

MEDICINE BEFORE SCIENCE

*The Business of Medicine from the
Middle Ages to the Enlightenment*

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CHAPTER I

Hippocrates and the philosophers

MEDICAL WISDOM

When the medieval doctor looked into the past for the beginnings of his own profession, what he found was the figure of Hippocrates, the Father of Medicine in the medical tradition from the Middle Ages to the Enlightenment. Modern scholarship has not revealed much about the historical Hippocrates or which of the 'Hippocratic' works were written by him,¹ but the medieval doctor felt more secure in his knowledge. The Hippocratic works gave him a number of things. There was technical advice in a practical subject, which told him what to do and what to expect. For instance, the *corpus* includes works that explain how to reduce dislocations and how to bandage wounds.² The Hippocratic works were also valuable because they were Hippocratic, that is, ancient and authoritative in an age that revered antiquity. These first two chapters are not directly concerned with the first of these aspects of antiquity, the technical content of Greek medicine and philosophy. They are not, that is, a background to or an early history of a professional activity developed during the Middle Ages and beyond. Rather, they present an image of the medieval and later perception of antiquity, a construction (however false in our historical terms) within the

¹ Hippocrates was mentioned by Aristotle and Plato who says (*Protagoras* 311b) that he taught medicine for a fee. In the *Phaedrus* (270a) the Platonic Socrates argues that rhetoric is like medicine, for they define the nature of the soul and the body respectively; Hippocrates 'the Asclepiad' is credited with the declaration that the body can be understood only as a whole. Biographies of Hippocrates were written by Soranus and Suidas. Tradition has it that he was born in 460 BC. Most of the works attributed to Hippocrates were written between 430 and 330 BC, and some later. See G. E. R. Lloyd, ed., *Hippocratic Writings*, Harmondsworth (Pelican Classics), 1978, p. 9 and W. H. S. Jones' general introduction in vol. 1 of the Loeb Library series (see note 2 below). For a recent account of the historical Hippocrates and the *corpus*, see Jacques Jouanna, *Hippocrates*, trans. M. B. DeBevoise, Baltimore (The Johns Hopkins University Press), 1999 (first published as *Hippocrate* in 1992).

² The Greek text of the Hippocratic works, with an English translation by W. H. S. Jones and E. T. Withington, may be found conveniently in the Loeb Library series: *Hippocrates* (vols. I–IV), London (Heinemann) and Cambridge, Mass. (Harvard University Press), 1962–8.

Latin tradition and on which the later Western doctors based their actions. It is not a story of beginnings but of resources.

What the medieval doctor found in Hippocrates was primarily medical *wisdom*. This was the first kind of medical learning used by the Rational and Learned Doctor in the West; we shall meet the other forms below. It went hand in hand with a useful knowledge of what natural things were good for this or that disease, or part of the body. Hippocratic medical wisdom was found primarily in the text called the *Aphorisms*. This had probably continued in circulation during the earlier Middle Ages, and was certainly translated into Latin as the Eastern Empire tried to regain control of Italy.³

The medical wisdom of the *Aphorisms* is of a particular kind. It is imparted with great confidence and authority and appears to be the distillation of long experience by a retentive and perceptive mind. Indeed, the first aphorism of them all declares that the art of medicine requires much time to acquire and that, in comparison, life is short. It was generally agreed later on in the West that such had been the clarity of Hippocrates' mind that he had achieved this medical wisdom without the aid of other arts such as dialectic and philosophy, which had not then been invented and which later came to be such a prerequisite of learning medicine. In our terms this air of original authority of the Hippocratic writings may well be because they include some of the earliest written medical material.⁴ No doubt they reflect an earlier oral tradition, but there were no earlier books to be used as an authority or as a basis of discussion, which became important features of the later Western tradition. Possibly the Hippocratic *corpus* is a collection of early Greek medical writings made and named by a librarian, possibly in Alexandria; possibly the collection is itself the remains of a medical library.⁵ At all events, literate doctors from the middle of the fifth century were discussing the nature of medicine and using rhetoric to persuade their readers of the superiority of their own medicine in a competitive situation. Public lectures could also be used,⁶ but 'it is clear that they felt that the

³ See A. Beccaria, *I Codici di Medicina del Periodo Presalernitano*, Rome (Storia e Letteratura), 1956, esp. p. 6.

⁴ On literacy, see I. M. Lonie, 'Literacy and the development of Hippocratic medicine', in *Formes de Pensée dans la Collection Hippocratique. Actes du IV^e Colloque International Hippocratique (Lausanne 21–26 Septembre 1981)*, ed. F. Lasserre and P. Mudry, Geneva (Librairie Droz), 1983, 145–61. The first prose book in medicine seems to date from the middle of the sixth century, and the doctors were the first to create a distinct body of technical literature.

⁵ As suggested by Jones in the Loeb Library series, vol. 1.

⁶ For example, the Hippocratic *Nature of Man* opens with a reference to public debates on medical topics, from which a victor emerged. The context is whether 'man' could be reduced to the few elements of the philosophers or the few humours of some physicians. (Loeb Library series, vol. 4.)

written word offered the possibility of a wider audience, and an enhanced authority'.⁷

Medical aphorisms, as wisdom, share features with other forms of expression. Like proverbs and the words of oracles, they speak with their own authority without supporting reasons and are open to the implication that this authority depends on either long experience or some kind of revealed knowledge. It can be argued that transmitting knowledge in this way is characteristic of pre-literate societies. Oral transmission in a complex business like farming has to be precise and not subject to accumulated errors. *Structured* oral expression helps here: the verse of Homer was famously committed to memory, and terse and expressive proverbs and aphorisms are memorable and useful. Pliny in imperial Rome reports some agricultural aphorisms of this kind. One of them was to have pruned the vines before the first cuckoo is heard (leave it too late and the vines bleed alarmingly. Pliny says that the farmer who *did* leave it too late might be embarrassed by his neighbours making jeering cuckoo noises at him).⁸ Proverbs also often have a rhymed structure to give them memorability. 'Sell in May and go away' used to be a stock-market proverb reminding the broker of the slack summer season. 'Oak before ash and we'll have a splash; ash before oak and we'll have a soak' is a rustic proverb of prediction based on the bursting of the buds. (It is also an English joke, because the rain will come anyway.)

