

MAGIC, REASON
AND
EXPERIENCE

STUDIES IN THE ORIGIN AND
DEVELOPMENT OF GREEK SCIENCE

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THE CRITICISM OF MAGIC AND THE INQUIRY CONCERNING NATURE

THE PLURALISM OF GREEK RELIGIOUS BELIEFS

The first time in extant Greek – indeed in extant Western – literature that an attempt was made explicitly to refute a set of what the writer himself called magical beliefs and practices is in a work that dates from the later part of the fifth or the early fourth century B.C. But the attack on magic – including, especially, any claim to be able forcibly to manipulate the divine or the supernatural – must be understood against the background of the pluralism of Greek religious beliefs; so we must first consider briefly the development of critical attitudes towards certain aspects of Greek traditional notions concerning the gods. This begins already with Hesiod, if not with the Homeric poems themselves.² Although the extent of the originality of Hesiod's *Theogony* is hard to estimate, it represents at the very least a systematisation of a group of stories about the origins of the gods. Although he invokes the Muses at the start of the poem, it is the 'fine song' that they taught him (and he identifies himself by name)³ that he recounts. Hesiod stands at the head of a line of writers of theological cosmogonics – the group Aristotle refers to as the θεολόγοι.⁴ These include such men as Pherecydes and Epimenides – and we can now add Alcman on the evidence of the recently discovered fragment of his theogony – as well as a number of other more shadowy figures. Our sources for their ideas are often, to be sure, late and unreliable, but Alcman in the seventh,⁵ and Pherecydes in the sixth, century, at least, evidently introduced a number of new theological myths, based partly on earlier Greek and partly, it may be, on non-Greek material.⁶ Again another recent discovery, the so-called Derveni

papyrus, provides valuable evidence that is independent of Plato for Orphic theogonical speculation.⁷

Moreover the first natural philosophers, the Milesians, may also be thought of as innovators in this area in two respects. First they attempted naturalistic explanations of phenomena such as earthquakes, lightning and thunder, which had often been ascribed to the gods.⁸ Secondly, there is evidence that they considered their principles – that is, what the world comes from – to be divine,⁹ and in that, admittedly very limited, sense they may be seen as putting forward a new or 'reformed' theology.¹⁰ Again although the precise nature of Pythagoras' religious teaching is disputed,¹¹ we have good early evidence that he held that the soul is immortal and transmigrates from one species of living being to another.¹²

Whilst a number of seventh-, sixth- and early fifth-century writers may be represented as religious innovators, the two outstanding early explicit critics of certain traditional Greek religious notions are Xenophanes (c. 570–470 B.C.) and Heraclitus (active at the turn of the sixth and fifth centuries). Xenophanes inveighed against the conception of the gods in Homer and Hesiod first on moral grounds. 'Homer and Hesiod have ascribed to the gods everything that is shameful and a reproach among men, thieving, adultery and deceiving each other' (Fr. 11, cf. Fr. 12). But he also satirised anthropomorphism more generally. 'But men', he says in Fr. 14, 'think that gods are born and that they have clothes and voices and shapes like their own.' In the first extant text to bring to bear knowledge of what other societies believed about the gods he says: 'the Ethiopians say their own gods are snub-nosed and black, the

⁷² The degree of dependence on non-Greek ideas has recently been rather exaggerated in West's discussion (West 1971, chh. 1 and 2).

⁷ See especially Burkert 1968 and 1970. The papyrus itself dates from the second half of the fourth century, but the commentary on Orphic ideas it contains is thought to be a product of 400 B.C. or shortly afterwards.

⁸ See further below, p. 32.

⁹ Thus Aristotle suggests that Anaximander described the Boundless as immortal and imperishable (*Ph.* 209 b 13ff, DK 12A 15). Our late sources report that Anaximenes held his principle, air, to be divine (e.g. Aetius 1 7.13, Cicero, *N.D.* 1 10 26, both in DK 13A 10, and cf. Aet. 1 3.4, DK 13 B 2 and Hippolytus, *Haer.* 1 7.1, DK 13A 7). Even Thales, too, may have considered his principle, water, to be divine, though the precise application of the dictum that 'all things are full of gods', ascribed to him by Aristotle (*de An.* 411a8, DK 11A 22; cf. Plato, *Lg.* 899b, where, however, there is no mention of the author of the saying), is controversial (see Lloyd 1966, pp. 233ff).

¹⁰ Different versions of this line of interpretation can be found in, for example, Jäger 1947 and Hussey 1972.

¹¹ See especially Burkert 1972a, ch. 2.

¹² Xenophanes Fr. 7 is quoted by Diogenes Laertius, viii 96, as referring to Pythagoras. Even if that were incorrect, the fragment is good early evidence of the belief in transmigration.

¹ On the origin and application of the terms *ύμνοι* and *μύθια*, see below, p. 13 n. 20.

² The extent to which the Homeric poems introduced new religious conceptions has been much debated. See, for example, Guthrie 1950, pp. 117ff, and Finley (1954) 1977, pp. 135ff (and the works listed in his bibliographical essay, pp. 183ff), and Burkert 1977, pp. 191ff.

³ *Th.* 1ff, 22ff. * E.g. *Metaph.* 1000a9f, 1071 b26f, 1075 b26 and 1091 a33ff.

⁴ The interpretation of Alcman's theogony (Fr. 5) is notoriously controversial. See, for example, Page 1959, pp. 20f, Frankel (1962) 1975, pp. 164 and 233f, Burkert 1963a, West 1963, 1967 and 1971, pp. 206ff, Vernant 1970 and Penwill 1974.

⁶ For an account of Pherecydes' myths, see, for example, Kirk and Raven 1957, pp. 48–

Thracians say theirs are blue-eyed and red-haired' (Fr. 16). Another fragment (15) attempts to reduce anthropomorphism to absurdity by drawing an analogy with animals: 'If oxen and horses and lions had hands and could draw with their hands and produce works of art like men, horses would draw the forms of the gods like horses, and oxen like oxen, and they would make their bodies such as each of them had themselves.' In place of the crude anthropomorphism he rejects, he puts forward an idea of god as the divine Mind (Fr. 24-6), a notion that is, to be sure, still influenced by a human model, even if his god is said to be 'not like mortals either in shape [form] or in thought' (Fr. 23).

With Heraclitus, the range of religious notions and practices under attack is extended.¹³ Thus in one fragment (5) he condemns ritual purifications after murder and praying to statues: 'They purify themselves polluting themselves further¹⁴ with blood, as if a man who had stepped into mud were to wash it off in mud: he would be thought mad¹⁵ if anyone remarked him doing this. And they pray to these statues, as if someone were to converse with houses, not knowing at all who the gods and heroes are.' In another passage (Fr. 15) he refers to the Dionysiac religion in particular: 'For if it were not for Dionysus that they were holding processions and singing the hymn to the phalli,¹⁶ it would be a most shameless act: but Hades and Dionysus, in whose honour they go mad and perform bacchic rites, are the same.' Here and elsewhere it may be that it is not the acts themselves that he objects to, so much as performing them in ignorance of their true significance, that is of the true nature of the god or gods to whom they are addressed.¹⁷ In a third fragment (14), the extent and authenticity of which are unfortunately in doubt,¹⁸ he is again reported as criticising the mystery religions ('what are

deemed to be mysteries among men are unholy mysteries') and as 'prophesying against'¹⁹ 'night-rovers', 'mages' (*μάγοι*), 'baccants', 'maenads, initiates'. If *μάγοι* here is part of the original quotation and not – as is quite possible – an addition by our source, this is the first reference in extant Greek literature to these men: our earliest extensive authority, Herodotus, represents them as a Median tribe who – or members of which – acted as priests and the interpreters of signs and dreams.²⁰ Like Xenophanes, Heraclitus' remarks about the gods are not merely destructive and critical, for he has his own quite different, if in parts obscure, conception of the divine to propose, one that is linked with his central philosophical doctrine of the unity of opposites. Thus we are told in Fr. 67 that 'god is day night, winter summer, war peace, satiety hunger', while another fragment (102) says that 'to god all things are beautiful and good and just, but men have thought that some things are unjust, others just'.²¹

These texts show that in the sixth and early fifth centuries it was, within broad limits, perfectly possible both to criticise existing

¹⁰ This is Clement's term (*αγορεύματα*) and Clement held (incorrectly, as is now generally thought) that Heraclitus, like the Stoics much later, believed that the world is periodically destroyed by fire (the doctrine of *καταστροφές*). Yet Clement's misinterpretation of Heraclitus on that point does not, by itself, undermine the value of this testimony as a whole, since it is still possible that it reflects some statement of Heraclitus criticising some at least of the types of person that Clement mentions.

