Some landmarks in the progress of medical science : being the annual oration at the Medical Society of London : delivered on May 20th, 1901 / by F. Richardson Cross.

Medical Society of London.

Annual Oration.

1901.

SOME LANDMARKS IN THE PROGRESS OF MEDICAL SCIENCE

BEING THE ANNUAL ORATION AT THE MEDICAL SOCIETY OF LONDON.

Delivered on May 20th, 1901,

BY

F. RICHARDSON CROSS, F.R.C.S., M.B. LOND.,

Honorary Fellow of King's College, London,
Member of Council Royal College of Surgeons of England,
Lecturer on Ophthalmology in University College, Bristol, &c., &c.

LONDON:
HARRISON AND SONS, ST. MARTIN'S LANE,
PRINTERS IN ORDINARY TO HIS MAJESTY.

SOME LANDMARKS IN THE PROGRESS OF MEDICAL SCIENCE.

Mr. President and Gentlemen,—I am deeply conscious of the compliment paid me by you, Sir, and the Committee of the distinguished and ancient Medical Society of London, in adding me to the list of eminent men who have filled the honourable office of Orator to the Society, and I am grateful to my old friends and their colleagues for their kind memory of me for this enviable position.

But now that the time has arrived for me to fulfil the obligation that the compliment entails, I feel that the proper performance of the duties I have undertaken demands knowledge and abilities that I do not possess, and that I can scarcely hope to satisfactorily follow in the footsteps of my distinguished predecessors.

During the year that I have been in office in the Medical Society we have passed out of one century into another, and standing on the threshold of the twentieth century one cannot resist dwelling on the element of time—on the century just past, and on the many preceding ones that have rolled away, leaving more or less of their records with us—and on the one that lies before us impenetrable, unknown, but full of hope.

Almost synchronous with the close of the nineteenth century there ended another great chronological period—the longest, the most prosperous, and the most remarkable one in the history of the British Empire—the Victorian era.

The Queen on her accession had just completed her eighteenth year, and was thus old enough to escape a regency. It was a most critical period in the history of this country and of Europe. The Reform Bill had not been long passed (a final and irrevocable settlement of a great constitutional question, which had almost embarked the country in a civil war). Disgraceful riots had

followed the earlier rejection of the Bill by the House of Lords; London had been fairly well protected by the new police force of Sir Robert Peel, but at Nottingham, Derby, Bristol, and other large towns, castles and public buildings had been demolished, jails forced, and hundreds of people had been killed and injured. Ireland was under martial law, and Canada was on the eve of insurrection. The recent abolition of slavery was producing results unsatisfactory whether from the standpoint of humanity or of policy. Almost every institution in the country seemed insecure. The poor demoralised people were overcrowded, starved, almost uncared for. The Corn Law imposed a duty on the importation of foreign grain, which amounted almost literally to a prohibition. (It was lawful to export wheat on payment of 1*s.* a quarter customs duty, but no foreign grain could be imported until the price of our own wheat at home had risen to 80*s.* a quarter.) The poor man, though not much of a political economist, knew when his bread was too dear, and he knew that its price was kept up, by law, for the benefit of the corn-grower. Riots were occurring from time to time—very serious riots in some places. It was in these stormy times that the young Queen Victoria, then quite inexperienced in public affairs, but possessing a fine mental aptitude which had been well cultured and trained for its future work, took up the burden of royalty. She laboured constantly in studying the interests and welfare of her people; she entered into their feelings. Her royal life was not one of ease and pleasure; her many sorrows and many losses perhaps widened that sympathy which she so constantly extended even to the humblest of her subjects, and which made her an object of love as well as of honour in every home. She endeared herself to her people by her character (built up by good acts performed from day to day, strengthened and matured as years went by), and by consistency, sincerity, and goodness. Her strong sense of duty and self-sacrifice and her power of work were associated with kind tact and judgment, and with a personal knowledge of affairs of State perhaps unique in the history of the world.

For sixty-three years her influence had been ceaselessly directed to uplift and purify the life of the nation. She had given the throne an influence it had never possessed before, and throughout the widespread territory of the British Empire (in Canada and

Australia, in India and South Africa) it is our Sovereign who is the living symbol of the unity of the whole to-day. Reigning to the end without any loss of interest or prestige, she will continue to live in the undying reverence and affection of her former subjects.

Gentlemen, we have been living in an age crowded with great achievements in art, literature, and science, and have experienced innumerable applications of them in all departments of human industry; among the gains of the last century were railways, steamships, gas, the electric light, telegraphy, the telephone, the phonograph, photography, and spectrum analysis, while anæsthetics, antiseptics, and the Röntgen rays are indications of a conterminous advance in the science of surgery. The enormous gains in knowledge and the progressive great development in practice of all branches of the healing art, and of its associate sciences, were admirably set forth by many writers at the time of Queen Victoria's jubilee.

In seeking for the subject-matter of an address suitable for such an occasion as the present, I have been much interested to see, by means of a list kindly lent me by Mr. Hall, on what themes former Orators may have spoken. Many have passed in review various phases in the history of our Society itself; others have dealt with the principles that regulate medical knowledge or practice, and the inquiries that have led to their development. "The Vocation of the Medical Scholar" and "The Medical Profession in its relation to Society and the State" have been ably discussed. Some of the Orations have been of a philosophic character, others have been devoted to the consideration of special diseases. All kinds of subjects have been chosen by my distinguished predecessors. The very width of choice open to us renders selection none the easier.

To look back twice as far in time as the Victorian era, we see, in 1773, 90 doctors—physicians, surgeons, and apothecaries equally represented—meeting at Lettsom's house to found the Medical Society of London. We trace the history of the Society through its migrations thence to Crane Court (1776), to Bolt Court, Fleet Street (1788), on to George Street, Hanover Square, which was taken in 1850. (By that time the Medical Society had somewhat degenerated, but it then gained new power through an amalgamation

with the Westminster Medical Society,* and in that same year the Lettsomian Lectureship was inaugurated.) At the completion of a 21 years' lease the Society removed from George Street to its present home in 1871, nearly 100 years after the first meeting at Lettsom's house.

One is tempted to dwell upon some of the incidents that have occurred in the history of the Society or in the lives of some of its best known members, and to inquire what advance has our science made since the Medical Society of London was founded? What part has the Society played collectively, or by its individual members, in the progress that has taken place? Or what opportunities have been lost of doing more? The story is already told in past memoirs, transactions, and proceedings, and by the Orations of Dr. John Sims, Dr. Routh, Sir Duncan Gibb, Mr. Edmund Owen, and others. Nor shall I allude to the progress in medicine and the allied sciences made in the last century or in the one preceding it, for the Presidential Address of Dr. Roberts and the Oration of Dr. Kingston Fowler have occupied this ground.

Or in looking forward: What is the best use we can now make of so well-managed, so popular, so learned, so experienced a corporation as this is in the improvement of professional relationships and feeling, or in the leading forward of medical thought, and in making sure the pathways of science, not for ourselves only, but for those who are to follow after us?

Towards the future we can only speculate. From the past we can listen, read, and learn. In the present we can observe and think.

Speculation, mystery, and false philosophy have been great stumbling blocks in the way of the advance of wisdom. The foundations of medical science rest on the knowledge and sound reflections of experience, while independent accurate observation and cautious progress in deduction are the only reliable guides to its further progress.

The study of systems in medicine is unproductive; all of them excepting homœopathy are gone; the maintenance of this one is illogical, and only a proof of ignorance or of deceit.

* The "Westminster Medical Society" was founded in 1805 by Sir C. Mansfield Clarke and Sir Benjamin Brodie, and shortly after its foundation elected in a batch as honorary members the "Lyceum Medicum Londinensis," founded by John Hunter and Dr. Fordyce, 1785–1815.

A retrospect of some of the great periods and of the principal actors in the course of the development of the science of medicine seems to be of interest, and I have found myself rapidly tracing some of the brooks and rivulets from which the strong stream of medical science has gradually acquired its present force and magnitude. Where other forms of intellectual effort have grown more strongly medicine has also generally made more rapid headway, while conversely most forms of knowledge have usually degenerated all together. So where the streams of healing are broadest and most powerful the greatest peoples dwell upon their banks, which are covered with the intellectual efforts of literature and science, brightened by the pictures of the imagination, and coloured with art and poetry.*

The story of the early history of medicine is clouded in obscurity. The instinctive efforts of animals to relieve themselves of pain and suffering must in the case of primeval man have been improved on by superior intelligence and memory. It is said that the Egyptians and Babylonians exposed their sick in public so that any passer-by might give his aid by former personal experience, and those relieved were required to go to the temples and there record their symptoms and their cures.

Our knowledge of early Egyptian practice is derived from the 'Hermetic Books,' which possibly were not written until after the birth of Christ, and of which the 'Papyrus Ebers' may have been one. Before Hippocrates, the Egyptian priest-physicians were the most famous. The sick seem to have attended at the temple, where they were relegated to some practitioner specially selected to attend on their particular malady. Ancient Egyptian instruments show that surgery was practised by them. The knowledge of medicine and surgery possessed by the Jews was probably learned in Egypt. Cleanliness was the guiding principle, and the regulations of Moses for the public health are of more than passing interest.

The Indians found doctors among their priests and Brahmins. They were drawn from the higher castes, and were to be influenced

* Among the books which I have read with pleasure on this subject are Baas's 'Outlines of the History of Medicine,' Dr. Munk 'On the Royal College of Physicians', and South's 'Craft of Surgery,' but I am particularly under obligation to Dr. Withington's 'Medical History from the Earliest Times' and to Dr. Roswell Park's 'History of Medicine,' from both of which I have liberally borrowed.

by decorum, piety, benevolence, and unselfishness. They encouraged general knowledge, and said in proverb that "A physician who is no surgeon is like a bird but with one wing." Laparotomy appears to have been early practised by them for treatment of abdominal lesions.

