the coast of Mysia, N. of the entrance of the Gulf of Smyrna, forming the main part of a sanjak in the archipelago vilayet of European Turkey. It is divided into three districts, Mytilene or Kastro in the E., Molyvo in the N., and Calloni in the W. Since the middle ages it has been known as Mytilene, from the name of its principal town. Strabo estimated the circumference of the island at 1100 stadia, or about 138 m., and Scylax reckoned it seventh in size of the islands of the Mediterranean. The width of the channel between it and the mainland varies from 7 to 10 m. The island is roughly triangular in shape; the three points are Argennum on the N.E., Sigrium (Sigri) on the W., and Malea (Maria) on the S.E. The Euripus Pyrrhaeus (Calloni) is a deep gulf on the west between Sigrium and Malea. The country though mountainous is very fertile, Lesbos being celebrated in ancient times for its wine, oil and grain. Homer refers to its wealth. Its chief produce now is olives, which also form its principal export. Soap, skins and valonea are also exported, and mules and cattle are extensively bred. The sardine fishery is an important trade, and antimony, marble and coal are found on the island. The surface is rugged and mountainous, the highest point, Mount Olympus (Hagios Elias) being 3080 ft. The island has suffered from periodical earthquakes. The roads were remade in 1889, and there is telegraphic communication on the island, and to the mainland by cable. The ports are Sigri and Mytilene. The Gulf of Calloni and Hiera or Olivieri can only be entered by vessels of small draught.

The chief town, called Mytilene, is built in amphitheatre shape round a small hill crowned by remains of an ancient fortress. There are now 14 mosques and 7 churches, including a cathedral. It was originally built on an island close to the eastern coast of Lesbos, and afterwards when the town became too large for the island, it was joined to Lesbos by a causeway, and the city spread along the coast. There was a harbour on each side of the small island. Maloeis, by some surmised to be the northern of these, was not far away. Besides the five cities which gave the island the name of Pentapolis (Mytilene, Methymna, Antissa, Eresus, Pyrrha), there was a town called Arisba, destroyed by an earthquake in the time of Herodotus. Professor Conze thinks that this is the site now called Palaikastro, N.E. of Calloni. Pyrrha lay S.E. of Calloni, and is now also called Palaikastro. Antissa was on the N. coast near Sigri. It was destroyed by the Romans in 168 B.C. Eresus was also near Sigri on the S. coast. Methymna was on the N. coast, on the site of Molyvo, still the second city of the island. The name Methymna is derived from the wine (Gr. μέθυ) for which it was famous. Considerable remains of town walls and other buildings are to be seen on all these sites.

(E. GR.)

History.—Although the position of Lesbos near the old-established trade-route to the Hellespont marks it out as an important site even in pre-historic days, no evidence on the early condition of the island is as yet obtainable, beyond the Greek tradition which represented it at the time of the Trojan war as inhabited by an original stock of Pelasgi and an immigrant population of Ionians. In historic times it was peopled by an “Aeolian” race who reckoned Boeotia as their motherland and claimed to have migrated about 1050 B.C.; its principal nobles traced their pedigree to Orestes, son of Agamemnon. Lesbos was the most prominent of Aeolian settlements, and indeed played a large part in the early development of Greek life. Its commercial activity is attested by several colonies in Thrace and the Troad, and by the participation of its traders in the settlement of Naucratis in Egypt; hence also the town of Mytilene, by virtue of its good harbour, became the political capital of the island. The climax of its prosperity was reached about 600 B.C., when a citizen named Pittacus was appointed as *aesymnetes* (dictator) to adjust the balance between the governing nobility and the insurgent commons and by his wise administration and legislation won a place among the Seven Sages of Greece. These years also constitute the golden age of Lesbian culture. The lyric poetry of Greece, which owed much to two Lesbians of the 7th century, the musician Terpander and the dithyrambist Arion, attained the standard of classical excellence under Pittacus’ contemporaries Alcaeus and Sappho. In the 6th century the importance of the island declined, partly through a protracted and unsuccessful struggle with Athens for the possession of Sigeum near the Hellespont, partly through a crushing naval defeat inflicted by Polycrates of Samos (about 550). The Lesbians readily submitted to Persia after the fall of Croesus of Lydia, and although hatred of their tyrant Coës, a Persian protégé, drove them to take part in the Ionic revolt (499-493), they made little use of their large navy and displayed poor spirit at the decisive battle of Lade. In the 5th century Lesbos for a long time remained a privileged member of the Delian League (*q.v.*), with full rights of self-administration, and under the sole obligation of assisting Athens with naval contingents. Nevertheless at the beginning of the Peloponnesian War the ruling oligarchy of Mytilene forced on a revolt, which was ended after a two years’ siege of that town (429-427). The Athenians, who had intended to punish the rebels by a wholesale execution, contented themselves with killing the ringleaders, confiscating the land and establishing a garrison. In the later years of the war Lesbos was repeatedly attacked by the Peloponnesians, and in 405 the harbour of Mytilene was the scene of a battle between the admirals Callicratidas and Conon. In 389 most of the island was recovered for the Athenians by Thrasybulus; in 377 it joined the Second Delian League, and remained throughout a loyal member, although in the second half of the century the dominant democracy was for a while supplanted by a tyranny. In 334 Lesbos served as a base for the Persian admiral Memnon against Alexander the Great. During the Third Macedonian war the Lesbians sided with Perseus against Rome; similarly in 88 they became eager allies of Mithradates VI. of Pontus, and Mytilene stood a protracted siege on his behalf. This town, nevertheless, was raised by Pompey to the status of a free community, thanks no doubt to his confidant Theophanes, a native of Mytilene.

Of the other towns on the island, Antissa, Eresus and Pyrrha possess no separate history. Methymna in the 5th and 4th centuries sometimes figures as a rival of Mytilene, with an independent policy. Among the distinguished Lesbians, in addition to those cited, may be mentioned the cyclic poet Lesches, the historian Hellanicus and the philosophers Theophrastus and Cratippus.

During the Byzantine age the island, which now assumes the name of Mytilene, continued to flourish. In 1091 it fell for a while into the hands of the Seljuks, and in the following century was repeatedly occupied by the Venetians. In 1224 it was recovered by the Byzantine emperors, who in 1354 gave it as a dowry to the Genoese family Gattilusio. After prospering under their administration Mytilene passed in 1462 under Turkish control, and has since had an uneventful history. The present population is about 130,000 of whom 13,000 are Turks and Moslems and 117,000 Greeks.

See Strabo xiii. pp. 617-619; Herodotus ii. 178, iii. 39, vi. 8, 14; Thucydides iii. 2-50; Xenophon, *Hellenica*, i., ii.; S. Plehn, *Lesbiacorum Liber* (Berlin, 1828); C. T. Newton, *Travels and Discoveries in the Levant* (London, 1865); B. V. Head, *Historia Numorum* (Oxford, 1887), pp. 487-488; E. L. Hicks and G. F. Hill, *Greek Historical Inscriptions* (Oxford, 1901), Nos. 61, 94, 101, 139, 164; Conze, *Reise auf der Insel Lesbos* (1865); Koldewey, *Antike Baureste auf Lesbos* (Berlin, 1890).

(M. O. B. C.)

LESCHES (Lescheos in Pausanias x. 25. 5), the reputed author of the *Little Iliad* (Ἰλιὰς μικρά), one of the "cyclic" poems. According to the usually accepted tradition, he was a native of Pyrrha in Lesbos, and flourished about 660 B.C. (others place him about 50 years earlier). The *Little Iliad* took up the story of the Homeric *Iliad*, and, beginning with the contest between Ajax and Odysseus for the arms of Achilles, carried it down to the fall of Troy (Aristotle, *Poetics*, 23). According to the epitome in the *Chrestomathy* of Proclus, it ended with the admission of the wooden horse within the walls of the city. Some ancient authorities ascribe the work to a Lacedaemonian named Cinaethon, and even to Homer.

See F. G. Welcker, *Der epische Cyclus* (1865-1882); Müller and Donaldson, *Hist. of Greek Literature*, i. ch. 6; G. H. Bode, *Geschichte der hellenischen Dichtkunst*, i.

LESCURE, LOUIS MARIE JOSEPH, Marquis de (1766-1793), French soldier and anti-revolutionary, was born near Bressuire. He was educated at the École Militaire, which he left at the age of sixteen. He was in command of a company of cavalry in the Régiment de Royal-Piémont, but being opposed to the ideas of the Revolution he emigrated in 1791; he soon, however, returned to France, and on the 10th of August 1792 took part in the defence of the Tuileries against the mob of Paris. The day after, he was forced to leave Paris, and took refuge in the château of Clisson near Bressuire. On the outbreak of the revolt of Vendée against the Republic, he was arrested and imprisoned with all his family, as one of the promoters of the rising. He was set at liberty by the Royalists, and became one of their leaders, fighting at Thouars, taking Fontenay and Saumur (May-June 1793), and, after an unsuccessful attack on Nantes, joining H. du Verger de la Rochejaquelein, another famous Vendean leader. Their peasant troops, opposed to the republican general F. J. Westermann, sustained various defeats, but finally gained a victory between Tiffauges and Cholet on the 19th of September 1793. The struggle was then concentrated round Chatillon, which was time after time taken and lost by the Republicans. Lescure was killed on the 15th of October 1793 near the château of La Tremblaye between Einée and Fougères.

See Marquise de la Rochejaquelein (Lescure's widow, who afterwards married La Rochejaquelein), *Mémoires* (Paris, 1817); Jullien de Courcelles, *Dictionnaire des généraux français*, tome vii. (1823); T. Muret, *Histoire des guerres de l'ouest* (Paris, 1848); and J. A. M. Crétineau-Joly, *Guerres de Vendée* (1834).

LESDIGUIÈRES, FRANÇOIS DE BONNE, Duc de (1543-1626), constable of France, was born at Saint-Bonnet de Champsaur on the 1st of April 1543, of a family of notaries with pretensions to nobility. He was educated at Avignon under a Protestant tutor, and had begun the study of law in Paris when he enlisted as an archer. He served under the lieutenant-general of his native province of Dauphiné, Bertrand de Simiane, baron de Gordes, but when the Huguenots raised troops in Dauphiné Lesdiguières threw in his lot with them, and under his kinsman Antoine Rambaud de Furmeyer, whom he succeeded in 1570, distinguished himself in the mountain warfare that followed by his bold yet prudent handling of troops. He fought at Jarnac and Moncontour, and was a guest at the wedding of Henry IV. of Navarre. Warned of the impending massacre he retired hastily to Dauphiné, where he secretly equipped and drilled a determined body of Huguenots, and in 1575, after the execution of Montbrun, became the acknowledged leader of the Huguenot resistance in the district with the title of commandant general, confirmed in 1577 by Marshal Damville, by Condé in 1580, and by Henry of Navarre in 1582. He seized Gap by a lucky night attack on the 3rd of January 1577, re-established the reformed religion there, and fortified the town. He refused to acquiesce in the treaty of Poitiers (1578) which involved the surrender of Gap, and after two years of fighting secured better terms for the province. Nevertheless in 1580 he

was compelled to hand the place over to Mayenne and to see the fortifications dismantled. He took up arms for Henry IV. in 1585, capturing Chorges, Embrun, Châteauroux and other places, and after the truce of 1588-1589 secured the complete submission of Dauphiné. In 1590 he beat down the resistance of Grenoble, and was now able to threaten the leaguers and to support the governor of Provence against the raids of Charles Emmanuel I. of Savoy. He defeated the Savoyards at Esparron in April 1591, and in 1592 began the reconquest of the marquessate of Saluzzo which had been seized by Charles Emmanuel. After his defeat of the Spanish allies of Savoy at Salebertrano in June 1593 there was a truce, during which Lesdiguières was occupied in maintaining the royal authority against Éperon in Provence. The war with Savoy proceeded intermittently until 1601, when Henry IV. concluded peace, much to the dissatisfaction of Lesdiguières. The king regarded his lieutenant's domination in Dauphiné with some distrust, although he was counted among the best of his captains. Nevertheless he made him a marshal of France in 1609, and ensured the succession to the lieutenant-generalship of Dauphiné, vested in Lesdiguières since 1597, to his son-in-law Charles de Créquy. Sincerely devoted to the throne, Lesdiguières took no part in the intrigues which disturbed the minority of Louis XIII., and he moderated the political claims made by his co-religionists under the terms of the Edict of Nantes. After the death of his first wife, Claudine de Bérenger, he married the widow of Ennemond Matel, a Grenoble shopkeeper, who was murdered in 1617. Lesdiguières was then 73, and this lady, Marie Vignon, had long been his mistress. He had two daughters, one of whom, Françoise, married Charles de Créquy. In 1622 he formally abjured the Protestant faith, his conversion being partly due to the influence of Marie Vignon. He was already a duke and peer of France; he now became constable of France, and received the order of the Saint Esprit. He had long since lost the confidence of the Huguenots, but he nevertheless helped the Vaudois against the duke of Savoy. Lesdiguières had the qualities of a great general, but circumstances limited him to the mountain warfare of Dauphiné, Provence and Savoy. He had almost unvarying success through sixty years of fighting. His last campaign, fought in alliance with Savoy to drive the Spaniards from the Valtelline, was the least successful of his enterprises. He died of fever at Valence on the 21st of September 1626.