PREDICTION

Thus an important feature of proverbs, aphorisms and oracles is that many of them are predictive. 'When sleep puts an end to delirium, it is a good sign' is a predictive aphorism. The third aphorism of the collection is both paradoxical and predictive when it says (at first sight) that good health in athletes is dangerous because it can only change for the worse. In medical terms prediction was very important. The doctor gained a good reputation by being able to predict the outcome of a case, and he avoided a bad one by refusing to take on a case where the patient was clearly going to die. The Hippocratic *corpus* contains a text devoted to medical prediction, *Prognosis*. The Greek author was quite explicit about the benefits to one's reputation from correct prognosis, but the medieval version read by aspiring doctors down to the sixteenth century was much more so. It opens directly by

⁷ See John Vallance, 'Doctors in the library: the strange tale of Apollonius the bookworm and other stories', in Roy MacLeod, ed., *The Library of Alexandria. Centre of Learning in the Ancient World*, London and New York (I. B. Tauris), 2000, pp. 95–113, at p. 99.

⁸ *Historia Naturalis* XVIII. 66.

advising the doctor who wants ‘glory’ and ‘lots of friends’ to be careful in prognosis.⁹ These are important words, for we are looking at the figure of Hippocrates through the eyes of later Western doctors as they tried to recover ancient medicine. The Greek text does not have these words. Possibly they were introduced into the text when it was paraphrased in Arabic or when the Arabic was translated into Latin.¹⁰ At all events they provided authoritative justification for medieval doctors to seek monetary rewards from their practice of medicine. It was a message reinforced by *Decorum*, where the rewards of proper ‘ethical’ behaviour are said to include glory.¹¹

Prognosis goes on to explain that medical ‘foresight’ is more than predicting an outcome and includes giving an account also of the patient’s present symptoms and those that he has suffered in the past. It is very helpful, the text says, if the doctor can describe past symptoms that the patient himself has forgotten about or not mentioned to the doctor. It was all good advertising for the doctor’s skills, and *Prognosis* is quite clear that the purpose is to impress the patient. An impressed patient trusts his doctor, gives himself more readily into his hands, and obeys him.¹²

In other words, the doctor has persuaded the patient that he knows about the kind of thing the patient is suffering from and can guide him through it: he has told the patient what in this book we shall call the Good Story.

Prognosis then dwells on the uncertainty of the outcome in acute cases. Perhaps the patient has delayed too long before calling the doctor. Perhaps the disease is severe, and the patient will not last the day. It was vitally important to foresee death because in predicting it, the text says, the doctor will escape blame. For this purpose there follows the famous *facies Hippocratica*, the appearance of the face of a dying person, with its sunken eyes and sharp nose. As with the *Aphorisms*, the descriptions in *Prognosis* are brief pieces of medical wisdom, seeming to derive from long experience.

⁹ *Omnis qui medicine artis studio seu gloriam seu delectibilem amicorum consequi desiderat copiam: adeo prudentum regulis rationem suam munit. Videtur mihi ut sit ex melioribus rebus ut medicus utatur previsionem.* See the *Articella*, Venice, 1483, f. 47r.

¹⁰ They are not included in the new translations from the Greek by Cornarius and Copus. See *Hippocratis Coi Medicorum longe Principis, Opera quae ad nos extant Omnia*, trans. I. Cornarius, Basel, 1557, p. 617; *Hippocratis Coi Medicorum Omnium longe Principis, Opera*, Basel (Cratander), 1526, p. 355. On the Arabic paraphrase, see C. O’Boyle, *The Art of Medicine. Medical Teaching at the University of Paris, 1250–1400*, Leiden (Brill), 1998, p. 90.

¹¹ See also V. Nutton, ‘Beyond the Hippocratic Oath’, in *Doctors and Ethics: The Earlier Historical Setting of Professional Ethics*, ed. A. Wear, J. Geyer-Kordesch and R. French, Amsterdam (Rodopi), 1993, pp. 10–37.

¹² *[E]st dignus ut de eo credatur quod est potens scire res egrorum ita ut illud provocet infirmos: vel sit fiducia ad confidendum: et committendum se in manibus medici.* *Articella*, Venice (H. Liechtenstein), 1483, f. 47r.

Like oracles, medical aphorisms and prognostic advice were often expressed in terse and even obscure language. Ambiguity in an oracle left room for interpretation after the prediction had or had not come true, without destroying the credibility of oracles in general. The practising doctor had to be more direct, but generally left himself some room for manoeuvre after the event. What was important in this case, and in the terse language, was *interpretation*. Sometimes an aphorism omits a verb, or uses a pronoun in place of a noun, so that we are left to guess who 'he' is. Medical teachers found that aphorisms had to be explained, all the more so when they had to be translated out of old-fashioned Greek into Latin.

But the most important form of interpretation that aphorisms seemed to need was the giving of reasons behind the situation so curtly described. How do winds from the south make people deaf? Why do acute diseases come to a crisis in fourteen days? Why was it that those whose bowels were loose in youth became constipated in age? Every age that followed the Hippocratic period had its own preferred reasons for the truth of the aphorisms (and explaining an aphorism was part of medical graduation down to the eighteenth century). In an important sense aphorisms were not *rational* statements, but declarations of medical wisdom. They were not of course irrational in our sense, but were conspicuously without *arguments*.¹³ The rational doctor, in the sense we are using in this book, supplied his own arguments to the aphorisms to show why they were true or what must have been in the mind of Hippocrates when he wrote them. We shall see below that the most important of the rational interpreters of Hippocrates was Galen, the Greek doctor in imperial Rome.

