

## GREEK MEDICINE

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Medical culture, at least as far back as our written records go, is known to have been born at the confluence of two great Biblical rivers, the Tigris and Euphrates in the land of Mesopotamia. From here the tide of medical knowledge ebbed westward onto the shores of the Nile, and like the Nile itself flowed out over the Mediterranean as Egypt's cultural influence grew. A seed was carried on these waves of knowledge to Greece, whence it grew and blossomed forth in a splendour such as had never been seen before. Fruit from this tree of medical knowledge was later carried in two diverging directions, only to converge again one thousand years later in medieval Europe at the dawn of the Renaissance.

The Greek influence, six hundred years before Christ, spread throughout the Eastern Mediterranean. Through Alexandria medicine was carried on to the Roman Empire, where, after its fall, Greco-Roman medicine was kept alive for centuries in the monasteries of Europe. Greek medicine also spread to the east, where it was taken up by the rising star of Islam, only to be brought westward again to Europe as the Byzantine Empire fell and Arabic knowledge trickled in, largely from Moslem Spain. This Greco-Arabic medicine was compounded with the Greco-Roman culture, and set the foundation for modern medical thought, at Montpellier and Paris, later at Leyden and westward to Oxford and Cambridge, and finally across the Atlantic to the New World.

Is it not important that we find out more about the medicine of Greece, where rational medicine as we know it first began, and whose physicians were foremost in the world for over eight hundred years (from the sixth century B.C. to the second century A.D.)? This medical thought was taught with almost

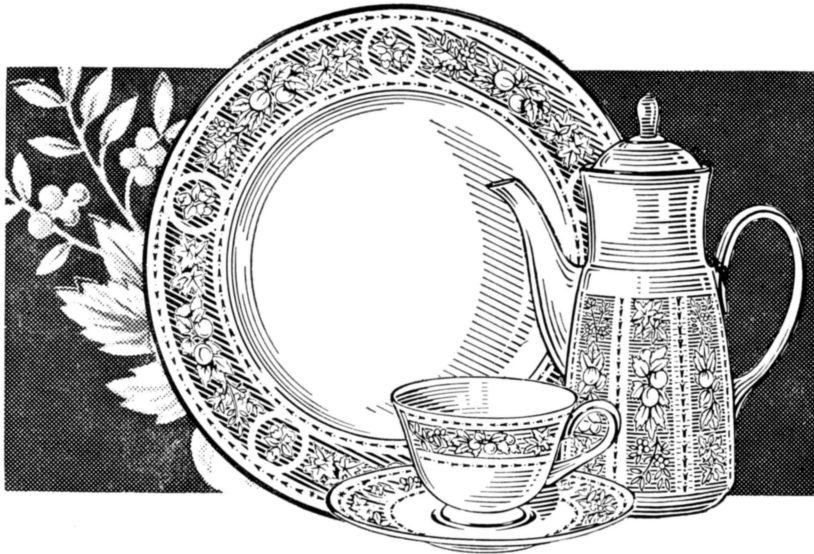
blind faith until the fifteenth century, an additional period of 1200 years. Even now Greek influence is felt in modern medicine.

Before going into the actual development of Greek medicine, let us mention a few facts about medicine up to that time. Earliest man recognized three types of disease: (i) diseases having natural causes, as when a man was wounded on the battlefield by his enemy; (ii) diseases which developed through human sorcery, or by witchcraft; (iii) diseases which were sent by the gods. It is no wonder that the earliest physicians were priests, for only they could appeal to the gods and counteract sorcery. Whereas the surgeons, who dealt chiefly with natural diseases and wounds, based their practices on empirical knowledge. The level of surgery rose to great heights in ancient times as wars raged the Orient. Thus medicine practised in southern Mesopotamia, which was the cultural centre of the world in 4000 B.C., was almost entirely in the hands of the priests, and its philosophy was religious-magic-empirical. Although pharmacology was started in its most immature form, and animal dissection was carried on (almost solely for religious reasons), medical treatment consisted primarily of magical incantations and observing the heavens for the prognosis and therapy required to effect a cure. These early people believed that blood was the "vital function", and since the liver was the organ which received all the blood, it was the seat of the essential life process. It was therefore used in predicting the future when animals were sacrificed. Later, under the Code of Hammurabi, laws were written stating rather clearly the responsibility of the physician to his patient and what the physician should be paid for his treatment.