The life of the Huguenot captain has been written in detail by Ch. Dufuyard, *Le Connétable de Lesdiguières* (Paris, 1892). His first biographer was his secretary Louis Videl, *Histoire de la vie du connestable de Lesdiguières* (Paris, 1638). Much of his official correspondence, with an admirable sketch of his life, is contained in *Actes et correspondance du connétable de Lesdiguières*, edited by Comte Douglas and J. Roman in *Documents historiques inédits pour servir à l'histoire de Dauphiné* (Grenoble, 1878). Other letters are in the *Lettres et mémoires* (Paris, 1647) of Duplessis-Mornay.

LESGHIANS, or Lesghis (from the Persian *Leksi*, called Leki by the Grusians or Georgians, Armenians and Ossetes), the collective name for a number of tribes of the eastern Caucasus, who, with their kinsfolk the Chechenzes, have inhabited Daghestan from time immemorial. They spread southward into the Transcaucasian circles Kuba, Shemakha, Nukha and Sakataly. They are mentioned as Λῆχαι by Strabo and Plutarch along with the Γῆλαι (perhaps the modern Galgai, a Chechenzian tribe), and their name occurs frequently in the chronicles of the Georgians, whose territory was exposed to their raids for centuries, until, on the surrender (1859) to Russia of the Chechenzian chieftain Shamyl, they became Russian subjects. Moses of Chorene mentions a battle in the reign of the Armenian king Baba (A.D. 370-377), in which Shagir, king of the Lekians, was slain. The most important of the Lesghian tribes are the Avars (*q.v.*), the Kasimukhians or Lakians, the Darghis and the Kurins or Lesghians proper. Komarov[1] gives the total number of the tribes as twenty-seven, all speaking distinct dialects. Despite this, the Lesghian peoples, with the exception of the Udi and Kubatschi, are held to be ethnically identical. The Lesghians are not usually so good-looking as the Circassians or the Chechenzes. They are tall, powerfully built, and their hybrid descent is suggested by the range of colouring, some of the tribes exhibiting quite fair, others quite dark, individuals. Among some there is an obvious mongoloid strain. In disposition they are intelligent, bold and persistent, and capable of reckless bravery, as was proved in their struggle to maintain their independence. They are capable of enduring great physical fatigue. They live a semi-savage life on their mountain slopes, for the most part living by hunting and stock-breeding. Little agriculture is possible. Their industries are mainly restricted to smith-work and cutlery and the making of felt cloaks, and the women weave excellent shawls. They are for the most part fanatical Mahommedans.

See Moritz Wagner, *Schamyl* (Leipzig, 1854); von Seidlitz, "Ethnographie des Kaukasus," in *Petermann's Mitteilungen* (1880); Ernest Chantre, *Recherches anthropologiques dans le Caucase* (Lyon, 1885-1887); J. de Morgan, *Recherches sur les origines des peuples du Caucase* (Paris, 1889).

1 *Ethnological Map of Daghestan.*

LESINA (Serbo-Croatian, *Hvar*), an island in the Adriatic Sea, forming part of Dalmatia, Austria. Lesina lies between the islands of Brazza on the north and Curzola on the south; and is divided from the peninsula of Sabbioncello by the Narenta channel. Its length is 41 m.; its greatest breadth less than 4 m. It has a steep rocky coast with a chain of thinly wooded limestone hills. The climate is mild, and not only the grape and olive, but dates, figs and the carob or locust-bean flourish. The cultivation of these fruits, boat-building, fishing and the preparation of rosemary essence and liqueurs are the principal resources of the islanders. Lesina (*Hvar*) and Cittavecchia (*Starigrad*) are the principal towns and seaports, having respectively 2138 and 3120 inhabitants. Lesina, the capital, contains an arsenal, an observatory and some interesting old buildings of the 16th century. It is a Roman Catholic bishopric, and the centre of an administrative district, which includes Cittavecchia, Lissa,

and some small neighbouring islands. Pop. (1900) of island 18,091, of district 27,928.

To the primitive “Illyrian” race, whose stone cists and bronze implements have been disinterred from barrows near the capital, may perhaps be attributed the “Cyclopean” walls at Cittavecchia. About 385 B.C., a Greek colony from Paros built a city on the site of the present Lesina, naming it *Paros* or *Pharos*. The forms *Phara*, *Pharia* (common among Latin writers), and *Pityeia*, also occur. In 229 B.C. the island was betrayed to the Romans by Demetrius, lieutenant of the Illyrian queen Teuta; but in 219, as Demetrius proved false to Rome also, his capital was razed by Lucius Aemilius Paullus. *Neos Pharos*, now Cittavecchia, took its place, and flourished until the 6th century, when the island was laid waste by barbarian invaders. Constantine Porphyrogenitus mentions Lesina as a colony of pagan Slavs, in the 10th century. Throughout the middle ages it remained a purely Slavonic community; and its name, which appears in old documents as *Lisna*, *Lesna* or *Lyesena*, “wooded” is almost certainly derived from the Slavonic *lyés*, “forest,” not from the Italian *lesina*, “an awl.” But the old form Pharia persisted, as *Far* or *Hvar*, with the curious result that the modern Serbo-Croatian name is Greek, and the modern Italian name Slavonic in origin. Lesina became a bishopric in 1145, and received a charter from Venice in 1331. It was sacked by the enemies of Venice in 1354 and 1358; ceded to Hungary in the same year; held by Ragusa from 1413 to 1416; and incorporated in the Venetian dominions in 1420. During the 16th century Lesina city had a considerable maritime trade, and, though sacked and partly burned by the Turks in 1571, it remained the chief naval station of Venice, in these waters, until 1776, when it was superseded by Curzola. Passing to Austria in 1797, and to France in 1805, it withstood a Russian attack in 1807, but was surrendered by the French in 1813, and finally annexed to Austria in 1815.

LESION (through Fr. from Lat. *laesio*, injury, *laedere*, to hurt), an injury, hurt, damage. In Scots law the term is used of damage suffered by a party in a contract sufficient to enable him to bring an action for setting it aside. In pathology, the chief use, the word is applied to any morbid change in the structure of an organ, whether shown by visible changes or by disturbance of function.

LESKOVATS (Leskovatz or Leskovac), a town in Servia, between Nish and Vranya, on the railway line from Nish to Salonica. Pop. (1901) 13,707. It is the headquarters of the Servian hemp industry, the extensive plain in which the town lies growing the best flax and hemp in all the Balkan peninsula. The plain is not only the most fertile portion of Servia, but also the best cultivated. Besides flax and hemp, excellent tobacco is grown. Five valleys converge on the plain from different directions, and the inhabitants of the villages in these valleys are all occupied in growing flax and hemp, which they send to Leskovats to be stored or manufactured into ropes. After Belgrade and Nish, Leskovats is the most prosperous town in Servia.

LESLEY, JOHN (1527-1596), Scottish bishop and historian, was born in 1527. His father was Gavin Lesley, rector of Kingussie. He was educated at the university of Aberdeen, where he took the degree of M.A. In 1538 he obtained a dispensation permitting him to hold a benefice, notwithstanding his being a natural son, and in June 1546 he was made an acolyte in the cathedral church of Aberdeen, of which he was afterwards appointed a canon and prebendary. He also studied at Poitiers, at Toulouse and at Paris, where he was made doctor of laws in 1553. In 1558 he took orders and was appointed Official of Aberdeen, and inducted into the parsonage and prebend of Oyne. At the Reformation Lesley became a champion of Catholicism. He was present at the disputation held in Edinburgh in 1561, when Knox and Willox were his antagonists. He was one of the commissioners sent the same year to bring over the young Queen Mary to take the government of Scotland. He returned in her train, and was appointed a privy councillor and professor of canon law in King’s College, Aberdeen, and in 1565 one of the senators of the college of justice. Shortly afterwards he was made abbot of Lindores, and in 1565 bishop of Ross, the election to the see being confirmed in the following year. He was one of the sixteen commissioners appointed to revise the laws of Scotland, and the volume of the *Actis and Constitutionis of the Realme of Scotland* known as the Black Acts was, chiefly owing to his care, printed in 1566.

The bishop was one of the most steadfast friends of Queen Mary. After the failure of the royal cause, and whilst Mary was a captive in England, Lesley (who had gone to her at Bolton) continued to exert himself on her behalf. He was one of the commissioners at the conference at York in 1568. He appeared as her ambassador at the court of Elizabeth to complain of the injustice done to her, and when he found he was not listened to, he laid plans for her escape. He also projected a marriage for her with the duke of Norfolk, which ended in the execution of that nobleman. For this he was put under the charge of the bishop of London, and then of the bishop of Ely (in Holborn), and afterwards imprisoned in the Tower of London. During his confinement he collected materials for his history of Scotland, by which his name is now chiefly known. In 1571 he presented the latter portion of this work, written in Scots, to Queen Mary to amuse her in her captivity. He also wrote for her use his *Piae Consolationes*, and the queen devoted some of the hours of her captivity to translating a portion of it into French

verse.

In 1573 he was liberated from prison, but was banished from England. For two years he attempted unsuccessfully to obtain the assistance of Continental princes in favour of Queen Mary. While at Rome in 1578 he published his Latin history *De Origine, Moribus, et Rebus Gestis Scotorum*. In 1579 he went to France, and was made suffragan and vicar-general of the archbishopric of Rouen. Whilst visiting his diocese, however, he was thrown into prison, and had to pay 3000 pistoles to prevent his being given up to Elizabeth. During the remainder of the reign of Henry III. he lived unmolested, but on the accession of the Protestant Henry IV. he again fell into trouble. In 1590 he was thrown into prison, and had to purchase his freedom at the same expense as before. In 1593 he was made bishop of Coutances in Normandy, and had licence to hold the bishopric of Ross till he should obtain peaceable possession of the former see. He retired to an Augustinian monastery near Brussels, where he died on the 31st of May 1596.

The chief works of Lesley are as follows: *A Defence of the Honour of ... Marie, Queene of Scotland, by Eusebius Dicaeophile* (London, 1569), reprinted, with alterations, at Liége in 1571, under the title, *A Treatise concerning the Defence of the Honour of Marie, Queene of Scotland, made by Morgan Philippes, Bachelar of Divinitie, Piae afflicti animi consolationes, ad Mariam Scot. Reg.* (Paris, 1574); *De origine, moribus et rebus gestis Scotorum libri decem* (Rome, 1578; re-issued 1675); *De illustrium feminarum in republica administranda authoritate libellus* (Reims, 1580; a Latin version of a tract on "The Lawfulness of the Regiment of Women": cf. Knox's pamphlet); *De titulo et jure Mariae Scot. Reg., quo regni Angliae successionem sibi juste vindicat* (Reims, 1580; translated in 1584). The history of Scotland from 1436 to 1561 owes much, in its earlier chapters, to the accounts of Hector Boece (*q.v.*) and John Major (*q.v.*), though no small portion of the topographical matter is first-hand. In the later sections he gives an independent account (from the Catholic point of view) which is a valuable supplement and a corrective in many details, to the works of Buchanan and Knox. A Scots version of the history was written in 1596 by James Dalrymple of the Scottish Cloister at Regensburg. It has been printed for the Scottish Text Society (2 vols., 1888-1895) under the editorship of the Rev. E. G. Cody, O.S.B. A slight sketch by Lesley of Scottish history from 1562 to 1571 has been translated by Forbes-Leith in his *Narrative of Scottish Catholics* (1885), from the original MS. now in the Vatican.