GROUPS OF DOCTORS

In these ways, medical knowledge – wisdom – could be used directly to treat a patient and less directly to enhance the reputation of the doctor. It is often remarked that there was no system of licensing doctors in the ancient world, and therefore the doctor's reputation and that of his teacher were very important.¹⁴ There was competition in the medical marketplace. If, like Hippocrates, the Greek doctor taught medicine for money, then potentially at least, he competed with other teachers to attract pupils. Naturally, a

¹³ Lloyd calls the *Aphorisms* one of the 'scrapbooks or notebooks' of the Hippocratic collection. Lloyd, *Hippocratic Writings*, p. II.

¹⁴ The reputation of his school was also important for an aspiring city physician; Alexandria came to be important in this respect. See O. Temkin, *Hippocrates in a World of Pagans and Christians*, Baltimore and London (The Johns Hopkins University Press), 1991, p. 20.

good reputation always helped. Practice among fee-paying patients held out greater rewards and some Greek doctors became very rich, whether as physicians to the rich and powerful or to the Greek city-states.¹⁵ Democedes of Croton earned over thirty times as much as the average skilled worker.¹⁶ Such men were clearly successful, and when Democedes moved from Aegina to Athens his salary increased, no doubt in line with his reputation. But not all doctors agreed on what kind of business they were in, how patients should be treated or how reputations should be maintained. There is abundant evidence that Greek doctors belonged to different ‘schools’, whether schools of thought, cliques or confraternities, and articulated their differences.

One particular aspect of this is especially important as we unravel the process by which medieval doctors tried to reconstruct and emulate the medicine of the ancients. Like-minded members of a group naturally believe that their common beliefs and practices are superior to those of a rival group, particularly if the groups are competing in a calling such as medicine. It can easily follow that a rival group’s success can be seen as being achieved by dubious means. In the case of medicine it would equally have followed that their medicine, being of the ‘wrong’ kind, was incapable of being practised ethically, because it damaged the patient.

In fact, the Hippocratic collection of texts contains some that deal with the ethics of medical practice and teaching. There are two ways of reading such texts. The traditional internal reading of the texts rests on the (not unreasonable) assumption that there are some general or absolute ethics in the relationship between people. In Renaissance editions of the Hippocratic *corpus*, the ethical works were often placed first, as though they formed an introduction setting out the moral basis of the practice of medicine.¹⁷ But it is also possible to read these texts ‘externally’ by considering who they were directed at and what they were designed to achieve. Let us take as a first example the text called *Precepts*.¹⁸ It is addressed to the ‘brothers’ of a ‘family of physicians’, that is, to a self-defined group. Part of the motivation of the group was altruistic, for ‘where there is love of man, there is also love of the art’,¹⁹ but it would not be unduly cynical to guess that the physician also loved his fee. The author advises against negotiating the fee when first meeting the patient, for worry about providing it and the

¹⁵ Public physicians were chosen by a panel of laymen. ¹⁶ Lloyd, *Hippocratic Writings*, p. 19.

¹⁷ See, for example, Cratander’s edition. A similar sequence was maintained into the eighteenth century, the end of the period considered in this book. See, for example, *Magnus Hippocrates Cous Prosperi Martiani Medici Romani Notationibus Explicatus*, Padua, 1719. The ethical works drew the attention of medieval doctors at a comparatively late date. They were not discussed by Parisian masters, for example, until about 1400, and they appear in the *Articella* only in the late and printed versions.

¹⁸ Loeb Library series, vol. 1, p. 312. ¹⁹ *Ibid.*, p. 318.

possible departure of the physician will make him worse: better to press for the fee when the patient has recovered. Indeed, forgoing the fee from a poor patient is recommended for ‘brothers of the art’ because the gain in reputation will be greater than the financial reward. Although a personal choice, the brothers of the same fraternity would have gained from such a reputation.

The most important of the ethical works is the *Oath*.²⁰ It has been treated as an expression of high ethical ideals, on a level that gives it a timeless validity, and for this reason has often been revived. It was an oath sworn by a new doctor at graduation down to the time when medicine became scientific.²¹ But it is also clearly the product of a group of doctors with a particular kind of medicine, one that was atypical of ancient medicine in general.²² It is in fact a document of entry. The candidate or new recruit who swore the oath was agreeing to a set of rules that governed the group he was joining. The rules of such a group are its *ethics*, and while some of the rules may well be designed to benefit others outside the group, the effect of the ethical rules of a group is the survival of the group. The individual, after all, joins the group to enjoy the privileges it can secure by being an organised group; this may entail some sacrifice, but collaboration with fellow-workers generally brings benefits. The long-term beneficiary of such ethics is the group itself.²³

The medical man who swore the Hippocratic *Oath* did so by appeal to Apollo and Aesculapius, so probably he was joining a fraternity that was partly religious; perhaps the members believed that medicine was originally a gift from the gods. He swore to treat his teacher as a father and to teach his teacher’s sons as he would his own. This seems to reflect a father-to-son type of education, and the new doctor was entering an arrangement where the ethics of family responsibility were added to those of religion. He swore to teach other incomers, provided that they followed the rules, that is, became

²⁰ See L. Edelstein, *Ancient Medicine*, Baltimore (The Johns Hopkins University Press), 1967, which includes earlier papers, especially that of 1943 on the *Oath*.

²¹ Thus the *Oath* is a ‘deathless gem’ for Jacques Jouanna: ‘The birth of Western medical art’, in M. D. Grmek, ed., *Western Medical Thought from Antiquity to the Middle Ages*, trans. A. Shugaar, Cambridge, Mass. and London (Harvard University Press), 1998, pp. 22–71, at p. 63.

²² Edelstein argues that the *Oath* is Pythagorean in origin; Darrel W. Amundsen, *Medicine, Society and Faith in the Ancient and Medieval Worlds*, Baltimore and London (The Johns Hopkins University Press), 1996, p. 41 points out that it was little known in the ancient world before the coming of Christianity.