About this time (circa 2000 B.C.) Egyptian medicine was of high calibre, by ancient standards. At first it was in the hands of the priests as in Babylonia, but later medical schools as such became established, and an organized medical caste was set up. Already

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specialists in certain fields appeared, each specialist devoting himself to one organ, area, or disease. Diagnosis of various diseases became more exact - in fact it was realized that jaundice was associated with biliary disease. A rudimentary pharmacopeia began to take shape, and slowly medicine was becoming divorced from religion. It did become more empiric, yet magic and incantations still played the predominant role in treatment.

The Greek peoples are descendants of the Indo-European race who were believed to inhabit an area roughly what is now south-western Russia from about 3500 - 2500 B.C. As they had no written language, little is known about them, except that they were nomads tending cattle, sheep, and goats. Around 2500 B.C., these barbarians started to migrate - the Aryans over the Afghanistan mountains into the Indus valley, the Hittites descending into Babylon. Circa 2000 B.C., tribes from the region of the Danube, called the Achaeans, were the first to invade Greece. Towards 1200 a second great wave, the Dorian invasion, reached the Greek mainland and Crete was conquered. The colonization of the Greek islands and of the Asiatic coast took place mainly between 1300 and 1000 B.C. Thus the northern part of Greece and the Aegean islands became settled by the Aeolians, the central part (including Athens, which became the cradle of Greek science and medicine) by the Ionians, Ionian is the language of the Hippocratic writings. The south was Dorian which is the language of Sparta. The people whom the Greeks drove out were the Mycenaeans, recalled by Homer in the *Iliad* as he describes the fall of their last stronghold at Troy.

#### HOMERIC MEDICINE AND ITS DEVELOPMENT

After the first wave of tribes settled in Greece around 2000 B.C., they copied the culture of the resident Mycenaeans and Cretes, and the period from 1600 to 1200 became known as the Mycenaean Age. The Cretes especially had a flourishing culture at this time, and in their religion, unlike their Oriental neighbours, they were not afraid of the dead, nor haunted by the fear of evil ghosts. All evil forms existed in an underworld which was far away; the gods were, moreover, the friends of man. Thus their attitude toward

nature and disease was more rational. It was only after the Greeks accepted these ideas that religion and black magic could be divorced from medicine, and that the latter could advance along more empirical lines. Twelve hundred years later Christianity again set medicine back with the belief that disease was caused by God for the punishment of man's sins.

The second wave of invaders, the Dorians, in 1200 B.C. completely destroyed all Mycenaean and Cretan civilization. The Cretes were forced out and settled in Syria, to become known to us as the Philistines of the Bible. Then followed the dark age of Greek civilization until 900 B.C., during which time no advancements were made other than the adoption of the Phoenician alphabet.

From the Cretan-Mycenaean Age we have no written records, it is therefore impossible to tell how Greek medicine was practiced. Only by such indirect sources as the *Iliad* of Homer, which was probably not written until five hundred years later, do we have any idea.

The Greeks, copying the Cretans, held health in high esteem - disease was the worst lot of mankind. Although still believing that disease was sent by the gods, as they shot their arrows and inflicted illness and death on man, we hear of many conditions resulting from natural causes and for which the gods were only indirectly responsible. Magic, then, began to play a less and less important role in Greek medicine. We do not hear of magic incantations in the *Iliad*; wounds were treated first by removing the foreign body, then washing the wound (often with wine), and applying drugs.

Soldiers, we learn, were able to treat their own minor wounds, but certain soldiers stood out above the others as physicians and surgeons. These were Machaon and Podalirus the sons of Asklepios, who is referred to by Homer as the "blameless physician". In the *Odyssey* we are told that physicians at this time were professional workers, and belonged to a class not unlike other craftsmen.