LESLEY, J. PETER (1819-1903), American geologist, was born in Philadelphia on the 17th of September 1819. It is recorded by Sir A. Geikie that "He was christened Peter after his father and grandfather, and at first wrote his name 'Peter Lesley, Jr.,' but disliking the Christian appellation that had been given to him, he eventually transformed his signature by putting the J. of 'Junior' at the beginning." He was educated for the ministry at the university of Pennsylvania, where he graduated in 1838; but the effects of close study having told upon his health, he served for a time as sub-assistant on the first geological survey of Pennsylvania under Professor H. D. Rogers, and was afterwards engaged in a special examination of the coal regions. On the termination of the survey in 1841 he entered Princeton seminary and renewed his theological studies, at the same time giving his leisure time to assist Professor Rogers in preparing the final report and map of Pennsylvania. He was licensed to preach in 1844; he then paid a visit to Europe and entered on a short course of study at the university of Halle. Returning to America he worked during two years for the American Tract Society, and at the close of 1847 he joined Professor Rogers again in preparing geological maps and sections at Boston. He then accepted the pastorate of the Congregational church at Milton, a suburb of Boston, where he remained until 1851, when, his views having become Unitarian, he abandoned the ministry and entered into practice as a consulting geologist. In the course of his work he made elaborate surveys of the Cape Breton coalfield, and of other coal and iron regions. From 1855 to 1859 he was secretary of the American Iron Association; for twenty-seven years (1858-1885) he was secretary and librarian of the American Philosophical Society; from 1872 to 1878 he was professor of geology and dean of the faculty of science in the university of Pennsylvania, and from 1874-1893 he was in charge of the second geological survey of the state. He then retired to Milton, Mass., where he died on the 1st of June 1903. He published *Manual of Coal and its Topography* (1856); *The Iron Manufacturer's Guide to the Furnaces, Forges and Rolling Mills of the United States* (1859).

See Memoir by Sir A. Geikie in *Quart. Journ. Geol. Soc.* (May 1904); and Memoir (with portrait) by B. S. Lyman, printed in advance with portrait, and afterwards in abstract only in *Trans. Amer. Inst. Mining Engineers*, xxxiv. (1904) p. 726.

LESLIE, CHARLES (1650-1722), Anglican nonjuring divine, son of John Leslie (1571-1671), bishop of Raphoe and afterwards of Clogher, was born in July 1650 in Dublin, and was educated at Enniskillen school and Trinity College, Dublin. Going to England he read law for a time, but soon turned his attention to theology, and took orders in 1680. In 1687 he became chancellor of the cathedral of Connor and a justice of the peace, and began a long career of public controversy by responding in public disputation at Monaghan to the challenge of the Roman Catholic bishop of Clogher. Although a vigorous opponent of Roman Catholicism, Leslie was a firm supporter of the Stuart dynasty, and, having declined at the Revolution to take the oath to William and Mary, he was on this account deprived of his benefice. In 1689 the growing troubles in Ireland induced him to withdraw to England, where he employed himself for the next twenty years in writing various controversial pamphlets in favour of the nonjuring cause, and in numerous polemics against the Quakers, Jews, Socinians and Roman Catholics, and especially in that against the Deists with which his name is now most commonly associated. He had the keenest scent for every form of heresy and was especially zealous in his defence of the sacraments. A warrant having been issued against him in 1710 for his pamphlet *The Good Old Cause, or Lying in Truth*, he resolved to

quit England and to accept an offer made by the Pretender (with whom he had previously been in frequent correspondence) that he should reside with him at Bar-le-Duc. After the failure of the Stuart cause in 1715, Leslie accompanied his patron into Italy, where he remained until 1721, in which year, having found his sojourn amongst Roman Catholics extremely unpleasant, he sought and obtained permission to return to his native country. He died at Glaslough, Monaghan, on the 13th of April 1722.

The *Theological Works* of Leslie were collected and published by himself in 2 vols. folio in 1721; a later edition, slightly enlarged, appeared at Oxford in 1832 (7 vols. 8vo). Though marred by persistent arguing in a circle they are written in lively style and show considerable erudition. He had the somewhat rare distinction of making several converts by his reasonings, and Johnson declared that "Leslie was a reasoner, and a reasoner who was not to be reasoned against." An historical interest in all that now attaches to his subjects and his methods, as may be seen when the promise given in the title of his best-known work is contrasted with the actual performance. The book professes to be *A Short and Easy Method with the Deists, wherein the certainty of the Christian Religion is Demonstrated by Infallible Proof from Four Rules, which are incompatible to any imposture that ever yet has been, or that can possibly be* (1697). The four rules which, according to Leslie, have only to be rigorously applied in order to establish not the probability merely but the absolute certainty of the truth of Christianity are simply these: (1) that the matter of fact be such as that men's outward senses, their eyes and ears, may be judges of it; (2) that it be done publicly, in the face of the world; (3) that not only public monuments be kept up in memory of it, but some outward actions be performed; (4) that such monuments and such actions or observances be instituted and do commence from the time that the matter of fact was done. Other publications of Leslie are *The Snake in the Grass* (1696), against the Quakers; *A Short Method with the Jews* (1689); *Gallienus Redivivus* (an attack on William III., 1695); *The Socinian Controversy Discussed* (1697); *The True Notion of the Catholic Church* (1703); and *The Case Stated between the Church of Rome and the Church of England* (1713).

LESLIE, CHARLES ROBERT (1794-1859), English genre-painter, was born in London on the 19th of October 1794. His parents were American, and when he was five years of age he returned with them to their native country. They settled in Philadelphia, where their son was educated and afterwards apprenticed to a bookseller. He was, however, mainly interested in painting and the drama, and when George Frederick Cooke visited the city he executed a portrait of the actor, from recollection of him on the stage, which was considered a work of such promise that a fund was raised to enable the young artist to study in Europe. He left for London in 1811, bearing introductions which procured for him the friendship of West, Beechey, Allston, Coleridge and Washington Irving, and was admitted as a student of the Royal Academy, where he carried off two silver medals. At first, influenced by West and Fuseli, he essayed "high art," and his earliest important subject depicted Saul and the Witch of Endor; but he soon discovered his true aptitude and became a painter of cabinet-pictures, dealing, not like those of Wilkie, with the contemporary life that surrounded him, but with scenes from the great masters of fiction, from Shakespeare and Cervantes, Addison and Molière, Swift, Sterne, Fielding and Smollett. Of individual paintings we may specify "Sir Roger de Coverley going to Church" (1819); "May-day in the Time of Queen Elizabeth" (1821); "Sancho Panza and the Duchess" (1824); "Uncle Toby and the Widow Wadman" (1831); *La Malade Imaginaire*, act iii. sc. 6 (1843); and the "Duke's Chaplain Enraged leaving the Table," from *Don Quixote* (1849). Many of his more important subjects exist in varying replicas. He possessed a sympathetic imagination, which enabled him to enter freely into the spirit of the author whom he illustrated, a delicate perception for female beauty, an unfailing eye for character and its outward manifestation in face and figure, and a genial and sunny sense of humour, guided by an instinctive refinement which prevented it from overstepping the bounds of good taste. In 1821 Leslie was elected A.R.A., and five years later full academician. In 1833 he left for America to become teacher of drawing in the military academy at West Point, but the post proved an irksome one, and in some six months he returned to England. He died on the 5th of May 1859.

In addition to his skill as an artist, Leslie was a ready and pleasant writer. His *Life* of his friend Constable, the landscape painter, appeared in 1843, and his *Handbook for Young Painters*, a volume embodying the substance of his lectures as professor of painting to the Royal Academy, in 1855. In 1860 Tom Taylor edited his *Autobiography and Letters*, which contain interesting reminiscences of his distinguished friends and contemporaries.

LESLIE, FRED [Frederick Hobson] (1855-1892), English actor, was born at Woolwich on the 1st of April 1855. He made his first stage appearance in London as Colonel Hardy in *Paul Pry* in 1878. He had a good voice, and in 1882 made a great hit as Rip Van Winkle in Planquette's opera of that name at the Comedy. In 1885 he appeared at the Gaiety as Jonathan Wild in H. P. Stephens and W. Yardley's burlesque *Little Jack Sheppard*. His extraordinary success in this part determined his subsequent career, and for some years he and Nelly Farren, with whom he played in perfect association, were the pillars of Gaiety burlesque. Leslie's "Don Caesar de Bazan" in *Ruy Blas, or the Blasé Roué*, was perhaps the most popular of his later parts. In all of them it was his own versatility and entertaining personality which formed the attraction; whether he sang, danced, whistled or "gagged," his performance was an unending flow of high spirits and ludicrous charm. Under the pseudonym of "A. C. Torr" he was acknowledged on the programmes as part-author of these burlesques, and while on occasion he acted in more serious comedy, for which he had undoubted capacity, his fame rests on his connexion with them. In 1881 and 1883 he played in America. He died on the 7th of December 1892.

See W. T. Vincent, *Recollections of Fred Leslie* (1894).

LESLIE, SIR JOHN

(1766-1832), Scottish mathematician and physicist, was born of humble parentage at Largo, Fifeshire, on the 16th of April 1766, and received his early education there and at Leven. In his thirteenth year, encouraged by friends who had even then remarked his aptitude for mathematical and physical science, he entered the university of St Andrews. On the completion of his arts course, he nominally studied divinity at Edinburgh until 1787; in 1788-1789 he spent rather more than a year as private tutor in a Virginian family, and from 1790 till the close of 1792 he held a similar appointment at Etruria in Staffordshire, with the family of Josiah Wedgwood, employing his spare time in experimental research and in preparing a translation of Buffon's *Natural History of Birds*, which was published in nine 8vo vols. in 1793, and brought him some money. For the next twelve years (passed chiefly in London or at Largo, with an occasional visit to the continent of Europe) he continued his physical studies, which resulted in numerous papers contributed by him to Nicholson's *Philosophical Journal*, and in the publication (1804) of the *Experimental Inquiry into the Nature and Properties of Heat*, a work which gained him the Rumford Medal of the Royal Society of London. In 1805 he was elected to succeed John Playfair in the chair of mathematics at Edinburgh, not, however, without violent though unsuccessful opposition on the part of a narrow-minded clerical party who accused him of heresy in something he had said as to the "unsophisticated notions of mankind" about the relation of cause and effect. During his tenure of this chair he published two volumes of a *Course of Mathematics*—the first, entitled *Elements of Geometry, Geometrical Analysis and Plane Trigonometry*, in 1809, and the second, *Geometry of Curve Lines*, in 1813; the third volume, on *Descriptive Geometry and the Theory of Solids* was never completed. With reference to his invention (in 1810) of a process of artificial congelation, he published in 1813 *A Short Account of Experiments and Instruments depending on the relations of Air to Heat and Moisture*; and in 1818 a paper by him "On certain impressions of cold transmitted from the higher atmosphere, with an instrument (the aethrioscope) adapted to measure them," appeared in the *Transactions of the Royal Society of Edinburgh*. In 1819, on the death of Playfair, he was promoted to the more congenial chair of natural philosophy, which he continued to hold until his death, and in 1823 he published, chiefly for the use of his class, the first volume of his never-completed *Elements of Natural Philosophy*. Leslie's main contributions to physics were made by the help of the "differential thermometer," an instrument whose invention was contested with him by Count Rumford. By adapting to this instrument various ingenious devices he was enabled to employ it in a great variety of investigations, connected especially with photometry, hygroscopy and the temperature of space. In 1820 he was elected a corresponding member of the Institute of France, the only distinction of the kind which he valued, and early in 1832 he was created a knight. He died at Coates, a small property which he had acquired near Largo, on the 3rd of November 1832.

LESLIE, THOMAS EDWARD CLIFFE

(1827-1882), English economist, was born in the county of Wexford in (as is believed) the year 1827. He was the second son of the Rev. Edward Leslie, prebendary of Dromore, and rector of Annahilt, in the county of Down. His family was of Scottish descent, but had been connected with Ireland since the reign of Charles I. Amongst his ancestors were that accomplished prelate, John Leslie (1571-1671), bishop first of Raphoe and afterwards of Clogher, who, when holding the former see, offered so stubborn a resistance to the Cromwellian forces, and the bishop's son Charles (see above), the nonjuror. Cliffe Leslie received his elementary education from his father, who resided in England, though holding church preferment as well as possessing some landed property in Ireland; by him he was taught Latin, Greek and Hebrew, at an unusually early age; he was afterwards for a short time under the care of a clergyman at Clapham, and was then sent to King William's College, in the Isle of Man, where he remained until, in 1842, being then only fifteen years of age, he entered Trinity College, Dublin. He was a distinguished student there, obtaining, besides other honours, a classical scholarship in 1845, and a senior moderatorship (gold medal) in mental and moral philosophy at his degree examination in 1846. He became a law student at Lincoln's Inn, was for two years a pupil in a conveyancer's chambers in London, and was called to the English bar. But his attention was soon turned from the pursuit of legal practice, for which he seems never to have had much inclination, by his appointment, in 1853, to the professorship of jurisprudence and political economy in Queen's College, Belfast. The duties of this chair requiring only short visits to Ireland in certain terms of each year, he continued to reside and prosecute his studies in London, and became a frequent writer on economic and social questions in the principal reviews and other periodicals. In 1870 he collected a number of his essays, adding several new ones, into a volume entitled *Land Systems and Industrial Economy of Ireland, England and Continental Countries*. J. S. Mill gave a full account of the contents of this work in a paper in the *Fortnightly Review*, in which he pronounced Leslie to be "one of the best living writers on applied political economy." Mill had sought his acquaintance on reading his first article in *Macmillan's Magazine*; he admired his talents and took pleasure in his society, and treated him with a respect and kindness which Leslie always gratefully acknowledged.

