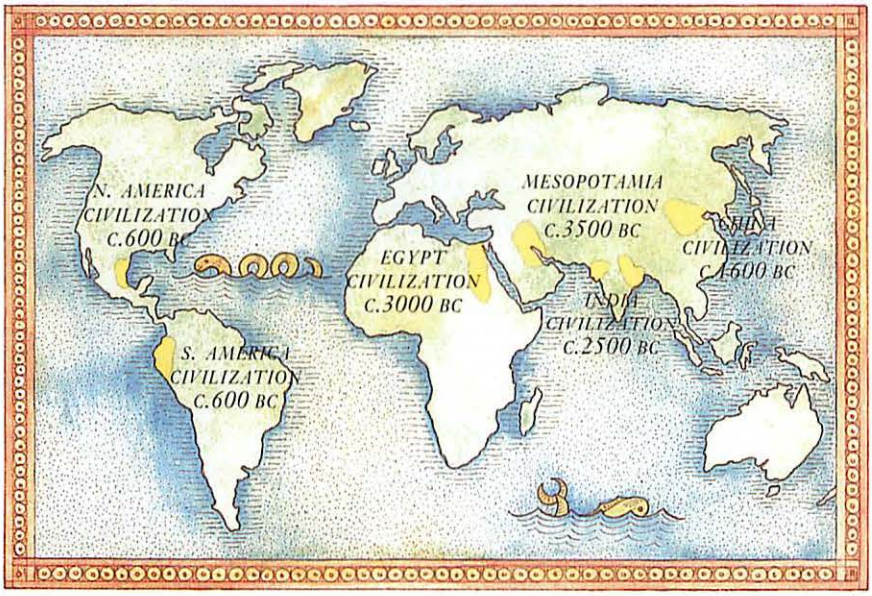
EARLY HISTORICAL EVIDENCE OF MEDICINE AND SURGERY

ABOVE A wall painting from the tomb of Sennedjem (XIXth Dynasty, *c.1320–1200 BC)* showing the god Anubis embalming the body of a pharaoh. Although the supernatural played a large part in Ancient Egyptian medicine, there is also evidence of an organized medical profession.

EGYPT

The name most frequently recalled in accounts of Ancient Egyptian medicine is that of Imhotep, the grand vizier (or high government official) of King Zoser, who reigned about 2980 BC. A man of many parts (he was the reputed architect of the large pyramid of Sakkara), Imhotep was greatly revered as a physician and was later deified as the god of medicine. Temple sleep, known as incubation, in which the god appeared to the patient in a dream and indicated the appropriate treatment, became one of the rites of his worship. Similar rites developed in the later Greek worship of the god Aesculapius.

The Ancient Egyptian texts that have survived, dating from about 2000 to 1200 BC, refer to even earlier periods. One of the most important is the Edwin Smith Papyrus of about 1600 BC. The name is that of its discoverer, an American Egyptologist, who discovered it at Luxor in AD 1862.



BELOW This map shows the first civilizations for which written evidence of medical practices exists. Our understanding of medicine in prehistoric times remains largely guesswork.

MEDICINE IN BABYLON AND ASSYRIA

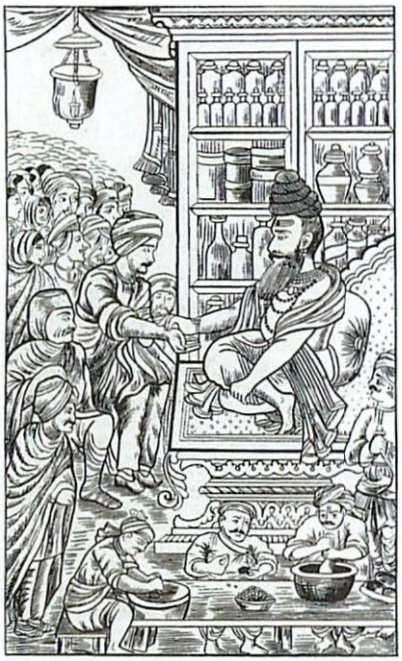
There is more evidence of early medicine found in the cuneiform writing preserved on baked clay tablets from ancient Babylon and Assyria. These early civilizations developed in Mesopotamia (in what is now known as Iraq) from around 3500 BC onwards. The most well known account is found in the Laws of Hammurabi *(1948–1905 BC)*, Hammurabi being a ruler of Babylon. They were written on a pillar or slab, known as a stele, eight feet (2.4m) long. Among a variety of laws dealing with social conditions and economic regulations are some detailing the responsibilities of the physician. These showed that the profession was highly regulated and contained clauses that inflicted severe punishment on the unsuccessful surgeon, including the loss of his hand as a penalty for surgical incompetence.