The Persians and the Chinese can also claim a very early knowledge of and interest in medical practice.

But it is from Greece that the most valuable records of the early development of this subject reach us. Greece is the motherland of rational medicine, and she had probably made her superior knowledge of it felt in Persia, Egypt, and India before any records we possess upon medicine were written in any of those countries; and, moreover, from the time of Hippocrates to that of Harvey it is always the medicine of the Greeks that alone commands and deserves our thoughts, whether it seems to emanate from the schools of Alexandria, Rome, Bagdad, Salerno, or Paris.

The date of the revival of the Isthmian games, 776 B.C., separates the period of fable from that of recorded history in Greece, while practically the same date, 753 B.C., is given as that of the foundation of Rome by Romulus.

Homer (1250 B.C.) tells us of the Thessalian chieftain and blameless physician, Æsculapius, and of his sons, Machaon and Podalirius, who acted as surgeons in the Trojan War. Arctinus of Lesbos (B.C. 770), writing 500 years afterwards, assumes that Æsculapius was a deity, and writes "that he endowed one of his sons with nobler gifts than the other, for while to the one (Machaon) he gave skilful hands to draw out darts, make incisions, and heal sores and wounds, he placed in the heart of the other (Podalirius) all cunning to find out things invisible, and cure that which healed not"; a passage in which medicine and surgery are clearly separated.

With the rapid growth of the Greek colonies and the spread of Hellenic influence to the districts lining the shores of the Mediterranean the teaching of the followers of Æsculapius was widely distributed, and gradually there arose Æsclepiadæ, a medical caste, which became in places somewhat engrafted with priestcraft. Their temples were situated in fine health-giving situations, or near springs of reputed medicinal value; pure air, mineral waters, and baths were aided by temperance in food and drink, and it

would seem by purgatives, emetics, and blood letting. Faith that a cure would follow treatment was sometimes stimulated by religious services or strengthened by the mystic demonstrations of the oracles.

The teaching of Pythagoras (582 B.C.) raised a school of more philosophic medicine. Its practitioners were entirely separate from the priest service of Æsculapius, and the profession was open to every free-born citizen, who after a period of study was permitted to treat patients at his own house (*ιατρειον*), or to visit them at their homes; they also travelled from city to city with this intention.

It would appear that from very early times the services of doctors were recognised as of high value for the welfare of the State. Many towns kept a physician for the public service; thus Herodotus mentions that the physician Democedes (B.C. 520), a pupil of Pythagoras, was chosen public medical officer at Ægina with a salary of a Talent (£240) per annum, an income far in excess of that received by an Athenian ambassador of those days. He afterwards went to Athens in the same capacity, and later received a salary of 2 Talents at Samos.

Xenophon in the 'Cyropœdeia' (362 B.C.) makes the model king to say that—having heard how cities which care for the health of their people elect public physicians, and how generals take surgeons with them for their troops—he has provided the most skilful doctors he can find for his army, whom he shall employ for his own wounded and also for those of the enemy.

Both surgery and medicine had attained considerable development when the master mind of Hippocrates (460 B.C.) gathered up what was already taught about them, rearranged what was best, and gave the future of these sciences a character and impress of his own.

One of the family of the Æsclepiadæ, this grand central figure of medical history, studied in Athens during the golden age of Pericles, the greatest statesman of ancient Greece, who not only aimed at making all the separate Hellenic States into one great nation, but succeeded in converting Athens, by its position and the beauty of its statuary and architecture, into the most glorious city of the ancient world. At that time there shone in Greece an extraordinary combination of men of genius—Anaxagoras, Socrates,

Æschylus, Zeno, the father of Logic, Herodotus, the father of History, Euripides, Pindar, Phidias, and Myron.

On the island of Cos, where Hippocrates was born, and whither he returned to practise, was a temple already dedicated to Æsculapius. This he made the leading school of medicine of that time; but he also travelled to many foreign cities and practised there what he had preached at home, that careful observation and recorded facts were essential for wisdom in medical science.

He denied to disease a supernatural origin. "From God comes one disease as well as another, but nothing happens except in conformity with nature" (φύσις).

In medicine proper his method was threefold—to ascertain the past, to investigate the present, and to foretell the future of the patient. He took full notes of the clinical history of his cases, he observed all details of the patient's appearance and condition, and he insisted on the necessity for studying every symptom of the disease. He thus made the study of medicine accurate and objective, and quite separated it from the theories of pure philosophy. He reminds philosophers that the nature of man cannot be well known without the aid of medical observation, and that nothing ought to be assumed as to that nature until the evidence of the senses has confirmed it to be true. He described the lighting and the appliances necessary for the doctor's consulting room, the duties of the assistant, and the essential preparations for successful operation: the instruments, splints, and bandages. His knowledge of the diagnosis and treatment of surgical injuries and diseases is little short of marvellous when we remember how superficial and incorrect was his acquaintance with anatomy, for the Greeks religiously guarded the bodies of the dead and forbade examination of them. The Greek surgeons, however, lost no opportunity of perfecting their knowledge of wounds and accidents on the battlefield, on shipboard, in gymnastic and athletic contests, or in building operations.

The best of his followers aimed at a knowledge of anatomy and physiology as a basis of medicine.

The divine Plato (427 B.C.), who was a pupil of Socrates, must have come under the influence of Hippocrates. The method of this noblest of philosophers was one not of mere intellectual speculation, but a habit of mind and a plan for living; he

preferred, however, the theories of philosophic deduction to the realities of Nature (about which at that time it must be admitted very little was known). He approached the study of disease by intuition rather than by observation, and from his criticisms seems to have had but a poor opinion of physicians and of their work, though he introduces one into the select party of the Symposium.

Aristotle (384 B.C.), the pupil of Plato, was a member of a medical family. Educated as a physician, he possessed the mental habits of a man of science, and his breadth of culture covered an all-embracing range of subjects. An accurate observer, he became the greatest naturalist of antiquity. He created a system of comparative anatomy and physiology by the dissection of animals, and the plans and methods of his classification were so perfect that they were closely copied two thousand years afterwards by Cuvier. He was a prolific writer, and his teachings applied the ideal doctrines of Plato to the realities of natural phenomena. Though he never made dissections on human bodies, he was the founder of anatomy and the pioneer of the Anatomical School of Alexandria.

His influence on the development of medicine was perhaps chiefly due to the great part played by one of his pupils in the history of the world.

Philip, of Macedon, a province hitherto considered barbarian by the other Hellenic States, had gradually become (338 B.C.) the master of the whole of Greece. He was a lover of learning, and a liberal supporter of learned men. On his death he was succeeded by Alexander the Great (356 B.C.). Great Philip's greater son had been educated by Aristotle, and with his victories spread the language and civilisation of Greece over Persia, which contained the old Indian, Babylonian, Assyrian, and Chaldean civilisations, and over a great part of the Eastern world. Thus Egypt passed under Greek rule, the language of its government, its administration, and its education became essentially Greek. Alexandria was made the capital of the new empire, and soon attracted to itself representatives of all other nationalities besides Greeks and Egyptians, while a very large number of Jews were brought from Palestine to people the city, which rapidly rose to be a leading centre of learning, civilisation, and refinement.

After the death of Alexander the Macedonian empire was divided among his generals, and Egypt came into the hands of Ptolemy I, who established Alexandria as his seat of government. The situation

of this city at the point of junction between the East and West rendered it the centre of the commerce of the world, and raised it to the highest degree of prosperity; it long remained a leading seaport, particularly for the distribution of corn. Alexandria became the residence of this family of Macedonian kings of Egypt, whose court was always a great centre of learning and philosophy.

The Ptolemies Soter and Philadelphus founded the Alexandrian Library and Museum. Books were bought or copied and put into the library, which became the storehouse of the collected literature of Rome, Greece, India, and Egypt; continually added to and improved, it afforded to the citizens an easy pathway into the knowledge of literature and science as it then existed. Destroyed by fire at the siege of Alexandria by Julius Cæsar, a part was replaced by the library of Pergamos, which had been founded by Eumenes, another general of Alexander, and which was presented to Cleopatra, the last of the Ptolemies, by Marc Antony.

For many centuries the Alexandrian school was the focus of the intellectual life of the world. It was the great centre of Greek learning, literature, and science, a knowledge of which spread thence over every existing civilisation.

The tendency of its professors was to reject efforts of imagination in order to rely upon the study of observed facts: they enforced the principle that the proper method of studying nature is by experimental interrogation. The school contained the four faculties of literature, mathematics, astronomy, and medicine. Eratosthenes (276 B.C.) was one of its earlier librarians, and Euclid (300 B.C.) was the founder of its school of mathematics. Students flocked to it from all countries for instruction hitherto impossible in the history of the human race.

Our interest chiefly centres in the school of medicine, where, in spite of the prejudices of the age, particularly of the Egyptians, anatomy was for the first time systematically studied by means of dissection on dead human bodies.

Erasistratus (the grandson of Aristotle) and Herophilus were its most distinguished workers in anatomy (about 300 B.C.). It is said that they were even allowed to open the cavities of the scarcely dead bodies of executed criminals for purposes of physiological discovery. They greatly advanced the knowledge of anatomy, particularly that of the brain and nervous system (they noticed the complexity of the convolutions of the grey matter, that they

were greatest in man, and that they seemed to be to some extent a measure of the intelligence), and of the heart and pulse, and gave an extraordinary impulse to the sciences of surgery and medicine.

Philoxenus, a voluminous writer, and largely quoted by Celsus, is the most celebrated surgeon of Alexandria, while Ammonius, the lithotomist, practised crushing of the stone in many cases.