In the frequent visits which Leslie made to the continent, especially to Belgium and some of the less-known districts of France and Germany, he occupied himself much in economic and social observation, studying the effects of the institutions and system of life which prevailed in each region, on the material and moral condition of its inhabitants. In this way he gained an extensive and accurate acquaintance with continental rural economy, of which he made excellent use in studying parallel phenomena at home. The accounts he gave of the results of his observations were among his happiest efforts; "no one," said Mill, "was able to write narratives of foreign visits at once so instructive and so interesting." In these excursions he made the acquaintance of several distinguished persons, amongst others of M. Léonce de Lavergne and M. Émile de Laveleye. To the memory of the former of these he afterwards paid a graceful tribute in a biographical sketch (*Fortnightly Review*, February 1881); and to

the close of his life there existed between him and M. de Laveleye relations of mutual esteem and cordial intimacy.

Two essays of Leslie's appeared in volumes published under the auspices of the Cobden Club, one on the "Land System of France" (2nd ed., 1870), containing an earnest defence of *la petite culture* and still more of *la petite propriété*; the other on "Financial Reform" (1871), in which he exhibited in detail the impediments to production and commerce arising from indirect taxation. Many other articles were contributed by him to reviews between 1875 and 1879, including several discussions of the history of prices and the movements of wages in Europe, and a sketch of life in Auvergne in his best manner; the most important of them, however, related to the philosophical method of political economy, notably a memorable one which appeared in the Dublin University periodical, *Hermathena*. In 1879 the provost and senior fellows of Trinity College published for him a volume in which a number of these articles were collected under the title of *Essays in Political and Moral Philosophy*. These and some later essays, together with the earlier volume on *Land Systems*, form the essential contribution of Leslie to economic literature. He had long contemplated, and had in part written, a work on English economic and legal history, which would have been his *magnum opus*—a more substantial fruit of his genius and his labours than anything he has left. But the MS. of this treatise, after much pains had already been spent on it, was unaccountably lost at Nancy in 1872; and, though he hoped to be able speedily to reproduce the missing portion and finish the work, no material was left in a state fit for publication. What the nature of it would have been may be gathered from an essay on the "History and Future of Profit" in the *Fortnightly Review* for November 1881, which is believed to have been in substance an extract from it.

That he was able to do so much may well be a subject of wonder when it is known that his labours had long been impeded by a painful and depressing malady, from which he suffered severely at intervals, whilst he never felt secure from its recurring attacks. To this disease he in the end succumbed at Belfast, on the 27th of January 1882.

Leslie's work may be distributed under two heads, that of applied political economy and that of discussion on the philosophical method of the science. The *Land Systems* belonged principally to the former division. The author perceived the great and growing importance for the social welfare of both Ireland and England of what is called "the land question," and treated it in this volume at once with breadth of view and with a rich variety of illustrative detail. His general purpose was to show that the territorial systems of both countries were so encumbered with elements of feudal origin as to be altogether unfitted to serve the purposes of a modern industrial society. The policy he recommended is summed up in the following list of requirements, "a simple jurisprudence relating to land, a law of equal intestate succession, a prohibition of entail, a legal security for tenants' improvements, an open registration of title and transfer and a considerable number of peasant properties." The volume is full of practical good sense, and exhibits a thorough knowledge of home and foreign agricultural economy; and in the handling of the subject is everywhere shown the special power which its author possessed of making what he wrote interesting as well as instructive. The way in which sagacious observation and shrewd comment are constantly intermingled in the discussion not seldom reminds us of Adam Smith, whose manner was more congenial to Leslie than the abstract and arid style of Ricardo.

But what, more than anything else, marks him as an original thinker and gives him a place apart among contemporary economists, is his exposition and defence of the historical method in political economy. Both at home and abroad there has for some time existed a profound and growing dissatisfaction with the method and many of the doctrines of the hitherto dominant school, which, it is alleged, under a "fictitious completeness, symmetry and exactness" disguises a real hollowness and discordance with fact. It is urged that the attempt to deduce the economic phenomena of a society from the so-called universal principle of "the desire of wealth" is illusory, and that they cannot be fruitfully studied apart from the general social conditions and historic development of which they are the outcome. Of this movement of thought Leslie was the principal representative, if not the originator, in England. There is no doubt, for he has himself placed it on record, that the first influence which impelled him in the direction of the historical method was that of Sir Henry Maine, by whose personal teaching of jurisprudence, as well as by the example of his writings, he was led "to look at the present economic structure and state of society as the result of a long evolution." The study of those German economists who represent similar tendencies doubtless confirmed him in the new line of thought on which he had entered, though he does not seem to have been further indebted to any of them except, perhaps, in some small degree to Roscher. And the writings of Comte, whose "prodigious genius," as exhibited in the *Philosophie Positive*, he admired and proclaimed, though he did not accept his system as a whole, must have powerfully co-operated to form in him the habit of regarding economic science as only a single branch of sociology, which should always be kept in close relation to the others. The earliest writing in which Leslie's revolt against the so-called "orthodox school" distinctly appears is his *Essay on Wages*, which was first published in 1868 and was reproduced as an appendix to the volume on *Land Tenures*. In this, after exposing the inanity of the theory of the wage-fund, and showing the utter want of agreement between its results and the observed phenomena, he concludes by declaring that "political economy must be content to take rank as an inductive, instead of a purely deductive science," and that, by this change of character, "it will gain in utility, interest and real truth far more than a full compensation for the forfeiture of a fictitious title to mathematical exactness and certainty." But it is in the essays collected in the volume of 1879 that his attitude in relation to the question of method is most decisively marked. In one of these, on "the political economy of Adam Smith," he exhibits in a very interesting way the co-existence in the *Wealth of Nations* of historical-inductive investigation in the manner of Montesquieu with a priori speculation founded on theologico-metaphysical bases, and points out the error of ignoring the former element, which is the really characteristic feature of Smith's social philosophy, and places him in strong contrast with his *soi-disant* followers of the school of Ricardo. The essay, however, which contains the most brilliant polemic against the "orthodox school," as well as the most luminous account and the most powerful vindication of the new direction, was that of which we have above spoken as having first appeared in *Hermathena*. It may be recommended as supplying the best extant presentation of one of the two contending views of economic method. On this essay mainly rests the claim of Leslie to be regarded as the founder and first head of the English historical school of political economy. Those who share his views on the philosophical constitution of the science regard the work he did, notwithstanding its unsystematic character, as in reality the most important done by any English economists in the latter half of the 19th century. But even the warmest partisans of the older school acknowledge that he did excellent service by insisting on a kind of inquiry, previously too much neglected, which was of the highest interest and value, in whatever relation it might be supposed to stand to the establishment of economic truth. The members of both groups alike recognized his great learning, his patient and conscientious habits of investigation and the large social spirit in which he treated the problems of his science.

(J. K. I.)

LESLIE, a police burgh of Fifeshire, Scotland. Pop. (1901) 3587. It lies on the Leven, the vale of which is overlooked by the town, 4 m. W. of Markinch by the North British railway. The industries include paper-making, flax-spinning, bleaching and linen-weaving. The old church claims to be the "Christ's Kirk on the Green" of the ancient ballads of that name. A stone on the Green, called the Bull Stone, is said to have been used when bull-baiting was a popular pastime. Leslie House, the seat of the earl of Rothes, designed by Sir William Bruce, rivalled Holyrood in magnificence. It was noted for its tapestry and its gallery of family portraits and other pictures, including a portrait of Rembrandt by himself. Daniel Defoe considered its park the glory of the kingdom. The mansion sustained serious damage from fire in 1763. Norman Leslie, master of Rothes, was concerned in the killing of Cardinal Beaton (1546), and the dagger with which John Leslie, Norman's uncle, struck the fatal blow is preserved in Leslie House.

MARKINCH (pop. 1499), a police burgh situated between Conland Burn and the Leven, 7¼ m. N. by E. of Kirkcaldy by the North British railway, is a place of great antiquity. A cell of the Culdees was established here by one of the last of the Celtic bishops, the site of which may possibly be marked by the ancient cross of Balgonie. Markinch is also believed to have been a residence of the earlier kings, where prior to the 11th century they occasionally administered justice; and in the reign of William the Lion (d. 1214) the warrantors of goods alleged to have been stolen were required to appear here. Its industries comprise bleaching, flax-spinning, paper-making, distilling and coal-mining. Balgonie Castle, close by, the keep of which is 80 ft. high, was a residence of Alexander Leslie, the first earl of Leven, and at Balfour Castle were born Cardinal Beaton and his uncle and nephew the archbishops of Glasgow.

LESPINASSE, JEANNE JULIE ÉLÉONORE DE (1732-1776), French author, was born at Lyons on the 9th of November 1732. A natural child of the comtesse d'Albon, she was brought up as the daughter of Claude Lespinasse of Lyons. On leaving her convent school she became governess in the house of her mother's legitimate daughter, Mme de Vichy, who had married the brother of the marquise du Deffand. Here Mme du Deffand made her acquaintance, and, recognizing her extraordinary gifts, persuaded her to come to Paris as her companion. The alliance lasted ten years (1754-1764) until Mme du Deffand became jealous of the younger woman's increasing influence, when a violent quarrel ensued. Mlle de Lespinasse set up a salon of her own which was joined by many of the most brilliant members of Mme du Deffand's circle. D'Alembert was one of the most assiduous of her friends and eventually came to live under the same roof. There was no scandal attached to this arrangement, which ensured d'Alembert's comfort and lent influence to Mlle de Lespinasse's salon. Although she had neither beauty nor rank, her ability as a hostess made her reunions the most popular in Paris. She owes her distinction, however, not to her social success, but to circumstances which remained a secret during her lifetime from her closest friends. Two volumes of *Lettres* published in 1809 displayed her as the victim of a passion of a rare intensity. In virtue of this ardent, intense quality Sainte Beuve and other of her critics place her letters in the limited category to which belong the Latin letters of Héloïse and those of the Portuguese Nun. Her first passion, a reasonable and serious one, was for the marquis de Mora, son of the Spanish ambassador in Paris. De Mora had come to Paris in 1765, and with some intervals remained there until 1772 when he was ordered to Spain for his health. On the way to Paris in 1774 to fulfil promises exchanged with Mlle de Lespinasse, he died at Bordeaux. But her letters to the comte de Guibert, the worthless object of her fatal infatuation, begin from 1773. From the struggle between her affection for de Mora and her blind passion for her new lover they go on to describe her partial disenchantment on Guibert's marriage and her final despair. Mlle de Lespinasse died on the 23rd of May 1776, her death being apparently hastened by the agitation and misery to which she had been for the last three years of her life a prey. In addition to the *Lettres* she was the author of two chapters intended as a kind of sequel to Sterne's *Sentimental Journey*.

Her *Lettres* ... were published by Mme de Guibert in 1809 and a spurious additional collection appeared in 1820. Among modern editions may be mentioned that of Eugène Asse (1876-1877). *Lettres inédites de Mademoiselle de Lespinasse à Condorcet, à D'Alembert, à Guibert, au comte de Crillon*, edited by M. Charles Henry (1887), contains copies of the documents available for her biography. Mrs Humphry Ward's novel, *Lady Rose's Daughter*, owes something to the character of Mlle de Lespinasse.

LES SABLES D'OLONNE, a seaport of western France, capital of an arrondissement of the department of Vendée, on an inlet of the Atlantic seaboard, 23 m. S.W. of La Roche-sur-Yon by rail. Pop. (1906) 11,847. The town stands between the sea on the south and the port on the north, while on the west it is separated by a channel from the suburb of La Chaume, built at the foot of a range of dunes 65 ft. high, which terminates southwards in the rocky peninsula of L'Aiguille. The beautiful smoothly sloping beach, 1 m. in length, is much frequented by bathers. To the north of Sables extend salt-marshes and oyster-parks, yielding 6,000,000 to 8,000,000 oysters per annum. Sables has a church built in the Late Gothic style towards the middle of the 17th century. The port, consisting of a tidal basin and a wet-dock, is accessible to vessels of 2000 tons, but is dangerous when the winds are from the south-west. The lighthouse of Barges, a mile out at sea to the west, is

visible for 17 to 18 nautical miles. The inhabitants are employed largely in sardine and tunny fishing; there are imports of coal, wood, petroleum and phosphates. Boat-building and sardine-preserving are carried on. The town has a sub-prefecture and a tribunal of first instance.

