by governments and the profession together.

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# THALES TO GALEN: A BRIEF JOURNEY THROUGH RATIONAL MEDICAL PHILOSOPHY IN ANCIENT GREECE

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## Part II: Hippocratic Medicine

Hippocrates (Fig 4) was born on the Ægean island of Cos (*c.* 460BC), of an old family or guild of priest-physicians, Asclepiads, who were reputed to be able to trace their ancestors back to the God of Healing. His name became synonymous with treatises devoted to medicine, written mostly by his pupils. The Hippocratic *Corpus* represented the final philosophical and intellectual break from Homeric irrationality. Its timeless principles and ethics as expressed in the Oath have been passed down from generation to generation of physicians, providing a moral standard by which to practice. Hippocrates advocated the employment of powers of observation and logical thinking from which the physician could deduce the course of a particular illness and its potential outcome.

Before the arrival of the Hippocratic authors, medical thought suffered from two major drawbacks. Firstly, the philosophical enquiry that led to the progress of rational medical thought was secondary to the philosophers' discourses on the attributes of nature. Secondly, the sources for this progress are fragmentary statements that happen to have been preserved because they were quoted by later writers, notably aristotle. The dominance of irrational medicine in ancient Greece was ended in the fifth century when Hippocrates is reputed to have removed medical practice from the temples, and created on the Aegean island of Cos, his birthplace, a rational and empirical art of healing;[1] however secular superstitious medicine seems never to have disappeared entirely.[2,3] Perhaps it is sufficient to say that in the fifth century in the Coan School associated with the name of Hippocrates, the training of physicians and the practice of medicine were put on a rational and systematic footing. So was established a firm tradition of rational medicine which was never lost in the centuries thereafter.[4]

Hippocrates travelled widely in Greece and Asia Minor, and by the time of his death in Thessaly in 377BC,[5] where his tomb was still to be seen in the second century AD, the treatises of the Hippocratic *Corpus* were written. Fifty entire treatises have come down to us, and with other medical text fragments compose what is referred to as the *Corpus Hippocraticum*[6] (Table 4). However, the available evidence from his own time provides no confidence that any of the works were by Hippocrates himself. Inconsistencies between one work and another indicate that these were probably works of multiple authors, perhaps under the editorship of Hippocrates himself.[7–9] Scholars are deeply divided as to which works may have been actually by Hippocrates. The overall conclusion is that the *Corpus* represents a collective drive towards medical rationality. We see in it for the first time, for example in the treatise *Ancient Medicine* (Gk: *peri archaies iatrikes*), the distinction between medicine and philosophy clearly drawn and a breaking away from poetic fantasy and a diety-directed cosmos.[10]

The *Corpus* was to be vastly influenced by many great minds of the age, such

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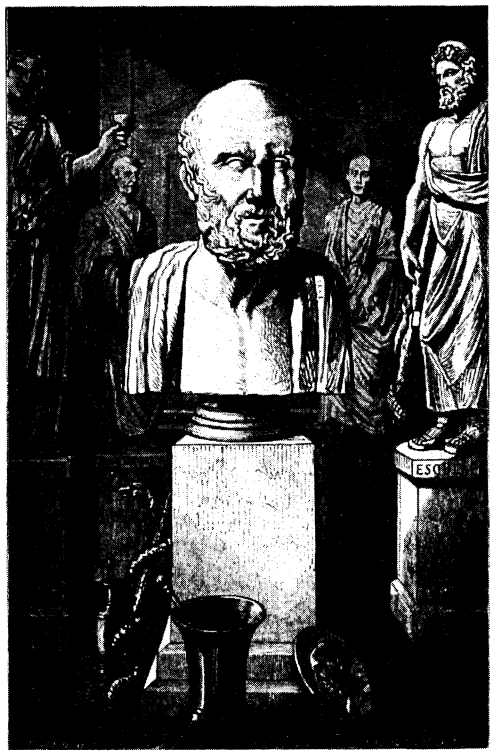

FIGURE 4

Hippocrates. Wood engraving by Meyner-Hein after C. Kreutzberger.