#### THE CULT OF AESCULAPIUS

In the 6th and 5th centuries B.C. the cult of Asklepios was founded in Greece, and was to function for over eleven centuries until the fall of Rome. In all civilizations there have been religious people who have presumed to

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be able to cure diseases, greatly publicizing their spectacular cures (seen today in the religious shrines of the world). There was a need for this type of treatment in ancient Greece because of certain ideals in Greek culture. Herophilus in the fifth century B.C. stated:

*When health is absent, wisdom cannot reveal itself, art cannot be made manifest, strength cannot fight, wrath becomes useless, and intelligence cannot be made use of.*

The Greeks were almost fanatics in the cult of physical fitness and health. They believed that the sick, the crippled, and the weak were inferior people who could not count on society's attention unless their condition was curable. Even sickly infants were destroyed after birth. If the disease was incurable, a physician would not treat the patient, since perfect health was unattainable. Thus in chronic diseases or in hysterical reactions, both refractory to medical attention, the patient sought the temples of Aesculapius. The poor also did this, as they could not afford the help of a physician.

Aesculapius (Latin form) was a Homeric mortal deified by the priests of his cult. The physicians of ancient Greece looked upon him as the patron of their guild, and most claimed to be of his descendancy.

The best known centre of Aesculapius was at Epidauris about thirty miles from Athens. The principle was that the patient sleep in a building having sacred associations. In the morning he related to the priest any dream he had, whereupon the priest interpreted the dream and advised the patient as to treatment, which was supposed to have been prescribed by the gods.

These temples were situated in the most beautiful parts of the country, often near a mineral spring where there was plenty of water and fresh air. There were also gymnasia and theatres to entertain the patients and their relatives. Thus we can see the resemblance of these temples to some of our modern health resorts and spas.

The plagues which raged the Eastern world were believed caused by the curses of the gods, and it was the temple priests of Aesculapius who were sought to help, a community rid itself of these dread diseases. Thus the cult arrived in Athens after the plague in 420 B.C., and in Rome by 293 B.C. when a ship was sent to Greece to seek the gods'

help during a plague. On its return, as the legend goes, a snake is said to have swum ashore from the ship to the island of Saint Bartholomew on the Tiber, and there a temple to Aesculapius was erected.

### THE DEVELOPMENT OF HIPPOCRATIC MEDICINE IN GREECE

About 500 B.C. the theory was advanced that there were but four basic elements: water, earth, air, and fire; all living and non-living things depended upon these for their creation and/or maintenance. Heraclitus added to this concept when he stated that all things are in constant motion, that there is a dynamic balance between the four basis elements, as there is in all living things. It is only when these elements are in balance that harmony with nature is achieved. This was a momentous concept for that day, as it has taken man 2500 years to realize and prove that our body does exist in a state of dynamic equilibrium.

Of the many philosophical schools during that period, it is probably the Pythagorean school which has had the greatest influence on Hippocratic medicine. Pythagoras, who taught in 530 B.C. on the island of Samos in Asia Minor, was forced to flee; with him he took his students and founded a religious school in Sicily which became famous for its mathematicians. Side by side a medical school was founded following his doctrines and closely related to those of Heraclitus. Medicine learned from Pythagoras that health is a condition of perfect equilibrium; the Pythagorean way of life meant to preserve this equilibrium by practicing moderation in every respect. If the balance of health was upset, it had to be restored by diet and exercise. The number four which was incorporated in many of Pythagoras' mathematical theories came to play an important part in medicine, as it was known that two pairs of forces, equal and opposite, would produce a balance. This thought became a significant part of Aristotle's theory a century later. About this time also, medical schools were springing up on the periphery of the Greek world, in Croton, Sicily, Rhodes, Cnidus, and Cos; it was in these places, not on the mainland, that all the startling discoveries in medicine were to take place.