The Dogmatic, or Rational school of Hippocrates, and of the Alexandrian anatomists, realised that medicine, as a science, must be based on a knowledge of anatomy and physiology, but in accordance with the habit of the learned men of the day they unhappily tried to formulate theories of disease far in advance of any facts of these subjects, indeed before any real knowledge of physiology existed.

The Empirics and Methodists, on the contrary, scorned anatomy and rejected the dogmatic teachings, such as they were, of physiology and pathology. They argued :—" It is not the cause, but the cure of the disease that concerns us ; not how we digest, but what is digestible. A person is ill, has unpleasant symptoms, surely the first thing to do is to find something that will remove them."

Thus the art of healing was by them reduced to a mere system of therapeutics ; one of their most deserving leaders was Heraclides of Tarentum (B.C. 230), a Greek physician who wrote a book on 'The Preparation and Preserving of Drugs,' collected from his own experience, in which he urges the great value of opium in various disorders ; he made use of it in sleeplessness, cough, and cholera, and as poultices for painful ophthalmia.

Even in these early days there were not wanting educated men who realised that the truths, whether of philosophy or of medicine, were not entirely to be found in any existing systems. These so-called Eclectics saw that both Dogmatics and Empirics held some truths and some fallacies. They declined to follow definite rules, or to be guided by fixed principles. Despairing to obtain absolute truth, they attempted to reach the highest standard obtainable in their day by selecting what seemed best in already existing knowledge. But the Eclectics, too, in time established a school or system. They were tempted to write books and compilations upon what had been already done in medicine, instead of aiming to still further improve and develop their practice by an objective study of the subject.

The story of Cleopatra, the last of the Ptolemies (died 30 B.C.), reminds us how Alexandria came into the hands of the Romans, who a century earlier had destroyed the Achæan league, and had thus made themselves masters of Greece.

In the second century before Christ so widespread was the influence of Rome that the Mediterranean Sea might have been regarded as a Roman lake. Her control had spread all along it, from Syria and Egypt on the east to Spain on the west.

The higher culture of Greece and Alexandria permeated the city and stimulated an appreciation of the drama and of art, while it introduced Greek teachers of philosophy and literature, of science and medicine.

Marcius Portius Cato, the Censor (234 B.C.), strove with all his might to stem the tide of Greek refinement and luxury, and endeavoured to encourage a return to a simpler and stricter social life after the ancient Roman pattern. He was the first writer of good Latin prose, and in the 'De re Rustica,' he gives some useful surgical rules, doubtless drawn from his experience as a slave-owning patrician.

Archagathus, a Greek practitioner who came to Rome about 200 B.C., was so successful in his treatment of wounds, fractures, and dislocations that he was known as "Vulnerarius." He was allowed by the Senate to practise at a "taberna" in a much frequented thoroughfare, but when he began to operate with the knife his popularity fled, he was nicknamed "Carnifex," and had to leave the city.

The first physician of eminence who practised in Rome was a Greek, Asclepiades, from Bithynia (128 B.C.). He had studied philosophy and rhetoric at Athens, and possibly medicine at Alexandria. He advocated a mode of living conformably with nature, fresh air, exercise, moderation in diet, cleanliness, the use of the bath, and massage.

He applied to medicine the principles of the Greek philosopher, Epicurus (341 B.C.), whose views were being popularised by Lucretius, the Roman poet of the day, in the 'De Rerum Natura.' (Pleasure—that is freedom of the body from pain, and of the soul from anxiety—temperance, and simplicity of life.)

Asclepiades possessed all the personal attributes and culture likely to make him popular in a rich, aristocratic community, and he soon became the most successful fashionable physician of the

day, and one of the best known members of the Roman Republic. He was on terms of intimate friendship with Cicero (106 B.C.) (whose thoughts and speculations were borrowed from the Greeks, though he clad them in a perfect style of Latin prose), and with him he probably discussed foreign travel, the philosophy of Epicurus, and Falernian wine ; while at the villa of Lucullus at Tusculum, or at his house in Rome—the luxurious splendours of which have become proverbial—he mixed with artists, poets, and men of letters, and with all that was best in Roman society at a time which just preceded the richest period of its culture (the Augustan age), the brilliant days of Sallust, Livy, Virgil, Horace, and Ovid.

Asclepiades left behind him a number of worthless imitators, who desired to be judged by the luxury and elegance they displayed rather than by the knowledge they possessed, and some more capable pupils, who strongly developed the methodic system, among whom Thessalus, who flourished under Nero, was a good practitioner. He advocated careful dieting and exercise, but so conceited was he of his knowledge of medicine that he called himself the Conqueror of Physicians.

In Rome medical men seem as a rule to have held but a poor social position, and most of them were foreigners or freedmen. The calling was considered unworthy of a Roman citizen, "though not dishonourable for those to whose social rank in life it was suited."

During the first century of the Christian era it is probable that the profession of medicine had begun to be recognised as of some importance, for Julius Cæsar granted citizenship to all the physicians practising in the city, perhaps in order that he might more readily obtain army doctors for his legions, in which none but citizens could serve. This improved status may have been further due partly to the high standard of education and ability possessed by the leading practitioners, but it is certain also that large incomes were being made by some of them, and this alone always commands respect.

But on the other hand, under the term Medicus all kinds of doctors, specialists, and quacks flourished. Ophthalmists, medical and surgical, were particularly active, and Galen, writing on diseases of the eye, declares that he thought it useless to treat the subject scientifically, for the oculists would not understand it, while Martial and the Satirists are very severe on this class of specialists, as indeed they are against the whole profession.

By imperial edict, Archiatri—chief physicians—who had probably previously existed in Greece and Egypt, were selected, possibly after some sort of examination, and ameliorated the position of the medical profession. A few of them attended on the emperors (Palatini), others were appointed to the chief cities and neighbourhoods, while the Archiatri Populares had private practice, attended to the sick poor, and gave instruction on the medical sciences. The opportunities thus afforded to the most competent teachers for attracting pupils, and the foundation of learned societies (Schola Collegia), which included medical men, encouraged the development of educational centres for the study of medicine in various portions of the Roman Empire. At a later period those who were not members of the College of Archiatrio had no rights nor emoluments as practitioners of medicine.

In the Roman period the physician (Medicus Clinicus) and surgeon (Chirurgicus) seem to have been clearly distinguished. We may infer something of the practice of early Roman surgery from the bronze and iron instruments now resting in the Museo Nazionale at Naples, which were buried under the ashes of Pompeii when that city and Herculaneum disappeared under the eruption from Vesuvius in the year 79 A.D.

Several eminent Greek surgeons flourished in Rome about that time. One of these, Heliodorus, in speaking of his operations for hernia, says:—"We ligature the larger vessels, but as for the smaller ones we catch them and twist them many times in order to close their mouths," and in giving detailed directions as to the amputation of various limbs, he directs before operating to tie a ligature as tightly as possible above the point of amputation. Antyllus, a century later, described his well-known treatment for aneurysm, and tabulates the operations for cataract then in vogue much as we should do at present:—

(1) It may be simply depressed or couched (Egyptian); (2) it may be extracted entire; (3) the lens may be broken up and left to be absorbed; (4) the lens may be broken up and removed by suction (Persian).

Almost the only great medical author who wrote in Latin was Aulus Cornelius Celsus, about 50 A.D. A Roman patrician of very widespread knowledge, he shone in Rome about the same time as Martial, 30 A.D., and Quintillian, 35 A.D., Tacitus, 53 A.D., Juvenal,

55 A.D., and the two Plinys, 23 A.D. and 62 A.D., who constituted what has been called the silver age of Latinity, and after whom, if we except the Vulgate, and the writings of the Latin Fathers on theology, Latin literature almost died out until its revival at the Renaissance.

The 'De Medicina' of Celsus was probably written from the point of view of a rich man who desired to know everything that related to the management of his estates and the well-being of his slaves and dependents. He was well versed in all the knowledge of his day, and his writings exerted a great influence long afterwards. His is the greatest name associated with Roman surgery, but it is doubtful if he ever operated, or indeed if he was a doctor at all. His Latin was clear and forcible, but influenced by Græcisms; like Hippocrates, he bases medicine on anatomy and the scientific investigation of the causes of disease, while without excluding what is hypothetical he allows no hypothesis to influence practice.

His writings are of the greatest value from an historical standpoint, as the source from which we have a knowledge of the Alexandrian period, and of earlier developments in medical science.

During the second century of the Christian era Rome enjoyed a happy period of beneficent rule, but in it she possessed few men of genius. An exception must be made in favour of Claudius Galen (131–201 A.D.), a Greek physician, born in Pergamos, but who had also studied all the sciences under the most distinguished teachers in Corinth and Alexandria. On his return to his native city he was appointed physician to the school of gladiators, but later he went to Rome, where by his power of rhetoric, his profound knowledge, and his practical ability, he soon took a foremost place, and was appointed physician to the emperor.

He was a prolific writer, and gathered up all the medical knowledge of his time; he arranged it in such an admirable manner that it remained the authoritative account of the science for centuries; and without his writings it is certain that the valuable work of many of his distinguished predecessors would have been lost, and thus the progress of medicine definitely hindered. The subsequent Greek and Roman authors were mainly mere compilers from his writings, and when about the sixth century his works were translated into Latin they were widely followed in the West; while in the ninth century, when translated into Arabic, they were at once

adopted throughout the East also, and for many years remained the leading text-books among the Arabian physicians. By his influence great progress was made, particularly in anatomy. He described nearly all the bones in a monograph on the skeleton, and advised his students to go to Alexandria to see and handle the bones, from which it may be inferred that then no human skeleton existed in Rome. He was the first to refute the doctrine hitherto held that the arteries contain air, he showed that blood flowed from a wounded vessel, but he did not realise the circulation. He studied accurately the function of the muscles, partly by exposing them in animals and observing their actions in producing flexion and extension of the joints. He recognised that the heart was a muscle, and showed that the nerves came from the spinal cord and the brain, and that they are separately concerned in sensation and motion. He divided the body into cranial, thoracic, and abdominal cavities, and described the viscera that they contain. He dissected animals, not human bodies but apes, as being most like men, or possibly occasionally the body of a man found murdered. Excepting in Alexandria human anatomy had been but little studied through dissection, pagans and Christians alike dreaded interference with the dead body, though they had not hesitated to put the bodies of the living to the greatest tortures and indignities.