TABLE 4

Important Hippocratic treatises from the *Corpus*.

| *Gk:* | *Lt:* | |
|---|---|---|
| *c.* 430–380BC | | |
| *Peri arkhaies ietrikes* | De vetere medicina | On ancient medicine |
| *Peri physios anthropou* | De natura hominis | On the nature of man |
| *Peri physon* | De flatibus | On breathing |
| *Peri hebdomadon* | De hebdomadibus | On the seventh day of diseases |
| *Epidemion, proton, deutron, triton* | Epidemics I–III | On plagues |
| *Peri prieres nosou* | De morbo sacro | On sacred diseases |
| *c.* 400–350BC | | |
| *Peri physios paidiou* | De natura pueri | On the nature of boy |
| *Peri gones* | De genitura | On giving birth |
| *Peri sarkin* | De carnibus | On flesh |
| after 350BC | | |
| *Peri trophes* | De alimento | On nutrient |
| *Peri diaites* | De victu I | On regimen in health |



as Democritus the atomist,‡ Herodius the gymnasiarch* and Georgias, father of rhetoric.†[11,12] Arguably the most influential was Georgias, a native of Leontini, in Sicily, and active in the last third of the fifth century. He was, at least primarily, a rhetorician, but his treatise *Concerning What Is Not* has close connections with a school of philosophy based in Elea in southern Italy. He was in his own right a profound thinker, a nihilist and a sceptic, as well as a great influence on the authors of the *Corpus* treatises. This intellectual influence helped translate rational thought into practical clinical applications, manifested in the treatises on medicine, surgery and gynaecology, and descriptions of clinical practice. Interestingly, the Hippocratic doctors possessed no legally recognised professional qualifications, and so the distinctions between them and the gymnasiarchs were often fine.

There are few major pre-Alexandrian references to Hippocrates. The most important are those in Plato's *Phaedrus* and *Protagoras*, in Aristotle's *Politics*, and in the account of Hippocrates' medical doctrines that is attributed to Aristotle in the manuscript *Anonymous Londinensis* (V. 35–VI 42, ed. Diels). Of Hippocrates the physician, Aristotle in *Politics* tells us only that he was known as a great doctor and that he was small in stature, and from Plato's *Protagoras* that he taught medicine for a fee.[13] The great variety of medical theories in both the Hippocratic *Corpus* and the *Anonymous Londinensis* provide abundant evidence that they were based upon one or more of the four Empedoclean elements (see Part I), or upon one or more of the four primary opposites current in the fifth and fourth centuries.[14,15]

The steps taken by Hippocratic 'authors' to achieve true rationality were great. The author of the treatise *Ancient Medicine* rejected the postulations of pre-Hippocratic philosophers to explain physiological processes, thereby drawing the line between medicine and philosophy. Another Hippocratic work to attack philosophical intervention in medicine was *Nature of Man*, which likewise stressed the autonomy of medicine. However there is no doubt that the Hippocratic authors were influenced by their philosophical ancestors, especially when one considers the similarities between *Nature of Man* and Diogenes' work *On Nature*.[16,17] Often treatises were selective in their exploitation of pre-Hippocratic philosophical theories to suit their needs. Milesian influence was evident in a number of passages:

> The body of man has in itself blood, phelgm, yellow bile and black bile. These constitute the nature of his body, and through these he feels pain or enjoys health. Hippocrates. *De natura hominis* Ch4.

What is also interesting here is that the concept of the 'humours' was not a product of Hippocratic rationality, nor of Empedocles (see Part I). Rather its origins may be traced to more ancient references, the 'phlegm' is mentioned in the ancient Egyptian Ebers and Edwin Smith papyri, and the 'bile' in the fragments of Hipponax (Frag 51 Diehl) and Architochus (Frag 96 Diehl).[18,19]

‡**Atomists**—the original materialists who based their philosophy on the particulate indivisability of atoms that composed nature.

