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ROMAN NATURAL HISTORY AND
SCIENCE, AND ROMAN MEDICINE.

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VIII. 3 NATURAL HISTORY AND
SCIENCE.

VIII. 4. MEDICINE.

VIII. 3. NATURAL HISTORY AND SCIENCE.

1068. THE knowledge which the Romans possessed on these subjects was derived, broadly speaking, from the Greeks. Only one Latin writer, the elder Pliny (23—79 A.D.), takes an independent position in *Natural History*, a term which he was apparently the first to use. He met his death while observing the eruption of Vesuvius, A.D. 79. He belongs, with Varro, to the class of Roman Encyclopaedists, and wrote many works, all of which have perished except the *Naturalis Historia*. This memorable book, the only Roman contribution to Natural Science, was compiled in two years from two thousand works, and contains twenty thousand 'noteworthy observations' in thirty-seven books. It comprises Cosmogony, Geography, Anthropology, Zoology, Botany, Medicine (especially Pharmacology) and Mineralogy, all treated with special reference to their practical utility in various crafts and arts. The whole forms a wonderful repertory of the knowledge of the ancients on these subjects. In the present place, it is only possible to consider the sections on *Natural History* and *Medicine*.

1069. Pliny's observations on Botany are not wanting in originality, though they lack scientific precision. He mentions about one thousand

species, many of which he must have seen and handled. Some he learnt to know in the botanic garden of a Greek physician in Rome, Antonius Castor. His references to the localities of different plants and their place in folk-lore are valuable; such, for instance, as the cult of the Mistletoe by the Druids in Gaul and Britain (xvi 249). The Zoology is more imperfect than the Botany. There are some good observations but also a good many absurd legends and fables, many of which have passed into the popular literature of Europe. His observations on precious stones, minerals, and pigments are important, in relation to the use of these substances in Medicine and the Fine Arts. He gives a long account of drugs and their uses, and quotes many popular medical receipts derived from old Roman folk-lore, which have some antiquarian interest. The great work of Pliny is, in fact, so marvellous a compendium of ancient Science that its popularity in successive ages is not surprising. Received in the Middle Ages with unquestioning belief, it was, in the subjects of which it treats, the great storehouse of knowledge for the learned world, and many parts have gone down deep into popular literature. Studied in a critical spirit, Pliny, though no longer a scientific authority, is of the highest value to the historian of Science; and his importance in this respect is likely rather to increase than diminish. (Cp. § 997 *supra*. On Seneca's *Naturales Quaestiones*, cp. § 993.)

1070. There is no trace of the science of number being studied or used by the Romans, except for practical purposes. Their well-known numeral system is supposed to have been derived from the Etruscans. They calculated on their fingers, and on the *ābācus*, a board or tray divided into spaces and strewn with sand. Mental arithmetic was taught in schools, at least in the time of St Augustine. But the science attained no higher development.

Science.

Mathematics.

Arithmetic.

1071. Geometry, in its original sense of Land-measuring, was used by the Romans, from early times, as a practical art, especially for the orientation of temples, and the laying out of camps and of cities. They used a simple levelling instrument, the *grōma*, from which writers on this subject were called *grōmātīci*. The chief of these were Frontinus, Hyginus, Balbus, Nipsus, Epaphrōditus, and Vitruvius Rufus. The lost encyclopaedia of Varro included some mathematics. Practical surveyors, *Agrimensōres*, called in earlier times *Finītōres*, formed a distinct profession or official class. Their duties were to divide and mark out the land in new colonies, and to determine the boundaries of private properties. In the latter case, they were directed by legal authority, or called in by the proprietors themselves. They obtained instruction in practical geometry from regular teachers. Whether these teachers were Greeks or not, there is no certain evidence. The great survey of the Roman Empire, meditated by Iulius Caesar, and carried out by Augustus, was entrusted to M. Vipsanius Agrippa and Balbus, showing that some

Geometry.

Romans at least were familiar with the subject. The perfection of Roman camps and roads, as seen in existing remains, is evidence of the high level to which the art was carried.

1072. The Romans produced no original science of Astronomy, and added nothing to what they learned from the Greeks. The imperfection of their own knowledge is shown by the extreme inaccuracy of their old Calendar (attributed to Romulus and Numa), and by the fact that their names for the constellations were, with few exceptions (such as *Septemtriones* and *Libra*), mere translations from the Greek. The earliest instance of accurate knowledge is the prediction¹ of an eclipse of the moon by C. Sulpicius Gallus on the eve of the battle of Pydna, 168 B.C. (Liv. xlv 37). When Iulius Caesar, as Pontifex Maximus, reformed the Calendar, though he had himself (it is said) written a book on Astronomy (Plin. xviii 57) he called in Sōsigēnēs, a Peripatetic philosopher, for scientific aid. The encyclopaedic writers, Varro and Pliny, treated of Astronomy, and it became a popular subject in the literary circles of Rome. The astronomical poems of Aratus seem, however, to have been more read than the works of Hipparchus and Ptolemy. These poems were translated into Latin by Cicero, Germanicus Caesar, and Rufus Auienus, which versions, more or less fragmentary, were first printed by Aldus in the *Astronomici Veteres* (Venice, 1499). The poem of M. Manilius, *Astronomica*, dedicated to Augustus, is the most considerable Latin work on the subject, but it is mainly on Astrology, the astronomical part being founded on Aratus. Columella, Vitruvius, C. Iulius Hygīnus, also wrote on Astronomy, and so did, it is said, Andrōnicus, physician to Nero. The numerous astronomical passages in Lucretius, Virgil and Ovid (*cum sole et luna semper Aratus erit*) are well known. Although the Romans added nothing to the science of Astronomy, Astrology became very popular at Rome, as is shown by the number of penal enactments directed against astrologers, who were called Chaldaeans, or *Mathematici*. The most important astrological writer was Iulius Firmicus Māternus (4th century), whose work (*Matheseos Libri viii*) was printed in the Aldine collection, and later.

S. Günther, *Geschichte der Mathematik und der Naturwissenschaften in Alterthum*, in Iwan von Müller's *Handbuch*, v (1), ed. 2, 1894.
 Bibliography. Sir G. C. Lewis, *Historical Survey of the Astronomy of the Ancients*, 1862. J. L. Heiberg's chapter on *Exacte Wissenschaften und Medizin*, in Gercke and Norden's *Einleitung in die Altertumswissenschaft*, ii (1910) 391—432 (dealing mainly with the Greek side of these topics), was published when pages 712—727 were already in type.

¹ Perhaps only the explanation; cp. Cic. *De Rep.* i 23.