¹¹ See Herodotus I 101, 107, 120, 128, 132, 140, VII 19, 37, 43. It is clear that for Herodotus the *μάγοι* were a distinct tribe (the doubtful accuracy of his reports does not affect their value as evidence of what was believed about the *μάγοι* in Greece). But already in the fifth century *μάγοι* and its derivatives came to be used pejoratively – often in association with such other words for vagabonds, tricksters and charlatans as *δρυῶνες*, *ῥόγος* and *δαργῶν* – for deception, imposture and fraudulent claims for special knowledge. This is so not only in *Alph. Ser.* (on which see below), but also in Gorgias' *Helen* (para 10, cf. para. 14), Sophocles, *OT* 387ff and Euripides, *Or.* 1496ff (cf. Aristotle (para 96, which however exonerates the *μάγοι* themselves of the practice of *ἄγναισθαι*). Thus these texts already exhibit what was to remain a prominent feature of words from the *μαρ-* root (and of their Latin equivalents, *magus*, *magister* etc.). They were never clearly defined in terms of particular beliefs or practices, but were commonly used of such activities or claims to special knowledge as any particular author or speaker suspected of trickery or fraudulence. Pliny, for instance, attacks the 'magical art' at length in *Nat. xxx* especially (as often elsewhere, e.g. xxiv 1.4f, xxiv 9.18ff, xxviii 23.85f). But that does not prevent him from including in his work a mass of homeopathic and sympatric remedies, amulets and the like, which he is half inclined himself to believe to be efficacious: he often mentions, for example, the special, ritualistic procedures to be used in their collection and preparation (see e.g. xxiii 71.137ff, xxvi 62.95ff, xxvii 43.66, xxviii 23.77ff, xxix 32.98ff). See further Hubert 1904, Thorndike 1923–58, Hophner 1928, Bidez and Cumont 1938 and Nock 1972, 1 pp. 308ff, especially.

¹² Cf. such other, often cryptic, fragments on god and the divine as Fr. 24, 32, 53, 62, 86, 114 and notably those that emphasise the contrast between divine knowledge and human ignorance, e.g. Fr. 78, 79, 89. Even though his statements on soul and on immortality are exceptionally obscure, it is fairly clear that he believed in some form of after-life, see, e.g., Fr. 63, 77, 88 and cf. Fr. 27, 36, 45, 98, 115.

¹³ Again there is a play on words. The term translated 'phalli' is *οὐλοῖαν* (lit. 'shameful parts'), which is immediately followed by *δυσβέστερα* ('most shamelessly').

¹⁴ Cf. Guthrie 1962, pp. 475f, who also refers to Fr. 69.

¹⁵ Our source is Clement of Alexandria (who is also responsible for Fr. 15). Clement is not a very reliable witness at the best of times, since his own chief purpose, in the *Protrepticus*, is to expose all heathen religions (and especially the Greek mysteries). But there is an additional reason to be cautious about the first part of what appears in DK as fragment 14: it does not form a grammatical sentence, but consists simply of a list of the types of people whom Clement represents Heraclitus as 'prophesying against'. The dangers of such a list being subject to interpolation and corruption are obvious.

¹⁶ Heraclitus often expresses his contempt both for the ordinary mass of mankind (e.g. Fr. 1, 2, 17, 29, 34, 104) and for most of those (including Xenophanes himself) who passed as 'wise men' (e.g. Fr. 35, 40, 42, 56, 57, 106).

¹⁷ Reading *δαῖον* with DK (and Marcovich). Alternatively, reading *δαῖον*, 'they purify themselves in vain, polluting themselves with blood'.

¹⁸ Here, as so often elsewhere in the fragments, there is a calculated play on words – *μαυροῖαν* (translated 'polluting') and *μαυροῖαν* (translated 'mad') – which cannot be captured in English.

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religious ideas and practices and to introduce new ones.²² To put it negatively, there was no dogmatic or systematic religious orthodoxy.²³ Although there were certain widespread and deeply held beliefs, there was no common sacred book,²⁴ no one true religion, represented by universally recognised spokesmen – priests or prophets – and backed by an organised religious authority such as a church. The expression of new and quite individualistic views on god and the divine was, as our examples show, not only possible but quite common, and by the end of the fifth century we have evidence²⁵ of a series of rationalistic accounts of the origin of religion.²⁶ First Democritus explained belief in the gods as in part a mistaken inference from terrifying natural phenomena,²⁷ although he evidently did not dismiss notions of the gods entirely, for he is also reported to have related certain such ideas to ‘images’ that appear to men.²⁸ Secondly, Prodicus is said to have accounted for beliefs in the gods in terms of man’s gratitude for the benefits he derives from such things as bread, water, wine and fire. Thus Sextus reports that

Prodicus of Ceos says: ‘The ancients considered as gods the sun and moon and rivers and springs and in general everything that aids our life because of the benefit from them, just as the Egyptians consider the Nile a god.’ He adds that for this

²² Modifications to religious practices and the introduction of new ones appear to continue throughout the sixth and fifth centuries – especially, though not exclusively, in connection with the growth of the mystery religions.

²³ Thus Herodotus, II 3, puts it that all men have equal knowledge – or ignorance – of the gods. We shall be discussing later the significance of trials for impiety; see below, p. 255 and n. 129, p. 257 and n. 138.

²⁴ Such ‘sacred stories’, *Iepoi λόγοι*, as the Greek possessed were associated with particular exclusive cults, such as the mysteries; see, for example, Burkert 1972a, pp. 178ff, 219ff, 1977, pp. 414f.

²⁵ Admittedly much of our most striking evidence derives from a single source, Sextus Empiricus, who sets out in *M.* ix 13ff to show the doubtfulness of the inquiry concerning gods. But it is clear that by the end of the fifth century rationalising speculations about the gods were common in two contexts in particular, etymologising on the gods’ names and allegorical interpretations of incidents in Homer. The Derveni papyrus reflects the former interest; for the latter, see Richardson 1975, pp. 66f, 70ff.

²⁶ Conjectures concerning the possible origins of particular religious beliefs and customs begin already in Herodotus. Thus at II 43ff (especially 50) he speculates on the Egyptian origin of the Greek names of the gods. See also II 81 on the prohibition concerning the use of wool (on the problems posed by the alternative readings in this text, see, for example, Burkert 1972a, pp. 127f.), II 104 on circumcision and II 123 on the Egyptian origin of the belief in immortality. Cf. also, for example, Euripides, *Her.* 799ff, where the gods themselves are said to be subject to *νόμος*, custom or convention.

²⁷ Sextus, *M.* ix 24, DK 68A 75, mentioning thunder, lightning, the conjunctions of stars and eclipses of the sun and moon among the ‘happenings in the upper regions’ for which men in the past thought the gods responsible.

²⁸ Democritus Fr. 166 (some of these images are beneficial, others harmful): he is reported to have wished for the former kind himself), cf. also e.g. Plutarch, *Quaest. Conv.* viii 10.2, 734Ff (DK 68A 77). In Fr. 30 Democritus was, presumably, being ironical in referring to those who, gesturing towards the air, spoke of Zeus as ‘king of all’.

reason bread was worshipped as Demeter, wine as Dionysus, water as Poseidon, fire as Hephaestus, and so on with each of the things that are good for use.²⁹

Thirdly, and far more radically, a text from Critias’ *Sisyphus* represents the gods as a human invention for the purposes of moral control:

Then when the laws prevented them [men] from committing open deeds of violence, but they continued to do them in secret, it seems to me that a man of clever and cunning wit first invented for men fear of the gods, so that there might be something to frighten the wicked, even if they do or say or think something in secret. Hence he introduced the divine, saying that there is a deity [daimon] who enjoys immortal life, hearing and seeing with his mind, thinking of everything and caring about these things, and possessing a divine nature, who will hear everything said among mortals and be able to see everything that is done... The place he said the gods lived in was one by the mention of which he could most frighten men – from which he knew came fears for mortals and rewards for their miserable life – the upper circuit, where he remarked lightnings and fearful claps of thunder, and the starry frame of heaven, the beautiful workmanship of the cunning craftsman Time... With such fears he surrounded men... and quenched lawlessness by his ordinances... So I think did someone first persuade men there is a race of deities.³⁰

THE CRITICISM OF MAGIC

In addition to this evidence for the rational criticism of religious beliefs and customs in the philosophers and sophists, we have first-hand information relating to the rejection and refutation of certain magical notions. For this we have to turn to the medical writers. Our chief text is the treatise *On the Sacred Disease*,³¹ the date of which cannot be fixed at all precisely but which is generally thought to belong to the end of the fifth or the beginning of the fourth century B.C.³² The principal aims of this work are (1) to establish that the ‘sacred disease’ – that is, epilepsy³³ – is, as the author puts it, ‘no

²⁹ Sextus, *M.* ix 18 (cf. 52). On the important evidence in Philodemus, *Phil. (PHerc.)* 1428) see most recently Henrichs 1975, pp. 107ff. Cf. also Cicero, *N.D.* I 42.118, Themistius, *Or.* xxx 349ab (Hardouin), II 183.1ff (Schenk), Downey, Norman (DK 84 B 5).