The Ebers Papyrus, dating from the sixteenth century BC, contains even older prescriptions for the treatment of various diseases. It was discovered in a tomb near Luxor. The papyri show that both medicine and surgery were extensively practised, with evidence of specialization in certain disciplines. Many prescriptions are listed; these are made up from hundreds of different substances including minerals, plants, and animal byproducts. The treatments for bone fractures are given in detail. An interesting addendum appears in some documents to the effect that the practitioner divides his advice on treatment into three parts: an ailment or injury that he will treat, one that he will contend with and one that he will not treat.

ABOVE The Chinese symbols of the opposed but complementary principles of *Yin* and *Yang* are surrounded by trigrams that represent natural phenomena.

INDIA

Early Hindu medicine belongs to the Brahman period *(800 BC–AD 1000)* and the famous medical textbook *Su´sruta Samhitā* contains a materia medica of some 760 medicinal plants. There is a large section on surgery, describing 101 instruments, 'the most important of which is the hand'. The use of the cautery, of leeches, excision, aspiration, and suturing are described. The instructions are detailed and cover operations for anal fistula, tonsillectomy, lithotomy and Caesarian section. The operation for rhinoplasty (plastic surgery on the nose) was devised presumably to restore the noses of adulterers, who had lost them as punishment.



ABOVE An undated drawing of Su´sruta, one of the founders of Indian medicine. Although hard to date precisely, the classic text entitled *Su´sruta Samhitā* or *Su´sruta's Compendium* is thought to have been composed in Benares in around the second century AD.

There are two great names in the early period. Caraka lived during the millennium before Christ and Su´sruta in the millennium after. Their dating has not been precisely determined. Su´sruta was predominantly a surgeon and his book gives instructions for anatomical dissection and its use in improving surgical technique.

The earlier Caraka described himself as an interpreter of Atreya , the 'father of Indian medicine', who was, according to tradition, the son of Atri, an earthly manifestation of the important Hindu god Brahma. The *Caraka Samhitā* is predominantly a medical treatise and is regarded as a classic text of Hindu medicine.

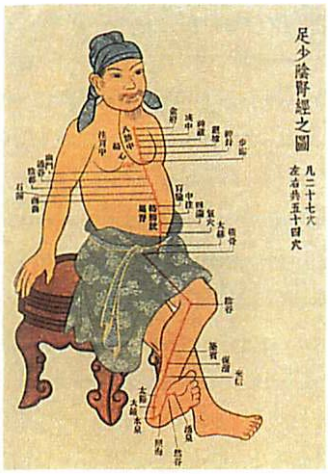
A third name of note from ancient Indian medicine is that of Vagbhata, whose chief work was the *Astranga Sangraha,* which encompasses medicine, surgery and midwifery. There is also uncertainty about his date, which has been placed variously between the second century BC and the seventh century AD.

CHINA

Chinese medicine developed on lines not dissimilar to those of the early Greeks, which will be discussed shortly. The tradition is much older, however, with the classic text-book, *Huangdi Neijing* representing the medical teaching of China in the time of the legendary founder of Chinese medicine, the Yellow Emperor, Huangdi *(2698–2598 BC).* This has been interpretively translated as *The Yellow Emperor's Inner Canon* probably composed in this form around 200 BC. Ancient Chinese theories continued to be refined and developed over many centuries; some of them bear many remarkable resemblances to those of the Greeks, later declaimed by the physician Galen.

They considered life and death and the meaning of 'life-force'. The Chinese postulated that all states of being, characteristics and physical phenomena could be categorized as either *Yang,* which was formless and existed conceptually in an association with light, heaven, heat and masculinity, or *Yin,* which corresponded to darkness, earth, cold and femininity. Diagnosis of illness would involve identifying excesses of yin and yang in the patient, and systems of healing aimed to rebalance his or her inner yinyang energy. It is a complex concept and not easily reduced to a simple explanation. The reader should turn to Chapter Four for a more detailed treatment of the subject.

ABOVE An ivory figure depicting the legendary founders of Chinese medicine, Huangdi, the Yellow Emperor, and Shen Nong. The *Huangdi Neijing* is one of the seminal texts in the history of traditional Chinese medicine.



ABOVE An illustration dating from the Ming Dynasty *(1368–1644)* showing acupuncture points located on one of the meridians along which qi is thought to flow.