²³ Again, this is not to deny personal or corporate altruism, but what is prominent in the historical records is the physicians’ advice to each other on how to maintain a reputation. ‘Many, if not most, of the ethical principles expressed in the medical literature were motivated by the physician’s concern for his reputation’: see Amundsen, *Medicine, Society and Faith*, p. 35.

members of the family. He also swore not to give to patients substances that could be used by them to commit suicide or procure abortions. Was this a lofty expression of eternal ethical values? Some historians have treated it as such, but we have to remember that there have been times and places when suicide, abortion and even infanticide have been acceptable and thus not ethically problematic. Suicide in particular was rarely censured in the ancient world.²⁴ Whatever the intention of the author of the *Oath*, we can see that the external effect of these prohibitions might have been to enhance the reputation of the group of doctors who swore to obey them. An abortion might leave an aggrieved father, denied his legal right to his child. The family of a suicide victim might feel the tragedy had been avoidable. These were the people who might, or might not, call in medical help again, and the doctors needed a fixed code of behaviour. Some doctors were itinerant: they needed guidance on the properties and diseases of different locations (supplied in the text *Airs, Waters and Places*),²⁵ and they needed to leave behind a good image so that the itinerant doctors who followed them would also benefit from the high esteem in which Hippocratic doctors were generally held.

The converse of ethics seen in this light is the Greek doctor's need to recognise hopeless cases, so that he could avoid them.²⁶ This looks timelessly *unethical* to us, but it meant that the doctor could avoid being linked to failure, that is, death. Greek prognosis was not only a matter of predicting an outcome; it also involved diagnosis in the sense of persuading the patient that the doctor knew about the condition itself. In describing the symptoms to the patient, perhaps symptoms that the patient had forgotten to mention, the doctor could make a display of his technical knowledge that would impress the patient and family. This knowledge was valuable. Indeed, it was a stock-in-trade that the doctor used in two ways: to treat his patients and to maintain the reputation of the group to which he belonged. Some groups were aware of this to the extent of keeping their medical knowledge secret. The father-to-son education of the *Oath* and the strict rules about who could be taught imply that medical knowledge was a family secret. The Hippocratic text called *Law* suggests that medicine was originally a gift of the gods and that knowledge of it had to be protected from the profane. A

²⁴ Amundsen, *Medicine, Society and Faith*, p. 38. ²⁵ See Lloyd, *Hippocratic Writings*, p. 15.

²⁶ See *The Art*, in vol. 2 of the Loeb edition of *Hippocrates*, ed. W. H. S. Jones, London (Heinemann), 1923, pp. 185–217, chs. 3 and 8. This is another polemical text, against an unknown critic. The identification of hopeless cases was an important characteristic of the author's kind of medicine, and his refusal to tackle them was an important criticism. In Cratander's edition of the Hippocratic corpus, *The Art* stands in first place, as if defining what Hippocratic medicine was.

number of the ethical works carry the message 'holy things should be given only to holy men'. Professional secrecy, the refusal to take on hopeless cases and the management of prognosis for professional gain were all devices to enhance the reputation of the doctors and to form the expectations of the public.

We can usefully glance at another of the Hippocratic ethical works, *Decorum*.²⁷ This sets out what is decent for the good doctor to do. He must, for example, dress modestly and not be too elegant or conspicuous. It was an article of ethics that came to be copied in the Renaissance in a fairly uncomplicated way, simply on the authority of Hippocrates. Later doctors may have seen the utility of modesty for creating an image or reputation, but we must for once go beyond later perceptions of the Hippocratics to the circumstances of the Greek text. It soon becomes clear on reading *Decorum* that it is a partisan document. The tract is aimed against another group of medical men, who profess and practise another kind of medicine. Necessarily the two groups had different ethics in the sense in which we are using the term. To our author the other group seemed obviously not ethical or 'decorous'. From his attacks on this other group we can learn a little about its characteristics. That the members of the group wore 'ostentatious' clothing means most likely that they dressed with studied elegance. From other complaints by our author we can conclude that they also had great powers of persuasion. Perhaps this was evident in the public disputations that the Greeks used to arrange in order to judge between speakers. At all events, this is the nub of the matter: the two groups were in competition. *Decorum* says that the other doctors appealed especially to the young, which might imply that pupils were being poached by the other group. They are sophists, says *Decorum*, giving them the no doubt gratuitous image of claiming to be able to teach anything for a fee (and so teaching nothing properly).

PHILOSOPHY

So far we have seen some of the uses to which medical *wisdom* could be put, particularly the authoritative and experiential wisdom of aphorisms. We can distinguish this from the technical medical *knowledge*, perhaps of divine origin, that was a stock-in-trade. Both were kinds of medical learning that characterised our Learned Doctor, and both were used by later European

²⁷ O. Temkin dates the text to the first century AD: *Hippocrates in a World of Pagans and Christians*, Baltimore and London (The Johns Hopkins University Press), 1991, p. 25.

doctors in trying to re-establish ancient medicine. But our Learned Doctor was also Rational in the sense indicated above, and he drew this too from the ancient world. The use of *argument* in medicine in the high Middle Ages was taken directly or indirectly from Aristotle, a circumstance we examine next. For the medical man, Aristotle's style of argument was most interesting in the context of natural philosophy, and the theory of medicine was to become almost wholly Aristotelian in its principles.