³⁰ Critias, Fr. 25.9ff: see, for example, Burkert 1977, p. 405 and cf. ch. 7, pp. 452ff, in general on the topic of philosophical criticism of religious beliefs.

³¹ I follow Gressmann’s edition (1988), cited by chapter and paragraph) except where otherwise indicated. My translations are adapted from those in Chadwick and Mann (1978) who follow the chapter divisions in W. H. S. Jones, 1923–31, II (J) rather than those in Littré (L) and Gressmann (G). Some aspects of this material are discussed in Lloyd 1975c.

³² See, for example, W. H. S. Jones 1923–31, II p. 134, Pohlenz 1968, p. 35, Heinemann 1945, pp. 170ff, especially 206–9, Bourgey 1953, pp. 75f, Gressmann 1968, pp. 7–31. The philosopher Diogenes of Apollonia, whose *foruit* is usually assigned to about 430 B.C., provides a probable *terminus post quem*, but we have no reliable means of determining how long after Diogenes the treatise was written.

³³ On the identification of this disease, see especially Temkin 1933a, and 4, and 1971, pp. 15ff, for example 19: ‘various diseases were called “sacred disease” in Antiquity’, but ‘in the great majority of cases “the sacred disease” meant epilepsy for physicians as well as laymen’.

more sacred than any other disease' and that it has a natural cause like all other diseases, and (2) to expose as frauds those who claimed to be able to cure the disease by purifications, incantations and other ritual means. The work begins:

I do not believe that the sacred disease is any more divine or sacred than any other disease but, on the contrary, just as other diseases have a nature from which they arise, so this one has a nature (φύσις) and a definite cause (πρόφασις). Nevertheless, because it is completely different from other diseases, it has been regarded as a divine visitation by those who, being only human, view it with ignorance and astonishment.³⁴

Shortly afterwards the writer makes a suggestion about why the disease came to be considered 'sacred':

It is my opinion that those who first called this disease 'sacred' were the sort of people we now call magics (μάγοι), purifiers (καθαροί), vagabonds (δύοπτοι) and charlatans (δωροδωτές). These are exactly the people who pretend to be very pious and to be particularly wise. By invoking a divine element they were able to screen their own failures to give suitable treatment and so called this a 'sacred' malady to conceal their ignorance of its nature. By picking their phrases carefully, prescribing purifications and incantations along with abstinence from baths and from many foods unsuitable for the sick, they ensured that their therapeutic measures were safe for themselves.³⁵

The writer's criticisms of his opponents³⁶ take various forms. He accuses them not only of ignorance, but also of deceit and fraudulence, of inconsistency and indeed of impiety.³⁷ In opposition to the views he attacks he puts forward his own naturalistic doctrines about diseases in general and about the sacred disease in particular, during the course of which he produces some fairly detailed anatomical and physiological theories. Several of the criticisms he advances can be paralleled either from anthropologists' reports concerning attitudes towards witchdoctors and magic in non-literate societies, or from the accounts of historians of witchcraft, such as Keith Thomas' celebrated study of sixteenth- and seventeenth-century England, *Religion*

and the *Decline of Magic*.³⁸ It is essential, then, both to analyse the precise nature of the attack on the 'magics' in *On the Sacred Disease* – in particular to identify where that attack departs from patterns that may easily be paralleled elsewhere – and then also to assess what the Hippocratic author offers in place of the doctrines he rebuts.

A comparison may be suggested, first, in respect of certain accusations of dishonesty and fraudulence. Discussing attitudes to witchdoctorhood among the Azande, Evans-Pritchard wrote:

I was surprised to find a considerable body of sceptical opinion in many departments of Zande culture, and especially in regard to their witch-doctors. Some men are less credulous than others and more critical in their acceptance of statements made by witch-doctors. . . . Many people say that the great majority of witch-doctors are liars whose sole concern is to acquire wealth. I found that it was quite a normal belief among Azande that many of the practitioners are charlatans who make up any reply which they think will please their questioner, and whose sole inspiration is love of gain.³⁹

Similarly the author of *On the Sacred Disease* both explicitly accuses his opponents of ignorance,⁴⁰ and suspects that their motive is love of gain:

But perhaps these claims are not true and it is men in search of a living (βίον βόλευον) who invent all these fancy tales about this particular disease and all the others too – attaching the responsibility for each of the different forms of the complaint to a god, for they hold not just one, but several gods responsible for these.⁴¹

Next there are charges of special pleading, or of recourse to what we may call secondary elaborations. Analysing the factors that contributed to the reputation enjoyed by the 'cunning men' in Tudor and Stuart England, and in particular the defences available to them when they failed actually to produce a cure, Thomas wrote:

When failure was unavoidable the belief in witchcraft provided a ready excuse. By informing their clients that they had been 'overlooked' or 'forspoken', the cunning men could imply that if only the disease had been natural they would have been able to cure it. Even the Catholic who held charming sessions at St James's in

³⁴ Thomas 1971.

³⁵ Evans-Pritchard 1937, p. 183.

³⁶ E.g. ch. 1 para. 11 (C) (L v 354.15ff) quoted above, p. 16.

³⁷ Ch. 1 para. 32 (G) (L v 360.9ff). Among many other passages in Greek literature, one may compare Oedipus accusing Teiresias of prophesying for gain (*OT* 387ff: he calls Teiresias μάγος and δύοπτος) though he does not deny the art of prophecy as a whole. Similarly accusations of greed and fraudulence are particularly common in the many scenes in which Aristophanes satirises both named prophets and soothsayers and their kinds in general, e.g. *Fox* 1045–1126, *An.* 958–91, *Eg.* 115ff, 1002ff, cf. Plato, *Lg.* 699ab. Homer already provides examples of attacks on particular prophets or prophetesses, e.g. *Il.* 1106ff, *Od.* II 178ff, and in a famous speech at *Il.* XI 231ff Hector, dismissing Polydamas' interpretation of an omen, says that he does not care whether birds fly to the right or to the left: there is one best omen, to fight for the fatherland.

³⁸ Ch. 1 paras. 2f (G). Cf. the rather different texts of Littré, VI 352.1ff, and of W. H. S. Jones, 1923–31, II p. 198. Gressmann square brackets the first sentence I have translated: but even if this is a gloss, the idea it expresses is genuine enough, being repeated in a slightly different form at the beginning of ch. 2 (para. 2 (G) = ch. 5 (J)) and cf. ch. 18 (para. 1 (G) = ch. 21 (J)).

³⁵ Ch. 1 paras. 10–12 (G) (cf. L v 354.12ff).

³⁶ The identity of these opponents cannot be determined precisely, but see further below, pp. 37f.

³⁷ E.g. ch. 1 para. 28 (G) (cf. L v 358.16ff): 'And yet I believe that all these professions – as they think – of piety are really more like impiety and a denial of the existence of the gods, and all their piousness and talk of the divine is impious and unholy, as I shall demonstrate.' Cf. also ch. 1 paras. 30, 39 and 44 (G) (L v 360.3ff, 362.6ff, 16ff).

1664 was prepared to fall back on this. In this way the wizard's procedure could be virtually foolproof. For if the patient recovered it was a tribute to the cunning man's perception, and if he died then the witch was to blame.⁴²

Although it is not witches or other magicians, but the gods, whom the charlatans attacked in *On the Sacred Disease* invoke, the way they are said to excuse themselves is strikingly similar. 'They also employ', the Hippocratic writer reports, 'other pretexts so that, if the patient be cured, their reputation for cleverness is enhanced, while, if he dies, they can excuse themselves by explaining that the gods are to blame while they themselves did nothing wrong.'⁴³

Yet whilst references to anthropological and other sources shows that there are certain similarities between points that *On the Sacred Disease* makes in its attacks on the purifiers and what can readily be found elsewhere, the criticisms in our Hippocratic text do exhibit certain exceptional features. Evans-Pritchard, for instance, emphasised that although many Azande suspect individual witchdoctors of being frauds, there is no scepticism about witchdoctorhood in general: 'I particularly do not wish to give the impression that there is any one who disbelieves in witch-doctorhood. Most of my acquaintances believed that there are a few entirely reliable practitioners, but that the majority are quacks.'⁴⁴ He observed that 'faith and scepticism are alike traditional. Scepticism explains failures of witch-doctors, and being directed towards particular witch-doctors even tends to support faith in others.'⁴⁵ Similarly, although there is this major difference in the material that Thomas dealt with, that general scepticism about witchcraft was occasionally expressed in sixteenth- and seventeenth-century England,⁴⁶ Thomas too drew

⁴² Thomas 1971, p. 247, and cf. p. 401 on astrology.