Chinese acupuncture is undoubtedly and deservedly amongst the oldest effective therapies, and its success is related to the extraordinary ability of the ancient Chinese to keep detailed records. Acupuncture is a system of treatment with needles. It is based on the notion that the vital life-force, or *qi*, flows through a system of channels, or meridians, through the body. Blockages or disturbances in the flow of qi may produce symptoms of illness in the body; the acupuncturist aims to stimulate the flow of qi by inserting needles in specific acupoints on the appropriate meridian to correct imbalances noticed during diagnosis. It is often the case that these acupoints are physically at some distance from the part of the body in which the symptoms are manifested.

In the *Neijing*, 295 acupoints are identified. For the benefit of the twentieth century practitioner, efforts were later made to reduce these to a more manageable, but necessarily less precise, number of between twenty and fifty! The textbooks that explained and illustrated the locations of the various meridians and their acupoints were known as acutracts.

Today the efficacy of acupuncture seems increasingly to have a scientific explanation. Patients may also gain confidence from the fact that orthodox acupuncture requires a long, expensive and traditional apprenticeship. Many years of study are required for the pupil to learn the acupoints and relate them to all the indications of illness detailed in the traditional and classical method.

The Chinese also have long experience of medicinal herbs. Books such as the *Shen Nong Bencaojing (Classic of Roots and Herbs of Shen Nong)* appeared as early as the third century AD. Shen Nong was venerated as the Father of Chinese Medicine, and this was the first extant book on materia medica; it contains some 365 herbs and drugs. The herbal tradition reached its peak some thousand years later. Li Shi-zhen compiled his *Great Herbal* of 52 volumes between 1552 and 1578 AD. Interestingly, the modern drug ephedrine had its origin in *ma huang*, a Chinese herb of great antiquity. The complexities of Chinese herbal medicine are difficult to summarize briefly. The reader is again directed to Chapter Four, where they are explained in more detail.

THE AMERICAS

Our knowledge of medical practices in the ancient civilizations of Southern America relates mainly to the Mayas in the fourth century AD and the later cultures of the Aztecs and Incas, which flourished until the sixteenth century. Medicine in its early days had primarily a religious and magical flavour, but was to develop much further than that of Native American cultures to the north. By the time of the Spanish Conquest, Francisco Hernandez *(1517–1587)* was able to record some 3,000 Aztec herbs used in medicine. Many of these compilations are to be found in the sixteenth-century *Codex barberini* held in the Vatican Library. It has been suggested that the surgical skills of the Aztecs may have benefited from the anatomical knowledge gained in their macabre pursuits of human sacrifice.

The ancient Peruvians also possessed an extensive materia medica from which we have inherited quinine, cocaine and curare, among many other medicines. As with the ancient Egyptians, mummification of the dead was practised.

GREEK MEDICINE

The beginnings of true medical science in the West were laid when the reliance on superstition that underpinned tribal medicine was replaced by civilized and rational curiosity about the cause of illness. The great pursuit of metaphysics, or of thinking about the essence of things and principles of being, ushered in a variety of medical theories and with them a demand for a choice of doctor. This had not been possible in earlier societies where 'a second opinion' was not possible.

The growth of civilized thought allowed for argument on medical cause and cure. This stimulated a fair degree of contention, which, paradoxically, often has the effect of reducing popular confidence in the practitioner.

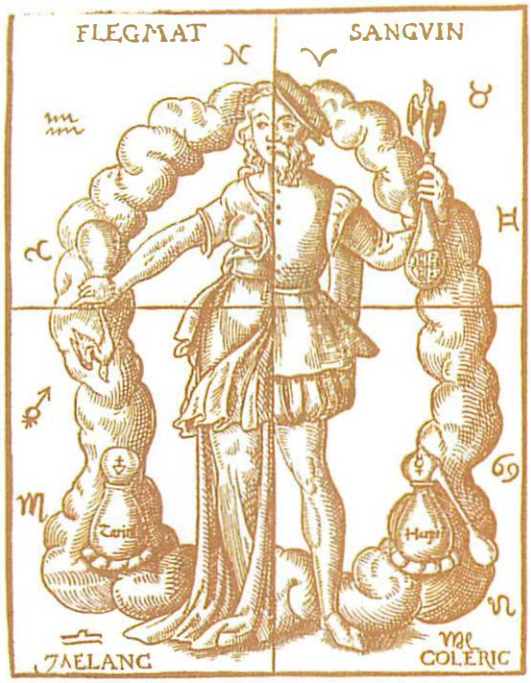
ABOVE A medieval representation of Hippocrates of Kos. He based his medical practice on careful bedside observation, and recognized the importance of keeping records of case histories. He also established a set of ethical standards for the medical profession which inspired the Hippocratic oath.