VIII. 4. MEDICINE.

1073. THE history of Roman Medicine falls into two clearly marked periods,—one before the introduction of Greek medicine, the other after. In the latter period it means chiefly the history of Greek medicine at Rome. The Pre-Hellenic Roman medicine is known chiefly from Cato and Pliny, from fragments of other writers, from Laws and Inscriptions, and many allusions in Latin authors.

Medicine.

Pliny's assertion (xxix 11) that the Romans, like many other nations, did without physicians, though not without medicine, for six hundred years, cannot be taken literally. The Romans, though they had framed no organised art and science of medicine (like that of the Greeks, the Egyptians or the great nations of the East), had nevertheless their own methods of dealing with diseases and injuries. These methods resembled in the main those of other peoples, ancient and modern, which have not adopted the scientific medicine originated by the Greeks. Appeal to supernatural powers was the chief resource of the ministers of the healing art. Thus, in times of pestilence, processions and special supplications of the old Roman divinities were instituted. In such proceedings, the priestly class was necessarily dominant, and thus there was no encouragement given to the growth of a distinct medical profession. But, gradually, an empirical art of rough surgery and simple domestic medicine, with some admixture of magical folk-lore, grew up; which, though largely practised by the *paterfamilias* (as in the case of Cato), had also its regular practitioners. For the word *mēdicus* is an old Roman word (not Greek), and occurs in the *Lex Aquilia* of the 3rd century B.C. Pliny gives the names of one or two old Roman physicians. This was lay-medicine, not sacerdotal. Thus the old Roman medicine consisted of three branches:—(1) Sacred rites paid to the higher Gods of Healing; (2) Deprecatory rites paid to the malevolent deities who caused special diseases; (3) An empirical popular medicine.

1074. Among the ancient gods of healing, the chief was *Sālus*, an old Roman or Sabine goddess, whose temple stood on the *Mons Salutaris*, one of the summits of the Quirinal. Another was the goddess *Carna*, invoked to preserve the health of the bodily organs, and spoken of by Ovid (*Fasti*, vi 101 f), as protecting children from the '*strigae*' or destructive birds of the night. In the 5th century B.C., on occasion of a pestilence, a temple was dedicated to Apollo, who was later honoured as *Apollo Medicus*. Mars also was regarded as the protector against plagues and other diseases. A large number of divinities presided over married life and child-birth, such as *Carmenta*, honoured by women at the festival of the *Carmentalia*, *Lūcīna* (*Iuno*), the moon-goddess, whose attributes are well known, with other

Gods of healing.

female and some male divinities. It has been reckoned that at least twenty gods and goddesses might exercise their powers at one child-birth¹.

1075. A remarkable feature of Roman religious medicine was the recognition of special divinities as the authors of diseases. Cicero (*De Nat. Deorum*, iii 63) remarks on the impropriety of paying religious rites to the injurious powers of nature, *Febris*, *Tempestates*, *Mala Fortuna*. The goddess *Febris* must have had a special importance in a place so ravaged by fevers as Rome and its vicinity. We hear also of a *Dea Mefitis* (for malaria), *Dea Angerōna* (for *angina*, ἄγχονη, or inflammation of the throat); and even, it is said, *Dea Scabies* (for the itch). (In some parts of India a special goddess of small-pox is still recognised and worshipped.)

1076. The empirical domestic medicine of early Rome is known chiefly from Pliny's *Natural History* and from some fragments of Cato. Cato, with his well-known hostility to Greek learning, preferred the traditions of his forefathers and his own personal experience. He wrote a *Commentarium*, extant in Pliny's time though now lost, for the instruction of his son, whom he forbade to consult Greek physicians. There are a few medical precepts in his treatise *De agri cultura*. His therapeutic methods consisted chiefly in the use of simples, mostly herbs, with some rough surgery of wounds and injuries. Cabbage was a remedy for almost every ailment, a prescription quoted with approval by Pliny (xix 136; xx 78). Charms and incantations were also used. So, in treating a dislocation, splints made of reeds were to be applied, and at the same time certain unintelligible words were to be sung (Cato, c. 160). Pliny, though sceptical as to the value of incantations, does not omit to mention some of them (xxviii 10—21). This magical element (which the classical Greek medicine, alone of all the ancient medical systems, repudiated) formed an important part of Roman popular medicine, as it has done among other peoples, and in later ages, even to the present day. It reappears in *Marcellus Empiricus* (c. 400 A.D.), along with other medical folk-lore. We must not suppose, therefore, that, when Greek medicine was introduced into Rome, the old system was extinguished. Doubtless it remained the medical creed of the great mass of the people, among whom Greek ideas hardly penetrated.

The cardinal dates in the history of Greek medicine at Rome are the introduction of the worship of Asklepīos (293 B.C.); and the arrival of the Greek physicians, Archagathus (219 B.C.), Asclepiades (c. 100 B.C.), and Galen (163 A.D.).

1077. On the occasion of a severe pestilence at Rome, 293 B.C., the Sibylline books were consulted, and the advice thence obtained was to apply for relief to the Greek divinity, Asklepīos, at his temple in Epidaurus. The Roman envoys who proceeded thither were directed by the *Asclepiads*, or priests of the temple, to found a similar temple at Rome, and were presented with a sacred serpent, which should confer sanctity on the new

Introduction
of Greek
medicine.

Worship of
Asklepīos
(Aesculapius).

¹ Ivan Bloch, in Neuburger and Pagel's *Geschichte der Medizin*, 1902, i 404.

shrine. Accordingly a temple was built on an island of the Tiber where the sacred creature landed (Livy, x 47; Plin. xxix 72). Apart from certain alleged miracles, the whole story is quite probable; for recent researches at Epidaurus have shown that the serpents were an essential part of the cult, and were made to appear to worshippers by special contrivances. (Richard Caton, M.D., *The Temples and Ritual of Asklepios*.) As the pestilence soon ceased, the popularity of the new sanctuary was assured; and it is probable that the cult of the God of Healing was celebrated with the same rites as at Epidaurus. Remains of baths have been found, with coins bearing the effigies of Asklepios and the serpent, and *donaria* or votive offerings in the shape of models of various parts of the body. There was a hospital for the reception of the sick, but it is not certain that this was founded before the time of Antoninus Pius. A law of Claudius orders that slaves sent to the island for cure, and neglected by their masters, should receive their freedom (Suet. *Claudius*, 25). Neither Galen nor Celsus refers to the Asclepian cult at Rome; it appears to have remained quite distinct from the regular medicine, being purely theurgic.