***Gymnasiarch**—a word derived from the Greek for naked, as the Greeks always stripped for exercise. Originally intended for military training, the three gymnasia of classical Athens became the philosophical schools of Plato, Aristotle and the Cynics. Their regimens were based on physical exercise.

†**Rhetoric**—science of oratory and public debating.

The individual treatises of the *Corpus* provide a remarkably rational exploration of the practices, deliberations and ethical principles expected from a physician. *On Airs, Waters, Places* is designed to help the physician anticipate the types of diseases that are likely to occur in towns with different climates and locations.[20] *Prognostic* lays down the general principles for the examination of patients, and in *Epidemics*, especially in Books I and III, there are diligently observed and documented case histories, about forty in all.[21,22] Both *On Regime in Acute Disease* and *On Ancient Medicine* point out the folly of assuming that the same symptoms have the same explanation every time. It was not only general principles that were discussed. Individual areas such as growth and reproduction were tackled in treatises such as *On the Child*, and *On Fractures and On Joints*.[23,24]

Many terms now commonplace in medicine owe their origins to the *Corpus*. In *Epidemics*, the patient, Philiscus, is described as having *oûra mélana*, black urine, a case description of what was probably blackwater fever.[25] Thus we describe the tarry black stool of gastro-intestinal bleeding as being 'meleana'. A complication arising from the initial symptoms of a cough is described as *perípneumonía*, eventually to become the modern term 'pneumonia'. *Karkínos* or *karkínoma* was used to describe clinical signs and symptoms of the tumours which we now call cancers. Hippocratic physicians knew that if a wound was deep enough, suppuration affected bone as well as flesh; this was known as *sphákelos*, or *gángraina*, hence 'gangrene'. Sciatica (*iskhiás*) is indeed the same disease now as in the time of Hippocrates, but the concepts of the term and its strict definition are different. Likewise the Greek word *kholéra* designates, as it does now, blood-free watery diarrhoea and colic, but today it refers specifically to infection with *Vibrio cholerae*. However, there are still residual aspects of irrationality in many of the treatises; *On Airs, Waters, Places*, the writer warns that

> physicians should guard against the most violent changes in the seasons and against the rising of the stars, especially the Dog star, then Arcturus, and also the setting of the Pleiads. For it is especially at these times that diseases have their crisis.[26]

The essential rationality of Hippocratic medicine was the interplay between individual (*physis* Gk: φνστζ, translated as nature, and also in the Hippocratic treatises associated with the concept of 'the disposition or constitution of a person'), and environment. According to Hippocrates and the classical theory of Greek medicine, health existed when there was a proper mixture, or *crasis*, of the body fluids. From this state of *eucrasia* imbalances occurred which could ultimately lead to *dyscrasia* and disease. The only essential difference between health and disease is that in the latter, the individual has more difficulty (dis-ease) in mastering his environment. The environment is not merely the *Airs, Waters, and Places* of Hippocrates, but also the ingested food, and the patient's *diaita* or *regimen*.[27] The process of cure (*pepsis*), involving elimination or *crisis* of excess matter, was taken to occur on certain definite days of the disease, being affected by sweating, purging, urination, or even haemorrhage.[28]