As western civilization developed, so new ideas arose among the Greek doctors. Hippocrates of Kos flourished between 460 and 377 BC. He is rightly regarded as the 'father of Western medicine', acknowledged for his interest in the whole patient. He developed and taught his concept of *physis*, meaning that one must consider the human being as an organic unity, which must be observed and treated as a whole, and which could be influenced by the environment.

THE FOUR HUMOURS

An important Greek idea concerning the cause of disease had developed out of the humoral theory of Empedocles, the Sicilian philosopher *(c.500–430 BC)*. It was developed by Hippocrates, and consolidated by Galen, as will be mentioned later. It eventually was absorbed into medieval medicine, and its influence even extended into the nineteenth century. This was the doctrine of the four humours. In the first place Empedocles argued that everything was made from four elements: earth, air, fire and water, with their associated qualities of dryness, coldness, warmth and wetness. From these elements and qualities derived the idea of the four humours (or fluids) of black bile, yellow bile, blood and phlegm, with their associated melancholic, choleric, sanguine and phlegmatic temperaments. It was believed that the balance of these humours in the body determined physical states of health.

ABOVE **The humoral theory propounded by Hippocates was taken up and elaborated at a later date by the famous physician Galen. He stressed the importance of critical days in the course of acute diseases.**



ABOVE **A sixteenth-century engraving that relates the four humours to astrological signs of the Zodiac.**

Perfect health was enjoyed when there was a perfect balance of the humours, known as a *crasis* or *eucrasia*. An imbalance of one or more humours resulted in *dyscrasia*. There was a natural physical tendency toward recovery and self-healing via a process known as *pepsis* or coction.

The Hippocratic School extolled the idea of *vis medicatrix naturae*, i.e., the power of nature to cure itself, and thus the belief that there was a natural tendency for things to get better on their own. This tendency could be aided by providing a beneficial environment for the patient and by improving physical function with a regimen of suitable diet and exercise. In extreme cases further aids to recovery could be sought, and stubbornly offending humours removed with the help of blood-letting and purgatives, and with the application of sudorifics to induce sweating, and diuretics to increase urination.

CLINICAL PROGNOSIS CAME BEFORE CLINICAL DIAGNOSIS

Hippocrates of Kos had taught ancient Greek doctors to recognize which changes in the physical appearance of the patient were of serious consequence and which were not. These skills constitute the art of prognosis, rather than fulfilling the more exact requirements of diagnosis. Prognosis foretells the outcome or future course of a disease, and is learned by observation and experience. Diagnosis, on the other hand, is the art of determining the nature of the disease.

The description of the face in serious illness, often portending death, is still known as the Hippocratic facies, and is indicative of his powers of direct physical observation. In his own words, the worst countenance to be seen in acute disease showed 'a sharp nose, hollow eyes, collapsed temples; the ears cold, contracted and their lobes turned out; the skin about the forehead being rough, distended and parched; the colour of the whole face being green, black, livid or lead-coloured.'

Empedocles also taught that respiration took place through the pores of the skin as well as through the lungs, so that if you thought a condition was caused by closed pores, you sought a remedy to open them. And if you thought it due to open pores, you sought to close them.

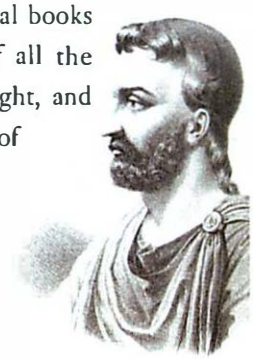
The thinking man – and just thinking is what metaphysics really signifies – was evidently now concentrating on the patient's body. The causes and effects of disease were being sought in the body itself, rather than in magic or external powers. Nevertheless, it was also appreciated by masters such as Hippocrates that external factors in the environment played a part. This change of emphasis brought the first glimpses of a realization of the fundamental concepts of the nature of disease. Arguably, by the time of Galen in Rome in the second century AD, the historical foundations of both alternative and scientific medicine in the West had been laid. Another enduring influence of the teachings of Hippocrates can be identified in the way the ethical relationship of doctor to patient has been immortalized in the Hippocratic Oath; a simple statement of the ethical code governing medical professional relationships with the patient. Contrary to popular belief, however, it is not universally part of the ritual of medical graduation today.

RIGHT Celsus was a Roman writer who lived during the first part of the first century AD. His influential work *De medicina* was essentially a compilation in Latin of earlier sources, particularly those of the Hippocratic school. It includes detailed descriptions of surgical practice, including the use of the ligature and an operation for cataracts.

BELOW The teachings of Hippocrates exerted their influence across centuries of Western medical history. This medieval manuscript illumination shows a teacher instructing his pupils in the Hippocratic aphorisms.