1078. Probably after this, Greek physicians from time to time found their way to Rome, but there is no certain record of any having done so before Archagäthus, a Spartan, who, according to Pliny (xxix 12 f), came in 219 B.C. He was favourably received, was granted the right of Roman citizenship, and had an office bought for him at the public expense. He was preeminently a surgeon; and the boldness and success with which he practised this Greek art, won for him at first the admiration of the Romans, who gave him the epithet *uolnerarius*; but the severity of his operations at length caused a revulsion of feeling, and he became known as *carnifex*. Pliny, who relates these stories, implies that Greek medicine and its practisers were generally condemned, though he admits that physicians were exempted when Greeks generally were banished from Italy. It is probable that he exaggerates the prejudices against them; and that, after the subjugation of Hellas, physicians accompanied the Greek rhetoricians, artists, athletes and others who flocked to Rome as the centre of wealth and patronage. The discipline of the *gymnasia* and athletic schools implied medical aid, and these institutions must be regarded as having been, in a minor degree, medical.

Greek
physicians in
Rome.
Archagathus.

1079. The first eminent Greek physician at Rome was Asclēpiādēs of Prusa in Bithynia (born *c.* 124 B.C.). The little that is known of his life is from allusions in Pliny, Celsus and Galen. He probably came to Rome soon after 100 B.C. Pliny, whose account is prejudiced, says that he was first a teacher of rhetoric, and, finding this career unprofitable, became a physician, without previous training. The latter statement must be erroneous, and the former may only be founded on the reputation which Asclepiades acquired for eloquence and culture. He seems to have soon gained the friendship

Asclepiades.

of distinguished men, such as L. Crassus, Q. Mucius, M. Antonius. Cicero, though of a younger generation, might have known him, and in his dialogue *De Oratore* (i 62) makes Crassus refer to his eloquence, as well as his medical skill. The story of his meeting a funeral, and of his declaring that the supposed corpse was not really dead, and bringing it back to life, is evidence (if, indeed, it was not the occasion) of his popularity with the lower classes. His fame was also high in his own profession, as we see from Celsus, who often quotes him, and from Galen, who controverts his views with respect. He wrote, in Attic Greek, at least twenty medical treatises, of which the titles are known, though only a few fragments have survived. The medical theory of Asclepiades was founded on the atomic philosophy of Democritus and Epicurus. In his practice he inclined to the rule of the Stoics, 'to live according to nature'. Thus he touched the philosophy of Lucretius on the one hand; while, on the other, he gained the respect of those high-minded Romans who followed the Stoic rule. According to Asclepiades, the human body was composed of atoms, so arranged as to form passages or channels, through which the juices of the body passed. Disease consisted in a disproportion between the atoms and the passages; so that, if the latter were constricted, stoppages or congestions followed. He rejected the Hippocratic doctrine of the humours, and the conception of a *materies morbi*, which had to be eliminated by nature with the help of art. Hence he disapproved of the violent purgings and vomitings by which the Hippocratics thought to get rid of the morbid matter. His object was to remove obstructions and morbid conditions by regulating the size of the passages and the movement of the atoms; and this was to be effected chiefly by mechanical and physical means; by diet, exercise, massage, and an energetic cold-water cure. Of drugs he made little account, but he regarded wine as an almost universal remedy. His motto was to cure the patient *cito, tuto, iucunde*. Pliny says that these methods of Asclepiades so commended themselves to the natural man, as to account for his great popularity (xxvi 13).

1080. The theoretical system of Asclepiades was the basis of the *Methodic school* (as developed by his followers Thēmison, Soranus, and later, Caelius Aurelianus), the doctrines of which are even less congruous with modern medicine than the Humoral Pathology of Hippocrates and Galen. But his practical methods represent a very important side of Therapeutics, and one which is increasingly valued. Imperfectly as he is known, Asclepiades must be regarded as one of the greatest physicians of antiquity. (Cp. Hans von Vilas, *Asklepiades von Bithynien*, Wien, 1903.)

1081. A feature of Roman culture, after it was stimulated by Greek thought, was a desire for general information on all subjects; and more than one writer met this need by compiling an Encyclopaedia of all that an educated gentleman ought to know. Such was Varro's *Disciplinae*; such also, though more special, the

The Methodic School.

The Roman Encyclopaedists.

Natural History of Pliny; and, lastly, the work (preserved only in part) of Cornelius Celsus. His treatise *De Medicina* is the second part of a large work in six parts, the first of which was on Agriculture, the third on the Military Art, the fourth on Rhetoric, the fifth on Philosophy, the sixth on Jurisprudence. Only the second and a fragment of the fourth remain. It is generally agreed that the work on Medicine must have been written in the reign of Tiberius. Nothing is known of the life of Celsus. He is referred to as a medical author by Pliny (xx 29), by Columella, as a contemporary authority on agriculture, and by Quintilian, as a general writer of moderate ability, *mediocri uir ingenio*. It is clear that he was not a professional doctor, but a Roman patrician, who, like Cato, took medical charge of his own family and slaves. He himself refers to practice in the *ualetudinaria* or slave-infirmaries. The work of Celsus is never mentioned by any ancient medical writer, and must have been intended for the lay public. Its clear and elegant style has always been admired. It must be regarded as, in the main, a compendium of Greek medicine for Latin readers. Its Greek origin is shown by the references to, and the tacit borrowing from, the works of Hippocrates, and some Alexandrian physicians, along with writers of the Methodic school, as Asclepiades and Themison. The debt of Celsus to Hippocrates has been shown in parallel passages collected from their writings, most completely by Daremberg. The number of Greek medical terms used by Celsus is evidence in the same direction.

The *De Medicina* is divided into eight books. The *first* treats of Diet and rules of health; the *second* is of Prognosis, Diagnosis, and general Therapeutics; the *third*, of fevers and general diseases; the *fourth* takes local diseases of different parts of the body in order, from the head to the feet; the *fifth* is on treatment of general diseases by drugs; the *sixth*, on local diseases which require similar treatment; the *seventh* and *eighth* deal with surgery.

The Prooemium of the first book gives a short but masterly account of the Greek schools of Medicine, the Dogmatic, the Methodic and the Empiric, which is of great historical importance. The remainder of the first book, devoted to the means of preserving health, is the most original part of the work, being founded on his own experience in the class of society to which he himself belonged. The chief means recommended are exercise and change; alternation of town and country life, travelling, baths hot or cold, sports such as hunting, fishing, sailing, but *not* athletic exercises, which were regarded as superfluous. The regulation of diet, sleep, and rest, was necessarily to vary according to the constitution of the individual, whether strong or weak; while account was also to be taken of the season of the year, the time of life, and any tendency to some particular ailment. In general, his advice is wise and rational, and more applicable than might be supposed to the circumstances of modern life. It will never be out of date.