Founded by Basque or Spanish sailors, Sables was the first place in Poitou invaded by the Normans in 817. Louis XI., who went there in 1472, granted the inhabitants various privileges, improved the harbour, and fortified the entrance. Captured and recaptured during the Wars of Religion, the town afterwards became a nursery of hardy sailors and privateers, who harassed the Spaniards and afterwards the English. In 1696 Sables was bombarded by the combined fleets of England and Holland. In the middle of the 18th century hurricanes caused grievous damage to town and harbour.

LES SAINTES-MARIES, a coast village of south-eastern France in the department of Boûches-du-Rhône, 24 m. S.S.W. of Arles by rail. Pop. (1906) 544. Saintes-Maries is situated in the plain of the Camargue, 1½ m. E. of the mouth of the Petit-Rhône. It is the object of an ancient and famous pilgrimage due to the tradition that Mary, sister of the Virgin, and Mary, mother of James and John, together with their black servant Sara, Lazarus, Martha, Mary Magdalen and St Maximin fled thither to escape persecution in Judaea. The relics of the two Maries, who are said to have been buried at Saintes-Maries, are bestowed in the upper storey of the apse of the fortress-church, a remarkable building of the 12th century with crenelated and machicolated walls. Two festivals are held in the town, a less important one in October, the other, on the 24th and 25th of May, unique for its gathering of gipsies who come in large numbers to do honour to the tomb of their patroness Sara, contained in the crypt below the apse.

LESSE, one of the most romantic of the smaller rivers of Belgium. It rises at Ochamps in the Ardennes, and flowing in a north-westerly course reaches the Meuse at Anseremme, a few miles above Dinant. The river is only 49 m. long, but its meandering course may be judged by the fact that it is no more than 29 m. from Ochamps to Anseremme in a straight line. There is a good deal of pretty scenery along this river, as, for instance, at Ciergnon, but the most striking part of the valley is contained in the last 12 m. from Houyet to Anseremme. In this section the river is confined between opposing walls of cliff ranging from 300 to 500 ft. above the river. Here were discovered in the caves near Walzin the bones of prehistoric men, and other evidence of the primitive occupants of this globe at a period practically beyond computation. Another curious natural feature of the Lesse is that on reaching the hill of Han it disappears underground, reappearing about 1 m. farther on at the village of that name. Here are the curious and interesting Han grottoes. The Lesse receives altogether in its short course the water of thirteen tributaries.

LESSEPS, FERDINAND DE (1805-1894). French diplomatist and maker of the Suez Canal, was born at Versailles on the 19th of November 1805. The origin of his family has been traced back as far as the end of the 14th century. His ancestors, it is believed, came from Scotland, and settled at Bayonne when that region was occupied by the English. One of his great-grandfathers was town clerk and at the same time secretary to Queen Anne of Neuberg, widow of Charles II. of Spain, exiled to Bayonne after the accession of Philip V. From the middle of the 18th century the ancestors of Ferdinand de Lesseps followed the diplomatic career, and he himself occupied with real distinction several posts in the same calling from 1825 to 1849. His uncle was ennobled by King Louis XVI., and his father was made a count by Napoleon I. His father, Mathieu de Lesseps (1774-1832), was in the consular service; his mother, Catherine de Grivégnée, was Spanish, and aunt of the countess of Montijo, mother of the empress Eugénie. His first years were spent in Italy, where his father was occupied with his consular duties. He was educated at the College of Henry IV. in Paris. From the age of 18 years to 20 he was employed in the commissary department of the army. From 1825 to 1827 he acted as assistant vice-consul at Lisbon, where his uncle, Barthélemy de Lesseps, was the French chargé d'affaires. This uncle was an old companion of La Pérouse and a survivor of the expedition in which that navigator perished. In 1828 Ferdinand was sent as an assistant vice-consul to Tunis, where his father was consul-general. He courageously aided the escape of Youssouff, pursued by the soldiers of the bey, of whom he was one of the officers, for violation of the seraglio law. Youssouff acknowledged this protection given by a Frenchman by distinguishing himself in the ranks of the French army at the time of the conquest of Algeria. Ferdinand de Lesseps was also entrusted by his father with missions to Marshal Count Clausel, general-in-chief of the army of occupation in Algeria. The marshal wrote to Mathieu de Lesseps on the 18th of December 1830: "I have had the pleasure of meeting your son, who gives promise of sustaining with great credit the name he bears." In 1832 Ferdinand de Lesseps was appointed vice-consul at Alexandria. To the placing in quarantine of the vessel which took him to Egypt is due the origin of his great conception of a canal across the isthmus of Suez. In order to help him to while away the time at the lazaretto, M. Mimaut, consul-general of France at Alexandria, sent him several books, among which was the memoir written upon the Suez Canal, according to Bonaparte's instructions, by the civil engineer Lapère, one of

the scientific members of the French expedition. This work struck de Lesseps's imagination, and gave him the idea of piercing the African isthmus. This idea, moreover, was conceived in circumstances that were to prepare the way for its realization. Mehemet Ali, who was the viceroy of Egypt, owed his position, to a certain extent, to the recommendations made in his behalf to the French government by Mathieu de Lesseps, who was consul-general in Egypt when Mehemet Ali was a simple colonel. The viceroy therefore welcomed Ferdinand affectionately, while Said Pacha, Mehemet's son, began those friendly relations that he did not forget later, when he gave him the concession for making the Suez Canal. In 1833 Ferdinand de Lesseps was sent as consul to Cairo, and soon afterwards given the management of the consulate-general at Alexandria, a post that he held until 1837. While he was there a terrible epidemic of the plague broke out and lasted for two years, carrying off more than a third of the inhabitants of Cairo and Alexandria. During this time he went from one city to the other, according as the danger was more pressing, and constantly displayed an admirable zeal and an imperturbable energy. Towards the close of the year 1837 he returned to France, and on the 21st of December married Mlle Agathe Delamalle, daughter of the government prosecuting attorney at the court of Angers. By this marriage M. de Lesseps became the father of five sons. In 1839 he was appointed consul at Rotterdam, and in the following year transferred to Malaga, the place of origin of his mother's family. In 1842 he was sent to Barcelona, and soon afterwards promoted to the grade of consul-general. In the course of a bloody insurrection in Catalonia, which ended in the bombardment of Barcelona, Ferdinand de Lesseps showed the most persistent bravery, rescuing from death, without distinction, the men belonging to the rival factions, and protecting and sending away not only the Frenchmen who were in danger, but foreigners of all nationalities. From 1848 to 1849 he was minister of France at Madrid. In the latter year the government of the French Republic confided to him a mission to Rome at the moment when it was a question whether the expelled pope would return to the Vatican with or without bloodshed. Following his interpretation of the instructions he had received, de Lesseps began negotiations with the existing government at Rome, according to which Pius IX. should peacefully re-enter the Vatican and the independence of the Romans be assured at the same time. But while he was negotiating, the elections in France had caused a change in the foreign policy of the government. His course was disapproved; he was recalled and brought before the council of state, which blamed his conduct without giving him a chance to justify himself. Rome, attacked by the French army, was taken by assault after a month's sanguinary siege. M. de Lesseps then retired from the diplomatic service, and never afterwards occupied any public office. In 1853 he lost his wife and daughter at a few days' interval. Perhaps his energy would not have been sufficient to sustain him against these repeated blows of destiny if, in 1854, the accession to the viceroyalty of Egypt of his old friend, Said Pacha, had not given a new impulse to the ideas that had haunted him for the last twenty-two years concerning the Suez Canal. Said Pacha invited M. de Lesseps to pay him a visit, and on the 7th of November 1854 he landed at Alexandria; on the 30th of the same month Said Pacha signed the concession authorizing M. de Lesseps to pierce the isthmus of Suez.

A first scheme, indicated by him, was immediately drawn out by two French engineers who were in the Egyptian service, MM. Linant Bey and Mougel Bey. This project, differing from others that had been previously presented or that were in opposition to it, provided for a direct communication between the Mediterranean and the Red Sea. After being slightly modified, the plan was adopted in 1856 by an international commission of civil engineers to which it had been submitted. Encouraged by this approval, de Lesseps no longer allowed anything to stop him. He listened to no adverse criticism and receded before no obstacle. Neither the opposition of Lord Palmerston, who considered the projected disturbance as too radical not to endanger the commercial position of Great Britain, nor the opinions entertained, in France as well as in England, that the sea in front of Port Said was full of mud which would obstruct the entrance to the canal, that the sands from the desert would fill the trenches —no adverse argument, in a word, could dishearten Ferdinand de Lesseps. His faith made him believe that his adversaries were in the wrong; but how great must have been this faith, which permitted him to undertake the work at a time when mechanical appliances for the execution of such an undertaking did not exist, and when for the utilization of the proposed canal there was as yet no steam mercantile marine! Impelled by his convictions and talent, supported by the emperor Napoleon III. and the empress Eugénie, he succeeded in rousing the patriotism of the French and obtaining by their subscriptions more than half of the capital of two hundred millions of francs which he needed in order to form a company. The Egyptian government subscribed for eighty millions' worth of shares. The company was organized at the end of 1858. On the 25th of April 1859 the first blow of the pickaxe was given by Lesseps at Port Said, and on the 17th of November 1869 the canal was officially opened by the Khedive, Ismail Pacha (see Suez Canal). While in the interests of his canal Lesseps had resisted the opposition of British diplomacy to an enterprise which threatened to give to France control of the shortest route to India, he acted loyally towards Great Britain after Lord Beaconsfield had acquired the Suez shares belonging to the Khedive, by frankly admitting to the board of directors of the company three representatives of the British government. The consolidation of interests which resulted, and which has been developed by the addition in 1884 of seven other British directors, chosen from among shipping merchants and business men, has augmented, for the benefit of all concerned, the commercial character of the enterprise.

Ferdinand de Lesseps steadily endeavoured to keep out of politics. If in 1869 he appeared to deviate from this principle by being a candidate at Marseilles for the Corps Législatif, it was because he yielded to the entreaties of the Imperial government in order to strengthen its goodwill for the Suez Canal. Once this goodwill had been shown, he bore no malice towards those who rendered him his liberty by preferring Gambetta. He afterwards declined the other candidatures that were offered him: for the Senate in 1876, and for the Chamber in 1877. In 1873 he became interested in a project for uniting Europe and Asia by a railway to Bombay, with a branch to Peking. He subsequently encouraged Major Roudaire, who wished to transform the Sahara desert into an inland sea. The king of the Belgians having formed an International African Society, de Lesseps accepted the presidency of the French committee, facilitated M. de Brazza's explorations, and acquired stations that he subsequently abandoned to the French government. These stations were the starting-point of French Congo. In 1879 a congress assembled in the rooms of the Geographical Society at Paris, under the presidency of Admiral de la Roncière le Noury, and voted in favour of the making of the Panama Canal. Public opinion, it may be declared, designated Ferdinand de Lesseps as the head of the enterprise. It was upon that occasion that Gambetta bestowed upon him the title of *Le Grand Français*. He was not a man to shirk responsibility, and notwithstanding that he had reached the age of 74, he undertook to carry out the Panama Canal project (see Panama Canal and France: *History*). Politics, which de Lesseps had always avoided, was his greatest enemy in this matter. The winding-up of the Panama Company having been declared in the month of December 1888, the adversaries of the French Republic, seeking for a scandal that would imperil the government, hoped to bring about the prosecution of the directors of the Panama Company. Their attacks were so vigorously made that the government was obliged,

in self-defence, to have judicial proceedings taken against Ferdinand de Lesseps, his son Charles (b. 1849) and his co-workers Fontane and Cottu. Charles de Lesseps, a victim offered to the fury of the politicians, tried to divert the storm upon his head and prevent it from reaching his father. He managed to draw down upon himself alone the burden of the condemnations pronounced. One of the consequences of the persecutions of which he was the object was to oblige him to spend three years, from 1896 to 1899, in England, where his participation in the management of the Suez Canal had won for him some strong friendships, and where he was able to see the great respect in which the memory and name of his father were held by Englishmen.