After the time of Galen, either from prejudice or apathy, the practice of dissection was apparently given up for centuries, and except by Cœlius Aurelianus, scarcely anything was written in the Latin language to help to develop medical knowledge, which was barely maintained in the West by its connection with the Church.

At about the time of the death of Galen, the Roman dominion seemed to be so firmly established that it could never be shifted. The domain of the mind was also apparently stable and definite; the teaching of Aristotle was the authority in physics and metaphysics, as was that of Galen in medicine, while in moral philosophy, Plato, Epicurus, and Zeno were almost universally followed.

But the mission of Christ was meanwhile secretly extending. Despite the constant persecution of its converts, Christianity increased in numbers and influence (the blood of the martyrs was bearing its fruit on the whole world of thought, as well as on religions and philosophies), until the Christians constituted a powerful party in the State. In 312 A.D., a century after the death of Galen, Constantine the Great had obtained possession of

Rome and of the Western Roman Empire. He had been converted to Christianity, it is said, by seeing a flaming cross in the sky, carrying the words: ἐν τούτῳ νικα (By this, conquer!), and by a vision bidding him to inscribe the shields of his soldiers with the sacred monogram of the name of Christ; hence the well-known "Labarum" or "Standard of the Cross," which he afterwards gave to his army.

He now put himself forth as the head of the Christian party. It was natural that the first Christian Emperor should greatly favour the Christians, and place leading members of the new religious body in positions of wealth and power; at the same time these privileges encouraged crowds of worldly persons, who cared nothing about its religious ideas, to be warm supporters of the new sect.

Pagans at heart, their influence was soon manifested in the paganisation of Christianity that forthwith ensued, and the doctrines of the Christian faith became transformed from a religion into a political system.

A few years later Constantine, having also conquered the eastern provinces, became sole governor of the Roman world. He selected Byzantium as his capital, and inaugurated it as the seat of government under the name of Constantinople.

But the eastern and western provinces were again permanently separated at the death of the Emperor Theodosius, 395 A.D. One of his sons, Honorius, ruled from Rome over the western portion—Britain, Gaul, Spain on the Mediterranean, and Italy—while Arcadius reigned at Constantinople and governed Turkey, Greece, Asia Minor, Syria, and Egypt.

The Roman Empire was very soon overrun by Huns and Visigoths, and various tribes who conquered and left desolate the regions over which they passed, until the Germans under Odoacer (476) practically destroyed it. Italy came under barbarian rule, Rome ceased to be its capital, and later passed into the hands of the Popes.

From the fifth to the eleventh century were the dark ages of Western Europe. Learning and the sciences were entirely neglected by the people. The Greek language became practically unknown, though Archbishop Theodore made an exception by bringing a Greek library from Tarsus, and by finding translators for it in the School at Canterbury. Within the pale of the Church, particularly in Southern Europe, a few men could obtain such protection as

enabled them to study. Later, ecclesiastical schools were maintained, in some of which a study of medicine was encouraged, together with that of other branches of science. Thus, intellectual work and the learned professions fell into the hands of the clergy, some of whom possessed a little knowledge of the healing art, recognised a few symptoms of diseased conditions, and possessed receipts for herb remedies, instruction in which they always considered important.

Throughout the early history of medicine, from the descendants of Æsculapius in the temples of ancient Greece, in Alexandria, and in Rome, the practice of the healing art has often tended to pass into the hands of the priests, who have devoted themselves always to the study of books, and who have always been an educated class. By them, however, the science of medicine has often been tinged with theological controversy. They deserve the greatest credit for the rescue and care of books and of the treasures they contain, but with them scientific accuracy usually counted for little, investigation and free thought were strongly discountenanced, while the natural causes of disease were taught to be regarded as due to divine wrath or diabolic influence, and their cures to depend on prayer, and to be brought about by the power which the priests could alone exercise through their divine prerogative. Much good work that these well-read men could have done was hampered by their religious dogmatism, and by that habit of mind which also spoiled the progressive development of the old pagan philosophies —the blind regard for tradition, and the lack of original study and research—the encouragement of theories and disputations on matters of opinion which often started on faulty assumptions, and frequently disregarded matters of fact.

On the other hand, it is to the early Christian clergy that we are indebted for the foundation and support of the system of voluntary hospitals. It is true that there existed in ancient Athens, Cynosarges—homes for deserted children—and in Rome, Iatreia—State-supported infirmaries, but it was St. Basil, Bishop of Cæsarea, who founded the first voluntary hospital there in the year 370 A.D., together with an almshouse, where he preached a theological pathology and a cure by faith. St. Ephem the Hermit collected money for the help of the sick during a plague, and founded the hospital at Edessa, 372 A.D., which has played a great part in the history of medicine: while about 400 A.D., Fabiola, a rich Roman

widow, also built one. After these examples, buildings and endowments have been dedicated by Christian peoples, heathen Emperors, and Moslem chiefs to the relief of suffering humanity, and this system remains to-day the greatest work of voluntary charitable effort.

Certain parts of the Roman Empire showed at different times increased interest in the art of healing, but scarcely any real progress was made in knowledge of disease : and very few important original writings were in Latin.

Meanwhile the Byzantine Empire, with Constantinople as its capital, although it underwent a great variety of fortunes, was maintained for more than a thousand years, until 1453, when its last Emperor, Constantine XI, died, sword in hand, vainly trying to save his capital and kingdom from the attack of the Ottoman Turks.

Throughout the entire history of the Byzantine Empire, freedom, originality, force of intellect, and character were repressed by the severe despotism of the Imperial Government, yet for many centuries this Empire was a bulwark of Christian theology against Persians, Saracens, and Turks, while it transmitted Christianity to Russia and other Slavonic tribes. In it the Greek language and learning continued to survive, until banished by the Turks in 1453, and although no advance was made in medical knowledge it produced a few Greek physicians, educated in the Alexandrian school, who by their writings maintained some general interest in the subject, and spread the doctrines of Galen and Hippocrates by means of compilations which became the chief medical classics of the earlier Arabian teachers of medicine.

In the fourth century, Oribasius, of Pergamos, physician to Julian the Apostate (who made him Quæstor at Constantinople), was the last of the great pagan physicians. After the Emperor's death, Oribasius was banished, but he effected such extraordinary cures, and so attached himself to the savage men around him, that he was recalled to the capital and reinstated. He was held to be the wisest man of his time, most skilful in medicine, and most charming in conversation. His 'Collections' of earlier writers are exact and well arranged, and his work on obstetrics is of considerable value.

The first medical writer of note who professed Christianity was Ætius, who, like Oribasius, held office in the Byzantine Court. He was born in Amida, 502 A.D., an eastern outpost of the Grecian

Empire, where he was brought into contact with Arabian medicine, and he gives many remedies taken from this source.

In the sixth century there also flourished Alexander of Tralles, a Greek physician who practised in Rome. His writings, and those of Ætius, show some originality, but are imbued with mysteries, and are evidently influenced by the theological teaching around them.

Paulus Ægineta was one of the last Greek medical writers; he lived about 690 A.D., and must have practised among the Arabs shortly after the days of Mahomet. He travelled extensively, and acquired much knowledge and skill in surgery and obstetrics. His synopsis of the medical art has gone through many editions in the original Greek, in Latin, and in English, while translations from it into Arabic formed the chief guides and handbooks of the Arabian surgeons.

The Christians, as they became more powerful, broke up the pagan schools, and discouraged the learning of what they designated the profane sciences. Some of the leaders of the Christian Church were still influenced by the writings of the old philosophers and scientists, amongst these, Nestorius, the patriarch of Constantinople, must be mentioned, as he largely influenced the development of medical knowledge. His unorthodox opinions caused him to be excommunicated by the Council of Ephesus (431), and he was confined in a monastery near Constantinople, whence he was banished to Arabia. His followers, escaping to Mesopotamia, joined the university already existing at Edessa, and founded a medical school there which for a time rivalled that of Alexandria. They were further expelled by Bishop Cyril and driven into Persia. Other Nestorians banished out of the Roman Empire wandered as far as Persia, India, and China, and carried their higher education with them. Excluded from the service of the Church, and unable to gain eminence in the State, they devoted themselves to the study of medicine, and founded in several centres schools of philosophy, mathematics, and astronomy, in which medicine was also taught. Perhaps the most celebrated was the university at Djondesabour (Jondisapur, Gondisapor), in which were combined the ancient knowledge of the East, Greek philosophy, and Christian doctrine. Students of many countries and of different creeds came to these schools for purposes of study and to gain experience. They enjoyed toleration under the Califs, and exercised much influence by their teaching throughout Arabia, Syria, and Palestine.

When some years afterwards Justinian (A.D. 483) expelled the pagan from Alexandria and Athens, many of these also escaped into Persia, where they found the Hospital and University at Jondisapur strongly imbued with the ideas of the Nestorian Christians, some of whom had found their way to India and had returned to Jondisapur with much of the lore of that country, and even with Hindu physicians learned in the knowledge of Indian remedies. This city thus became a very strong medical educational centre, where Easterns and Greek philosophers and scientists, Jews from Egypt, Nestorian Christians from Syria, and Hindoos, all met for purposes of study and the development of learning. Here they were later to be joined and strengthened by the Arabs.