For the first time in the written history of medicine, dissection of animals were made at

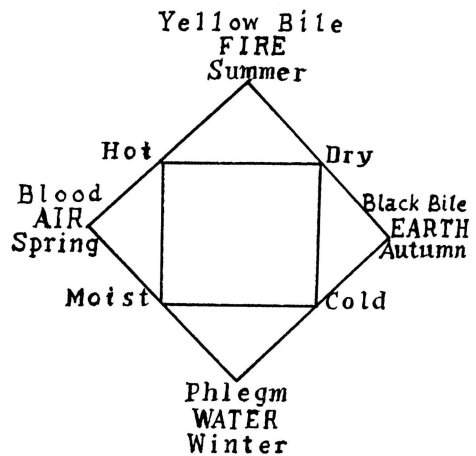
these schools; important findings establishing the brain as the central organ in man were made, contrary to the opinion that the heart was the central organ, as proposed by Aristotle.

Also about this time, Democritus advanced the theory that all things are composed of small particles or atoms. This theory was incorporated, at least in part, into the medical philosophy of some of the early Greek physicians, but never reached a high degree of popularity. It was their belief that tiny particles filled all space, and that gas, liquid and solid were only increasing densities of these ethereal particles. The human body was a condensation of these particles, and was surrounded by a cloud of them which could interpenetrate it, replacing physical substance with new and revitalized atoms. The body was also being constantly broken down into the ethereal cloud. Thus health to them was an equilibrium between the body and the ethereal substance which was used for growth and repair. When the body died the ethereal cloud about it dispersed. However, expounding this theory is a bit of a digression, as it was neither a major theory of the time, nor did it play a part in the development of Aristotle's and Hippocrates' theories, which were to influence medical thought for over a thousand years.

Also in the 5th and 4th centuries B.C. another theory, the Humoral Theory of disease was advanced and gained widespread popularity. It was accepted until the 17th century almost without contradiction. Greek medicine, contrary to the medicine of other civilizations at that time and before, through the philosophy of the Humoral theory, was the first to idealize the truth that disease is not restricted to one organ, but flows throughout the body affecting many organs.

At first, the humors consisted of phlegm, yellow bile, blood, and water. These were the natural secretions of the body - phlegm flows from the nose or was coughed as sputum (the brain was thought to secrete phlegm); yellow bile was often found in vomitus. Later water was replaced by black bile as a humor, since water though found in urine was not actually a secretion but one of the four basic elements. Black bile was probably "coffee ground" vomitus or melena found in intestinal bleeding.

When disease struck the body one of the four humors was thought to predominate all the others and produced the symptoms of that disease. It was only when a balance of the four humors was reinstated that health was regained. In each of the four seasons, one humor in particular was thought to be in excess (though the body still existed in a state of balance) and one was naturally predisposed to diseases caused by this humor during that season. Also linked with the Humoral Theory were the four opposing elements; earth, water, fire, and air.



This simple theory opened wide horizons for the Greek physician. For the first time in the history of medicine a rational or logical element entered the treatment of disease, and explanations as to the aetiology could be put forward. For example in fig. 1, during the Spring, the climate is moist but becoming hot as the summer approaches. Blood is the dominate humor in the body and disorders of the blood are more frequent - dysenteries, epistaxis, and other haemorrhages. Air is the dominate element in the spring (it was the common belief that air was transformed into blood in the heart, pumped throughout the body, to be collected in the liver).

This diagram showing the relation between the qualities - hot, cold, moist, dry; the elements and the humors is attributed to Aristotle (384-322 B.C.). By this reasoning the ancients could explain the nature of disease, the relation between the macrocosm of the universe and the microcosm of the organism and to link them with atmospheric changes in the seasons.

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Another interesting use of this theory we can find in the writings of Theophrastus who used it in classifying psychosomatic constitutional types. Theophrastus wrote that men of genius are frequently individuals in which the black bile or the melancholia dominates, not only in the fall but all year long. He includes in their nature the qualities hot and cold (differing slightly from fig. 1) and they are predisposed to diseases of the black bile. The Arabs extended this theory to include sanguine, phlegmatic, and choleric constitutional types.

The Humoral Theory was to have a pre-dominate influence on Hippocratic Medicine.

### HIPPOCRATIC MEDICINE

To discuss Hippocratic Medicine in any detail would be beyond the scope of this paper, at best I will briefly touch on a few highlights.

Hippocrates, it has often been said, freed Greek medicine from religious bonds, however in reality, religious medicine and empirico-logical medicine existed side by side for centuries.