But the situation was very different for the early Greek doctor. Returning to *Decorum*, it finally becomes clear that the enemy were doctors who based their medicine on natural philosophy. They invoked grand principles of change, common to the macrocosm and microcosm; they denied the role of the gods; they held that all physical change was wholly natural and intelligible; and they claimed that the number of principles or causes of change were few. This was all very different from the medicine of texts such as *Decorum* and *Ancient Medicine* and other works ascribed to Hippocrates. We have seen that the *Aphorisms* and *Prognosis* do not deal with physical causes at all and are implicitly based on the accumulation of human experience. The author of *Ancient Medicine* likewise accepted the superiority of long experience over a few imagined physical causes, and asserted that far from being godless, medicine had originally been born with divine help. 'Ancient' medicine was primarily dietetic and had begun with a study of the diet of the ill and grew, indeed was still growing, with the accumulated experience of the difficult business of how different foods affected different people. The art indeed was long, life was short and judgement difficult. In contrast, the physical principles of the new philosophy were of but recent origin. It is absurd, says the author of *Ancient Medicine*, to explain medicine and indeed the whole world on the basis of the four elementary qualities, the Hot, Cold, Dry and Wet. These were the few physical principles of the philosophers, the active powers that governed the four elements, Earth, Air, Fire and Water.²⁸ For the author of *Ancient Medicine* the world was a much more complex place. It was the many and subtle qualities of foods, like the bitter, salt and acid, which affected the body for good or evil; the elementary qualities were not causal, for a fever patient may feel hot but shiver with cold; a cold bath makes the patient glow with heat on being dried; frostbite is like a burn and only becomes apparent when the patient is warm again. In a complex world, medical experience was everything, for

²⁸ *Regimen* I for example is a philosophical-medical text that, having announced the general principle that to be an effective doctor one must know the basic components of the body, bases the body and soul of man on two elements, fire and water, which between them supply the four qualities (Loeb Library series, vol. 4, p. 230).

foods, patients and circumstances varied, and medicine was still being enriched by accumulated experience. Wisdom gained over time could not be replaced by the simplistic qualities of the philosophers or the false precision implied by their use of numbers.²⁹

In traditional historiography, Greek medicine of the Asclepiad kind was 'rational' in a modernist sense, in considering the natural world and the case history of the patient, eschewing divine causes.³⁰ It may be that writing *historia* as in medical case histories, the Hippocratic physician was 'rational' in this sense, but it should be emphasised again that in this book rationalism is to do with arguments, not with naturalness. Nevertheless, despite the antagonism between 'old medicine' and the new philosophy, some conflation was possible between 'nature' and 'reason' in medicine, and in late antiquity medicine and philosophy soon came to be regarded as sisters: *philosophia et medicina duae sorores sunt*, said the Alexandrians, attributing the doctrine to Aristotle.³¹

When medieval and later physicians tried to emulate Greek medicine they thus had two rather different models within the medical literature. The 'in-family' method of education treated medicine as a lifetime art that depended on accumulated experience and may have had divine origins. It was a valuable commercial asset and was often treated as secret, to be revealed only to the properly initiated. We may suppose that in these circumstances the composition of medical knowledge varied according to the 'school' or 'family' concerned.

On the other hand, the philosophical doctors made a virtue of the openness of their teaching (causing their opponents to make sour remarks about their verbosity). The reason for this may have been that the early Greek natural philosophers often constructed their theories with an agenda in mind. A not uncommon aim was to enable man to reach a stability of mind. This could be done by accepting that all the difficulties of life were in some sense inevitable and had to be accepted. Certainly all were natural, and if one understood the laws of nature then it was easier to bear the misfortunes of

²⁹ *Ancient Medicine*, in vol. 1 of the Loeb edition of *Hippocrates*, ed. Jones, pp. 1–64, chs. 1–2, 14, 16–17 and 20.

³⁰ Jouanna, *Hippocrates*, especially p. 56 and ch. 8.

³¹ The Aristotelian locus was probably in *De Sensu et Sensato*, where Aristotle says that the natural culmination of natural philosophy would be the study of man and his health. See Cornelius O'Boyle, 'Discussions of the nature of medicine at the university of Paris, ca. 1300', in John van Engen, ed., *Learning Institutionalized. Teaching in the Medieval University*, Notre Dame, Indiana (University of Notre Dame Press), 2000, pp. 197–227. That medicine was the philosophy of the body and philosophy the medicine of the soul was a doctrine eagerly taken up by the later rational and learned doctor, as we shall see. See also Temkin, *Hippocrates*, p. 8, who derives the opinion from Aristotle's observation that the philosopher finishes where the philosopher begins.

life. An important freedom that this aim helped to foster was freedom from fear of the gods. Some philosophers held that there were no gods, others that the gods were incapable of interfering with human and natural affairs. It was not Zeus who threw thunderbolts, said the philosophers, but a hot vapour arising from the earth, or the clouds exploding, or something of that sort. Ordinary Greeks worried about suffering from wilful gods not only in life but perpetually after death in some kind of quasi-material afterlife. The philosophers told them not to worry: death was so complete and final and *nothing* could happen afterwards.

Not all Greek philosophers argued in this kind of way. It was the young Socrates who despaired of finding satisfactory answers to physical and natural questions and turned instead to human matters. His pupil, Plato, followed him, but also wrote two works of great interest to later doctors and natural philosophers. One of them was the *Republic*, which explained the workings of an ideal city-state. The state in fact worked rather like the human body, with a threefold hierarchy. Controlling the city were the philosopher guardians, who alone had the wisdom to govern; its counterpart in the body was the rational soul, drawn down from the heavens into the head and possessing at least the rudiments of true knowledge. Below the head was the heart, the seat of the vital soul, the source of motion. Its place in the city was taken by the army, brave and vigorous but needing the direction of the guardians. In the lowest place in the body was the liver and its nutritive faculty, corresponding to the workers and kitchens of the city.