About the year 600 A.D. Christianity had spread into Arabia, into which many Jews hnd already immigrated. The ancient pagan creeds had ceased to be living faiths, and converts were preaching the doctrines of the Unity of God, the ancient religion of Abraham, human responsibility, and the judgment to come. Among these arose Mahomet, who united the different families of Arabs and the neighbouring tribes under one sceptre and one creed; and within a century after his teaching, Arabia, India, Syria, and Egypt were in the hands of his followers. His successor, Amrou, seized Alexandria, which since the second century had been the great centre of the conflict between Christianity and heathenism, and had gradually become the chief seat of Christian theology. He completed the destruction of the great library of the Ptolemies which had not only received serious injury at the hands of Julius Cæsar and Archbishop Theophilus (A.D. 391), but had been for many years uncared for, pilfered, and dispersed. The later Califs, however, made good amends for this; they encouraged men of merit and gave them employment: among these were Greek philosophers, the heretics banished from Christian countries, and the many thousand Jews who had been living in Alexandria since the time of its capture.

The Saracens thus came under the influence of Greek and Hebrew civilisation and of the main principles of Christian doctrine. The Nestorians taught their children, and the Jews became their family physicians; their ferocious fanaticism became tempered, their manners polished, and their thoughts elevated. The dominion of the Arabs from the time of Mahomet to the fall of the Califate of Bagdad in 1258 is a very important period in the history of civilisation, and an interesting chapter in the history of medicine.

If there was no great advance in knowledge under the Arabs, at any rate mental culture and study were encouraged and maintained by them while Europe was still in the deepest intellectual darkness. Learned men were invited from all parts by the Califs and were remunerated for their labours with princely munificence The works of the best Greek, Syriac, and old Persian writers were industriously collected. Ambassadors were instructed to buy up all they could procure of them in other countries, and the books were at once translated into Arabic and liberally distributed to the schools that needed them. Thus the intellectual treasures of Greece gradually became centred in the Saracens.

The Augustan age of Asiatic learning was during the Califate of Al-Mamun (813–832); he made Bagdad the centre of science, collected great libraries, and surrounded himself with learned men. He is reported to have brought into Bagdad hundreds of camel-loads of manuscripts, and he acquired by treaty one of the great libraries of Constantinople. At Cairo there were said to be 6,500 manuscripts on astronomy and medicine alone. Every great library had a department for the copying or manufacture of translations, and such manufactures were also managed by private individuals: thus Honain (850), a well-known Nestorian physician, had a private establishment in Bagdad for the copying of translations or manuscripts. He issued versions of Aristotle, Plato, Hippocrates, and Galen. The translators were mostly Christian employés.

In science the Arabs were willing workers, and rendered important services. They studied by experiment and observation, not by speculation and theory; they followed the writings of Aristotle on philosophy, and gave preference to his inductive reasonings rather than to the intellectual reveries of Plato.

Many of their best philosophers were also physicians, who not only kept alight the flickering torch of Greek medicine, but made some real advances, particularly in pharmacy and therapeutics, but not in surgery, because of the Oriental repugnance to the shedding of blood, nor in anatomy, for the Koran forbade the dissection of human bodies. The principal medical works relied on were translations from Oribasius, Ætius, Alexander of Tralles, Paulus Ægineta, Hippocrates, and Galen. They disregarded Celsus and the two or three other Latin authors,

For a long time the centre of medical training was in the Hospital

School at Jondisapur, and it was from hence that the first Pharmacopœia appears to have issued. Later schools of medicine sprang up in many cities under the domain of the Saracens.

Many hospitals flourished in Bagdad. The accounts that we have read of the perfections of the hospitals at Damascus and at Cairo, both as to their construction and management, are worthy the pen of the writer of 'The Thousand and One Nights.' Cairo possessed a public library and hall of science arranged for convenience and facility in reading, much as our best planned institutions for similar purposes are organised at present. It would appear that the medical students of Cairo were expected to pass rigidly conducted examinations, and that other Arabian colleges followed this example. In the Western Califate, universities, libraries, and hospitals seem to have existed in Cordova, Seville, Toledo, and other towns.

It is to the Arabians that we are indebted by their practical work for putting chemistry upon a sound basis. If the earlier objects of the alchemists to learn the secret of transmuting the baser metals into gold and silver, or to find the philosopher's stone and the elixir of life, were never realised, at any rate on the way to these discoveries were found many facts in chemical science. The Arabians created the science of chemical pharmacy and poly-pharmacy. Many chemical products were used in the treatment of disease, and new chemical methods were introduced for the preparation of medicines, together with many active vegetable remedies.

Their pestles and mortars, crucibles and furnaces, vessels for sublimation, coagulation, and calcining, for the making of infusions and decoctions were but little improved on till the eighteenth century, and many names introduced by them remain to-day :— Azimuth, Algebra, Alcohol, Alkali, Elixir, Zenith, Nadir.

In the Western Califate, 1,000 years after Christ, "The Spanish Califs had surrounded themselves with all the luxuries of Oriental life. Europe at the present day does not offer more taste, more refinement, more elegance than might have been seen in the capitals of the Spanish Arabs. Their streets were lighted and solidly paved. The houses were frescoed and carpeted; they were warmed in winter by furnaces, and cooled in summer with perfumed air brought from flower beds by underground pipes. They had baths and libraries and dining halls, but wine was prohibited. The enchanting moonlight evenings of Andalusia were spent by the

Moors in dancing to the lute or mandoline, or in sequestered fairy-like gardens, or in orange groves listening to the romances of the story teller or engaged in philosophic discourse; consoling themselves for the disappointments of this life by the reflection that, if virtue were rewarded in this world, we should be without expectations in the life to come, and reconciling themselves to their daily toil by the expectation that rest will be found after death—a rest never to be succeeded by labour." (Draper.)

But in the midst of all this comfort and pleasure, the towns of Spain, and of other countries under Saracenic rule, were thoroughly equipped to give their inhabitants a splendid education by means of schools, universities, and public libraries.

Amongst the long list of celebrated Arabian physicians may be mentioned Rhazes, a Persian (Rhazi of Bagdad), 850–922 A.D., called the "Experienced" or the "Experimentator," as he is thought to have made experiments on animals. He was professor in the University of Bagdad, where he taught large classes; and was the founder and director of the great hospital in that city. Like so many physicians of early days he is handed down to us as a kind of universal genius. The 'Liber Continens,' notes compiled for his own use, was an admirable epitome of medicine and surgery as then known, and long remained a guide to Oriental practitioners of medicine. It is said to have been the most valuable work that the small library of the Medical Faculty of Paris possessed at the end of the fourteenth century.

Another physician of the Eastern Califate was Ibn Sina (Avicenna), the foremost representative of Moslem science, who was born in Bokhara in 980 A.D. A most distinguished student in the University of Bagdad, he was astronomer, poet, philosopher, and statesman, as well as doctor. He was a first-rate osteologist, and described some structures hitherto unnoticed. His 'Canon Medicinæ,' based on the teachings of Aristotle and Galen, made him for a time the leading authority in the medical world, and remained a medical classic in Asia for many centuries; its scientific value was lessened by metaphysical speculations, and it was probably inferior in real value to 'The Continens,' or to the 'Amaleki,' or the 'Royal Book' of the Persian Haly Abbas.

The 'Materia Medica' of Mesuë (980), of Damascus, was the foundation of the pharmacopœias in Europe, and was used as a guide of the London College of Physicians in the reign of James I.

Albucasis, of Cordova, 1022, wrote one of the first independent treatises on surgery, which was illustrated by drawings, and contained much valuable work. It was largely quoted by mediæval surgeons.

Averroes, the most famous of Arabian philosophers, was born at Cordova 1126. He was educated in philosophy and in theology, and he became a judge in Morocco. He was also physician to the Calif, for he had studied medicine under Avenzoar (Ibn Zohn), whom he frequently praises, and who wrote largely on practical medicine. He was dismissed from office for expounding the Koran according to Aristotle, and thus founding a Moslem philosophy of religion which was unorthodox, and which gave rise to many heresies in Europe. He wrote a sort of medical system which, under the name of 'Colliget,' was translated into Latin and repeatedly printed.

Many books of these well-known writers on Arabian medicine, which describe the views held by this remarkable people on the theories and treatment of disease, were afterwards translated into Hebrew and into Latin.

The political conditions under which Arabian science had flourished gradually ceased to exist. The Castilians, under Ferdinand III, absorbed the Spanish territory, while the inroads of the Turks and Mongols into other parts were mainly instrumental in driving away the learned men with what books they could rescue from the libraries, chiefly into Italy.

Amidst the general disregard of learning in Europe during the early Middle Ages, some interest in the practice of the art of healin had been maintained, thanks to the religious orders. Their information was chiefly derived from the somewhat degenerate knowledge on the subject which had been passed on by the Latin writings of the later Roman medical authors.

Monastic medicine was at one time much interwoven with augury, divination, cheiromancy, astrology, and alchemy; but a better appreciation of medical science was due to the efforts o the Benedictine Order, who have always given a high place to the work of education and instruction, both in worldly and religious affairs, and whose monasteries have been valuable repositories of learning. One of the most important of their establishments had been founded by St. Benedict (480) himself, at Monte Casino, near Naples.