⁴³ Ch. 1 para. 20 (G) (L VI 356.9ff).

⁴⁴ Evans-Pritchard 1937, p. 185.

⁴⁵ Evans-Pritchard 1937, p. 193.

⁴⁶ For example by Reginald Scot, in his *Discoverie of Witchcraft* (1584) 1964, on which see Thomas 1971, pp. 684f especially. Although Scot has a four-fold classification of witches, and admitted they existed in the sense that he admitted the reality of 'impostors, poisoners, scolds and deluded persons', the key point is that he denied that any of them had any supernatural power. Although Scot had some followers, Thomas went on to note (p. 685) that 'most members of the educated classes remained slow to accept the full implications of his thesis... Scot's position remained that of a self-conscious minority'. One may also compare J. Needham's account (1954-7, II Section 14, pp. 346ff) of the sceptical tradition in Chinese thought. There are some admittedly rather limited signs of critical and rationalistic attitudes towards divination in two third-century B.C. writers, Hsün Chihing (see Dubs 1927, pp. 68ff, and 1928, pp. 179ff) and Han Fei (see Liao 1939, e.g. pp. 156ff, and 1959, e.g. p. 308f), and a more general attack in Huan Tan (43 B.C.-A.D. 28). In Fragment 210 of Huan Tan (Pokora 1975, p. 239) we read: 'Today all the artful and foxy, magicians of small talent, as well as the soothsayers, disseminate and reproduce diagrams and documents, falsely praising the records of prognostication. By deception and misinformation, by greed and dishonesty,

attention to the way in which failures in the predictions of individual astrologers did nothing to undermine, and even confirmed, belief in astrology as a whole.

Everyone knew that some practitioners were better than others and that the profession was infested by charlatans and quacks... The paradox was that the mistakes of any one astrologer only served to buttress the status of the system as a whole, since the client's reaction was to turn to another practitioner to get better advice, while the astrologer himself went back over his calculations to see where he had slipped up.⁴⁷

What is important in the attack expressed by the author of *On the Sacred Disease* is that it is directed against *all* the purifiers, and against *any* idea that the sacred disease or any other disease is the result of divine intervention, indeed against any idea that ritual purifications can influence natural phenomena in any way. He writes:

If these people claim to know how to draw down the moon, cause an eclipse of the sun, make storms and fine weather, rain and drought, to make the sea too rough for sailing or the land infertile, and all the rest of their nonsense, then, whether they claim to be able to do it by rites or by some other knowledge or practice, they seem to be impious rogues.⁴⁸

The Hippocratic author here and elsewhere clearly has in view not just this or that practitioner, but such practitioners *as a whole*, not just this or that instance of the belief in divine intervention causing diseases or in the ability to influence natural phenomena by ritual practices, but, again, such beliefs *in general*.

The author of *On the Sacred Disease* is evidently confident enough to attack his opponents' underlying assumptions as such, and this

they lend the ruler astray. How can we fail to suppress and banish such things?' (cf. also Frt. 40, 58, 68, 157, Pokora 1975, pp. 31, 50f, 65, 156f). The position of Wang Chihung (A.D. 27-97) is particularly interesting: as both J. Needham 1954-7, II pp. 368ff, and Forke 1907, pp. 16ff, point out, many of his criticisms of 'teleology', of superstitions and of imaginary causal connections between things are strikingly similar to those that can be cited from Greco-Roman sources, especially Lucretius. While Wang Chihung did not reject omens and portents completely, he attacked not just particular groups of diviners, but also the general assumptions on which common methods of divination were based, as for example those using milfoil and tortoise shells in ch. 71 of his work *Lun Hing* (Forke 1907, ch. 14, pp. 182-90): 'As a matter of fact, diviners do not ask Heaven and Earth, nor have weeds or tortoise shells spiritual qualities.' Nevertheless 'when a lucky man cuts up a tortoise, he finds auspicious omens, whereas an unlucky one, grasping the milfoil, obtains contrary signs' - even though this is not Heaven replying to the diviner, but a matter of chance (cf. also Forke 1907, pp. 173ff). Similarly he rejects the idea that dead men become ghosts, but not that there are ghosts or phantoms - which he explains as being formed by the Yang fluid. 'Thus we hold that the dead do not become ghosts, are not conscious and cannot hurt people. Consequently, it is evident that the ghosts, which are seen, are not the vital force of dead men, and that, when men have been hurt, it cannot have been done through this vital force' (Forke 1907, p. 201, cf. pp. 239ff).

⁴⁷ Thomas 1971, p. 401. The argument that lack of skill was to blame for failures was common in antiquity, e.g. Cicero, *Div.* 1.52.118.

⁴⁸ Ch. 1 paras. 29f (G) (cf. L VI 358.19ff) and cf. ch. 1 para. 31 (G) (L VI 360.6ff).

immediately raises the question of what his own explanation of the sacred disease was. His account, which brings epilepsy under a general theory of diseases, is explicit, detailed and, in parts, surprising. 'The brain is responsible for this disease', he says, 'as it is for the other very severe diseases. I shall explain clearly the manner in which it comes about and the reason (πρόφορος) for it.'⁴⁹ There are 'veins'⁵⁰ leading up to the brain from all over the body, and he proceeds to give a quite complex account of these to which I shall return. These 'veins', he believes, normally carry air, air being responsible, in his view, for, among other things, sensation and consciousness.⁵¹ But if the air in the 'veins' remains still and is left behind in some part of the body, then that part becomes powerless.⁵² He goes on to describe a variety of other conditions that may arise when the air is obstructed by discharges, especially by phlegm, and then applies this general theory to epilepsy which he describes as follows: 'Should these routes for the passage of phlegm from the brain be blocked, the discharge enters the veins which I have described. This causes loss of voice, choking, foaming at the mouth, clenching of the teeth and convulsive movements of the hands; the eyes roll, the patient becomes unconscious and, in some cases, passes a stool.'⁵³ He then promises, and gives, an explanation of each of these symptoms in turn. Thus 'loss of voice', he says,

occurs when the phlegm suddenly descends in the veins and blocks them so that air can pass neither to the brain nor to the hollow veins nor to the body cavities, and thereby inhibits respiration. . . . Therefore, when the veins are shut off from this supply of air by the accumulation of phlegm and thus cannot afford it passage, the patient loses his voice and his wits.⁵⁴

This account is supported by remarks concerning the observed or supposed differences in the incidence of the sacred disease among different sections of the population. He suggests that the disease attacks the phlegmatic, but not the bilious.⁵⁵ He notes that older people are not killed by an attack of the disease,⁵⁶ but that the young

⁴⁹ Ch. 3 para. 1 (G) (L VI 366-5ff).

⁵⁰ I use the conventional translation for φάρες, though it should be understood that the vessels in question are imagined as carrying air and phlegm, for example, as well as blood.

⁵¹ The chief proponent of the view that air is responsible for intelligence was Diogenes of Apollonia (Fr. 4 and 5): cf. also Anaximenes Fr. 2.

⁵² Ch. 4 para. 2 (G) (L VI 368-5ff).

⁵³ Ch. 7 para. 1 (G) (L VI 372-4ff). This account was considered accurate enough to be paraphrased by Osler 1947, p. 136f., in his own description of Grand Mal, or major epilepsy.

⁵⁴ Ch. 7 paras. 3 and 7 (G) (L VI 372.10ff, 22f).

⁵⁵ E.g. ch. 5 para. 1 (G) (L VI 368.10f).

⁵⁶ E.g. ch. 9 para. 1 (G) (L VI 376.1-7f).

are particularly prone to it.⁵⁷ He maintains that 'the discharge of phlegm takes place more often on the right side of the body than on the left because the veins on that side are more numerous and of greater calibre than on the left',⁵⁸ and he states that 'attacks are most likely to occur when the wind is southerly; less when it is northerly, less still when it is in any other quarter'⁵⁹ arguing that the winds have a direct effect on the body, especially the brain.