In the investigation of disease, Celsus lays great stress on *prognosis*; symptoms are to be studied not only for the purpose of diagnosis, but as of good or bad omen. He distinguishes acute from chronic ailments, and general diseases from local affections of particular organs. His account of general diseases, such as Fevers, Dropsy, Consumption and the like, is, as a rule, superior to his descriptions of special local affections; but, in all, the practical aim is apparent. In treatment, he starts from the principle of the rational school that the disease must first be known, and its cause inquired into, before any method of cure is adopted. He leans decidedly to dietetic and hygienic methods,

following therein Asclepiades, but (unlike that physician) attaching great importance to drugs. Indeed, he distinguishes those diseases in which dietetic treatment is of most importance from those which have to be combated by medicines. He gives a long enumeration of drugs classified according to their uses, not as objects of Natural History; and his repertory of medicinal agents is by no means to be despised. In general, his treatment, more especially of fevers and acute diseases, is simple and judicious. It is only in those diseases where a knowledge of anatomy and pathology (in the modern sense) is required, that he is (judged by our standards) less happy. The last two books, dealing with Surgery, have been much discussed, for it is a question whether the author had really performed all the operations he describes. Celsus is the earliest medical writer now known, who speaks of amputation of a limb, an operation only resorted to in extreme cases, as it was often fatal. His description of the operation for the stone has given rise to a considerable literature. Its obscurity makes it difficult to believe that it was written by an actual operator. But his account of other branches of surgery, and especially of the mechanical part, is superior, and has been highly praised by eminent surgeons.

It is curious that the work of Celsus was virtually unknown in the Middle Ages, being only casually referred to by a few writers:—Isidore of Seville, Gerbert of Aurillac (*Ep.* 169), John of Salisbury (as a writer on the military art), and Simon Januensis. A MS was discovered by Beccadelli at Siena in 1429, and another by Thomas of Sarzana (Nicholas V) at Milan in 1443; and, after the publication of the *editio princeps* at Florence in 1478, the work became extremely popular, being the most widely read and the most practically useful text-book of medicine in Europe down to comparatively modern times. (Ed. Daremberg, Leipzig, 1859, reprinted with French transl., notes and illustrations, by Védrenes, Paris, 1876; German transl. and commentary by E. Scheller, ed. Frieboes, Braunschweig, 1906.) J. Ilberg's *A. Cornelius Celsus und die Medizin in Rom*, Leipzig, 1907, is a valuable study, intended for lay readers. Cp. § 989 *supra*.

1082. Galen (*c.* 130—*c.* 200 A.D.), the greatest Greek physician who ever lived in Rome, was born at Pergamum. He was the son of

Galen.

an architect, Nikōn, who gave him a very complete education. After studying at Alexandria and elsewhere he returned to Pergamum, but left it for Rome about 163-4. He soon became acquainted, he says, with nearly all the distinguished men of the day (ii 214-18, ed. Kühn). After three years, he left Rome in consequence of the hostility of the other physicians and returned home; but came back in 169 on the invitation of the emperors, Marcus Aurelius and Lucius Verus. Declining an invitation to accompany M. Aurelius on his campaign against the Marcomanni he remained in Rome as physician to the young Commodus. During a long residence in the city he wrote many books and practised his profession, but returned at an uncertain date to Pergamum, where he continued his literary activity in old age.

The number and variety of his writings make some kind of classification necessary. The following arrangement is that of Greenhill:—

(1) Works on Anatomy and Physiology; (2) On Dietetics and Hygiene; (3) On Pathology; (4) On Diagnosis and Semeiology; (5) On Pharmacy and Materia Medica; (6) On Therapeutics including Surgery; (7) Commentaries on Hippocrates; (8) On Philosophy and Logic.

(1) Galen's great work on anatomy, *περὶ ἀνατομικῶν ἐγχειρήσεων*, *De Anatomicis Administrationibus*, is in fifteen books. The last six and part of the ninth are unknown in the original or in Latin, but are preserved only in

Anatomy.

an Arabic version. The Arabic text, with a German version, has lately been brought out by Dr Max Simon (Leipzig, 1906). The work is essentially a guide to dissection, but it is also descriptive, and is evidence of Galen's intimate and practical knowledge of the subject. It was unknown in the Middle Ages, being first partially translated into Latin in the sixteenth century.

A much better known work is *περὶ χρείας τῶν ἐν ἀνθρώπῳ σώματι μορίων*, *De Usu Partium Corporis humani*, in seventeen books. This is a description of the human body designed especially to show the adaptation of the different parts to their functions, and thus to display the wisdom and goodness of the Creator. It is essentially teleological in aim, and might almost be described as a treatise on Natural Theology. The descriptions are often short, or merely allusive. Nevertheless, it was from this work (in a Latin version made from the Arabic) that mediæval physicians derived their idea of Galen's anatomy, and indeed almost their whole anatomical knowledge, till the revival of Anatomy in the sixteenth century. The influence of this treatise has been immense, and it is well described by Greenhill as 'a noble work'. Its chief fault is that, in endeavouring to show that every part of the body is perfectly constructed, Galen was led to strain the facts, and fall into serious errors. Thus he praises the perfect adaptation to their purpose of the human hand and foot; but tries to prove this by describing the muscles of the extremities in an *ape*, where the special peculiarities of the human structures are, of course, wanting. Galen's anatomical knowledge was, in fact, entirely derived from dissection of the lower animals, especially pigs, dogs, and apes. Human dissection was impossible; and, even to see a human skeleton, Galen recommended students to go to Alexandria. Only chance opportunities of seeing the inside of the human body occurred, such as certain surgical operations, or the hasty examination of the corpses of barbarians killed in war. Notwithstanding this drawback, Galen's anatomical writings are a monument of careful observation. They are important, as the only considerable works of the kind which have come down to us from ancient times.

1083. Galen did not conceive of Physiology as a science distinct from Anatomy. But several of his works relating to the functions of parts are distinctly physiological. The *De Usu Partium* has been so classed, but more Physiology. distinctly so is the treatise *περὶ κράσεων*, *De Temperamentis*, which expounds the doctrine of 'temperaments' or mixtures of the humours and elementary qualities supposed to cause individual peculiarities. From this doctrine has proceeded the whole class of words relating to 'humour', 'temper', good or bad, and so on. This treatise was translated into Latin by Linaere (1521). His other treatises are entitled *περὶ δυνάμεων φυσικῶν*, *De Facultatibus Naturalibus*; *περὶ χρείας ἀναπνοῆς*, *De Usu Respirationis*, etc.