Ferdinand de Lesseps died at La Chenaie on the 7th of December 1894. He had contracted a second marriage in 1869 with Mlle Autard de Bragard, daughter of a former magistrate of Mauritius; and eleven out of twelve children of this marriage survived him. M. de Lesseps was a member of the French Academy, of the Academy of Sciences, of numerous scientific societies, Grand Cross of the Legion of Honour and of the Star of India, and had received the freedom of the City of London. According to some accounts he was unconscious of the disastrous events that took place during the closing months of his life. Others report that, feeling himself powerless to scatter the gathered clouds, and aware of his physical feebleness, he had had the moral courage to pass in the eyes of his family, which he did not wish to afflict, as the dupe of the efforts they employed to conceal the truth from him. This last version would not be surprising if we relied upon the following portrait, sketched by a person who knew him intimately:—"Simple in his tastes, never thinking of himself, constantly preoccupied about others, supremely kind, he did not and would not recognize such a thing as evil. Of a confiding nature, he was inclined to judge others by himself. This naturally affectionate abandonment that every one felt in him had procured him profound attachments and rare devotions. He showed, while making the Suez Canal, what a gift he possessed for levying the pacific armies he conducted. He set duty above everything, had in the highest degree a reverence for honour, and placed his indomitable courage at the service of everything that was beneficial with an abnegation that nothing could tire. His marvellous physical and moral equilibrium gave him an evenness of temper which always rendered his society charming. Whatever his cares, his work or his troubles, I have never noticed in him aught but generous impulses and a love of humanity carried even to those heroic imprudences of which they alone are capable who devote themselves to the amelioration of humanity." No doubt this eulogy requires some reservations. The striking and universal success which crowned his work on the Suez Canal gave him an absoluteness of thought which brooked no contradiction, a despotic temper before which every one must bow, and against which, when he had once taken a resolution, nothing could prevail, not even the most authoritative opposition or the most legitimate entreaties. He had resolved to construct the Panama Canal without locks, to make it an uninterrupted navigable way. All attempts to dissuade him from this resolution failed before his tenacious will. At his advanced age he went with his youngest child to Panama to see with his own eyes the field of his new enterprise. He there beheld the Culebra and the Chagres; he saw the mountain and the stream, those two greatest obstacles of nature that sought to bar his route. He paid no heed to them, but began the struggle against the Culebra and the Chagres. It was against them that was broken his invincible will, sweeping away in the defeat the work of Panama, his own fortune, his fame and almost an atom of his honour. But this atom, only grazed by calumny, has already been restored to him by posterity, for he died poor, having been the first to suffer by the disaster to his illusions. Political agitators, in order to sap the power of the Opportunist party, did not hesitate to drag in the mud one of the greatest citizens of France. But when the Panama "scandal" has been forgotten, for centuries to come the traveller in saluting the statue of Ferdinand de Lesseps at the entrance of the Suez Canal will pay homage to one of the most powerful embodiments of the creative genius of the 19th century.

See G. Barnett Smith, *The Life and Enterprises of Ferdinand de Lesseps* (London, 1893); and *Souvenirs de quarante ans*, by Ferdinand de Lesseps (trans. by C. B. Pitman). (de B.)

LESSING, GOTTHOLD EPHRAIM

(1729-1781), German critic and dramatist, was born at Kamenz in Upper Lusatia (Oberlausitz), Saxony, on the 22nd of January 1729. His father, Johann Gottfried Lessing, was a clergyman, and, a few years after his son's birth, became *pastor primarius* or chief pastor of Kamenz. After attending the Latin school of his native town, Gotthold was sent in 1741 to the famous school of St Afra at Meissen, where he made such rapid progress, especially in classics and mathematics, that, towards the end of his school career, he was described by the rector as "a steed that needed double fodder." In 1746 he entered the university of Leipzig as a theological student. The philological lectures of Johann Friedrich Christ (1700-1756) and Johann August Ernesti (1707-1781) proved, however, more attractive than those on theology, and he attended the philosophical disputations presided over by his friend A. G. Kästner, professor of mathematics and also an epigrammatist of repute. Among Lessing's chief friends in Leipzig were C. F. Weisse (1726-1804) the dramatist, and Christlob Mylius (1722-1754), who had made some name for himself as a journalist. He was particularly attracted by the theatre then directed by the talented actress Karoline Neuber (1697-1760), who had assisted Gottsched in his efforts to bring the German stage into touch with literature. Frau Neuber even accepted for performance Lessing's first comedy, *Der junge Gelehrte* (1748), which he had begun at school. His father naturally did not approve of these new interests and acquaintances, and summoned him home. He was only allowed to return to Leipzig on the condition that he would devote himself to the study of medicine. Some medical lectures he did attend, but as long as Frau Neuber's company kept together the theatre had an irresistible fascination for him.

In 1748, however, the company broke up, and Lessing, who had allowed himself to become surety for some of the actors' debts, was obliged to leave Leipzig too, in order to escape their creditors. He went to Wittenberg, and afterwards, towards the end of the year, to Berlin, where his friend Mylius had established himself as a journalist. In Berlin Lessing now spent three years, maintaining himself chiefly by literary work. He translated three volumes of Charles Rollin's *Histoire ancienne*, wrote several plays—*Der Misogyn*, *Der Freigeist*, *Die Juden*—and in association with Mylius, began the *Beiträge zur Historie und Aufnahine des Theaters* (1750), a periodical—which soon came to an end—for the discussion of matters connected with the drama. Early in 1751 he became literary critic to the *Vossische Zeitung*, and in this position laid the foundation for his reputation as a reviewer of learning, judgment and wit. At the end of 1751 he was in Wittenberg again, where he spent about a year engaged in

unremitting study and research. He then returned to Berlin with a view to making literature his profession; and the next three years were among the busiest of his life. Besides translating for the booksellers, he issued several numbers of the *Theatralische Bibliothek*, a periodical similar to that which he had begun with Mylius; he also continued his work as critic to the *Vossische Zeitung*. In 1754 he gave a particularly brilliant proof of his critical powers in his *Vademecum für Herrn S. G. Lange*; as a retort to that writer's overbearing criticism, Lessing exposed with scathing satire Lange's errors in his popular translation of Horace.

By 1753 Lessing felt that his position was sufficiently assured to allow of him issuing an edition of his collected writings (*Schriften*, 6 vols., 1753-1755). They included his lyrics and epigrams, most of which had already appeared during his first residence in Berlin in a volume of *Kleinigkeiten*, published anonymously. Much more important were the papers entitled *Rettungen*, in which he undertook to vindicate the character of various writers —Horace and writers of the Reformation period, such as Cochlaeus and Cardanus—who had been misunderstood or falsely judged by preceding generations. The *Schriften* also contained Lessing's early plays, and one new one, *Miss Sara Sampson* (1755). Hitherto Lessing had, as a dramatist, followed the methods of contemporary French comedy as cultivated in Leipzig; *Miss Sara Sampson*, however, marks the beginning of a new period in the history of the German drama. This play, based more or less on Lille's *Merchant of London*, and influenced in its character-drawing by the novels of Richardson, is the first *bürgerliches Trauerspiel*, or "tragedy of common life" in German. It was performed for the first time at Frankfort-on-Oder in the summer of 1755, and received with great favour. Among Lessing's chief friends during his second residence in Berlin were the philosopher Moses Mendelssohn (1729-1786), in association with whom he wrote in 1755 an admirable treatise, *Pope ein Metaphysiker!* tracing sharply the lines which separate the poet from the philosopher. He was also on intimate terms with C. F. Nicolai (1733-1811), a Berlin bookseller and rationalistic writer, and with the "German Horace" K. W. Ramler (1725-1798); he had also made the acquaintance of J. W. L. Gleim (1719-1803), the Halberstadt poet, and E. C. von Kleist (1715-1759), a Prussian officer, whose fine poem. *Der Frühling*, had won for him Lessing's warm esteem.

In October 1755 Lessing settled in Leipzig with a view to devoting himself more exclusively to the drama. In 1756 he accepted the invitation of Gottfried Winkler, a wealthy young merchant, to accompany him on a foreign tour for three years. They did not, however, get beyond Amsterdam, for the outbreak of the Seven Years' War made it necessary for Winkler to return home without loss of time. A disagreement with his patron shortly after resulted in Lessing's sudden dismissal; he demanded compensation and, although in the end the court decided in his favour, it was not until the case had dragged on for about six years. At this time Lessing began the study of medieval literature to which attention had been drawn by the Swiss critics, Bodmer and Breitinger, and wrote occasional criticisms for Nicolai's *Bibliothek der schönen Wissenschaften*. In Leipzig Lessing had also an opportunity of developing his friendship with Kleist who happened to be stationed there. The two men were mutually attracted, and a warm affection sprang up between them. In 1758 Kleist's regiment being ordered to new quarters, Lessing decided not to remain behind him and returned again to Berlin. Kleist was mortally wounded in the following year at the battle of Kunersdorf.

Lessing's third residence in Berlin was made memorable by the *Briefe, die neueste Literatur betreffend* (1759-1765), a series of critical essays—written in the form of letters to a wounded officer—on the principal books that had appeared since the beginning of the Seven Years' War. The scheme was suggested by Nicolai, by whom the *Letters* were published. In Lessing's share in this publication, his critical powers and methods are to be seen at their best. He insisted especially on the necessity of truth to nature in the imaginative presentation of the facts of life, and in one letter he boldly proclaimed the superiority of Shakespeare to Corneille, Racine and Voltaire. At the same time he marked the immutable conditions to which even genius must submit if it is to succeed in its appeal to our sympathies. While in Berlin at this time, he edited with Ramler a selection from the writings of F. von Logau, an epigrammatist of the 17th century, and introduced to the German public the *Lieder eines preussischen Grenadiers*, by J. W. L. Gleim. In 1759 he published *Philotas*, a prose tragedy in one act, and also a complete collection of his fables, preceded by an essay on the nature of the fable. The latter is one of his best essays on criticism, defining with perfect lucidity what is meant by "action" in works of the imagination, and distinguishing the action of the fable from that of the epic and the drama.

In 1760, feeling the need of some change of scene and work, Lessing went to Breslau, where he obtained the post of secretary to General Tauentzien, to whom Kleist had introduced him in Leipzig. Tauentzien was not only a general in the Prussian army, but governor of Breslau, and director of the mint. During the four years which Lessing spent in Breslau, he associated chiefly with Prussian officers, went much into society, and developed a dangerous fondness for the gaming table. He did not, however, lose sight of his true goal; he collected a large library, and, after the conclusion of the Seven Years' War, in 1763, he resumed more enthusiastically than ever the studies which had been partially interrupted. He investigated the early history of Christianity and penetrated more deeply than any contemporary thinker into the significance of Spinoza's philosophy. He also found time for the studies which were ultimately to appear in the volume entitled *Laokoon*, and in fresh spring mornings he sketched in a garden the plan of *Minna von Barnhelm*.

After resigning his Breslau appointment in 1765, he hoped for a time to obtain a congenial appointment in Dresden, but nothing came of this and he was again compelled, much against his will, to return to Berlin. His friends there exerted themselves to obtain for him the office of keeper of the royal library, but Frederick had not forgotten Lessing's quarrel with Voltaire, and declined to consider his claims. During the two years which Lessing now spent in the Prussian capital, he was restless and unhappy, yet it was during this period that he published two of his greatest works, *Laokoon, oder über die Grenzen der Malerei und Poesie* (1766) and *Minna von Barnhelm* (1767). The aim of Laokoon, which ranks as a classic, not only in German but in European literature, is to define by analysis the limitations of poetry and the plastic arts. Many of his conclusions have been corrected and extended by later criticism; but he indicated more decisively than any of his predecessors the fruitful principle that each art is subject to definite conditions, and that it can accomplish great results only by limiting itself to its special function. The most valuable parts of the work are those which relate to poetry, of which he had a much more intimate knowledge than of sculpture and painting. His exposition of the methods of Homer and Sophocles is especially suggestive, and he may be said to have marked an epoch in the appreciation of these writers, and of Greek literature generally. The power of *Minna von Barnhelm*, Lessing's greatest drama, was also immediately recognized. Tellheim, the hero of the comedy, is an admirable study of a manly and sensitive soldier, with somewhat exaggerated ideas of conventional honour; and Minna, the heroine, is one of the brightest and most attractive figures in German comedy. The subordinate characters are conceived with even more force and vividness; and the plot, which reflects precisely the struggles and aspirations of the period that immediately

followed the Seven Years' War, is simply and naturally unfolded.