Finally at the end of the work he puts forward a general aetiology of diseases:

This so-called 'sacred' disease is due to the same causes (προφάσεις) as all other diseases, to the things we see come and go [i.e. to and from the body], the cold and the sun too, the changing and inconsistent winds. . . . Each [disease] has its own nature (φύσις) and power (δύναμις) and there is nothing in any disease which is unintelligible or which is insusceptible to treatment. The majority of maladies may be cured by the same things as caused them. . . . A man with the knowledge of how to produce by means of a regimen dryness and moisture, cold and heat in the human body, could cure this disease too provided that he could distinguish the right moment for the application of the remedies. He would not need to resort to purifications (καθάρσις) and magic (μαγία)⁶⁰ and all that kind of charlatanism.⁶¹

As these quotations indicate, the writer exhibits an extraordinary self-assurance in the theories and explanations he advances not only about the causes and cures of epilepsy and other diseases, but also about the internal structures and functioning of the body. Yet many of those theories and explanations are quite fanciful. His account of respiration is that 'when a man draws in breath through the mouth and nose, the air passes first to the brain and then the greater part goes to the stomach, but some flows into the lungs and some to the veins. From these places it is dispensed throughout the rest of the body by means of the veins.'⁶²

His descriptions of the 'veins' themselves too is very largely imaginary. Like many other early Greek anatomists,⁶³ he speaks of two particularly important vessels, one connected with the liver and the other with the spleen, and some of what he says may be thought to reflect some knowledge of the main trunks of the inferior vena cava and the abdominal aorta. Describing the vein connected with the

⁵⁷ E.g. ch. 8 paras. 1f and ch. 10 para. 2 (G) (L VI 374.21ff and 378.12ff).

⁵⁸ Ch. 10 para. 1 (G) (L VI 378.10f).

⁵⁹ Ch. 13 para. 1 (G) (L VI 384.4ff).

⁶⁰ Litté reads μαγικόντων, Jones writing, for μαγίης (Grensemann).

⁶¹ Ch. 18 paras. 1ff (G) (L VI 394.9-395.9).

⁶² Ch. 7 para. 4 (G) (L VI 372.14ff).

⁶³ The notion of two vessels, one connecting the liver with the right arm, the other the spleen with the left, occurs in Diogenes of Apollonia Fr. 6 (Aristotle, HA 512a4ff, 9ff, 29ff) and Polybus (Aristotle, HA 512b32ff = *Nat. Hom.* ch. 11, L VI 80.1ff) and reappears in a modified form in Aristotle himself (HA 514a32ff, 93ff).

liver, he says:⁶⁴ 'one half runs down on the right side in relation with the kidney and the lumbar muscles, to reach the inside of the thigh and then continues to the foot. It is called the "hollow vein".'⁶⁵ But then he goes on:

The other half courses upwards through the right side of the diaphragm and the right lung; branches split off to the heart and to the right arm while the remainder passes up behind the clavicle on the right side of the neck and there lies subcutaneously so as to be visible. It disappears close to the ear and then divides; the thickest and largest and most capacious part finishes in the brain while smaller branches go separately to the right ear, the right eye and to the nostril.⁶⁶

Although the account of the lower part of the liver-vein may be thought to correspond, very roughly, to the inferior vena cava, this identification breaks down when we find the liver- and spleen-veins correlated with the right and left sides of the body respectively.⁶⁷ His picture of the vascular system – like that of many other Greek writers⁶⁸ – is strongly coloured by his expectations of general bilateral symmetry and by a firm conviction in the superiority of the right-hand side.⁶⁹ Thus on the spleen-vein he simply notes: 'It is similar to that coming from the liver, but is thinner and weaker.'⁷⁰

The boldness of his general pathology and therapeutics is equally striking. The idea that certain diseases are cured by what causes them, or by their opposites, is a common one in Greek medical writings. Here we find the principle generalised: 'The majority of maladies may be cured by the same things as caused them.'⁷¹ It is particularly remarkable that he should claim that there is no disease – not even epilepsy – that is not susceptible to treatment, and indeed by fairly simple means, to judge from his reference to the control of dryness, moisture, cold and heat by diet.⁷²

Although the description the writer gives of an epileptic attack is accurate enough as far as it goes, and so too are some of his remarks concerning the incidence of the disease,⁷³ most of the pathological,

⁶⁴ Ch. 3 para. 4 (G) (L vi 366.12ff).

⁶⁵ *kofn pley*, the regular term, in Greek anatomists, for the vena cava.

⁶⁶ Ch. 3 paras. 5–7 (G) (L vi 366.15ff).

⁶⁷ Note especially the reference to the right ear and the right eye, as well as the right arm, in the account of the connections of the liver-vein.

⁶⁸ See further below, pp. 157f.

⁶⁹ Cf. Lloyd 1966, pp. 48ff. and 1973.

⁷⁰ See ch. 3 para. 8 (G) (L vi 366.23ff).

⁷¹ Ch. 18 para. 3 (G) (L vi 394.15f), quoted above, p. 21.

⁷² Ch. 18 paras. 2 and 6 (G) (L vi 394.14f. 396.5ff.), quoted above, p. 21. He notes, however, that epilepsy may not be curable if it is firmly established (ch. 2 para. 3 (G) (L vi 364.12ff)).

⁷³ For example that the young are more prone to the disease than older people (see above, pp. 20f). Cf. Osler 1947, p. 1363: 'In a large proportion the disease begins shortly

anatomical and physiological theories are highly speculative and schematic, and this prompts one to ask how far he attempted to support his ideas by observation and research. Among the – fairly rare – occasions on which we find attempts made to collect and use empirical evidence, two are worth considering especially. First, when he speaks about the role of the winds in the disease, he suggests that the effects of the south wind in particular on the fluids in the body can be inferred from the changes it brings about on things outside the body. 'Jars in the house or in the cellars which contain wine or any other liquid are influenced by the south wind and change their appearance.'⁷⁴ Although it is not clear precisely what change the writer had remarked or had in mind,⁷⁵ he was evidently *attempting* to point to observable data outside the body in order to establish or support conclusions about what happens inside it.⁷⁶

The second passage is more striking. In this the writer sets out to justify his suggestion that the sacred disease is due to the brain being flooded with phlegm especially when the wind is southerly. It is particularly hard to cure then since 'the brain has become more moist than normal and is flooded with phlegm. This renders discharges more frequent. The phlegm can no longer be completely separated out; neither can the brain, which remains wet and soaked, be dried up.'⁷⁷ But then the writer goes on:

This observation results especially from a study of animals, particularly of goats which are liable to this disease. Indeed, they are peculiarly susceptible to it. *If you cut open the head* to look at it, you will find that the brain is wet, full of fluid and foul-smelling, convincing proof that disease and not the deity is harming the body.⁷⁸

It is clear from this passage that the idea of carrying out a post-mortem examination on an animal had occurred to this writer, and this is quite exceptional not only for the period at which the treatise was composed, but for any period in antiquity, since post-mortem investigation to establish the cause of death or to throw light on the aetiology of diseases never became a *regular* procedure in the ancient

before puberty. It is well always to be suspicious of "epilepsy" beginning in adult life, for in a majority of such cases the disease is not epilepsy.'

⁷⁴ Ch. 13 para. 8 (G) (L vi 384.22ff).

⁷⁵ The writer seems to have in mind not so much a change in the shape of the jars (as some translations imply) as in their appearance or – more plausibly – in that of the liquids they contain.

⁷⁶ Cf. Anaxagoras' dictum *ὄψις τῶν ἀφίλων τῶν φανόμενα*, 'things that are apparent are the vision of things that are unclear' (Fr. 21a), on which see below, p. 134.

⁷⁷ Ch. 11 para. 2 (G) (L vi 382.2ff).

⁷⁸ Ch. 11 paras. 3–5 (G) (L vi 382.6ff).

world.⁷⁹ It is, to be sure, not certain that the writer of *On the Sacred Disease* actually carried out the inspection he suggests: if he did not, that would not be the first nor the last time that a test that could be conducted in practice was treated by an ancient writer as a hypothetical exercise – a thought experiment. But if we assume, as perhaps we may, that he did do the test he describes, the result is as interesting for what is omitted as for what is included. The statement that ‘the brain is wet, full of fluid and foul-smelling’ does indeed help to achieve what the writer wanted, namely to establish that the ‘sacred disease’ is the result of natural causes: ‘disease, and not the deity, is harming the body’. At the same time we may remark that it apparently did *not* occur to the writer to check the description of the veins leading to the brain which he had set out in explaining the origin of the disease.⁸⁰ Yet much of what he presents by way of what we should call anatomical theories could have been verified by observation. Although the possibility of direct inspection, using dissection, is mentioned in this one context, at least, *in fact* the writer evidently tested very few, if any, of his general anatomical doctrines by this method.