Of the man himself we know little. He was an Aesculapiad, and was born in 460 B.C. on the Island of Cos. The most active part of his life began probably after 420 B.C. as he wandered through Cos, Athens, and Thrace as it was the custom of itinerant physicians, teaching all who wished to learn the Art of Medicine. He died in Thessaly at the age of either 83 or 101. Very little was written about him while he lived, the little we know comes from several biography-legends written centuries after his death. He was undoubtedly the greatest man in Western medical philosophy. His fame was greatly increased by a collection of about seventy books called the *Corpus Hippocraticus* which at one time were all attributed to him. Within the last century, it has been realized that these books were written by many authors, mainly from the islands of Cos, Cnidus, and Sicily. Though most of these works were written in the Golden Age of Greece, (4th and 5th centuries B.C.) they were not compiled into the *Corpus* until several hundred years later in Alexandria.

These books are the first written records of Greek medicine. Prior to this time medical knowledge was passed from father to son, from master to pupil. The Greeks introduced philosophy into their medicine, and specula-

tive theories on the nature and treatment of disease grew. Rather than look into mythology as their forefathers had done, they introduced logic and rationale into empirical medicine. Thus the science of medicine grew, and for the first time medical thought became too cumbersome to be handed down by word of mouth.

What is contained in the Hippocratic writings? Mainly it gives us a picture of a man, the ideal physician, an Aesculapiad to be sure, but a mortal; and instructions in the hippocratic method - careful observation and history taking, bedside teaching and manners, and the clinical lecture. For the first time we read the truth that nature is the true healer - "The gods are the real physicians, though the people do not think so." In this collection the physician was not guided by theories alone, but by practical experience as well. Hippocratic medicine at that time was based mainly on the Humoral theory and anatomy played only a minor role. Geography and climate played a greater part in medicine than it does now in our day. One of the Treatises "On Airs, Waters, and Places" - is one of the earliest books on medical geography. It was aimed at acquainting the physician with diseases he might expect to find in areas unknown to him and discussing how climate and food affected the constitution of various races.

Undoubtedly the most famous part of the *Corpus* is the seven volumes known as the Aphorisms which are comprised mainly of lists of medical truths or generalizations.

*Life is short, the art long, opportunity fleeting, experience fallacious, judgment difficult. Not only must the physician be ready to do his duty, but the patient, and external circumstances must conduce to the cure."*

*"Old persons bear fasting most easily, next adults, and young people yet less; least of all children, and of these least again those who are particularly lively" (which correlates metabolism with age and activity)*

*"A spasm supervening on a wound is fatal" (Tetanus).*

*"Those naturally fat are more liable to sudden death than the thin."*

The Treatise "On the Nature of Man" describes the relation of the four humors to disease. Another Hippocratic view of disease deals with the incompatibility of food in the



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stomach when it cannot be digested by the "essential heat" produced in the gut. Thus residues are formed in the stomach from which vapours arise. It is these vapours which upset breathing and cause disease. Undoubtedly recognizing Kussmal and Cheyne-Stokes respiration in various diseases, he confused symptom with cause.

It is recognized that the Corpus was compiled centuries after Hippocrates' death, in Alexandria, and that as his fame grew more and more anonymous treatises were accredited to him. However many theories there were explaining disease, the treatment was relative stable and was primarily dietetic. Dietetics had a much broader meaning then, it encompassed all man's relations with his environment - his sleep, recreation, food and drink. Pharmacological treatment at that time was relatively simple and consisted mainly of household herbs. According to the Greek way of life, and rightly so, exercise is the opposite of eating and the two had to be in proper balance for an individual to remain healthy, and the correct combination of these opposites was an essential part of the dietetic treatment. Vomiting was considered good rational therapy in the winter as it rid us of the humour which resides highest in the body, thought to be produced in the brain (phlegm). Similarly enemas were given in the summer since yellow bile predominated this season.