In 1767 Lessing settled in Hamburg, where he had been invited to take part in the establishment of a national theatre. The scheme promised well, and, as he associated himself with Johann Joachim Christoph Bode (1730-1793), a literary man whom he respected, in starting a printing establishment, he hoped that he might at last look forward to a peaceful and prosperous career. The theatre, however, was soon closed, and the printing establishment failed, leaving behind it a heavy burden of debt. In despair, Lessing determined towards the end of his residence in Hamburg to quit Germany, believing that in Italy he might find congenial labour that would suffice for his wants. The *Hamburgische Dramaturgie* (1767-1768), Lessing's commentary on the performances of the National Theatre, is the first modern handbook of the dramatist's art. By his original interpretation of Aristotle's theory of tragedy, he delivered German dramatists from the yoke of the classic tragedy of France, and directed them to the Greek dramatists and to Shakespeare. Another result of Lessing's labours in Hamburg was the *Antiquarische Briefe* (1768), a series of masterly letters in answer to Christian Adolf Klotz (1738-1771), a professor of the university of Halle, who, after flattering Lessing, had attacked him, and sought to establish a kind of intellectual despotism by means of critical journals which he directly or indirectly controlled. In connexion with this controversy Lessing wrote his brilliant little treatise, *Wie die Alten den Tod gebildet* (1769), contrasting the medieval representation of death as a skeleton with the Greek conception of death as the twin-brother of sleep.

Instead of settling in Italy, as he intended, Lessing accepted in 1770 the office of librarian at Wolfenbüttel, a post which was offered to him by the hereditary prince of Brunswick. In this position he passed his remaining years. For a time he was not unhappy, but the debts which he had contracted in Hamburg weighed heavily on him, and he missed the society of his friends; his health, too, which had hitherto been excellent, gradually gave way. In 1775 he travelled for nine months in Italy with Prince Leopold of Brunswick, and in the following year he married Eva König, the widow of a Hamburg merchant, with whom he had been on terms of intimate friendship. But their happiness lasted only for a brief period; in 1778 she died in childbed.

Soon after settling in Wolfenbüttel, Lessing found in the library the manuscript of a treatise by Berengarius of Tours on transubstantiation in reply to Lanfranc. This was the occasion of Lessing's powerful essay on Berengarius, in which he vindicated the latter's character as a serious and consistent thinker. In 1771 he published his *Zerstreute Anmerkungen über das Epigramm, und einige der vornehmsten Epigrammatisten*—a work which Herder described as "itself an epigram." Lessing's theory of the origin of the epigram is somewhat fanciful, but no other critic has offered so many pregnant hints as to the laws of epigrammatic verse, or defended with so much force and ingenuity the character of Martial. In 1772 he published *Emilia Galotti*, a tragedy which he had begun many years before in Leipzig. The subject was suggested by the Roman legend of Virginia, but the scene is laid in an Italian court, and the whole play is conceived in the spirit of the "tragedy of common life." Its defect is that its tragic conclusion does not seem absolutely inevitable, but the characters—especially those of the Gräfin Orsina and Marinelli, the prince of Guastalla's chamberlain who weaves the intrigue from which Emilia escapes by death, are powerfully drawn. Having completed *Emilia Galotti*, which the younger generation of playwrights at once accepted as a model, Lessing occupied himself for some years almost exclusively with the treasures of the Wolfenbüttel library. The results of these researches he embodied in a series of volumes, *Zur Geschichte und Literatur*, the first being issued in 1773, the last in the year of his death.

The last period of Lessing's life was devoted chiefly to theological controversy. H. S. Reimarus (1694-1768), professor of oriental languages in Hamburg, who commanded general respect as a scholar and thinker, wrote a book entitled *Apologie oder Schutzschrift für die vernünftigen Verehrer Gottes*. His standpoint was that of the English deists, and he investigated, without hesitation, the evidence for the miracles recorded in the Bible. The manuscript of this work was, after the author's death, entrusted by his daughter to Lessing, who published extracts from it in his *Zur Geschichte und Literatur* in 1774-1778. These extracts, the authorship of which was not publicly avowed, were known as the *Wolfenbütteler Fragmente*. They created profound excitement among orthodox theologians, and evoked many replies, in which Lessing was bitterly condemned for having published writings of so dangerous a tendency. His most formidable assailant was Johann Melchior Goeze (1717-1786), the chief pastor of Hamburg, a sincere and earnest theologian, but utterly unscrupulous in his choice of weapons against an opponent. To him, therefore, Lessing addressed in 1778 his most elaborate answers—*Eine Parabel*, *Axiomata*, eleven letters with the title *Anti-Goeze*, and two pamphlets in reply to an inquiry by Goeze as to what Lessing meant by Christianity. These papers are not only full of thought and learning; they are written with a grace, vivacity and energy that make them hardly less interesting to-day than they were to Lessing's contemporaries. He does not undertake to defend the conclusions of Reimarus; his immediate object is to claim the right of free criticism in regard even to the highest subjects of human thought. The argument on which he chiefly relies is that the Bible cannot be considered necessary to a belief in Christianity, since Christianity was a living and conquering power before the New Testament in its present form was recognized by the church. The true evidence for what is essential in Christianity, he contends, is its adaptation to the wants of human nature; hence the religious spirit is undisturbed by the speculations of the boldest thinkers. The effect of this controversy was to secure wider freedom for writers on theology, and to suggest new problems regarding the growth of Christianity, the formation of the canon and the essence of religion. The Brunswick government having, in deference to the consistory, confiscated the *Fragments* and ordered Lessing to discontinue the controversy, he resolved, as he wrote to Elise Reimarus, to try "whether they would let him preach undisturbed from his old pulpit, the stage." In *Nathan der Weise*, written in the winter of 1778-1779, he gave poetic form to the ideas which he had already developed in prose. Its governing conception is that noble character may be associated with the most diverse creeds, and that there can, therefore, be no good reason why the holders of one sect of religious principles should not tolerate those who maintain wholly different doctrines. The play, which is written in blank verse, is too obviously a continuation of Lessing's theological controversy to rank high as poetry, but the representatives of the three religions—the Mahommedan Saladin, the Jew Nathan and the Christian Knight Templar—are finely conceived, and show that Lessing's dramatic instinct had, in spite of other interests, not deserted him. In 1780 appeared *Die Erziehung des Menschengeschlechts*, the first half of which he had published in 1777 with one of the *Fragments*. This work, composed a hundred brief paragraphs, was the last, and is one of the most suggestive of Lessing's writings. The doctrine on which its argument is based is that no dogmatic creed can be regarded as final, but that every historical religion had its share in the development of the spiritual life of mankind. Lessing also maintains that history reveals a definite law of progress, and that occasional retrogression may be necessary for the advance of the world towards its ultimate goal. These ideas formed a striking contrast to the principles both of orthodox and of sceptical writers in Lessing's day, and gave a wholly new direction to religious philosophy. Another work of Lessing's last years, *Ernst und Falk* (a series of five dialogues, of which the

first three were published in 1777, the last two in 1780), also set forth many new points of view. Its nominal subject is freemasonry, but its real aim is to plead for a humane and charitable spirit in opposition to a narrow patriotism, an extravagant respect for rank, and exclusive devotion to any particular church.

Lessing's theological opinions exposed him to much petty persecution, and he was in almost constant straits for money. Nothing, however, broke his manly and generous spirit. To the end he was always ready to help those who appealed to him for aid, and he devoted himself with growing ardour to the search for truth. He formed many new plans of work, but in the course of 1780 it became evident to his friends that he would not be able much longer to continue his labours. His health had been undermined by excessive work and anxiety, and after a short illness he died at Brunswick on the 15th of February 1781. "We lose much in him," wrote Goethe after Lessing's death, "more than we think." It may be questioned whether there is any other writer to whom the Germans owe a deeper debt of gratitude. He was succeeded by poets and philosophers who gave Germany for a time the first place in the intellectual life of the world, and it was Lessing, as they themselves acknowledged, who prepared the way for their achievements. Without attaching himself to any particular system of philosophical doctrine, he fought error incessantly, and in regard to art, poetry and the drama and religion, suggested ideas which kindled the enthusiasm of aspiring minds, and stimulated their highest energies.

Bibliography.—The first edition of Lessing's collected works, edited by his brother Karl Gotthelf Lessing (1740-1812), J. J. Eschenburg and F. Nicolai, appeared in 26 vols. between 1791 and 1794, as a continuation of the *Vermischte Schriften*, edited by Lessing himself in 4 vols. (1771-1785); the *Sämtliche Schriften*, edited by Karl Lachmann, were published in 13 vols. (1825-1828), this edition being subsequently re-edited by W. von Maltzahn (1853-1857) and by F. Muncker (21 vols., 1886 ff.), the last mentioned being the standard edition of Lessing's works. Other editions are *Lessings Werke*, published by Hempel, under the editorship of various scholars (23 vols., 1868-1877); an illustrated edition published by Grote in 8 vols. (1875, new ed., 1882); *Lessings Werke*, edited by R. Boxberger and H. Blümner, in Kürschner's *Deutsche Nationalliteratur*, vols. 58-71 (1883-1890). There are also many popular editions. Lessing's correspondence is included in the Lachmann editions and in that of Hempel (edited by C. C. Redlich, 1879; *Nachträge und Berichtigungen*, 1886); his correspondence with his wife was published as early as 1789 (2 vols., new edition by A. Schöne, 1885). The chief biographies of Lessing are by K. G. Lessing (his brother), (1793-1795, a reprint in Reclam's *Universalbibliothek*); by J. F. Schink (1825); T. W. Danzel and G. E. Guhrauer (1850-1853, 2nd ed. by W. von Maltzahn and R. Boxberger, 2 vols., 1880-1881); A. Stahr (2 vols., 1859, 9th ed., 1887); J. Sime, *Lessing, his Life and Works* (2 vols., 1877); H. Zimmern, *Lessing's Life and Works* (1878); H. Düntzer, *Lessings Leben* (1882); E. Schmidt, *Lessing, Geschichte seines Lebens und seiner Schriften* (2 vols., 1884-1892, 3rd ed., 1910)—this is the most complete biography; T. W. Rolleston, *Lessing* (in "Great Writers," 1889); K. Borinski, *Lessing* (2 vols., 1900). Cf. also C. Hebler, *Lessing-Studien* (1862); A. Lehmann, *Forschungen über Lessings Sprache* (1875); W. Cosack, *Materialien zu Lessings Hamburgischer Dramaturgie* (1876, 2nd ed., 1891); H. Blümner, *Lessings Laokoon* (1876, 2nd ed., 1880); H. Blümner, *Laokoon-Studien* (2 vols., 1881-1882); K. Fischer, *Lessing als Reformator der deutschen Literatur dargestellt* (2 vols., 1881, 2nd ed., 1888); B. A. Wagner, *Lessing-Forschungen* (1881); J. W. Braun, *Lessing im Urteile seiner Zeitgenossen* (2 vols., 1884); P. Albrecht, *Lessings Plagiate* (6 vols., 1890 ff.); K. Werder, *Vorlesungen über Lessings Nathan* (1892); G. Kettner, *Lessings Dramen im Lichte ihrer und unsrer Zeit* (1904). Translations of Lessing's *Dramatic Works* (2 vols., 1878), edited by E. Bell, and of *Laokoon, Dramatic Notes and the Representation of Death by the Ancients*, by E. C. Beasley and H. Zimmern (1 vol., 1879), will be found in Bohn's "Standard Library."

(J. Sɪ.; J. G. R.)

LESSON (through Fr. *leçon* from Lat. *lectio*, reading; *legere*, to read), properly a certain portion of a book appointed to be read aloud, or learnt for repetition, hence anything learnt or studied, a course of instruction or study. A specific meaning of the word is that of a portion of Scripture or other religious writings appointed to be read at divine service, in accordance with a table known as a "lectionary." In the Church of England the lectionary is so ordered that most of the Old Testament is read through during the year as the First Lesson at Morning and Evening Prayer, and as the Second Lesson the whole of the New Testament, except Revelation, of which only portions are read. (See Lection and Lectionary.)

LESTE, a desert wind, similar to the Leveche (*q.v.*), observed in Madeira. It blows from an easterly direction in autumn, winter and spring, rarely in summer, and is of intense dryness, sometimes reducing the relative humidity at Funchal to below 20%. The Leste is commonly accompanied by clouds of fine red sand.