These texts certainly show that this writer occasionally thought to support his theories by appealing not just to what could easily be observed, but to the results of deliberate research. But they also illustrate just how limited the research in question was. Many of his doctrines are not so supported at all. Furthermore many could have been disproved, or at least seriously undermined, by the use of quite simple techniques of investigation, including techniques (such as post-mortem dissection) that the writer himself refers to.

But while his attempts to provide empirical backing for his own ideas are often feeble and abortive, the deploying of critical and destructive arguments to defeat his opponents is clearly one of his strengths. As we have remarked, he uses a wide variety of arguments

against the ‘magés’ and ‘purifiers’, and some of these are particularly interesting when considered as techniques of refutation. At one point, for instance, he mentions that the purifiers prohibit the eating of goat meat, the wearing of goat skins and the use of goat skin blankets. ‘I suppose’, he says, ‘that none of the inhabitants of the interior of Libya can possibly be healthy seeing that they use goat skins and eat goat meat. In fact, they possess neither blanket, garment nor shoe that is not made of goat skin, because goats are the only animals they keep.’⁸¹ If we supply what the writer merely leaves implicit here, we have an argument of the form that later came to be known as Modus Tollens⁸² (‘If *A*, then *B*; but not *B*; therefore not *A*’). If goat skins are responsible, then the Libyans would be expected to suffer especially from the disease; but that is not the case; so goat skins cannot be held to be responsible.

A second instance of a similar type of argument occurs when he adopts as one of his premises the supposed distinction in the incidence of the disease among the phlegmatic and the bilious. ‘Another important proof that this disease is no more divine than any other lies in the fact that the phlegmatic are constitutionally liable to it while the bilious escape. Yet if its origin were divine, all types would be affected alike without this particular distinction.’⁸³ Again the implied argument is a Modus Tollens: if the disease is divine, it should attack all equally; but it does not do so; so the disease is no more divine than any other.

Although Modus Tollens as such is not stated in general terms until Aristotle,⁸⁴ and not formally analysed until the Stoics in the early Hellenistic period,⁸⁵ we find plenty of examples of the use of arguments of that general type in the philosophers and medical writers – and indeed in other authors – before Plato. Here then is one powerful technique of refutation, the development of which we shall consider in detail later.⁸⁶ We may observe here, however, that in both the examples we have taken from *On the Sacred Disease* the writer presupposes what is at issue between him and his opponents,

⁷⁹ Herodotus (iv 58) says that the grass in Scythia is very ‘bilious’ may be judged by opening the bodies of the cattle (though he does not describe this further). Otherwise our evidence is late. The nearest ancient parallel to the text in *Med. Sacr.* is, perhaps, the story in Plutarch (which may well be apocryphal) that Anaxagoras had the head of a one-horned ram opened in order to demonstrate that its deformity was due to natural causes (*Pericles* ch. 6). As regards post-mortem dissection of men, this seems to be implied by Pliny (*Nat.* xix 26,86) when, in mentioning that radish juice is a specific for certain diseases of the internal organs, he says that the kings in Egypt had the bodies of the dead dissected (he does not specify whether men or animals, but the former seems more likely in the context). Yet if carried out at all, such a procedure was clearly not a regular one. On the early history of dissection, see further below, pp. 156ff.

⁸⁰ See above, pp. 21f, on ch. 3 paras. 3–8 (G) (L vi 366, 10ff.).

⁸¹ Ch. 1 para. 22 (G) (L vi 366, 15ff.). The writer continues (para. 23) with a second argument based on his opponents’ premises: see below, p. 55.

⁸² Now more often called *Denying the Consequent*.

⁸³ Ch. 2 paras. 6–7 (G) (L vi 364, 20ff.).

⁸⁴ Thus in the context of showing that it is not possible to draw false conclusions validly from true premises, Aristotle states that ‘If, when *A* is, it is necessary that *B* is, then, when *B* is not, it is necessary for *A* not to be’ (*APr.* 53b 11ff.).

⁸⁵ The schema of the second of the Stoics’ elementary arguments is: ‘If the first, then the second; but not the second; and so not the first.’ See, for example, Sextus, *M.* viii 227, cf. 225, and for discussion, see Mates 1961, pp. 70ff, Frede 1974, pp. 127ff, 148ff.

⁸⁶ See below, ch. 2.

namely the doctrine of the uniformity of nature, the regularity of natural causes and effects. If a factor is to be held to be a cause or contributory agent in bringing about a disease, then the action of that factor must be supposed to be uniform. If wearing goat skins is relevant, then this must be so whenever and wherever that is done. Indeed the gods too (whom his opponents invoke) are assumed by the Hippocratic author to be uniform in their behaviour: he takes it for granted that they would not discriminate between the phlegmatic and the bilious.

The two interrelated concepts of nature, φύσις,⁸⁷ and cause, to express which he uses such terms as αἰτία, αἰτίος and πρόφορος,⁸⁸ provide the key to the writer's own position. 'Nature', for him, implies a regularity of cause and effect. Diseases, like everything else that is natural, have determinate causes and this rules out the idea of their being subject to divine ('supernatural') intervention or influence of any sort. Interestingly enough, however, the writer of *On the Sacred Disease* does not exclude the use of the notion of the 'divine' altogether. Indeed his view is not that no disease is divine, but that all are: all are divine and all natural.⁸⁹ For him, the whole of nature is divine,⁹⁰ but that idea does not imply or allow any exceptions to the rule that natural effects are the result of natural causes.

This suggests that what we are dealing with has some of the features of a paradigm switch: the author and his opponents disagree fundamentally on what sort of account to give of the 'sacred disease', that is on what would count as an 'explanation' or 'cause' of this and other phenomena. Unlike the Zande sceptics described by Evans-Pritchard, the Hippocratic writer rejects the notion of supernatural

⁸⁷ Ch. 1 para. 2, ch. 2 paras. 1, 2, 6, ch. 11 para. 2, ch. 13 paras. 9, 10, ch. 14 paras. 5, 6, ch. 17 para. 4, ch. 18 para. 2 (C) (L VI 352.2f, 364.10f, 366.1, 382.3, 386.4, 388.4-7, 392.11f, 394.14). Cf. Holwerda 1955.

⁸⁸ αἰτία, αἰτίος ch. 1 paras. 20, 21, 23, 32, 33, 34, 37, 43, ch. 3 para. 1, ch. 17 paras. 5, 6, 8 (C) (L VI 356.13, 15, 368.3, 10, 369.12, 15, 16, 362.3, 16, 366.5, 392.13, 17, 394.2), πρόφορος ch. 1 paras. 2, 7, 20, ch. 2 para. 2, ch. 3 para. 1, ch. 10 paras. 4, 7, ch. 15 para. 2, ch. 18 para. 1 (C) (L VI 352.4, 354.5, 356.10, 13, 364.10f, 366.7, 378.18, 380.8, 388.10f, 394.9f). See especially the studies of Deichgräber 1933c, Weidauer 1954, pp. 8ff, 32ff, Norenberg 1968, pp. 49ff, 61ff, Rawlings 1975, pp. 36-55, and cf. further below, p. 54 n. 23f.

⁸⁹ As he puts it in the final chapter, for example: 'This so-called "sacred" disease is due to the same causes as all other diseases, to the things we see come and go, the cold and the sun too, the changing and inconstant winds. These things are divine so that there is no need to regard this disease as more divine than any other; all are alike divine and all human. Each has its own nature and power and there is nothing in any disease which is unimitable or which is insusceptible to treatment' (ch. 18 paras. 1-2 (C) (L VI 394.9ff). Cf. H. W. Miller 1953, Kudlien 1967, p. 58, Norenberg 1968, pp. 68ff, Ducatillon 1977, pp. 159ff.

⁹⁰ One may compare the evidence, noted above, p. 11 n. 9, that some philosophers too held that that from which the world originates is divine.

intervention in natural phenomena as a whole, as what might even be called a category mistake. Even when we have to deal with the divine, the divine is in no sense supernatural. We have, however, seen that, although appeals to observation and research are made, the empirical support for his own theories and explanations is often weak, and indeed many of his ideas could have been undermined by quite simple tests. Again, although he deploys a range of techniques of refutation to good effect, the key notion of the uniformity of nature is an assumption, not a proposition for which he explicitly argues.