Diseases were classified according to the symptoms they produced. This simplified the making of the prognosis on which greater emphasis was placed than the actual diagnosis. There are many reasons why prognosis assumed greater importance. The ability of the physician to make a correct prognosis was advantageous to his reputation. Was not the reputation essential as a physician travelled from city to city practicing medicine for without it he could not be distinguished from a charlatan. Not until the Roman Empire was at its peak were there laws prohibiting the practice of medicine without a licence. Also, in regards to prognosis, what good was gained by treating a patient who was about to die, and when he did, could not pay. Greek doctors did not treat the poor rather their slaves or students did.

Greek physicians travelled throughout the country accompanied by their pupils who were often left in care of the patient after

treatment was prescribed. There were no nurses at this time and students filled the gap. When a doctor reached a town, if there was enough work, he rented a shop. Patients came to be treated if they were poor, or if they were rich he treated them at their home. Patients were usually accompanied by their relatives who all offered their suggestions as to the cause and treatment. With all this chatter, one can imagine that there was little privacy in the physician's shop. The doctor's shop was also his surgery, for in Greek medicine there were not the strong distinctions between medicine and surgery that developed in later years.

The larger cities often hired a doctor permanently and paid him a salary for treating the citizens of the court. Herodotus, who travelled widely throughout the Orient, tells us of Democedes, the most eminent physician in Greece of his day who was paid one talent a year (\$1200) for being state physician at Aegina. Later, he went to the Island of Samos who had offered him a salary of two talents. This is quite a substantial amount when it is realized that a citizen of Athens could live quite comfortably on fifteen cents a day. In almost every foreign court of the known world Greek physicians were practising, as they had become the foremost doctors of their day.

Physicians in ancient Greece practised medicine as a craft rather than a science, which it was later to become in Alexandria. As craftsmen working for money, they actually belonged to a despised class of people. If it were not for the fact the Greek people held health and physical fitness as the ideal state attainable by man, doctors would not have contributed so much to the Greek state and philosophy. Endless lists of books have been written about Greek physicians who have been among the foremost philosophers, such as Aristotle; and as to whether Greek medicine was more influential on Greek philosophy or the contraverse. The truth probably lies in the fact that both were essential to each other in explaining man's position with respect to the universe, which particularly occupied Greek thought.

Though the medical schools of Cos and Cnidus continued to turn out famous physicians after the Golden Age of Greece, few advances in medicine were made. Medicine lapsed into the teachings of dogmas the

ancients had left. Only through the Alexandrian School was the spark of Greek inventiveness kept alive.

### THE ALEXANDRIAN SCHOOL

Alexander the Great conquered most of the known world shortly after 300 B.C. and at his death left Egypt to one of his generals, Ptolemy, who founded a dynasty which lasted till Cleopatra, 30 B.C. The city of Alexandria was founded and soon after a medical school arose. Ptolemy and his successors became patrons of learning and Alexandria became the centre of Greek medicine. Greek medical knowledge was compiled, such as was the case of the Hippocratic Collection (*Corpus*) in Alexandria, but at the same time, Greek medical thought was becoming incorporated into a struggle with oriental mysticism. Alexandria, though being more Greek than Egyptian, had become the most important trading and cultural centre between East and West. With the decay of the Ptolemies, and the organization of the land superseded by the oriental influence, so also medicine decayed. In the end, like post Hippocratic Greece, thought dwindled into the search for the written word. Superstition and dogmatism crept into the substance of the new medicine.

Soon after the foundation of the medical school, its greatest advancements were made, particularly in physiology and anatomy. Its earliest teachers became its best known. One was Herophilus, who was probably the first to dissect the human body in public. He is one of the first to name the brain as the central organ contra to Aristotle's theory of the heart. He was the first to grasp the true nature of nerves, which he distinguished as connected with motion and sensation, and he named various parts of the brain.

Another was Erasistratus, a physiologist, who noted that every organ is supplied with arteries, veins and nerves. He realized nerves caused the shortening of muscles, which produced movement. He brought to light two theories which had a lasting effect on medicine. One described the "pneuma" or vital spirit which was responsible for the transmutation of air in the ventricles of the heart into blood. This theory was enlarged by Galen and was accepted until the time of Harvey. The other considered all diseases to be due to an excess of blood or plethora. He popularized the practise of blood letting,

which has remained with us almost to this day.