THE INFLUENCE OF GREEK MEDICAL IDEAS

Remarkably little is known of the life of Celsus (lived around *AD 25*), a Roman who lived about the same time as Christ, and who wrote an important medical treatise in Latin called *De medicina (On medicine)*, using the valuable earlier Greek works as his sources. These included the extant Hippocratic *corpus*, a collection of medical books containing the teaching of all the Hippocratic School of thought, and probably the lost works of Asclepiades, Heracleides, and Erasistratus as well as a surgeon known as Meges of Sidon. The *prooemium* (or preface) to the treatise has been described by W.G. Spencer, who provided the English translation for the Loeb Classical Library, 'as a most fair and judicious summary of the history of [Greek] medicine.' One of the things for which Celsus is best remembered in medical practice is that he left us the four signs of inflammation by which this condition is still confidently recognized today: *dolor, rubor, calor et tumor*, or pain, redness, heat and swelling.



The name in Greek medicine that influenced and bestrode European practice for centuries was that of Galen *(AD ?131–201)*. He was born at Pergamum in Asia Minor in about the year 131 AD. His first medical appointment was as surgeon to the gladiators there. He later went to Rome where he took no pains to conceal his contempt for his fellow practitioners. He nevertheless built a great reputation for himself and wrote extensively on anatomy, physiology and practical medicine. His teaching dominated the revival of medical thinking. He himself claimed to have written 125 books on a variety of subjects. His medical writings stressed the humoral theory, which he elaborated, and the Hippocratic doctrine of critical days. In acute diseases, it was taught that the rebalance of the humours tended to take place on particular days by a process known as *crisis*.

ABOVE A great figure in medical history, Galen began work as a doctor to gladiators in Pergamum.

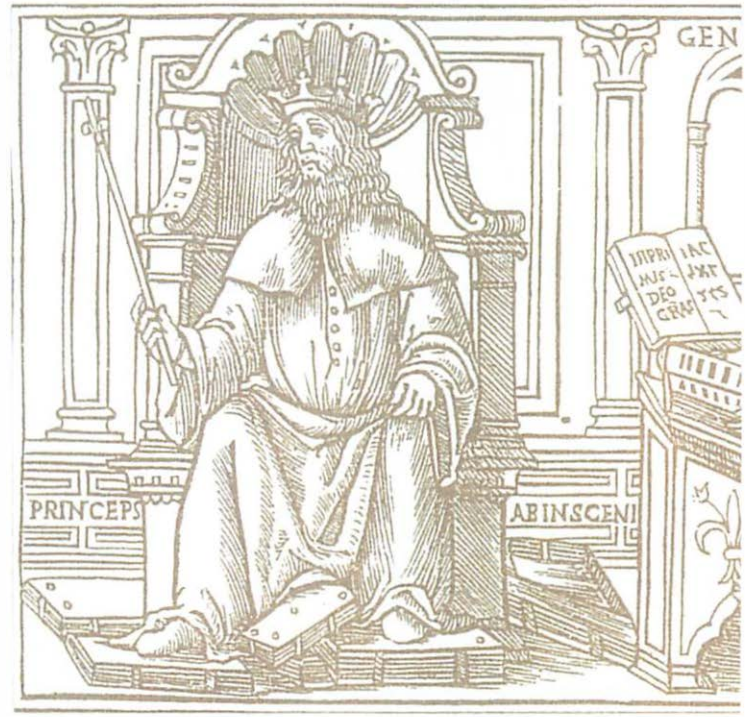
This process is particularly evident in the resolution of lobar pneumonia and was regularly seen and taught. It even persisted into the twentieth century, before the discovery of antibiotics provided an effective treatment for the condition. Clinical recovery of an acutely fevered patient with distressed breathing, and who might be comforted only with expert nursing, could be dramatically sudden. Galen viewed it as likely to occur on uneven days in the course of the illness, usually the fifth or seventh. The concept was still important centuries later, when the great Canadian physician Sir William Osler *(1849–1920)* regarded the crisis as very variable, rarely likely to happen before the third or after the twelfth day.

Oribasius *(?325–?403)* was the physician to the Emperor Julian in the 4th century AD and also one of the last great compilers of classical Greek texts. Oribasius made the works of Galen available for the medical practitioners of the Byzantine Empire in his extensive compilation known as his *Synopsis*.