Plato described this body in the second text, the *Timaeus*, which contains an account or a parable of the creation of the world by a deity, the demiurge. Like the *Aphorisms* of Hippocrates, this text and the commentary on it by Calcidius were remembered in the West after the fall of Rome. No doubt this was because the Christian church could sympathise with the doctrine of a soul with divine origins that returned to its celestial home after the death of the body. And the *Timaeus*, unlike the works of Aristotle, dealt with a creator god, as did the Old Testament. To all appearance, Plato had been struggling to reach a Christian truth, hampered principally by being unable to receive revealed knowledge. The doctrine of a wise and creative deity was taken up by Galen, as we shall see, and this gave it double authority with the later Christian doctors of the West. Because the body was the microcosm of the world at large, the doctor found it to be of advantage to have specialist knowledge of both, of nature as a whole. 'Nature' was *physis*, which covered the natural world and Aristotle's nature-of-a-thing (as explained later). The doctor full of natural knowledge became in the Latin

tradition a *physicus*, which could mean 'natural philosopher' or 'medical man' and which ultimately gave rise to the term 'physician'.³²

DEMOCRITUS *PHYSICUS*

When the medical man of the Middle Ages and Renaissance looked back at the beginnings of his subject he also saw a literature that has been treated as problematic by historians of the classical period. This includes letters attributed to Hippocrates in early medieval medical collections, and the story of Democritus the Philosopher. This too was a story of 'medicine meets philosophy', and it was remembered down to the time when traditional natural philosophy met its crisis in the seventeenth century. It concerns Democritus the natural philosopher, who preferred to spend his time in a retreat in the woods dissecting animals rather than live in his native city. His fellow citizens thought him mad and called in the great Hippocrates to examine him. Hippocrates duly came, interviewed Democritus, and declared him saner than the citizens. Not only that but, as if to symbolise the close relationship between medicine and philosophy, Democritus showed Hippocrates that he had discovered the physical cause of madness in animals. Democritus *physicus* was a philosopher with a great reputation, the details of whose philosophy could not easily be found by the men of later centuries. This was not inconvenient if, for example, an alternative to Aristotle had to be found. Democritus was even more ancient than Aristotle and the hints he left as to the nature of the world could be readily adapted to some later system. 'Democritean philosophy' in later ages only sometimes meant 'atomic' and often referred to the pragmatic sylvan dissector.

ARISTOTLE AND NATURAL PHILOSOPHY

As with the case of Hippocrates, it is not the intention of this chapter to give a chronological or analytical account of a historical figure and his works. Rather we need to know what it was that the medieval and later doctors chose to pick upon as they sought to reconstruct the medicine and philosophy of the ancient world.

We can conveniently begin with those philosophers whom Aristotle sometimes calls his predecessors. There are two cautions to be observed

³² We shall see in later chapters that it became convenient to use *physica* for 'philosophy' where the latter term had pejorative connotations. See also, J. Bylebyl, 'The medical meaning of *physica*', *Osiris*, 2nd series, 6 (1990), 16–41.

here. First, Aristotle often began his physical treatises with a refutation of other men's theories on the topic under discussion. This was partly a dialectical exercise, giving greater credibility to his own doctrines by the destruction of others. This meant that it was to Aristotle's advantage to make it appear as if earlier philosophers were engaged in the same kind of exercise as he was himself, but not so successfully. It would have been of no use to refute popular fables or the poets, and Aristotle occasionally points to the very different nature of these other forms of Greek thought.³³ But we have only fragments of the works of the early philosophers and cannot tell what their agenda was; before Socrates it seems unlikely that there was a 'succession' of philosophers with any common programme.

Second, the physical works of Aristotle were first explored in the later West, like the medical works, partly in the form of Arabic paraphrases. The process of abbreviation was selective, and certain kinds of materials were left out.³⁴ Occasionally pieces of additional matter were added, as we saw at the beginning of *Prognosis*. This meant that, at first, later Western scholars did not have a very good idea of what Aristotle had written. For our purposes this does not matter. We are not concerned with any process of transmission of the text of Aristotle in which the criterion of success was a faithful delivery of an accurate text, but with what later doctors made of Aristotle's texts, in whatever form they existed.

We saw that the Hippocratically 'decorous' doctors, who found rivals in philosophically inclined medical men, objected strongly to the doctrine that the fundamental principles of the world were the four elements and their paired qualities (each element had two qualities so that water, for instance, was Cold and Wet). This was a doctrine much developed by Aristotle, and it may be that the encounters described in *Decorum* (which is difficult to date) took place after Aristotle's time. To understand Aristotle's undertaking, however, it is necessary to glance back at his 'predecessors'.

It is well known that the 'pre-Socratic' philosophers were interested in questions of nature and the physical world, and we saw above that they wanted to keep the gods out of their answers to their questions. As we have seen, traditionally it was the young Socrates who despaired of finding answers to natural questions and turned instead to questions dealing with men. There was a true succession, of master and pupil, between Socrates and Plato, and Plato and Aristotle. Aristotle, the son of a doctor, returned to an enquiry into nature. He agreed that the gods had no place in the motions

³³ *Meteorologica* 357a24–28.

³⁴ See Roger French, 'Teaching meteorology in thirteenth-century Oxford. The Arabic paraphrase', *Physis*, 36 (1999), n.s., fasc. 1, 99–129.

and changes of the physical world, but held that earlier philosophers had been too 'materialist' in asserting that the natures of things arose from the characteristics of the matter of which they were composed. The necessity involved in this seemed too rigid to Aristotle, who wanted to put *purpose* into the world. He could not accept the rational and creative demiurge who, Plato had taught, created the world, and Aristotle made 'nature' a local principle of action. Every natural thing, and especially those living, had its own nature and purpose, that of achieving the full potentiality of its form.³⁵

First, we must note some of Aristotle's circumstances. He taught in his own school, the *Lyceum*. He and his colleagues taught a wide range of subjects, of which we have space here only for those concerned with the natural world. The cycle of lectures seems to have been repeated often and the content modified, no doubt after discussion. Probably no fully edited and polished lectures were produced, for Aristotle's text is sometimes loosely organised and even appears as notes. But those on the natural world are an organic whole. Aristotle began with the fundamental principles of natural change, or 'motion' in the text called the *Physics*. He then went on to explain how these principles operated in increasingly physical circumstances. He developed his doctrines of the structure of the world and of the actions of the four elements and their qualities in his text *On the Heavens and the Earth*, and in his work *On Meteorology*. As the cycle progressed, Aristotle often recalls the 'original undertaking' – nothing less than an explanation of the natural world – and refers backwards and forwards to other topics in the series.³⁶

The cycle took him through more and more elaborate forms of natural action, including those of animals. As we have seen, these were the natural objects that best exemplified his general doctrine of the nature-of-the-thing, and it is important from our point of view to note some details of Aristotle's procedure. First, he placed much more emphasis than Plato did on the role of the senses in generating knowledge (Plato held that the senses distracted the soul from uncovering the reality of its ideas). Aristotle liked empirical knowledge. In the *Lyceum* they kept written accounts of the winners of the games, maps and itineraries, and accounts of the constitutions of different city-states.³⁷ With animals Aristotle adopted what we might call a 'historical' approach. For the Greeks, a *historia* was a report on an event

³⁵ See Roger French, *Ancient Natural History. Histories of Nature*, London (Routledge), 1994, ch. 1.