Galen's physiology is more important than his anatomy, and not only so for his results, but for his admirable scientific method. He brought everything to the test of experiment, and though we cannot say positively that no one before him had made experiments on animals, he is historically the founder of Experimental Physiology. His methods of experiment and reasoning were quite in agreement with those of modern times. In his controversies with the Peripatetics and Stoics, who defended the crude physiology of Aristotle and added strange theories of their own, he appealed to the test of dissection and experiment. When, for instance, Chrysippus asserted that the voice came from the heart, Galen challenged any sincere lover of truth to witness the vivisections in which he demonstrated the mechanism of the voice and its connexion with the larynx and with certain nerves, so that if these were cut, the power of producing the voice was abolished. His antagonists, apparently, did not accept the challenge; their methods of argument, he says, consisted in simple assertion. The Peripatetics, indeed, knew how to reason, though they declined to dissect, but the Stoics were totally ignorant of the true methods of reasoning in science. He has a fine passage about the long and arduous way (of experiment) which alone leads to truth, while the short and easy way (of assertion) fails to attain it. (*De Dogmatis Hippocratis et Platonis*, ii 4; v 233, Kühn.) These references are sufficient to show how thoroughly scientific, in the modern sense, were

Galen's methods. The fact that he failed to solve the problem of the circulation, of which Harvey first furnished the solution, has led to an erroneous conception of his scientific accuracy. (This subject is further discussed with quotations in Dr J. F. Payne's *Harveian Oration* for 1896.)

(2) The most important of his works on Dietetics and Hygiene is *ὑγιανά*, *De Sanitate Tuenda*, a long treatise translated by Linacre (1517). It gives an excellent summary of the Science and Art of personal Hygiene, which the Greeks had brought to a high degree of perfection. Galen lays much stress on bodily exercise, but in a small tract *πότερον ἰατρικῆς ἢ γυμναστικῆς ἐστὶ τὸ ὑγιανόν*; 'Does the Art of Health belong to Medicine or to Gymnastics?', he claims that gymnastics should be regulated by medical knowledge, and strongly denounces the so-called *γυμναστικὴ* of the athletes as *κακοτεχνία*, agreeing with Plato that it is injurious rather than beneficial in ordinary life.

(3) *Pathology, or the Science of Disease.* This subject is closely interwoven with all Galen's medical writings, but among special works may be mentioned *περὶ ἀνωμάλου δυσκραςίας*, *De inaequali intemperie*, on the disturbance of humours which constitutes disease, a short treatise often appended to the *De Temperamentis*, of which it is the complement. The titles of some other works; e.g., *περὶ δυσπνοίας*, on difficulty of breathing; *περὶ πλήθους*, *De Plenitudine*, on Plethora; *περὶ τῶν παρὰ φύσιν ὄγκων*, *De Tumoribus praeter Naturam*, on Morbid Tumours, etc., explain their contents.

(4) *Works on Diagnosis and Semeiology.* As the Greek physicians had no knowledge of the actual condition of diseased organs, and lacked the precise methods of modern physicians in ascertaining the nature of the disease, they had to make their diagnosis entirely by symptoms, which they studied with wonderful minuteness. Four of Galen's treatises (perhaps meant to be parts of one work) are devoted to a comparison of the differences and causes of disease with the differences and causes of symptoms:—(1) *περὶ διαφορᾶς νοσημάτων*, (2) *περὶ τῶν ἐν τοῖς νοσημασίαις αἰτίων*, (3) *περὶ συμπτωμάτων διαφορᾶς*, (4) *περὶ αἰτίων συμπτωμάτων*. Galen wrote at least six treatises on the Pulse, in which its varieties are analysed with extraordinary complexity. They have been highly praised by eminent modern physicians. The most important work of this class has a somewhat different aim: viz. *περὶ τῶν πεπονθότων τόπων*, *De Locis Affectis*, which Haller (with whom the present writer respectfully agrees) thought the best of all Galen's medical works, having been written in his old age, and expressing his most mature judgement. He here takes the various organs of the body *seriatim*, and shows by what signs and symptoms their morbid conditions may be detected. Had he had opportunities of confirming his diagnosis by post-mortem examinations, he might have made some approach to modern pathology. Even as it is, this treatise is more congruous with modern medicine than any other of his writings. There is a good French translation by Daremberg (*Œuvres de Galien*, Paris, 1854, Tome 11).

(5) *Works on Pharmacy and Materia Medica.* In this class Greenhill places sixteen works, nine of which are spurious. These are, generally speaking, regarded as compilations from earlier writers, and show no great originality. The most characteristic is *περὶ κράσεως καὶ δυνάμεως τῶν ἀπλῶν φαρμάκων*, *De temperamentis et facultatibus simplicium medicamentorum*. In this work he classifies medicines according to their possession (in various proportions) of the four elementary qualities of Heat, Cold, Moisture, and Dryness, often inferred on very slender grounds. Since diseases were thought to be produced by an injurious predominance of one or more of these qualities in the humours, the application was obvious; e.g. for hot diseases, cold remedies and so forth, a principle which governed the selection of remedies for many centuries. The term 'cooling medicine' still survives.

(6) *Therapeutics, including Surgery.* The most important work is *θεραπευτικὴ μέθοδος*, *Methodus Medendi*, one of Galen's longest treatises. Though known in the Middle Ages through faulty Latin versions made from the Arabic, it was first rendered by Linacre into pure and intelligible Latin

(1519). Its aim was to set forth a general systematic method of treating disease; and in this scheme Galen compares himself to Trajan, who, by improving the roads through Italy, had made communication and government easier; even so, he had helped his disciples to find their way through the tangled maze of medicine (ix 8; Kühn, x 633). We here seem to recognise an idea not altogether Greek, but partaking of the organising and governing faculty of the rulers of the Roman Empire. The author succeeded so far as to become, whether he meant it or not, the Dictator of the medical world for centuries; but he showed also that the formal completeness of a system may be rather a hindrance than a help to progress.

A smaller work, *τέχνη ἰατρική*, *Ars Parua*, known in the Middle Ages through a version made from the Arabic, as *Microtechni*, *Microtegni*, or *Liber Tegni*, was the favourite manual of the mediæval physician. It deals with general principles rather than with details. To give any general idea of Galen's therapeutic methods is impossible. He also wrote on Surgery, but in this subject he acquired less fame than in Medicine, and, after his first visit to Rome, seems to have left the practice of the art to the contemporary Greek surgeons. The advanced state of (Greek?) surgery at Rome is shown by the rich collections of surgical instruments found at Pompeii and Herculaneum.