ROMAN MEDICINE

The Romans were great soldiers, and one of the natural consequences of battle was an increased demand for practical doctors. War, as is its wont, advanced the care of the wounded, and encouraged the provision of hospitals and medical officers in the field. The need for practical health care, however, is not necessarily conducive to the wider speculations that generate scientific advance. The historian Pliny's *Natural History* is contemptuous of the superstitious nature of Roman medical practice. For instance, Cato the Censor *(234–149 BC)* wrote *De agri cultura*, an agricultural book on the medical care of cattle and slaves, with special attention being devoted to the former. His principal remedy was cabbage, both raw and cooked, to be taken internally and applied to wounds and sores. If the slave was not cured by means of the cabbage panacea, Cato advised, amazingly, that 'he be got rid of'. The arrival of Greek physicians in Rome in about the third century BC certainly improved the outlook for the human patients, at least!

The fact that the Roman army itself had a competent medical service is supported by the evidence of the hospitals built throughout the Roman Empire, particularly to care for the needs of soldiers in the field. Scribonius Largus *(fl. AD 47)*, author of *De compositione medicamentorum*, a work on medicaments, was the medical officer who accompanied Emperor Claudius to Britain in AD 43. It is thought he may have been a Greek. He has left us one of the earliest statements of the Hippocratic Oath. His list of drugs indicates the use of opium.



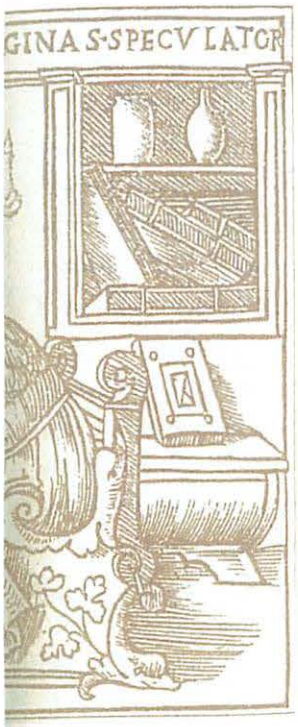
ABOVE After the fall of the Roman Empire, Islamic culture kept the flame of learning alive. This is the Byzantine doctor Myrepsos.

THE ARAB INFLUENCE

The prophet Mohammed *(AD 571–632)* effected a world change; it was brought about by the establishment of the religion of Islam. Within a century of his death Arab powers had conquered half the known world. The Arabic language of the Koran became as important to this empire as Greek and Latin were to the West.

The heretical sect of Nestorian Christians had already fled from their medical school at Edessa in the Byzantine Empire at the end of the fifth century. Their far-flung missionary activity had stimulated in them an interest in the medical scholarship of India and China. To this tradition they were able to add their own Greek medical learning. They established a famous and important school of learning at Gondisapor in Persia.

The Arabs captured Gondisapor in AD 636. Far from suppressing the inhabitants, they encouraged the growth of its university. The Nestorian Christians and the Jews and Arabs continued to translate influential Greek medical works into Syriac, with the benefit of their acquired Indian, Chinese and Persian medical knowledge. Greek medicine thus spread through Syria into Persia and so to the rest of the Arab world.



ABOVE Avicenna's *Canon of Medicine* was a highly influential text in the medieval curriculum.

Arab medicine, so-called because of the language in which it was written down, greatly influenced the medical thinking of the West from the twelfth to the fifteenth centuries. The great names of this movement included Rhazes *(c. AD 864–925)*, Haly Abbas *(d. AD 994)* and Avicenna (ibn Sina) *(AD 980–1037)*. The largest of Rhazes' works, *al-Hawi*, known in Latin as *Liber continens* or a compendium, is said to show him as a follower of Hippocrates in theory and Galen in practice. The Arabs played an important part in teaching the art of prescribing. The ninth book of *al-Hawi* deals with pharmacology and therapeutics. Avicenna, known by his contemporaries as 'the prince of physicians', is captured for us in his dispensary in the splendid illuminated copy of his *Canon of Medicine* in the University of Bologna Library in Italy. The fifth book of Avicenna's influential *Canon* is devoted to materia medica.

Spain at this time formed part of the Umayad Emirate in the Moorish or Saracen Empire. Cordoba became the capital city of the Western Caliphate in the tenth century. Albucasis *(936–c.1013)*, the great surgeon of Islam, was born near Cordoba in 936 and Averroës *(1126–1198)* in Cordoba in 1126. These two, and Averroës' pupil Maimonides *(1135–1204)*, wrote extensively on medicine and surgery using many Greek sources. The physician Avenzoar, born in Seville in 1091, also had great influence on European thought.

RIGHT The map shows the extent of Islamic influence at the start of the eleventh century.