³⁶ See, for example, the *Meteorologica* 339a8 and 390b21.

³⁷ *The Oxford Classical Dictionary*, ed. Simon Hornblower and Anthony Spawforth, 3rd edn, Oxford (Oxford University Press), 1996, p. 166.

given by a man who had done his best to visit and interview those with first-hand knowledge of it. The report was factual and modest in language, very different from other forms of Greek literature. Aristotle adopted it for philosophy. He and his colleagues sought *historiae* about animals from people professionally involved with them. That on elephants (and the amount they drink, in Macedonian measures) seems to have come from India. Aristotle's *History of Animals* is a selection of these reports, written in 'historical' language, while the *Parts of Animals* presents generalisations, first principles and conclusions about causes. These books contain a famous passage in which Aristotle, having dissected many animals, praises the knowledge to be gained from the inside of animals, however disgusting these are at first sight. It is natural knowledge, worthy of a philosopher, he says, because it is more certain than that of distant things like the heavens.

This empirical side of Aristotle's method led him to promise a work on plants to match those on animals, and to deal with the most complex of all natural motions, that of the human soul. He declared that the natural end to the cycle of teaching, from the simplest to the most complex of motions, was a study of man. In addition to the soul, he meant medicine. The maxim 'Where the philosopher finishes the physician begins', which was adopted so eagerly in the Middle Ages, is Aristotelian. But Aristotle did not teach medicine. It was, after all, a productive art. Aristotle knew that doctors traded in a marketplace and sold health, or at least treatment, for money. The philosopher's business was to teach people to handle knowledge, not how to make and sell things. He taught those who had the leisure to come and hear him and he gave them a liberal education. Indeed, the term 'liberal arts', so important in the Middle Ages, had its origins in Greece, and in both it meant studies suitable for the 'free' man. Liberal studies owed something of their status to the fact that in comparison to the productive arts they were quite useless: only the man with free time and ability could acquire them.

REASONING

We have now glanced at Hippocratic medical wisdom and seen how it could be used to win over patients and perhaps pupils, and to defend its practitioners from the rivalry of 'sophistical' philosopher-physicians. The other great characteristic of the Rational and Learned Doctor whose historical career we are inspecting was his rationality, that is, his use of arguments. They were very largely Aristotelian. We need to explore this a little to see what kind of arguments were used in philosophy.

Plato often strengthened his own position by allowing others to talk themselves into an untenable position. Since this is a characteristic of the dialogue format, we can broadly call it dialectical. Aristotle used a form of it in rejecting the views of his predecessors, but of course they were dead and could not reply in the manner of the circle round Socrates. But Aristotle in addition used, indeed almost invented, logic. In a sense this too was an observational business, observing, naming and classifying the ways in which people argued. It was also a theoretical business, which did not need Socratic conversation. A basic form was the syllogism, which the medievals seized on with such enthusiasm. Syllogisms came in many forms and could be inductive or deductive. Inductive syllogisms relied on repeated instances of the characteristics of a group, and a famous example is the link between rumination in animals and the possession of horns. Discover that the cow is a ruminant and it becomes known that it has horns. It is of course philosophically imperfect, for a perfect inductive syllogism would involve observation of *all* ruminants and *all* cows (the medievals found a way around this obstacle).

There is a good sense in which Aristotle was doing this kind of exercise in the *Parts of Animals*. He was looking for correlations between parts and behaviour of animals, for example between diet, dentition and the number of stomachs. Such features could remain constantly linked in different groups of animals, as repeated observation – the *historiae* – showed. The point about the linkage of these features was that they were co-ordinated for the benefit of the animal. This was not a *rational* or conscious plan of a creative demiurge, but was the product of the nature-of-the-animal striving to achieve its full expression during the development of the animal. It was of course a *purposeful* action, and, as we have seen, Aristotle had wanted to put purpose back into nature.

So Aristotle was using logic in looking at animals and making inductions. But there was also a deeper sense in which his natural philosophy involved logic. His insistence on the purpose of nature led him to what he considered the most valid form of knowledge. We can recall that he criticised earlier philosophers for ascribing the features of natural things to the matter from which they were made. This was a very partial explanation in Aristotle's view. Certainly, matter had irreducible characteristics which Aristotle called the 'material cause' of an object. But it also had shape or Form, and Aristotle systematised the position by adding to the Material and Formal cause the Efficient, generally the agent that brought it into being: a table might be made of wood, have a flat top and a number of legs, and be made by a carpenter. By far and away the most important of the four causes listed by

Aristotle was the last one, the Final. This was the *purpose* of the object, whether man-made or natural. Aristotle argued that full knowledge of a thing came from an awareness of what it was *for*, whether it was a tooth, a horn or a stomach.

In the more strictly logical works Aristotle worked at a related theme. The practical limitations of induction meant that it could not produce philosophically certain knowledge. Aristotle also wanted to produce *deductive* knowledge, from first principles to observed instances. This he called 'demonstrative', knowledge that a thing could not be otherwise. It related to Final Causes, knowledge of which was the best path to knowledge of a thing. To the medievals Aristotle's texts on logic, such as the *Posterior Analytics*, looked like a programme that could generate proper knowledge of the natural world that was displayed in the physical works.