(7) *Commentaries on Hippocrates*. Galen wrote valuable commentaries on several works of Hippocrates, some of which are useful in establishing the text, as well as in elucidating the subject-matter. That on the Aphorisms extends to seven books. He also composed some tracts in defence of the Master's doctrines.

On
Hippocrates.

(8) Galen wrote various treatises, chiefly polemical, on the philosophical sects of the Greeks, several of which are extant. Perhaps the most important is that 'On the Doctrines of Hippocrates and Plato', already referred to. It is directed chiefly against Chrysippus and the Stoics, while it includes a severe criticism of the Peripatetics. He was also a copious writer on Logic, about thirty treatises on this subject being attributed to him, of which only two survive:—*περὶ τῶν παρὰ τὴν λέξιν σοφισμάτων*, *De Sophismatis penes Dictionem* (Kühn, xiv 582) and *εἰσαγωγή διαλεκτική*, *Institutio Logica*. He is further credited with the invention of the fourth figure of the syllogism. He refers to a work, the loss of which is much to be regretted, on scientific reasoning, *περὶ ἀποδείξεως*. A skilful reconstruction of the fragments has been made by Iwan von Müller (*Ueber Galen's Werk vom Wissenschaftlichen Beweis*, München, 1895).

Philosophical
and Logical
works.

1084. The wonderful extent and variety of Galen's knowledge mark him out as one of the most accomplished and versatile scientific writers that ever lived, but not one of the most original. His style is extremely prolix, and sometimes obscure. The general impression derived from his writings is that his character was honest and truthful, but marred by egotism and self-sufficiency. He was liable to be led away from the path of simple observation by his love of theory and classification. In Philosophy he was broadly a follower of Aristotle, but differed much from the Peripatetics of his own time. In religion he was a pious monotheist, seldom mentioning the Olympian deities, and if at all, chiefly as illustrations of mythology. There are two passages in which he refers critically to Christian beliefs. (*De Usu Partium*, xi 14, iii 905 Kühn; *De Differentiis Pulsuum*, ii 4; viii 579 Kühn.) His great aim in Medicine was to unite the conflicting sects and divergent streams of doctrine, and to frame a synthesis which should combine his own results with those of his predecessors. He succeeded so far that Greek medicine in Galen reached its highest point, when it seemed to lose the power of growth and began to decline. Galen's reputation seems to have been higher in the next generation than in his lifetime; as may be gathered from such writers as Alexander Aphrodisiensis, Athenæus, and Eusebius. No Greek physician is so much quoted by Christian writers. In the Latin world he cannot be said to have founded a school; his works were not translated into Latin in classical times, and, in the eleventh century, Constantinus Africanus says that none existed in that language. Galen's true successors were the Greek physicians of the Byzantine school, who did little

Summary.

else than copy and comment upon his works. He acquired a like predominance among the Arabians, who possessed his works in Arabic translations. From these Arabic translations were made the Latin versions used in the Middle Ages; and by this circuitous route did Galen come back to Western Europe. With few exceptions his writings were not rendered direct from Greek into Latin till the epoch of the Renaissance, when they procured him a still higher, though transient, renown.

1085. Galen's extant writings are very numerous, and it is known that many have been lost; the total number has been estimated at five hundred or more. The best lists are (1) Ackermann's 'Historia Literaria Cl. Galeni' in Fabricius, *Bibliotheca Graeca*, ed. Harles, vol. v, reprinted in the first volume of Kühn's edition of Galen, 1821; this enumerates the Greek editions and translations; (2) Choulant's, in *Bücherkunde für die ältere Medicin*, 1841, is less complete as regards translations; (3) Greenhill's, in Smith's *Classical Dictionary*, vol. ii, 1846 etc.; (4) the most recent, that of Ilberg, reproduced by Fuchs, in Neuburger and Pagel's *Geschichte der Medizin*, Jena, 1902, vol. i, 381. A catalogue of the MSS of Galen in European libraries has been published in the *Abhandlungen* of the Berlin Academy, 1906; and a complete edition of the *Corpus Medicorum Græcorum*, which is to extend to 32 volumes, has been begun under the auspices of the associated Academies of Europe. Of the works enumerated some are certainly spurious, some doubtful. Choulant gives 181 titles, of which 98 are genuine, 19 fragmentary, 45 spurious and 19 doubtful. Greenhill enumerates 130 medical works, and 19 philosophical. Ilberg's list mentions 104 medical works.

There have been four editions of Galen in the Greek: (1) The Aldine, in five volumes folio, Venice, 1525; (2) Basel, 1538, five vols. folio; (3) ed. Charterius (R. Chartier), in Greek and Latin, along with Hippocrates, 13 vols. large folio, Paris, 1639-79, very complete but inconvenient from its size; (4) ed. C. G. Kühn, Greek and Latin, 20 vols. (in 22) 8vo Leipzig, 1821-33; vol. i contains Ackermann's *Historia Literaria*; the last vol. a full index. This is, at present, the only convenient edition. There are several Latin editions in folio. The *Epitome Galeni Operum* by A. Lacuna is useful. Some of Galen's smaller works have been edited by Marquardt, Iwan von Müller, and Helmreich, *Galenii scripta minora*, 3 vols. Teubner, Leipzig. There is a French transl. of some of the works by Daremberg, *Œuvres Anatomiques, Physiologiques et Médicales de Galien*, 2 vols. Paris, 1854. See also Ilberg, *Aus Galen's Praxis, ein Kulturbild aus der Römischen Kaiserzeit, in Neue Jahrbücher f. d. Class. Alterthum* etc. xv 276-312 (also separately, Leipzig, 1905).