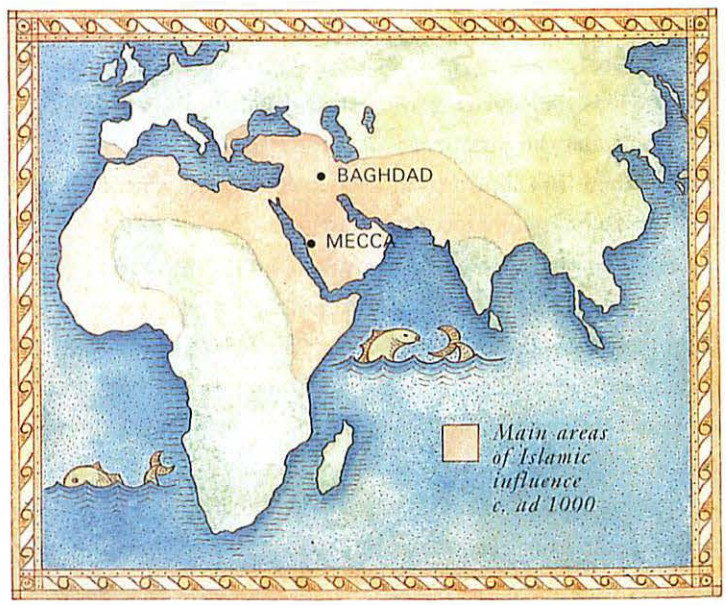
LEFT The great eleventh-century Persian philosopher and physician Avicenna (ibn Sina). His *Canon of Medicine* was first translated into Latin in the twelfth century.

LEPROSY

The Hebrew Bible is a great source for early medical history, but the story of one disease associated with both the Old and New Testaments has resulted in much confusion and distress to its victims. The Hebrew name *tsara'ath*, a Biblical term which does not refer at all to the modern disease known as leprosy or Hansen's disease, by a complicated process was mistakenly translated as leprosy. How this happened makes an intriguing study of historical detection and translation. It links us with the history of medicine from Biblical times to the present.

The confusion came about through mistakes made by the Jewish and Arabic translators of the Bible from Greek sources, who occasionally became muddled. As a result, the condition of spiritual uncleanness of *tsara'ath*, which was a matter for investigation and treatment by the priests, became associated through translators' errors with the mutilating deformities of leprosy. Scholars have recognized and corrected this erroneous interpretation, and as a result the modern hospital for lepers in Jersualem, once known as the Hospital for the *Tsara'Atish*, has recently had its name changed to the Hospital for Hansen's Disease. Leprosy today has become eponymously known as Hansen's disease, named after the Norwegian Armauer Hansen *(1841–1912)*, the discoverer of the bacillus *Mycobacterium Leprae* that causes it.

Leper houses, full of real lepers, abounded in the Middle Ages, and the classical leonine face of lepromatous leprosy is there to be seen in countless medieval representations.



ABOVE The practical care of the sick in Europe in the Middle Ages was often undertaken by members of the Church. It expressed the Christian virtue of *caritas* in a demonstrable form.

THE CHRISTIAN CHURCH

There existed meanwhile another religious force with a powerful influence on Western medical development. In the Byzantine Empire, the early Church itself was not without blame in suppressing the freedom of thought that had been the glory of classical Greece, in order to preach its own dogma. The Church wisely absorbed many pagan gods and rituals into its own liturgy. Old pagan festivals had been part of the common life of the new Christians for generations past. They were enjoyable and could be adapted for use in the new ceremonies.

It is now disputed whether the Church's ingenuity had much effect in discouraging medical science by substituting 'theological pathology' and 'theological therapy' for the magical medical rituals of its pagan predecessors. Bones of saints and holy water became accepted remedies that recalled the magical role of the African figurine described at the beginning of this chapter. Did the supernatural explanation of illness, with the Church's authority, stifle the opportunity for the advance of the secular medical ideas taught by Hippocrates? Centuries earlier he had clearly indicated how important it was to seek natural, rather than supernatural, causes for illness. His essay on epilepsy decried any description of it as 'the sacred disease'. We may legitimately ask how far the ideas implicit in exorcism and the casting out of devils are removed from the African witch doctor's ideas of aetiology?

At a time when theology was regarded as the 'queen of the sciences', the Church ruled men's and women's lives in a way that is inconceivable in modern society. The historian Charles Homer Haskins, writing of the rise of the universities, states that 'Paris was pre-eminent in the Middle Ages as a school of theology... the supreme subject of medieval study'.

At this time Paris was an important university and its example, and the importance it attached to theology, was to become a model for other teaching establishments.