Three main schools of medical philosophy were founded here; Erasistratist, Herophilist, both of which became sterile dogmas, and thirdly the Empiricists, who detached themselves slowly from all dogmatism and held that medicine was a science based on observation. Slowly Hippocratic medicine decayed, helped by the diffusion of Alexandrian empirical medicine. As Rome became the cultural centre, the system of local pathology which had been founded in Egypt over a thousand years previous returned. Diseases were localized to one organ, specialists arose, mysticism, occultism and magic crept back into medicine. And most important of all, the idea that health is a state of dynamic equilibrium was lost.

### GRECO-ROMAN MEDICINE

Early Rome had no physicians as such, the first physicians to come were Greek and were hardly ideal Hippocratians, but they slowly gained acceptance as the good of Greek Medicine was realized. The Roman citizen looked upon the practise of medicine as corrupt (as it was often); furthermore, as a craft, it was below their dignity. For this reason the physicians of Rome were mainly Greeks. These Greek physicians were often slaves in the early days of Rome, though some made vast fortunes. This situation gradually changed and by the end of the Republic (circa the birth of Christ) physicians were granted citizenship. As Rome grew in splendor, more and more Greek doctors were attracted to its confines. Alexandria still remained the centre of Greek medicine, and the most famous doctors of Rome, including Galen, had studied there.

Asclepiades (124 B.C.) was probably the next known Greek physician in Rome before the birth of Christ. He believed in the Atomic Theory of Democritus, denied natural healing, but expounded the doctrine that medical treatment should be "prompt, safe, and pleasant". Out of his teachings developed the Methodist School.

Soranus (100 A.D.) was another great physician of Rome. He was also a Methodist, and is the father of obstetrics. In his writings we find the indications of maturity of the fetus; he advises double ligation of the umbilical cord, prescribes bathing the new-



born's eyes with oil, and indicates catheterization of the bladder before delivery, to name just a few. All his works were written in his native tongue, Greek, as were all medical documents at that time.

Celcus (born in the early Christian era) was an encyclopedist rather than a doctor, and was the first Latin to write on Greek and Roman medicine. We know from him most of our knowledge of the Alexandrian School. Besides writing on medicine, he wrote innumerable books on such subjects as agriculture, the military, and geography. In his medical texts we read of the Empiricists treating patients almost solely with the use of drugs, while on the other hand the Methodists were exponents of diet and exercise. His texts were a general practitioner's guide but they did not gain acceptance by the Greeks, who considered the Romans inferior. We know from him that cadaver dissection was still being practised (though it was soon to lose popularity in the medical field). He is best known for these four words he gave to medicine, "Calor, rubor, tumor, and dolor." It was a century later that Galen added "functio laesa".

During the first centuries, A.D. with the exception of Galen's work, there was no advancement in the scientific concepts of medicine. The Roman period of medicine was simply a compiling of earlier Greek knowledge and has been referred to by some as the Greco-Roman era. Scientific concepts seemed definitely to have been arrested and rigidly encysted in the writings of the ancients.

What Rome did give to the world was organization, and this is no less true in relation to medicine, although this change did not occur until the Empire was in its decline. Chief physicians were elected after approval by the emperor or governor in each municipality, and were responsible for the jurisdiction of medicine in that area. Physicians arriving in an area would have to be approved by a majority vote of those already practising there. Certain physicians in each community also were elected to care for the poor, free of charge, for a given length of time. Medical Schools approved by the state were started. Students still followed their masters on the house calls, at times their numbers reached a hundred, much to dismay of the patient - and a compulsory lecture system was adopted. A physician's training was much

like our own, at first there was a period comparable to our pre-medical course, then followed medical school the whole ranging from two to eleven years. For the first time well-rounded physicians began to appear in numbers, and in the declining years of Rome they played a more important role in government and society.