Not far from this monastery there flourished one of the first great mediæval centres of intellectual activity. Salernum, on the Bay of Naples, was a Roman colony celebrated for its cooling baths, which were mentioned by Horace in contrast to the warmer ones of Baiæ. Its value as a health resort probably protected it from destruction by any of the numerous nations into whose hands it had fallen by the vicissitudes of war, until it was safely included in the kingdom of Naples. The Medical School for which it was early celebrated, may have been inaugurated by teachers who had escaped from Alexandria when that city was captured by the Saracens (640 A.D.). But whatever its origin, its great development in the Middle Ages was due to the efforts of the Benedictine monks, whose monastery at Monte Casino lay a few miles on the other side of Naples.

The school of Salernum was a non-religious body in which law, as well as philosophy, was taught, but the preponderance it gave to medicine as early as the ninth century earned for it the name of "Civitas Hippocratica." The earlier studies there were doubtless from the Latin works of Celsus and Cælius; for at that time the knowledge of Greek had disappeared from Italy, while the Arabs had (at the end of the seventh century) acquired nearly all the Greek manuscripts. A knowledge of Greek and Arabian medicine was probably first brought to it about the middle of the eleventh century by Constantine the African, the most celebrated Christian physician of his time. Constantine (1018) had travelled, for purposes of study, in Egypt, Bagdad, Babylon, and India, and when he returned to his birthplace, Carthage, his knowledge was so great that he was looked upon as a sorcerer, and was compelled to fly in order to save his life; escaping to Salernum, he wrote extensively on medical subjects in the monastery of Monte Casino. His writings were chiefly translations in Latin from works of the earlier Arabian physicians, and from Hippocrates and Galen. They stimulated much interest in drugs and materia medica, and led to the publication of a Salernian pharmacopœia.

At the end of the eleventh century, Salernum, which lay on the high road to the East, became a great medical centre for the soldiers injured in the Crusades, who, coming from different parts of Western Europe, may have brought various forms of valuable knowledge, while their wounds and injuries must have largely increased both the experience and the reputations of the medical men whose duty it was to attend to them.

Among others, William the Conqueror visited the town, and the famous rhyming Latin poem, 'Regimen Sanitatis Salerni,' which afterwards circulated widely in Europe, is supposed to have been written for his son Robert.

During the twelfth and thirteenth centuries Salernum became the principal university in Christendom, and it long exerted a widespread influence on the progress of medical science. Numerous very celebrated teachers in Paris, Bologna, and other schools received their education there, one of whom, Roger of Parma, with the help of his pupil Roland, of Bologna, gave the ground work for the 'Commentary of the Four Masters,' a celebrated early textbook on surgery.

As time went on other schools began to rival that of Salernum. During the thirteenth century the old Universities of Montpellier, Bologna, and Paris were rapidly increasing in importance, while new ones had been founded at Naples and Padua by Frederick II.

Frederick II of Germany, 1194 (grandson of Barbarossa), afterwards king of Sicily, Rome, and Jerusalem, is one of the most interesting figures of the Middle Ages. He was in many ways the most enlightened man of his time, and he is said to have spoken all the principal languages of his extensive empire—German, French, Italian, Latin, Greek, Arabic, and Hebrew. He supported all forms of learning and culture, and encouraged all men of ability, while he himself, in addition to his great power both as a general and as a politician, was a diligent student of natural science. He instituted codes of law to suit all classes of his German and Italian subjects, and in 1224 he united all the different faculties and schools of Salernum into a university, and ordered that no one should practise medicine within the two Sicilies until he had been publicly examined by the Faculty of the University on the 'Aphorisms' of Hippocrates, the 'Synopsis' of Galen, or the 'Canon' of Avicenna.

The first attempt to control the practice of medicine appears to have been made by Roger II, founder of the Kingdom of Sicily, who, under his firm but tolerant and enlightened government, in 1140 advised that everyone who wished to practise medicine must obtain authority to do so from a magistrate.

Second only in importance to Salernum as one of the earliest centres for culture in Western Europe was Montpellier, which, lying near the sea on the great route from Italy and Provence to

Spain, was, during the Middle Ages, in a highly favoured position for commercial and intellectual importance. Its Schools of Medicine, Law, and Arts, developed during the twelfth and thirteenth centuries, were formally constituted a University by Papal Bull in 1289. The Faculty of Medicine was founded mainly by Arabian physicians; Arnaud of Villeneuve (1235) was its best known representative, but he also worked long in Paris, visited the Italian Universities, and went to Spain for the purpose of translating the manuscripts of the Arabian physicians. He came into collision with the theologians, and many of his books were burnt. He wrote on medicine, theology, and chemistry. He introduced many chemical compounds into therapeutics, and is said to have discovered spirits of wine and oil of turpentine, while he regarded achohol as a most important remedy for disease, hence its name, "eau de vie."

At this time the Latin authors were being seriously studied, while the works of the Arabian compilers were translated into Latin, and through them a knowledge of Greek medicine, somewhat tinged with Eastern ideas, was restored to Europe.

The two most celebrated surgeons of the end of the thirteenth century were William of Saliceto, a professor in Bologna, and his pupil, Lanfranc of Milan, who afterwards went to Paris. Under the influence of their teaching was the well-known anatomist and surgeon, Henri de Mondeville, a pupil of the School of Montpellier. He in turn was the master of Guy du Chauliac (1300), and through these men a knowledge of the best Italian surgery was introduced into France.

The University of Oxford joined in the general revival in the thirteenth century, but especially because its fame had just then attracted the four great orders of mendicant friars—Dominican, Franciscan, Carmelite, and Austin Friars—who threw themselves into the studies of the University with such enthusiasm and with such success that emulation was kindled among other monastic and educational bodies, so that there followed a still further improvement in teaching. It was at this time that Roger Bacon (1214) was working at Oxford on physics, exploring the secrets of Nature and making discoveries which were looked on as the work of magic.

The first great revival of medical learning in Europe took place in Italy. The old University of Bologna had long been known for its Law School, but the Medical Faculty rapidly became celebrated at the beginning of the fourteenth century, chiefly by the teachings

in anatomy of Mondino, who was born at Milan (1315). He accurately studied the superficial markings on the human body, and made dissections at any rate on a few subjects, despite the difficulties, at that time serious, attending any such investigation. His book 'Anatomia' was the first published of importance since those of the Alexandrian anatomists. The excellent practical instruction in anatomy given at Bologna attracted, among others, Guy du Chauliac, the leading practitioner of the day, who had been a student of medicine in Montpellier and Paris. He had a wide knowledge of medical literature, but from what he observed in dissection, and in the study of patients, he became dissatisfied with the opinions he had acquired by reading, and with the medical practice of his teachers. Continuing investigations for himself, he learned how to observe accurately, and he laboriously translated the best Greek and Arabian authors for his own use. The increasing knowledge he thus gained, his independence and originality, his power of observation, and his fairness towards the writings of others enabled him to write in Latin a most valuable work, 'The Inventory,' which soon became the recognised guide for surgical practice, and was freely translated into various languages. It still remains a valuable comment on the condition of the science in the Middle Ages. He practised at Lyons, and at Avignon, where he was adviser to the Popes. There was at this time a tendency for the ecclesiastical physicians to hold aloof from manual intervention, and to look down upon surgical practice, which was thus left in the hands of less educated and less favoured disciples of the healing art. Du Chauliac endeavoured to bridge over this tendency to the separation of surgery from the other branches of medicine. He was constantly improving surgical method, and trying to raise the status of its practitioners.

The Roman Catholic clergy held sway in learning over the greater part of Europe. They were essentially the educated class, their monasteries were the great depositories of knowledge, and they tended to monopolise the learned professions. In their hands the practice of physic became so lucrative that it was necessary to prevent the monks from neglecting their religious duties in favour of the study of medicine. The secular members, however, continued to practise all branches of the healing art, until in 1215 an ordinance of Pope Innocent III debarred the clergy from undertaking surgical operations, on the plea that the Church "abhorret a sanguine."

This command threw the practice of surgery from the monks into the hands of the barbers and bonesetters, who practised it mechanically, and without any special training or anatomical knowledge, but who were encouraged to compete with the surgeons proper. In England, surgeons practised as well as physicians, at any rate as early as the twelfth century, when a "Guild of Surgeons" and a "Guild of Barbers" seem to have flourished quite separately and distinct from one another.

At the end of the fourteenth century, physicians, chiefly ecclesiastics, and surgeons, entirely laymen, and usually but little educated, were practising in London, some holding appointments at Court, or in the army, and many of them recognised as possessing a complete knowledge of their professions; and in addition there flourished barbers, barber surgeons, apothecaries, and all kinds of irregular practitioners of medicine.

In 1423 a great effort was made by the physicians to combine all the physicians and surgeons practising in London in a Conjoint Faculty of Medicine and Surgery. They had to be content that this Faculty was granted by the Mayor and Aldermen of London, for the recent death of King Henry V having left the Government under a Regency, had prevented it from being granted by Royal favour. Each partner of the Conjoint College was to be independent the one of the other. The management consisted of two Surveyors of the Faculty of Physic, two Masters of the Craft of Surgery, presided over by the Rector of Medicine, who was to be a Doctor of Physic and a Master of Arts. No physician or surgeon was to be allowed to practise in the City of London until after due examination (whether in medicine or surgery, as the case might be) by examiners appointed by the Faculty, and after having been admitted a member of the Commonalty of Physicians and Surgeons by licence of the Mayor and Aldermen of the City.

The new body soon began to interfere with the ignorant and unauthorised practitioners, and endeavoured to prevent members of the Guild of Barbers from practising surgery. The barber-surgeons, however, very soon obtained a confirmation of their rights to practise, which had been granted to them as early as 1415.