The Church's adaptations of practices dating from the pre-Christian era for its own rites were not exclusively taken from those of pagan origin. An accommodation had eventually to be reached as well with the lessons that had been learned from progressive Greek ideas as expounded in the influential writings of the classical philosophers. Greek thinking, revealed in the philosophy of Plato and his pupil Aristotle, could not be permanently ignored. It therefore became integrated by the Fathers of the Church into its religious philosophy.

Fortunately, Aristotle had trained as a physician and this was reflected in his analytical method and respect for fact as a basis for doctrine. In this way, he influenced Galen, whose works in turn influenced the schools of medieval medicine. However, the reverence for the authority of Galen paradoxically came to enforce an enduring rigidity in medical thinking that was to persist for centuries to come.

Overall, the Church was a source of great support in the practical care of the sick, the poor and the needy. It extolled the virtue of *caritas*, love for one's neighbour, and sympathetic, practical charity in a sense that has no translation into a single English word.

The monastery and its infirmary set the example in this respect,

BELOW A fresco *(1443)* by Domenico di Bartolo from the Santa Maria della Scala Hospital, Siena, showing a monk treating a sick man. Monastic infirmaries were effectively the hospitals of the Middle Ages.

helping the sick and poor. The denial of charity, of *caritas*, was regarded as the unforgivable sin. Its practice was the dominant virtue. Even today, it is a concept of great relevance to the successful practice of medicine.

However, things do not always work out according to prevailing ideas of morality. Practice does not always follow precept. Medieval medicine contained a mixture of pagan superstition and Christian prejudice, but beneath the surface it is just possible to see portents of the beginnings of medical science. Abstract philosophy was still the mainstay of medicine, rather than direct observation of nature and the search for accurate description of illness and experiment in treatment. The empirical testing of hypotheses, which is the basis both of science and of modern medicine, was still to come.

ASTROLOGY AND SURGERY

Astrological ideas were also an important factor in European medical thought. Astrology itself was of much older provenance even than the ideas of the Greeks. The Babylonians had plotted the courses of planets during the reign of Nebuchadnezzar, between 664 and 562 BC. Claims have been made for the discovery of astrological symbols of even greater antiquity in the Sumerian kingdom during the third millennium BC. And the practice of astrology would survive both the upheavals in thought brought about by the Renaissance and even the twentieth-century scientific revolution.

In the Middle Ages, astrological medicine played a large part in diagnosis and treatment, despite astrology's uncomfortable association with magic – and magic was proscribed by the Church. It relied on the proposition that the *macrocosm* of the planets in the Universe governed the *microcosm* of the internal parrs of man. This idea had an inherent popularity. In the prevailing climate of opinion, it was a theory that could be generally accepted as rational. Astrologers produced tables and drew figures to illustrate its application, and to enable it to be taught as a method of medical practice.

Another mainstay of medieval therapy was blood-letting. Surgeons and barber-surgeons were skilled at it. An illustration in the Mostyn manuscript shows the sites and indications for bleeding, including the well-known joke (even then) indicating the armpit with the comment 'If you bleed here the patient will die from laughing'. The medical historian Vivian Nutton has commented that venesection (blood-letting) and astrology had both been controversial issues since 'Galen had rejected astrological medicine as mumbo-jumbo'. How it survived this criticism and the Church's antagonism to become a cornerstone of medieval medicine is unclear. And it continues to defy all reason by making rich all sorts of forecasters and fortune-tellers of health and wealth even today.

Such doctrines flourished in the fifteenth century, despite the Church's religious doubts about their proper place in the scheme of things. At this time illness was still thought to result from an improper balance of the humours. Excess of one or lack of another required the appropriate rebalancing with a dose of a suitable medicine, chosen to correct the deficiency. This practice required a knowledge of the humoral nature both of the illness and of the remedy. Galen's theories were to remain as the basis of diagnosis and treatment for many centuries to come.

ASTROLOGICAL MEDICINE IN WALES

Such was the popularity of astrology, the word reached as far as Wales. Welsh copyists made texts, that would have been read by others than those primarily engaged in medical practice. Medicine was not the prerogative of an elite. The illustrations shown here are taken from the beautiful fifteenth-century Welsh language Mostyn Manuscript 88 *(AD 1488–1489)* and seem intended for a general readership.

The interpretation of the Zodiac man for use in particular cases of diagnosis was aided by a circular ready-reckoner, which 'computerized' the calculations.

The Mostyn manuscripts include instruction in other ancient principles, besides those associated with astrology. They reveal what was accepted contemporary practice, giving for example a treatise on urine with a coloured guide to urine gazing.

ABOVE AND LEFT Two illustrations from the Welsh Mostyn Manuscript showing (left) a rotating calculator and (above) tables used in astrological medicine, which recognized a link between zodiacal signs and specific parts of the human body.