L'ESTRANGE, SIR ROGER (1616-1704), English pamphleteer on the royalist and court side during the Restoration epoch, but principally remarkable as the first English man of letters of any distinction who made journalism a profession, was born at Hunstanton in Norfolk on the 17th of December 1616. In 1644, during the civil war, he headed a conspiracy to seize the town of Lynn for the king, under circumstances which led to his being condemned to death as a spy. The sentence, however, was not executed, and after four years' imprisonment

in Newgate he escaped to the Continent. He was excluded from the Act of Indemnity, but in 1653 was pardoned by Cromwell upon his personal solicitation, and lived quietly until the Restoration, when after some delay his services and sufferings were acknowledged by his appointment as licenser of the press. This office was administered by him in the spirit which might be expected from a zealous cavalier. He made himself notorious, not merely by the severity of his literary censorship, but by his vigilance in the suppression of clandestine printing. In 1663 (see NEWSPAPERS) he commenced the publication of the *Public Intelligencer* and the *News*, from which eventually developed the famous official paper the *London Gazette* in 1665. In 1679 he again became prominent with the *Observator*, a journal specially designed to vindicate the court from the charge of a secret inclination to popery. He discredited the Popish Plot, and the suspicion he thus incurred was increased by the conversion of his daughter to Roman Catholicism, but there seems no reason to question the sincerity of his own attachment to the Church of England. In 1687 he gave a further proof of independence by discontinuing the *Observator* from his unwillingness to advocate James II.'s Edict of Toleration, although he had previously gone all lengths in support of the measures of the court. The Revolution cost him his office as licenser, and the remainder of his life was spent in obscurity. He died in 1704. It is to L'Estrange's credit that among the agitations of a busy political life he should have found time for much purely literary work as a translator of Josephus, Cicero, Seneca, Quevedo and other standard authors.

LESUEUR, DANIEL, the pseudonym of JEANNE LAPANZE, *née* Loiseau (1860-), French poet and novelist, who was born in Paris in 1860. She published a volume of poems, *Fleurs d'avril* (1882), which was crowned by the Academy. She also wrote some powerful novels dealing with contemporary life: *Le Mariage de Gabrielle* (1882); *Un Mystérieux Amour* (1892), with a series of philosophical sonnets; *L'Amant de Geneviève* (1883); *Marcelle* (1885); *Une Vie tragique* (1890); *Justice de femme* (1893); *Comédienne Haine d'amour* (1894); *Honneur d'une femme* (1901); *La Force du passé* (1905). Her poems were collected in 1895. She published in 1905 a book on the economic status of women, *L'Évolution féminine*; and in 1891-1893 a translation (2 vols.) of the works of Lord Byron, which was awarded a prize by the Academy. Her *Masque d'amour*, a five-act play based on her novel (1904) of the same name, was produced at the Théâtre Sarah Bernhardt in 1905. She received the ribbon of the Legion of Honour in 1900, and the prix Vitet from the French Academy in 1905. She married in 1904 Henry Lapanze (b. 1867), a well-known writer on art.

LE SUEUR, EUSTACHE (1617-1655), one of the founders of the French Academy of painting, was born on the 19th of November 1617 at Paris, where he passed his whole life, and where he died on the 30th of April 1655. His early death and retired habits have combined to give an air of romance to his simple history, which has been decorated with as many fables as that of Claude. We are told that, persecuted by Le Brun, who was jealous of his ability, he became the intimate friend and correspondent of Poussin, and it is added that, broken-hearted at the death of his wife, Le Sueur retired to the monastery of the Chartreux and died in the arms of the prior. All this, however, is pure fiction. The facts of Le Sueur's life are these. He was the son of Cathelin Le Sueur, a turner and sculptor in wood, who placed his son with Vouet, in whose studio he rapidly distinguished himself. Admitted at an early age into the guild of master-painters, he left them to take part in establishing the academy of painting and sculpture, and was one of the first twelve professors of that body. Some paintings, illustrative of the Hypnerotomachia Polyphili, which were reproduced in tapestry, brought him into notice, and his reputation was further enhanced by a series of decorations (Louvre) in the mansion of Lambert de Thorigny, which he left uncompleted, for their execution was frequently interrupted by other commissions. Amongst these were several pictures for the apartments of the king and queen in the Louvre, which are now missing, although they were entered in Bailly's inventory (1710); but several works produced for minor patrons have come down to us. In the gallery of the Louvre are the "Angel and Hagar," from the mansion of De Tonnay Charente; "Tobias and Tobit," from the Fieubet collection; several pictures executed for the church of Saint Gervais; the "Martyrdom of St Lawrence," from Saint Germain de l'Auxerrois; two very fine works from the destroyed abbey of Marmoutiers; "St Paul preaching at Ephesus," one of Le Sueur's most complete and thorough performances, painted for the goldsmith's corporation in 1649; and his famous series of the "Life of St Bruno," executed in the cloister of the Chartreux. These last have more personal character than anything else which Le Sueur produced, and much of their original beauty survives in spite of injuries and restorations and removal from the wall to canvas. The Louvre also possesses many fine drawings (reproduced by Braun), of which Le Sueur left an incredible quantity, chiefly executed in black and white chalk His pupils, who aided him much in his work, were his wife's brother, Th. Goussé, and three brothers of his own, as well as Claude Lefebvre and Patel the landscape painter.

Most of his works have been engraved, chiefly by Picart, B. Audran, Seb. Leclerc, Drevet, Chauveau, Poilly and Desplaces. Le Sueur's work lent itself readily to the engraver's art, for he was a charming draughtsman; he had a truly delicate perception of varied shades of grave and elevated sentiment, and possessed the power to render them. His graceful facility in composition was always restrained by a very fine taste, but his works often fail to please completely, because, producing so much, he had too frequent recourse to conventional types, and partly because he rarely saw colour except with the cold and clayey quality proper to the school of Vouet; yet his "St Paul at Ephesus" and one or two other works show that he was not naturally deficient in this sense, and whenever we get direct reference to nature—as in the monks of the St Bruno series—we recognize his admirable power to read and render physiognomy of varied and serious type.

See Guillet de St Georges, *Mém. inéd.*; C. Blanc, *Histoire des peintres*; Vitet, *Catalogue des tableaux du Louvre*; d'Argenville, *Vies des peintres.*

LESUEUR, JEAN FRANÇOIS (1760 or 1763-1837), French musical composer, was born on the 15th of January 1760 (or 1763) at Drucat-Plessiel, near Abbeville. He was a choir boy in the cathedral of Amiens, and then became musical director at various churches. In 1786 he obtained by open competition the musical directorship of the cathedral of Notre-Dame in Paris, where he gave successful performances of sacred music with a full orchestra. This place he resigned in 1787; and, after a retirement of five years in a friend's country house, he produced *La Caverne* and two other operas at the Théâtre Feydeau in Paris. At the foundation of the Paris Conservatoire (1795) Lesueur was appointed one of its inspectors of studies, but was dismissed in 1802, owing to his disagreements with Méhul. Lesueur succeeded G. Paisiello as *Maestro di cappella* to Napoleon, and produced (1804) his *Ossian* at the Opéra. He also composed for the emperor's coronation a mass and a Te Deum. Louis XVIII., who had retained Lesueur in his court, appointed him (1818) professor of composition at the Conservatoire; and at this institution he had, among many other pupils, Hector Berlioz, Ambroise Thomas, Louis Désiré, Besozzi and Charles Gounod. He died on the 6th of October 1837. Lesueur composed eight operas and several masses, and other sacred music. All his works are written in a style of rigorous simplicity.

See Raoul Rochette, *Les Ouvrages de M. Lesueur* (Paris, 1839).

LE TELLIER, MICHEL (1603-1685), French statesman, was born in Paris on the 19th of April 1603. Having entered the public service he became maître des requêtes and in 1640 intendant of Piedmont; in 1643, owing to his friendship with Mazarin, he became secretary of state for military affairs, being an efficient administrator. In 1677 he was made chancellor of France and he was one of those who influenced Louis XIV. to revoke the Edict of Nantes. He died on the 30th of October 1685, a few days after the revocation had been signed. Le Tellier, who amassed great wealth, left two sons, one the famous statesman Louvois and another who became archbishop of Reims. His correspondence is in the Bibliothèque nationale in Paris.

See L. Caron, *Michel Le Tellier, intendant d'armée au Piémont* (Paris, 1881).

Another Michel le Tellier (1643-1719) Was confessor of the French king Louis XIV. Born at Vire on the 16th of December 1643 he entered the Society of Jesus and later became prominent in consequence of his violent attacks on the Jansenists. He was appointed provincial of his order in France, but it was not until 1709 that he became the king's confessor. In this capacity all his influence was directed towards urging Louis to further persecutions of the Protestants. He was exiled by the regent Orleans, but he had returned to France when he died at La Flèche on the 2nd of September 1719.

LETHAL (Lat. *lethalis*, for *letalis*, deadly, from *letum*, death; the spelling is due to a confusion with Gr. λήθη, forgetfulness), an adjective meaning "deadly," "fatal," especially as applied to weapons, drugs, &c. A "lethal chamber" is a room or receptacle in which animals may be put to death painlessly, by the admission of poisonous gases.

LETHARGY (Gr. ληθαργία, from λήθη, forgetfulness), drowsiness, torpor. In pathology the term is used of a morbid condition of deep and lasting sleep from which the sufferer can be with difficulty and only temporarily aroused. The term Negro or African lethargy was formerly applied to the disease now generally known as "sleeping sickness" (*q.v.*).

LETHE ("Oblivion"), in Greek mythology, the daughter of Eris (Hesiod, *Theog.* 227) and the personification of forgetfulness. It is also the name of a river in the infernal regions. Those initiated in the mysteries were taught to distinguish two streams in the lower world, one of memory and one of oblivion. Directions for this purpose,

written on a gold plate, have been found in a tomb at Petilia, and near Lebadeia, at the oracle of Trophonius, which was counted an entrance to the lower world, the two springs Mnemosyne and Lethe were shown (Pausanias ix. 39. 8). This thought begins to appear in literature in the end of the 5th century B.C., when Aristophanes (*Frogs*, 186) speaks of the plain of Lethe. Plato (*Rep.* x.) embodies the idea in one of his finest myths.

LE TRÉPORT, a maritime town of northern France in the department of Seine-Inférieure, on the English Channel, at the mouth of the Bresle, 114 m. N.N.W. of Paris on the Northern railway. Pop. (1906) 4619. Owing to its nearness to the capital, Le Tréport is a favourite watering-place of the Parisians. A good view is obtained from Mont Huon, which rises to the south-west of the town. The mouth of the Bresle forms a small port, comprising an outer tidal harbour and an inner dock accessible to vessels drawing from 13 to 16 ft. The fisheries and oyster parks with their dependent industries, shipbuilding and glass manufacture, furnish the chief occupations of the inhabitants. Coal, timber, ice and jute are imported; *articles de Paris*, sugar, &c., are exported. The chief buildings are the church of St Jacques (16th century), which has finely carved vaulting and good modern stained glass, and the casino erected 1896-1897. About 1 m. north-east of Le Tréport is the small bathing resort of Mers. The Eu-Tréport canal, uniting the two towns, has a length of about 3 m., and is navigable by vessels drawing 14 ft. Le Tréport (the ancient *Ulterior Portus*) was a port of some note in the middle ages and suffered from the English invasions. Louis Philippe twice received Queen Victoria here.

LETRONNE, JEAN ANTOINE (1787-1848), French archaeologist, was born at Paris on the 25th of January 1787. His father, a poor engraver, sent him to study art under the painter David, but his own tastes were literary, and he became a student in the Collège de France, where it is said he used to exercise his already strongly developed critical faculty by correcting for his own amusement old and bad texts of Greek authors, afterwards comparing the results with the latest and most approved editions. From 1810 to 1812 he travelled in France, Switzerland and Italy, and on his return to Paris published an *Essai critique sur la topographie de Syracuse* (1812), designed to elucidate Thucydides. Two years later appeared his *Recherches géographiques et critiques on the De Mensura Orbis Terrae* of Dicuil. In 1815 he was commissioned by government to complete the translation of Strabo which had been begun by Laporte-Dutheil, and in March 1816 he was one of those who were admitted to the Academy of Inscriptions by royal ordinance, having previously contributed a *Mémoire*, "On the Metrical System of the Egyptians," which had been crowned. Further promotion came rapidly; in 1817 he was appointed director of the École des Chartes, in 1819 inspector-general of the university, and in 1831 professor of history in the Collège de France. This chair he exchanged in 1838 for that of archaeology, and in 1840 he succeeded Pierre C. François Daunou (1761-1840) as keeper of the national archives. Meanwhile he had published, among other works, *Considérations générales sur l'évaluation des monnaies grecques et romaines et sur la valeur de l'or et de l'argent avant la découverte de l'Amérique* (1817), *Recherches pour servir à l'histoire d'Égypte pendant la domination des Grecs et des Romains* (1823), and *Sur l'origine grecque des zodiaques prétendus égyptiens* (1837). By the last-named he finally exploded a fallacy which had up to that time vitiated the chronology of contemporary Egyptologists. His *Diplômes et Chartres de l'époque Mérovingienne sur papyrus et sur vélin* were published in 1844. The most important work of Letronne is the *Recueil des inscriptions grecques et latines de l'Égypte*, of which the first volume appeared in 1842, and the second in 1848. He died at Paris on the 14th of December 1848.

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