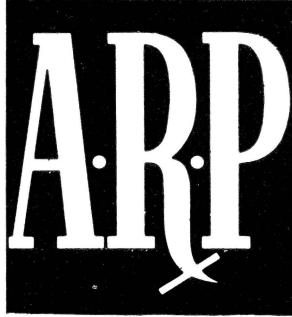
The Romans paid particular attention to hygiene, the swamps surrounding Rome were drained, and aqueducts supplied water to the city in so vast quantities that each citizen of Rome had more than one hundred gallons of water at his disposal. This was in addition to the public baths, a feat which no modern city has yet equalled. Control of food was supervised by inspectors, who had the right to forbid the sale of spoiled articles, and impose fines.

Burial of the dead was forbidden within the city walls. The practice of physicians was also under scrutiny, death or deportation was often in store for those who caused the needless death of a patient.

With the formation of stationary armies, a medical service arose, and by the time of Emperor Hadrian every legion and major workshops had its physician. The physicians were exempt from combat, and had the rank of non-commissioned officers, though in reality their station was probably little better than that of a clerk. Military physicians enjoyed several privileges, such as the "Jus resitutions" which gave the physician the right of demanding an indemnity for the material loss he might incur by his absence from home. As Rome's frontiers grew, it became increasingly difficult to send wounded soldiers home, so the first hospitals were founded as military hospitals, in Vienna, Bonn, and Baden in Switzerland.

No discussion of Greco-Roman medicine would be complete without mention of Claudius Galen (138 - 201 A.D.) Galen arrived at the end of the classical period; he popularized Aristotle's ideas, and held that the human body was simply a vehicle for the soul - which was an excellent basis for acceptance by the monotheism of the Arabs and Christians. He also believed in the healing power of nature.

Galen studied medicine in Asia Minor and Alexandria, returning to his home in Pergamon, he was appointed physician to the gladiators, a much sought after post. After



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several years he left for Rome, where his popularity grew so rapidly that he was appointed physician to the emperor. He wrote innumerable books which were translated into Latin and Arab and it may be said that he summarized everything in medicine, up to his own time. The observations that he made on anatomy of animals were transformed without the least hesitation to human anatomy. He expounded that every organ was created for a purpose and thus looked at physiology teleologically. His principles were akin to those of Christian thought, and set down so didactically that they were eagerly supported by the Christian Church. This helps to explain how his system remained unchanged and impregnable up to the time of the Renaissance; how his anatomical observations were regarded as absolute canon against which it was not even permissible to risk criticism or attempt experiment; and how those who dared question the truth of his statements were treated as heretics.

This man, to whose authority we owe the perpetuation of fundamental errors which produced a long arrest in medical evolution, was nevertheless a student and experimenter of the higher quality. He was probably one of the first to experiment with lesions of the cerebral cortex, and gained a far advanced view of neurology for his day. He certainly increased knowledge of inflammation and with keen observation, described and classified it.

After Galen, medicine remained a sterile doctrine for over a thousand years. Disease, under Christianity, was again thought to be due to the wrath of God for man's sins; mysticism and superstition crept back into medicine. The spark of theories, which the Greeks had given medicine, was lost to Western Culture. The monasteries of Europe, especially under the Benedictine monks, became the centres of medical thought as only

they were able to read the writings of the ancients, such as Galen. Hospitals became associated with these abbeys, and for the first time, the poor and indigent were treated. Medicine slowly moved out of the hands of the lay physicians and back into the hands of the priests, from which it had escaped a thousand years before. Slowly, however, medical schools were established close to these monasteries, and lay physicians again began to emerge. The most famous of these were at Salerno, and Monte Casino in Italy, and students, though limited, came from many parts of the world to study there.

As the Roman Empire fell, the Turkish empire was rising, and the Arabs were quick to monopolize on Greece learning. Nestorius, the Patriarch of Constantinople had been exiled for his teachings in the 5th century A.D. He, followed by his medical students, took exile into the deserts of Syria, where he translated many of the Hippocratic books into Syrian. These books were kept alive by the Arabs, added to, and improved. Centuries later, as Arab influence spread in Europe, these early Greek books (many of which had been lost to the Christian followers of Galen) together with the advances made by the Arabs, added new impetus to European medicine; more schools sprung up; slowly, experimentation and dissection of the human body (which had been prohibited under the Christian church) crept back into medicine, and paved the way for the Harveys, Vesaliuses, and the Leonardo da Vincis.

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