On the Sacred Disease provides a full and in general clear statement of a controversy concerning the origin and treatment of the sacred disease as seen from the Hippocratic writer's side. But we must now place this work in the wider context of debate in which it was composed. First there are other texts that afford further illustrations of the criticism of the belief in the supernatural intervention in diseases. At the same time that belief continued to be maintained in different forms by a variety of writers in the fifth and fourth, not to mention subsequent, centuries. The development of the notions of nature and of cause, and the survival of certain traditional beliefs, present, as we shall see, a complex set of interrelated issues. Our task now is to set out the chief evidence from both philosophy and medicine that will help to define the interaction of criticism and popular assumptions.

The closest parallel to what we find in *On the Sacred Disease* comes in the treatise *On Airs Waters Places*, another work of the late fifth or early fourth century,⁹¹ which expresses such similar views to those in *On the Sacred Disease* on certain topics that it has sometimes been thought to have been by the same author.⁹² In

⁹¹ No precise date can be assigned to *Air.* (which may, in any case, not be a unity, see below, n. 92) any more than to *Morb. Sacr.* There are possible echoes of views of Diogenes of Apollonia in the account of evaporation in ch. 8 (cf. DK 64A 17), and it has been thought that ch. 22 echoes Euripides, *Hippolytus* 7f (which would give a date for that chapter after 428) although the sentiment expressed - that the gods are pleased by the honours they receive from men - is a commonplace. There are many similarities between *Air.* and *Morb. Sacr.*, although there is no agreement as to which treatise was written first (for *Air.* being the earlier, see, for example, Heinmann 1945, p. 209; for *Morb. Sacr.* being the earlier, see, for example, H. Diller 1934, p. 100, Pohlenz 1938, p. 35). It seems reasonable to suppose, however, that both were composed within about 20 years of the turn of the fifth and the fourth centuries.

⁹² See, for example, Wiliamowitz 1901, pp. 16ff, H. Diller 1934, pp. 94ff (for identity of authorship of *Morb. Sacr.* and *Air.* chh. 1-11), and cf. Grensemann 1968, pp. 7-18. But contrast W. H. S. Jones 1923-31, II pp. 131f, Edelstein 1931, p. 181 n. 1, Heinmann 1945, pp. 181ff. Yet whether *Air.* as a whole, as we have it, was composed by the same man is itself not certain. That the treatise falls into two main halves (chh. 1-11 and chh. 12-24) has been generally recognised at least since Friedrich 1899, p. 32 n. 2. Although Deichgräber 1933a, pp. 112ff, Pohlenz 1938, pp. 3ff, 31ff, and Heinmann

ch. 220³ the writer discusses the impotence that affects certain Scythians, the so-called Anariëis. 'The Scythians themselves', he says, 'attribute this to a divine visitation and hold such men in awe and reverence, because they fear for themselves.' His own view on the general issue is identical with that put forward in *On the Sacred Disease*: he believes that all diseases are divine, but equally all are natural. As he puts it: 'Each disease has a natural cause (φύσις) and nothing happens without a natural cause.' He goes on to offer his own view of the cause of the Anariëis' condition. Horse-riding, he suggests, leads to varicose veins, which the Scythians then treat by cutting the vein that runs behind each ear. It is this treatment, he claims, that causes impotence: 'My own opinion is that such treatment destroys the semen owing to the existence of veins behind the ears which, if cut, cause impotence and it seems to me that these are the veins they divide.' As with *On the Sacred Disease*, we may remark the quite speculative nature of the anatomical theory implied (the idea of a vein linking the ears and the seminal vessels). And as in that treatise, so too this writer refutes the idea of divine intervention by an implied Modus Tollens argument. He states that the rich Scythians suffer more from the condition than the poor – since the poor ride less than the rich – and he proceeds: 'Yet, surely, if this disease is more to be considered a divine visitation than any other, it ought to affect not the most noble and richest of the Scythians only, but everyone equally.'⁹⁴

A third Hippocratic treatise that adopts a similarly naturalistic attitude towards particularly frightening conditions is *On the Diseases of Young Girls*.⁹⁵ This provides a brief account of the sacred disease, of apoplexies and of 'terrors' in which patients believe they see evil *Bolivoes*. Young women who do not marry when of the age to do so are, the writer says, particularly liable to such complaints, which he explains as due to a retention of blood. He remarks that when they

1945, pp. 170ff, have argued that the two main parts are by the same man, that view has been contested: see, for instance, Edelstein 1931, pp. 57ff, and H. Diller 1934, pp. 89ff (but cf. H. Diller 1942, pp. 65ff).

⁹⁴ *CMG* I, 1 74.10–75.25. My translations are again based on those of Chadwick and Mann 1978.

⁹⁵ *CMG* I, 1 75.5ff. The writer goes on, however, to consider the possibility that the gods may not behave uniformly in respect of the rich and the poor. If there is any truth in the belief that the gods take pleasure in sacrifices, one would expect the poor to be more liable to this condition, not less (as the writer claims is in fact the case because the poor do not ride). 'Surely it is the poor rather than the rich who should be punished.' But he then proceeds: 'Really, of course, this disease is no more of "divine" origin than any other. All diseases have a natural origin and this peculiar malady of the Scythians is no exception' (*CMG* I, 1 75.13–17).

⁹⁶ L. viii 466–470.

recover, women are often deceived by diviners (δύτιες) into dedicating costly garments to Artemis, although their recovery is to be attributed – he claims – merely to the evacuation of blood, and his own recommendation for treatment in such cases is that the girls should marry as soon as possible.⁹⁶

THE PERSISTENCE OF TRADITIONAL BELIEFS: HERODOTUS

Yet whilst in certain medical circles, at least,⁹⁷ the belief in the possibility of supernatural intervention in diseases and in the efficacy of spells and purifications was vigorously attacked, such beliefs not only persisted widely among ordinary people in the fifth and fourth centuries,⁹⁸ but can be found in leading writers some of whom are generally claimed as representatives, if not of the 'enlightenment', at least of the more advanced thought of their period. The evidence in Herodotus is particularly suggestive. On the one hand his work includes not only much natural history (topography, descriptions of flora and fauna), but also attempted explanations of such problematic phenomena as the flooding of the Nile (ii 20ff), explanations that are directly comparable with those attributed to the Presocratic philo-

⁹⁶ L. viii 468, 17ff.

⁹⁷ But not in all: cf. below, pp. 40ff.

⁹⁸ Such beliefs can be attested from Homer and Hesiod (e.g. *Il.* 1 43–52, *Od.* v 395f, *ix* 411, *xx* 455ff, Hesiod, *Op.* 240–5, cf. 102ff) to late antiquity (as we can see from, for example, Plutarch, *De Superstitiis* 168b, Galen, *CMG* v, 9, 2 205, 28ff = *K* xviii a 17, 9ff, Ptolemy, *Enneads* ii 9.14, Porphyry, *De Abstinētia* ii 40, as well as from a mass of magical papyri). In the period that particularly concerns us, the fifth and fourth centuries B.C., such texts as Pindar, *P.* iii 51ff, Aeschylus, *A.* 1019ff, *Eg.* 69ff, Sophocles, *Aj.* 381f, *Tr.* 1235f, Aristotle, *HA* 605a, 4ff, are evidence of popular beliefs in supernatural interventions in diseases and in the power of spells, whilst pseudo-Demosthenes, *Against Aristogeiton* xxv 79–80 (with Plutarch, *Demosthenes* ch. 14) implies that the practice of magic could be the subject of legal action. Plato took those who claimed to have special magical powers and to be able to control the gods by sacrifices and spells sufficiently seriously to issue a warning against their evil influences in the *Republic* 644b ff and to legislate against them in the *Laws* 909a–d, 933a ff (the latter passage notes how difficult it is to get to the truth of the matter in such cases). At *Phdr.* 244d–245a Socrates, referring to the second kind of 'divine madness', speaks of maladies that afflict certain families because of ancient sins, and says that relief may be procured from these by means of worship involving rites and purifications (cf. also *Chrm.* 155c ff, *Smp.* 202c–203a, *R.* 426b, *Tim.* 149cd and *Pli.* 280c among other Platonic texts). To this literary evidence may be added the mainly epigraphical data concerning the continued belief in god- or hero-healers, Apollo, Paean, Hygieia, and a variety of local heroes (see, for example, Kutsch 1913), whilst the cult of Asclepius himself grew in importance and spread during the latter part of the fifth, and in the fourth, century (see, for example, Herzog 1931, Edelstein and Edelstein 1945 and cf. further below, pp. 40f). The whole topic of such popular beliefs has been extensively discussed and documented: see especially Helm 1893, Tamborino 1909, Weinreich 1909, Wächter 1910, Deubner 1910, Stemplinger 1922 and 1925, Halliday 1936, Edelstein (1937) 1967, pp. 205ff, Dodds 1951, Moulhater 1952, Lanata 1967, Kudlien 1968.