1086. Some writers of inferior importance may be briefly mentioned:—

(1) *Scribonius Largus* lived, as appears from his writings, in the reigns of Tiberius and Claudius, and accompanied the latter emperor on his expedition to Britain, A.D. 43. He is thought to have been a Greek freedman, with a Latin name. He has left a short treatise, *De compositione Medicamentorum*, a collection of medical receipts, arranged according to their uses, derived chiefly from the Greek. It shows a high ideal of medical conduct, and, at the same time, great familiarity with personages of the imperial court. The work has been often printed. (2) *Niger*, or *Sextius Niger*, a Greek, wrote about A.D. 50 in his own tongue a noted work on 'Simple Medicines', now lost. Galen speaks of him as only second to Dioscorides, and Pliny praises him highly. (3) *Dioscorides*, the great Greek botanist, a contemporary of Pliny, inventor of the name and founder of the science of *Materia Medica* (ἔλη ἰατρική), has a place in Roman medicine, since his knowledge of plants was gained during his service as a Roman army-physician. The Vienna MS of his work, with all the illustrations, has been published in facsimile (1906). (4) *Marcellus Empiricus*, a layman, compiled probably at the end of the fourth century a treatise *De Medicamentis*, containing some classical medicine, mingled with Roman and Celtic folklore and oriental magic. This compendium is more Roman than Greek, and, worthless though it is, became very popular, and still possesses historical interest. (5) *Caelius Aurelianus*, a physician living at Rome in the beginning of the fifth century, the most

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History and
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Other
medical
writers
in Rome.

important Latin medical writer next to Celsus, wrote *De Morbis Acutis et Chronicis*, a work which is essentially a translation from Soranus, a physician of the Methodic school. The book is historically important as an example of the doctrines of this school. Three of the works of Soranus are still extant in the original Greek, and have been published by Ideler, *Med. min.* i 248—260, and Val. Rose, 1882. (6) *Cassius Felix* wrote, A. D. 447, a short treatise *De Medicina, ex Graecis Logicae Sectae auctoribus liber translatus* (ed. Val. Rose, 1879), which is useful for explaining the meaning of some Greek medical terms.

1087. Pliny's famous saying quoted above (§ 1073) seems to mean merely that there was no regular medical profession at Rome before the introduction of the Greek physicians. But no obstacles were placed in the way of the foreigners, since there were never any laws at Rome regulating the practice of medicine, or forbidding anyone (whether qualified or not) to undertake it. Hence the social status of physicians was very various. Men like Asclēpiādēs and Galen consorted with the highest personages, and there must have been many physicians in a middle status corresponding to that of professional men at the present day, but, at the other end of the scale, were drug-sellers, herbalists, bandagists, and rubbers, who bordered closely on simple craftsmen, though all were called *mēdici*. Many skilful physicians were slaves, but the profession was not generally servile, as has been asserted. Iulius Caesar conferred citizenship on Greek physicians, and Augustus granted them immunity from civic duties. Young slaves were sometimes educated as physicians, and such had a high pecuniary value, being taxed at sixty *solidi* in the code of Justinian. They served as domestic physicians, but the master, unless himself a physician, could not make a profit out of their services. Some became freedmen, and this class must have been large, as we find many physicians of Greek birth with Roman names. Few Quirites entered the profession (Plin. xxxix 8), which was therefore mainly Greek, though Celsus (v 22) speaks of some Jewish physicians. Many of them had offices (*tabernae medicae* or *medicinae*) like the Greek *ιατρεία*, which served as surgeries or consulting-rooms, and sometimes, temporarily, as private hospitals. These graded off into the shops of druggists, sellers of ointments, etc. (*pharmacōpōlai*, *unguentārii*, *arōmātārii*). Some cities established public *ιατρεία*, like those of the Greeks. The physicians, like other crafts, formed *Collēgia* or guilds (§ 559 f), and had their regular places of meeting, *Schōlae Medicorum*, but these were not places of instruction.

The medical profession.

1088. Neither law nor custom seems to have regulated the fee which a physician might ask or ought to receive. Fashionable doctors were lavishly remunerated by the wealthy Romans. Galen received 400 *solidi* for attending the wife of a consul. Pliny mentions still higher fees. Charmes, a physician of Marseilles, received 200,000 sesterces for visiting a patient at a distance. The ordinary salary of the emperor's physician was 300,000 sesterces, but Stertinius Xenophon demanded of Claudius double this sum, as the equivalent of his private practice. He and his brother (also a physician) left six million sesterces,

Emoluments of physicians.

though they had spent vast sums in their lifetime in beautifying Naples. Crinas, of Marseilles, also a munificent public benefactor to his native city, left ten millions. A passage in Plautus (*Aul.* 448 'nummō sum conductus; plus iam medico mercedist opus') vaguely suggests that an ordinary doctor's fee in Rome might be not more than one *nummus* (in Plautus, often a Greek coin equivalent to two *drachmae*, or two francs).

There is no evidence of any regular medical education in republican or early imperial times; though medicine may have been taught in the *Gymnasium* of Nero, or the *Atheneum* of Trajan, as well as in the celebrated schools of Marseilles and Bordeaux, where some eminent physicians received their 'education'. But perhaps this only referred to literary training. Alexander Sëuërus was the first to assign public lecture-rooms and salaries to medical professors. The usual method of teaching was individual. Physicians took pupils who paid them fees, and taught them either in their *tabernae* or by taking them round on their visits to private patients, as is known by allusions in Galen's works, and by a well-known epigram of Martial (v 9). There were no hospitals for clinical instruction, in the modern sense; no course of study was prescribed, nor any special ceremony, by which the student became a doctor. In fact, no kind of education was compulsory.

The meaning of the term *archiātri* has been disputed. Some understand it to mean physician to the ruler, or emperor, but it was used in Greek cities where there was no emperor. Others more correctly, it seems, interpret it as chief physician; either as a title or as an office, but it had different meanings at different times. The first at Rome was C. Stertinius Xenophon¹, physician to Claudius, the next Andrōmāchus, physician to Nero, who is mentioned by Galen. Galen (xiv 2, 4 and 211, Kühn) names two other Archiatri of his own time, Magnus and Dēmētrius, evidently meaning a title rather than an office. In the fourth and fifth centuries, we find two orders, *Archiatri populares* and *Archiatri pālātini*. The former were medical officers of towns, or districts of Rome, paid by the municipality to treat the poor. They formed a *Collegium*, into which new members were coopted (after examination or other test of their qualifications), and enjoyed important privileges and immunities. The *name* first appears in an edict of Valentinian I and Valens, A.D. 368, but the office must have existed before. The *Archiatri palatini* or *sacri palatii* were of higher rank, being the personal physicians of the emperor. Under Alexander Seuerus, who regulated their *status*, they were seven in number; one, well salaried, being the 'Physician in Ordinary', the others more or less titular. The position and duties of these two orders are laid down in the Codes of Theodosius and Justinian. The titles are found in numerous inscriptions. Under

¹ Called Stertinius by Pliny (xxix 5), Xenophon by Tacitus (*Ann.* xii 61, 67). An inscription at Cos gives both names, and calls him Physician to Claudius, and 'Archiater of the divine Augusti'.