The attractions of logic were great. Knowledge of syllogisms could prove an opponent wrong or prove that he had framed his premisses badly. This touched on rhetoric and public speaking, whether political or medical, which we perhaps saw in the case of *Decorum*. To produce demonstrative knowledge of the physical world in an irrefutable way with an elaborate apparatus of learning was a huge asset to the medical man, who could argue that the human body was the most important part of the physical world and that Aristotle had said it was the natural end-point of all natural philosophy. When he finally obtained Aristotle's philosophical and logical works, the Learned Doctor also became Rational.

ANATOMY

We have seen from the different works that Hippocratic medicine was a distillation of long experience, partly based on knowledge revealed by the gods, somewhat oracular in its aphorisms and prognosis, and largely concerned with diet. Such anatomy as it contained was incidental rather than fundamental. For Aristotle, on the other hand, anatomy *was* fundamental, for true knowledge of the parts of animals was gained through a knowledge of their function, which their shape indicated. The organs could not be otherwise in order to perform their function. We saw that Aristotle made dissections and vivisections to study form and function. But Aristotle's interest was philosophical, not medical. His subjects were animals, not men. The inside of the human body remained for him, as he said, one of the most unknown of all things.³⁸

³⁸ *Historia Animalium* 494b21–24.

Yet Aristotle's treatment of animals was immensely important for later rationalising doctors. They adopted it for the human body and it became a major part of their argument about the superiority of rational and learned medicine. We can call it anatomical rationality. But this adoption was not a straightforward business. It meant claiming to know the inside of the human body, and we shall see that this led ultimately to human dissection, which in turn meant the overturning of ancient and widespread taboos about mutilating the dead body. Many societies, including that of ancient Greece,³⁹ believed in a quasi-material afterlife, and the real punishment of judicial mutilation – lopping noses or the hands of criminals – was the fear of eternal disfigurement. Somehow European doctors overcame these taboos, practised human dissection and animal vivisection, and brought Aristotle's philosophical anatomy into their medicine.

They might never have done so had it not been for certain events in Alexandria, a few years after Aristotle's death. We have already met Alexandria in the third and fourth centuries BC where, probably, librarians were arranging early Greek medical works under the name of Hippocrates, thus causing immense trouble for later scholars. But in another quarter of town something much more sinister was going on, at least according to a persistent rumour. This story said that two Greek doctors, Herophilus (c. 330–260 BC) and Erasistratus (c. 315–240 BC), had not only broken the taboo against mutilating the body, but were performing *vivisections* on human beings.

Historians have thrown doubt on whether in fact these men were in Alexandria at the same time,⁴⁰ but of course what is important from our point of view is that later European doctors believed the story and that belief affected their actions. The context of their belief included some pieces of circumstantial evidence in favour of the rumour. The first is that Aristotle's view of the philosophical utility of dissection and vivisection may well have been known, together with his view that medicine followed naturally upon natural philosophy. Medical men would have seen that knowledge of internal human form and function would improve medicine, and the rumour asserts that Herophilus and Erasistratus were indeed inflicting great pain upon their subjects for the greater benefit of later generations. Second, it was believed that the vivisectionists' subjects were condemned criminals who had forfeited their right to live, which seemed to be some justification

³⁹ See H. Von Staden, *Herophilus. The Art of Medicine in Early Alexandria*, Cambridge (Cambridge University Press), 1989, p. 141.

⁴⁰ For a discussion on this point see Von Staden, *Herophilus*, p. 37; see also Vallance, 'Doctors in the library', p. 97.

for the manner of their death. Moreover, the rumour added that the exercise was carried out at the wishes of the ruling Ptolemy, a patron of learning.⁴¹ Third, Greek philosophers did not put much faith in an afterlife. Plato held that the important thing was the soul, which returned to the heavens at death, leaving its prison, the wholly corporeal body, on earth. Aristotle held that the most active part of the soul was indestructible, and the way in which he said the body and soul interacted in life could hardly be extended to a quasi-material afterlife. The Stoics and atomists said that death was absolute. In none of these cases was what happened to the body after death important. If our two Greek doctors were learned in philosophy, as seems likely, then they probably did not think they were inflicting eternal punishments on their subjects.

There are also some circumstances which suggest that the rumour was not true. These are also of interest to us for if they kept a false rumour alive they equally helped to form people's beliefs and actions. The first is that in form the rumour resembles the late-antique paradoxes. These constituted a genre of literature that presented stories of marvellous things and events. It may have grown out of the very sober Greek *historiae* which, as we have seen, were reports, as original as possible, on important things and events. Important events were interesting, and so were marvellous events, and so perhaps the form of the *historia* was extended to cover 'paradoxes'.

Alexander the Great enters the story here. Not only did he found the city of Alexandria in Egypt (in 331 BC) and several other cities of the same name in territories he conquered, but he took with him surveyors to assess the resources of these territories, and learned men to send home accounts of things done and found. Perhaps in being retold, these accounts became exaggerated, emphasising both the glory and abilities of Alexander as a general and conqueror, and the strangeness and richness of the distant countries now under Macedonian control. These stories were part of the 'Alexander literature' that survived through the Middle Ages. Impossibly strange races of men and animals found, for example, on medieval world maps derive from such forms of paradoxology that originated either from the Alexander literature or from the similar circumstances of Roman military expansion and found in Pliny.

⁴¹ Ptolemy Soter reigned from 323 BC to 283 BC and Ptolemy Philadelphus from 283 to 246. The latter thought that it would be possible to build a universal library, containing all the books in the world; and he tried to acquire Aristotle's library. See Luciano Canfora, *The Vanished Library*, London (Vintage), 1991, p. 20. For a criticism of Canfora and a discussion of the destruction of the library in Alexandria, see Robert Barnes, 'Cloistered bookworms in the chicken coop of the muses: the ancient library of Alexandria', in MacLeod, ed., *The Library of Alexandria*, pp. 61–77, at p. 74.