The Conjoint Faculty did not last long. No action seems to have been taken by the physicians to form a society for themselves until the College of Physicians was founded a century later. But the surgeons continued to work together towards their plan of

consolidating the craft, and in 1435 they appear as an established body, "The Guild of Surgeons," with a code of laws for the governance of the Society. The "Barbers' Guild" was meanwhile also strengthening its position, and in 1462 obtained from King Edward IV a Charter of Incorporation, which made it a City Company. Thus "The Barbers" and "The Guild of Surgeons" worked on side by side, but they could not prevent unlicensed persons who owed no allegiance to either guild from encroaching on the domain of surgery.

We need not further follow the numerous changes that occurred in the control or otherwise of the practice of surgery, but it is evident that the leaders of the Church possessed great power over the control of medicine in England, even into the seventeenth century.

The abuses committed by ignorant and illiterate persons in the practice of physic do not appear to have exercised the attention of our Legislature till the third year of the reign of Henry VIII (1511), when an Act was passed, the preamble of which set forth that :—

> "Forasmuch as the science and cunning of physic and surgery (to the perfect knowledge whereof be requisite both great learning and ripe experience) is daily within this realm exercised by a great multitude of ignorant persons of whom the greatest part have no manner of insight in the same nor in any other kind of learning &c."

And which goes on to enact—

> "That no person shall practise physic or surgery within the City of London or seven miles thereof without being first examined and approved by the Bishop of London or the Dean of St. Paul's (who shall call to their assistance four doctors of physic and for surgery other expert persons in that Faculty) upon pain of being fined five pounds for every month such person shall practise without being thus admitted."

By this Act similar powers were given to the Bishop of every diocese, for the examination of persons practising in the country; but an agitation against this Act caused its practical repeal, and it was ordained that at all times from henceforth it is lawful to any person being the King's subject, having knowledge or experience of the nature of herbs, &c., to minister in and to any outward sore or wound according to their cunning. The ecclesiastical authorities

however, maintained for more than a century the right to confer their licence to practise.

The Royal College of Physicians of London, the oldest Medical Corporation in the United Kingdom, was founded in 1518, by King Henry VIII on the suggestion of his physician, Thomas Linacre (1461), and by the advice of Cardinal Wolsey, for the improvement of the art of physic and for the repression of irregular practitioners "who profess physic rather from avarice than in good faith, and to the damage of credulous people." Many of the lay practitioners of medicine at that time were probably not much better instructed than the average mechanic.

Linacre, having become a Fellow of All Souls' College, Oxford, went for further study to Italy; he worked under that most remarkable genius, Polititian (1461), who was then Professor of the Greek and Latin languages at Florence, at that time the brilliant centre of the Italian Renaissance under the guidance of Lorenzo de Medici.

Linacre is said to have become the companion of the children of Lorenzo, but at any rate he came into contact with many of the most learned men of Italy at a time when, on the one hand, the development of art, literature, philosophy, and language was encouraged in a magnificent, if semi-pagan spirit; and on the other hand, when Savonarola (1452) was preaching against luxury, splendour, vice, and the worldly and irreligious manners of the age.

Having been made a doctor of medicine in Padua, then the most celebrated school of physic in the world, Linacre returned to England, and was soon occupied in busy medical practice among the notable people of the time. Henry VII made him (1501) tutor to Prince Arthur and king's physician, which latter post he retained under Henry VIII. About 1509 he was ordained to the priesthood, became a Canon of Westminster, and held other Church benefices.

Linacre, by his high position in the Church, and as a scholar, was enabled to interest the University authorities at Oxford and Cambridge in his scheme for medical education. He arranged that a chair should be founded in each University for the purpose of distributing the knowledge contained in the writings of Hippocrates and Galen.

It is noticeable that until within recent years no one could become a Fellow of the London College of Physicians unless he had graduated at Oxford or Cambridge. Hence the learning for

which the Fellows of the College have been famous, the good social position that they were able to maintain, and the esteem in which they were held in earlier days compared with the surgeons, whom, indeed, they would scarcely recognise as fellow workers, although the Act of 1540 explicitly declares that "surgery is a part of physic, and may be practised by any of the company or fellowship of Physicians." Linacre's scheme in founding the College of Physicians was without doubt partly to create a good understanding and unanimity among his own profession — which of itself was an excellent thought—but also in order to make its members more useful to the public. In addition to urging the necessity for its formation, Linacre supplied the funds necessary for the endowment of the College of Physicians.

By charter it was declared that no person except a graduate of Oxford or Cambridge was to be allowed to practise physic throughout England, unless he had been examined in anatomy, physiology, and the practice of medicine, and had been approved by the President of the College and his colleagues, the Elects, who were appointed for the purpose of controlling this matter. Moreover, even for University graduates who intended to practise in or within seven miles of London, it was necessary for them to pass the examination of the College of Physicians in addition to possessing their University degrees.

Linacre was distinguished as an ecclesiastic, a scholar, and a physician. He translated several works of Galen into very pure and elegant Latin, and was an early advocate in England for the new learning. "In private life he had an utter detestation of everything that was dishonourable; he was a faithful friend, and those whom he found distinguished for ingenuity, modesty, learning, good manners, or a desire to excel he assisted with his advice, his interest, and his purse."

Another distinguished University scholar was Dr. John Caius (1510), who became a Fellow of Gonville Hall, Cambridge. He studied in Italy, and took the M.D. of Padua, where he is said to have given lectures on Aristotle. He afterwards lectured on anatomy in London, and practised at Shrewsbury and Norwich. A loyal Catholic, he founded and became Master of the newly-made Gonville and Caius College, he was Physician to Edward VI, Queen Mary, and Queen Elizabeth, and was nine times President of the College of Physicians.

A great impulse was given to education and study in Europe in 1453, when Constantinople fell into the hands of the Turks. All men interested in learning who could escape from any part of the Turkish domain did so, and took with them all the writings they could save. Many went into Italy, where they were well received by the Medici in the North, by the Kings of Sicily in the South, and by the Pope in Rome, while some escaped into France and other parts of Europe.

At the same period another great impulse arose which rendered the distribution of knowledge far more rapid and widespread than it could possibly be made before. The art of printing by the use of movable type was invented in Europe about the middle of the fifteenth century. The name of the country in which the invention took place, the name of the inventor, the year of the invention are, up to the present, matters of dispute, but a knowledge of the new writing spread with marvellous rapidity, perhaps particularly in some German towns, though William Caxton brought it to England as early as 1476.

The discovery by Columbus of the New World was a further impulse towards the development of intellectual effort.

At the close of the fifteenth century the Arabic school was still predominant in medicine, but as the study of Greek literature was encouraged and spread, the books of Hippocrates and Galen were read alongside those of Rhazes, Avicenna, and Mesuë, and translations of them into Latin were instituted. Thus was encouraged a spirit of criticism as to the relative value of the teachings given by the various authors, and in regard to what observation of diseased conditions really showed.

Benevieni (1440), a Florentine who lived towards the end of the fifteenth century, made systematic *post-mortem* examinations for the purpose of discovering the anatomical position and the character of any abnormal conditions he could find. He examined the bodies of those who had been hung, and made many autopsies. He wrote a work on some of the hidden causes of disease.

Eustachius (1500), who was Professor in Rome, and was given by the Pope great opportunities for dissection, also closely observed pathological changes.

While the Italian schools were imbued with the great necessity of the knowledge of anatomy as the groundwork for medical practice, and the French were producing men of great clinical

ability, particularly surgeons, some capable people were still being influenced by prophecies and visions, and allowed their imagination and fancy to guide them rather than their senses. The old, superstitious mystic side of medicine was being preached by one of its most gifted exponents for them.

Theophrastus Bombastus von Hohenheim, the son of a Swiss physician, was born at Basle, 1493. He called himself Paracelsus, as he considered he surpassed every medical authority who had preceded him, Celsus among them. He visited many European cities, but seems to have passed his time in dissipation rather than in study; on his return, however, he was made town physician at Basle, and was appointed Lecturer on Medicine at the University. A man of great forethought, a good observer, with considerable knowledge of the world, full of conceit, and with no consideration for the feelings of his contemporaries, he founded his doctrines of medicine, not upon scientific inquiry or experiment, but upon the four "immovable pillars" of Philosophy, Astronomy, Alchemy, and the Virtue of the Physician. He lectured in German, a most unacademic proceeding—it is hinted because he had forgotten his Latin. His arrogance in assuming that no medical writings previous to his own deserved consideration and his intemperate life soon emptied his class room, and, having to leave Basle, he wandered to different towns in Germany. He left behind him some 300 works. written in Swiss German, showing in parts ability, but of little value to the progress of medical science.

A very different man was Jean Fernel, born at Clermont, 1497. He was physician to King Henry II of France, and found time, in the midst of a very large practice, to collect from the best writers and to translate into excellent Latin the Greek and Arabian masters.

He divided medical science into Physiology, Pathology, and Therapeutics, and the following statement of his views on diagnosis could scarcely be improved on in the present day:—

"As for myself, I shall never believe I have profound knowledge of any affection if I do not know positively, just as if I could see it with my eyes, in what part of the human body is the disease, its primitive seat, what suspicion of organic lesions constitute it, whence it proceeded, if it exists idiopathically or by sympathy, or if it be kept up by some external cause. He who pretends to be a rational physician must sound each of these subjects and discern them by certain signs."

But theory is too attractive to allow ingenious minds to be long idle. The love of system has been a perennial hindrance to medical progress. Fernel was ill-judged enough to be led astray by sophistry, and to attempt to systematise and formulate a plan of treatment upon the doctrine, "Contraria contrariis curantur": an endeavour to narrow and simplify the wide field of therapeutics, just as absurd as that which was made 300 years later, in order to found a so-called new school of medicine on the equally fallacious dogma, "Similia similibus curantur."

Surgery shared the advance made by the Renaissance, especially in France, and its practitioners improved their social standing with their knowledge.