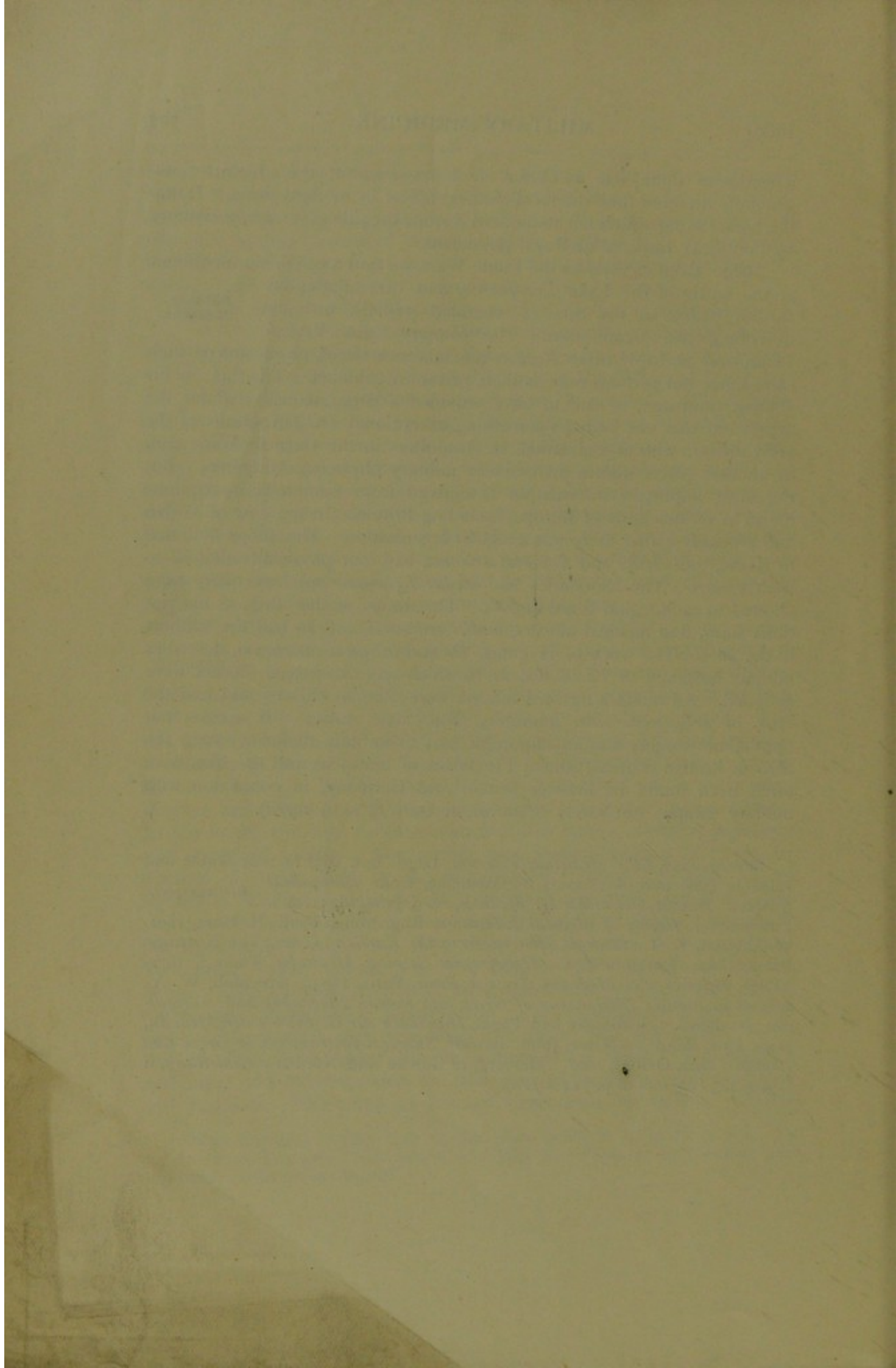
Theodosius there was a *Comes Archiatrorum*, but the *Archiater* was generally no more than the local medical officer of modern times. It was the higher order which left to modern Europe the title of *Archiater* assumed by Pontifical, Imperial or Royal physicians.

1089. Even as early as the Punic Wars, we find a physician mentioned at the battle of the Lake Trasymene, and Livy alludes in various places to the care of wounded soldiers, without describing the organisation. The younger Cato, Vibius Pansa and probably other Roman generals took Greek physicians on their campaigns, but perhaps only as their private attendants. Tiberius, on his Illyrian campaign, is said to have provided a large medical staff for the army; but this was perhaps something exceptional. Galen speaks of the army doctors who accompanied M. Antoninus in the German Wars, and, in another place, quotes an eminent military physician Antigonus. But the most important information is derived from numerous inscriptions found in various parts of Europe, including Britain. In the time of Trajan and probably earlier there was a regular organisation. The troops stationed in Rome, the *Vigiles* and *Cohortes urbanae*, had four physicians allotted to each cohort. The legionaries had *medici legionum*, but how many were allotted to each legion is not known. The troops of the allies, as inscriptions show, had medical officers, *medici ordinarii*, and so had the soldiers in the fleet. The work of Hýgínus, *De munitionibus castrorum*, describes military hospitals, or *Välētūdñāria*, to which special medical officers were assigned. All military medical officers were Roman citizens and had the rank of *principales* with immunity from civic duties. It seems that ophthalmic surgery was an important part of military medicine, since the *seals* of Roman oculists, attached to boxes of ointment and the like, have often been found in France, Britain and Germany, in connexion with military camps; but rarely or never in Italy (§ 1116 *infra*).

Military
Medicine.

Beverovicus, *Idea Medicinae Veterum*, Lugd. Bat. 1637 (a remarkable and valuable collection of extracts on Medicine, from *non-medical* writers). Haeser, *Geschichte der Medicin*, ed. 3, Jena, 1875, vol. i. Puschmann, *History of Medical Education*, Eng. transl. by E. H. Hare, 1891. Withington, E. T., *Medical History from the Earliest Times*, The Scientific Press, 1894. Daremberg, C., *Histoire des Sciences Médicales*, Tome i, 1870. Albert, Maurice, *Les Médecins Grecs à Rome*, Paris, 1894. Greenhill, W. A., articles in Smith's *Dictionaries of Greek and Roman Biography* and *Antiquities* (excellent). Neuburger und Pagel, *Handbuch der Geschichte der Medizin*, Jena, 1902, Band i. Milne, John Stewart, *Surgical Instruments in Greek and Roman Times*, Oxford, 1907. Heiberg, in Gercke and Norden's *Einleitung*, ii (1910) 423 (see foot of p. 714 *supra*).

Bibliography.





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