### OTHER CONTRIBUTORS TO HIPPOCRATIC RATIONALITY

Although often described as post-Hippocratic, Plato (born *c.* 428BC) was a contemporary of Hippocrates, as well as a follower of Socrates. In the Platonic writings there are many allusions to the art of medicine, and a complete anthology of ancient Greek medicine might well contain numerous extracts from his works[29,30] (Table 5). The medical allusions, however, are mostly couched in figurative and mystic language, notably in his treatise *Timaeus*. This great cosmological dialogue written in *c.* 399BC contains Plato's exposition on a tripartite classification of diseases. According to the first of these classes, diseases are held to be due to the excess, deficiency, varietal unsuitability or displacement of the four primary elements, earth, air, fire and water.[31,32] *Timaeus* combines the geometry of Pythagoras with the concepts expressed by Empedocles, the founder of Sicilian medicine; the elements are represented by four regular figures, cube for earth, tetrahedron for fire, octahedron for air and icosahedron for water. Plato's primary teleological aim in *Timaeus* is to operate in accordance with reason.[33] His medicine may not have been entirely practical but his philosophical interpretations were progressive. There were still a surprising number of innovations. Plato's theory of psychopathology in the *Timaeus*, where he claims that certain psychological disorders are due to physical causes, is highly developed. He was also the first to suggest that the cause of disease is due to an unnatural reversal of the normal processes of nutrition.[34]



TABLE 5

Principal events during the Hippocratic era.

| | | | |
|---|---|---|---|
| Hippocrates of Cos | 460 born | | |
| | 370 died | 421 | Peace of Nicias |
| | | 404 | End of Peloponnesian War |
| | | 399 | Death of Socrates |
| Plato of Athens | 365 died | | |
| | | 336 | Murder of Philip of Macedonia: Alexander the Great succeeds |
| Aristotle of Stagira | 384 born | 335 | Founded the Lyceum |
| | | 331 | Foundation of Alexandria |
| | 322 died | | |
| | | 323 | Death of Alexander the Great |

Plato's psychological theories, especially those postulated in *Phaedo* with its underlying theme of faith in immortality, were to influence greatly future medical writers, notably Galen. Galen admired Plato greatly, and repeatedly quotes him in his treatises.[35,36] Plato's pupil, Aristotle, confined himself to the realism of comparative and descriptive biology. As well as being the representative figure of the biology of classical antiquity, he was also the tutor to the young Alexander the Great. Aristotle, although the son of a physician, did not write any definitive medical works. But his biological treatises gave great impetus to the study of anatomy, which was to be continued in the great medical school of Alexandria, founded in 331BC.[37] Of great significance at this time was the further development of the importance of *pneuma* by Erosistrates. He developed the theory of *horror vacui*, nature's abhorrence of a vacuum, by describing how air gushed out of a severed artery followed by blood drawn into the arteries from the veins, during a disease process;[38] a rational, but nevertheless wrong conclusion of the observed events.

However, mechanistic theories of life and the philosophical descriptions of the balance of nature were still unable to cure people. From this inadequacy arose the Empiricists who concentrated on symptom-complexes, and the search for various panaceas, but who in so doing ignored the Hippocratic principle that encouraged

prevention rather than cure. Much of their work claimed descent from the Sceptics, including Pyrro of Elis.[39] As the Empiricists developed their methods in Athens, so Greek medical teaching was being introduced into Rome by Asclepiad of Bithynia (124BC).[40] Emphasis was placed on physicians and panaceas to cure the ailments. Again there was outright rejection of the very foundation of Hippocratic treatment (*diaita*). It was in this climate that Asclepiad, and his mechanistic views, developed into the philosophy of Methodism, in which treatment was given according to opposites: diseases of relaxation were treated with astringents, and diseases of constriction treated with laxatives. This was a preposterously simple system that found favour with many famous physicians, including Soranus of Ephesus, an authority on gynaecology, obstetrics and paediatrics in antiquity, and was to be popular with the medical profession for centuries.[41] There was little change in medical philosophy until just prior to Galen's time when Rufus of Ephesus, a physician to the court of the Roman emperor Trajan (200AD), developed his treatise *On the Interrogation of the Patient*, which broke with the doctrinal teaching of Methodism.[42] By this stage much of the Roman and Greek worlds had blended to such an extent that it was not possible to consider them as separate entities. From this heterogeneous environment Galen's medical philosophy was to develop.

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