As early as the year 1279 there had existed in Paris a little brotherhood of lay surgeons known as the Collége de St. Côme. This was the nucleus of the first college of surgeons of which we have records. Its members were in constant competition on the one hand with the Faculty of Medicine of Paris, and on the other hand with the barber surgeons.

After many years of varying success, the brotherhood of St. Côme (about 1515) became affiliated with the University of Paris. Those who desired recognition as practitioners of surgery put themselves under the university lecturers, and many who in former days would have practised without education in France as barber surgeons, were equipped with knowledge which gave them a real qualification to practise.

Thus surgery and medicine became closely allied together in France early in the sixteenth century, to the advantage of those who practised them and to the further development of the healing art.

Ambroise Paré (1510) is deservedly designated the "Father of Modern Surgery." After study at the Hotel Dieu he became an army surgeon, and took every advantage that a campaign affords to study wounds, burns, and other injuries. Although he held the highest surgical position at the Court, and was surgeon to three kings of France, he passed many years of his life in warfare. He successfully used the trephine, and made several improvements in surgical instruments. He replaced the use of the cautery for hæmorrhage by the ligature, and did away with the use of boiling oil in gunshot wounds—the universal method of treatment before his day. In spite of his extended practice and his frequent employment as military surgeon, he found time to write many books, and

always desired to tell his colleagues of any advances and improvements that had been made. His "Cinq Livres de Chirurgie" (which largely influenced the practice of surgery in all countries) and other works were written in French; indeed, so ignorant was he of Latin, that a special exception of the examination in Latin prescribed by the statutes of the Surgical Brotherhood of St. Côme was made in his favour, in order to allow of his being admitted a member of that body.

With the diffusion of truer and more comprehensive notions of structure and function, surgery became bolder and more effective, safer and swifter, reaching the then highest point in Richard Wiseman, the father of English surgery (1595). He seems to have gained experience both in the navy and the army. His 'Seven Chirurgical Treatises' show evidence of sound practice, particularly in dealing with tumours, wounds, fractures, and dislocations, and gave important help to laying the lines of scientific surgery.

About the beginning of the sixteenth century dissections were permitted to be made in Italy, the corpses being chiefly those of executed criminals, and some advantage was taken of this favour.

But the Belgian, Andrew Vesalius, born in Brussels, 1514, was the first great anatomist after Mondino and the Alexandrians, the first to make a real advance in the study of anatomy. He dissected animals, and having observed, at a place where criminals were executed near Louvain, that birds had removed the flesh from one of the bodies, he removed the bones and ligaments of the skeleton thus exposed. Later he removed other bodies or limbs from places of execution or from cemeteries, and he made such good use of them that at 22 years of age he became professor of anatomy in Padua, and published, at the age of 28, his book, 'De Corporis Humani Fabrica,' an epoch-making record of accurate observation and of independent and original work.

Columbus Vesalius's prosector at Padua made many dissections, and described the valves of the heart, and also the circulation of the blood from the right side of the heart through the lung into the left auricle, which Michael Servetus had earlier believed. He practised venesection, and showed that the pulmonary veins contained arterial blood, but it was left to Harvey to appreciate the greater circulation through the systemic vessels. About that time Eustachius was professor in Rome, Ingrassias at Naples, while Fallopius, during his life of less than 40 years, lectured

at Ferrara, Pisa, and Padua; his assistant, Fabricius Aquapendente (1537), made valuable researches on the comparative anatomy of the development of the embryo.

William Harvey, born at Folkestone, 1578, took his Arts degree from Caius College, Cambridge, and then studied under Fabricius at Padua, where he became M.D. in 1602. He was elected physician at St. Bartholomew's Hospital, and as Lumleian Lecturer at the College of Physicians he expounded his views on the circulation of the blood; and after further investigations he published his celebrated treatise, 'Exercitatio Anatomica de Motu Cordis et Sanguinis,' in 1628, at Frankfort (because it was declined in England); but for many years the doctrine of the circulation of the blood was criticised and denied. The capillary circulation and blood corpuscles were shown by Malpighi (1628) some 50 years later.

The genius of Francis Bacon, Lord Verulam (1561), who had replaced the deductive logic of the school-men by inductive methods, and who urged that truth is not derived from authority but is the fruit of experience, gave a great impetus to future scientific investigation; while the rapid progress of anatomical knowledge, the discoveries of Galileo (1564), and of Kepler (1571), and the endeavours of Descartes (1596) towards the attainment of philosophic certainty, his explanations of physical phenomena, and his work on mathematics, tended to widen the results of Harvey's discovery and to give a new impulse to inquiries about health and disease from the standpoint of science.

With the seventeenth century the status of medical men had much improved. All forms of intellectual effort associated with medicine tended towards originality. Italy, the Netherlands, and England (all comparatively free from national struggles), made great advances in scientific work. France produced many giants both in literature and in science, while her well-organised College of Surgeons provided good instruction, and enabled her pupils to take and retain the lead in this department of work. Germany had not yet fairly started in her grand career of intellectual development.

Sylvius (1614), in his little hospital of 12 beds at Leyden, relied on his knowledge of chemistry and anatomy, and on Harvey's doctrine of the circulation of the blood, for the treatment of his patients. He was the first to systematise clinical instruction, taking his pupils daily to visit the sick in the hospital. "There

I have put the symptoms of disease before their eyes, have let them hear the complaints of the patients, and have asked them their opinions as to the causes and rational treatment of each case, and the reasons for those opinions. Then I have given my own judgment on every point. Together with me, they have seen the happy results of treatment when God has granted to our cases a restoration of health, or they have assisted in examining the body when the patient has paid the inevitable tribute to Death." (Withington.)

Thomas Sydenham (Sommo Ippocratista Inglese) (1624) was a member of a Dorsetshire county family, and graduated M.B. at Oxford, later taking the M.D. at Cambridge. He appears to have been on terms of close intimacy with John Locke (1632), one of the most conspicuous figures in the intellectual history of modern Europe, with Robert Boyle (1627), and with other members of that association of scientific men who, "inquisitive into natural philosophy and other parts of human learning, did by agreement meet weekly in London on a certain day to treat and discourse of such affairs." These meetings may have originated with the "Invisible Society," founded by Milton in 1645; but, at any rate, the persevering "philosophers" were, through the favour of Charles II, incorporated by charter (in 1662) as the Royal Society of London for the Promotion of Natural Knowledge. Sydenham was profoundly influenced by the spirit and method of Hippocrates. If he failed to realise the importance of anatomy and physiology, it was because these new sciences had lent themselves, in his time, to all sorts of theories about diseases which were utterly at variance with bedside experiences. Sydenham laid great stress on accuracy of observation, and stated that careful note-taking would show that certain diseases were quite typical in their life-history. He insisted on the healing power of Nature, and on simple, direct methods of treatment. He shone chiefly as a successful practitioner of medicine with a clear, unprejudiced mind, who organised and simplified the excessive systems and theories of his day. The doctrines and teaching of Sydenham influenced the future of medicine throughout Europe.

Balgivi (1669), a pupil of Malpighi, became a Professor of Anatomy in Rome, and founded the theory of medicine known as "Solidism." He was profoundly influenced by the teaching of Sydenham, as was also Boerhaave (1668), who continued to carry

on at Leyden the clinical teaching introduced there by Sylvius. He was the most celebrated physician of his day, and he made the Leyden hospital the centre of the medical teaching of Europe, while patients came to consult him from all parts of the world. He wrote 'Institutiones Medicæ' and 'Aphorismi de Cognoscendis et Curandis Morbis.' He also rendered services to the sciences of botany and chemistry. After him Leyden soon ceased to be an important medical school, but the art of clinical teaching there established was carried by Van Swieten to Vienna, and by other pupils to Edinburgh and many Universities. Boerhaave was a charming character, most popular, amiable, and unassuming; and whilst he was successful in doing good work and in gaining a high reputation, he also realised a fortune of two millions of florins from his profession.

Surgery has recently become almost a perfect art, almost a complete science, one of the greatest triumphs of human intellect, energy, and resource. The problems that the physician has still to solve become increasingly difficult and more exacting, and they require greater scientific accuracy for their elucidation; but meanwhile the progress in accurate knowledge brings him daily nearer truth in diagnosis and certainty in treatment.

The study of morbid anatomy started in Bologna by Morgagni, and that of physiology by Johannes Müller in Berlin, continue to gain new ground; while the "Natural History School" of Schönlein has, through the work of Pasteur, Koch, and Lister, recorded observations on the life processes of organisms within the human body of the deepest interest, and has made bacteriology one of the most important branches of practical medicine.

But much requires to be done in this abstract scientific work, and as the health of the people should be a matter for the State—not only one for the medical profession—we may well ask (while we continue to do the unpaid clinical work of the hospitals) that Professors who show a special aptitude for research should be retained at the expense of the State, instead of being allowed to work at science for nothing during the time they can keep back out of a busy life of professional toil.

As has been the case in Scotland, some progress in scientific research will no doubt be made in some of the new Universities recently established in London, Birmingham, and the North of England. They will increase the opportunities for men of originality

and power to show themselves, but for good progress endowment must be given.

The old English Universities, particularly Cambridge, have begun to take some real interest in medical science.

The medical profession in the present day, armed with a real knowledge of its work, and possessing a scientific insight into the problems of life and into the structure and capacity of individuals, must in the future be bold enough to take responsibility in advising the State as well as the family upon conditions of life, of labour, and of environment.

Finally, we know that our constant struggle with disease and death, and our efforts to ameliorate the health and happiness of our fellow-countrymen, are carefully watched and encouraged by His Majesty the King, whom God protect!

LONDON :
HARRISON AND SONS, PRINTERS IN ORDINARY TO HIS MAJESTY,
ST. MARTIN'S LANE, W.C.