sophers.⁹⁹ In his descriptions of the habits of the crocodile (ii 68) and of the form of the hippopotamus (ii 71) Herodotus employs the term φύσις – 'nature', 'character' or 'growth' – much as it is used in connection with the philosophers' 'inquiry into nature' (πρὸς φύσεως ἰστορία) or in the Hippocratic Corpus.¹⁰⁰ Moreover in reporting beliefs and stories that invoke the marvellous or the supernatural he often records his own doubts or frank disbelief.¹⁰¹

On the other hand there are other passages where he voices no such doubts,¹⁰² and on several occasions he himself endorses the idea that misfortunes of many kinds, including diseases, may be the result of divine displeasure. Thus in discussing Cleomenes' madness and suicide he first recounts three views all of which associated Cleomenes' fate with some offence against the gods (vi 75). Most Greeks said that his misfortunes occurred because he suborned the Pythian priestess to give judgement that Demaratus was not the son of Ariston; the Athenians, however, said it was because he invaded the precinct of the gods at Eleusis, whilst the Argives held that it was because he desecrated the temple of Argus. He later notes (vi 84) that the Spartans said that 'heaven had no hand in Cleomenes' madness' – ἐκ βασιλευίου μὲν οὐβενός μνηστῆρα Κλεομένηα – which came about rather because he had consorted with Scythians and become a drinker of neat wine – but Herodotus concludes his account by endorsing what he had represented as the general view, namely that Cleomenes paid the penalty for what he had done to Demaratus.¹⁰³ Again after describing the death of Phereclime following a disease in

which her body became infested with worms, Herodotus comments: 'thus, it would seem, over-violent human vengeance is hated by the gods'.¹⁰⁴ Finally a text in which he mentions the Scythian Enareis (no doubt the same group as that called Anareis in *On Airs Waters Places* ch. 22) enables a direct comparison to be made between him and the Hippocratic author. Whereas *On Airs Waters Places* directly refutes the idea that the impotence of the Anareis is caused by a god,¹⁰⁵ Herodotus reports that it was the men who pillaged the temple of Heavenly Aphrodite at Ascalon – they and their descendants – who were afflicted by the goddess with the 'female sickness'. He makes it clear that he had this story from the Scythians themselves, but there is no hint of his doubting or rejecting it (i 105).

The evidence in Herodotus shows that it was perfectly possible to combine engaging in inquiries concerning the 'nature' of various phenomena with adherence to such beliefs as that diseases could be brought about by the gods. Such a belief was not threatened by an interest in – even by quite sustained research into – the character of particular phenomena, only by the generalisation that *all* such phenomena have natural causes. What counted was not just any notion of the nature or character of particular things – the term φύσις itself was already used, after all, in a passage in the *Odyssey* where Hermes indicates the 'nature' of a plant to Odysseus¹⁰⁶ – but rather the application of that notion in the form of a *universal* rule, that every physical object has a nature, that is, it manifests, or conforms to, certain regularities and has a determinate physical cause or causes. Nature may be thought of as itself divine, as in *On the Sacred Disease*.¹⁰⁷ But once it was believed that natural phenomena form a set every member of which has determinate physical causes, then it was no longer enough to cite a god or supernatural being as responsible for events (either for a specific occurrence of a phenomenon, or even for a group of phenomena such as a type of disease). The notion of divine intervention had, then, either to be abandoned or to be redefined: if maintained, it had now to be seen either as the suspension of nature

⁹⁹ See Aelius iv 1.1ff and the other testimonies collected at DK ii v 1 (37) (Thales), 35 A 1 (Thrasylakes), 41 A 11 (Ornoides), 59 A 91 (Anaxagoras) and 64 A 18 (Diogenes of Apollonia).

¹⁰⁰ See Holwerda 1955, pp. 18 and 64, and cf. Heidel 1909–10, Deichgräber 1939, Heinmann 1945.

¹⁰¹ Thus he reserves judgement, for example, about the story of Salmoxis (iv 94–6), about whether the Athenians were right to claim that it was in response to their prayers that the North Wind struck the Persian fleet (vii 189), and about whether the Magi were responsible for the wind's abating (vii 191); he rejects, for instance, Egyptian fables about the phoenix (ii 73), stories about men with goat's feet and men who sleep six months of the year (iv 25), and Scythian tales about were-wolves (iv 105).

¹⁰² Thus at i 167 he records that men and animals from Agylla became crippled and pained when they passed the place where the Agyllaicans had stoned certain Phocaean to death; at vi 98 he says that an earthquake on Delos was sent by god as a portent of the evils to come and at vii 129 he endorses, but rationalises, the Thessalian story that the vale of Tempe was caused by Poseidon, a reasonable belief because Poseidon is the earthshaker and it was an earthquake that caused the rift in the mountains. Cf. also i 19ff, 138, 174, ii 111, vi 27, vii 133 and ix 100.

¹⁰³ Cf. also iii 33, where he says that Cambyses became mad either because of the Egyptian god Apis (whose sacred calf Cambyses had killed) or because Cambyses suffered from the sacred disease. It is clear that Herodotus here treats the sacred disease primarily as a condition of the body, though one that can affect the mind also.

¹⁰⁴ ὅς τις ἀφαισῆται ἀπὸ τοῦ σώματος τῆς ἀφροδισίας γυναικῆς (iv 205). The excessive revenge that Phereclime had exacted on the people of Barce is described at iv 202.

¹⁰⁵ Cf. above, p. 28.

¹⁰⁶ *Od.* x 302ff: Odysseus says that Hermes offered him a 'drug' (φαρμακόν) 'pulling it from the earth, and he showed me its nature (καὶ μοὶ φέτωσ' αἰστροῦ βλάβη): it had a black root, but a flower like milk; the gods call it "moly", but it is difficult for mortal men, at least, to dig up'. φέτωσ, interpreted by Holwerda 1955, p. 63, as 'appearance' here, may also have some of the other primary sense of 'growth', the natural form being thought of as the result of growth.

¹⁰⁷ Cf. above, p. 26 on *Morb. Sacr.* ch. 18, p. 28 on *Air.* ch. 22 and p. 11 n. 9 on the evidence for the Milesian philosophers.

(that is, in later terminology, a miracle) or as in addition to it (when the event would be 'doubly determined', brought about both by gods and by natural causes, the former working through the latter).¹⁰⁸

THE PHILOSOPHICAL BACKGROUND

Now the origins of the idea that *all* natural phenomena are law-like are, fairly evidently, to be sought not in the medical writers themselves, so much as in the Presocratic philosophers, particularly in the group whom Aristotle calls the φυσιολόγοι, 'the inquirers into nature'. That some such general principle had been explicitly formulated by the time we come to the end of the Presocratic period can be affirmed on the basis of Leucippus Fr. 2, which states that 'Nothing comes to be at random, but everything for a reason and by necessity'.¹⁰⁹ The question is, rather, how much earlier a similar principle was expressed or at least used, and here the lack of original texts for most of the earlier Presocratics proves a serious handicap.

As we noted at the outset (p. 11) our secondary sources ascribe to Thales, Anaximander and Anaximenes a number of theories and explanations concerning a variety of what we should call natural phenomena. What our sources report generally takes the form of a naturalistic account,¹¹⁰ one that refers the phenomenon to be explained to a determinate physical cause, and one in which personal deities play no role. Moreover a high proportion of the theories and explanations recorded relate to phenomena such as lightning and thunder, earthquakes or eclipses, that were either terrifying or rare or both and that had often, in mythology, been associated with gods. We cannot know how far that predominance reflects the particular interests of our doxographic sources,¹¹¹ rather than those of the

¹⁰⁸ There is, to be sure, an element of 'double determination' (the combination of a 'natural' and a divine cause) in the account of Pherecydes' death in Herodotus IV 205, though it is absent, for instance, from the story about the Scythian Enareta, where divine displeasure alone is mentioned (I 105). What must remain in some doubt is the extent to which Herodotus saw nature as a universal principle, and *all* natural phenomena as law-like.

¹⁰⁹ οὐδὲν ἄρτιον ἄνευ λόγου, ἀλλὰ πάντα τὰ λόγου τὸ ἀέθρον. Our source for this, Aetius, is, admittedly, late: nor can we say with confidence just how strictly Leucippus intended the principle to be applied, although the double formulation, both negative and positive ('nothing...') may, if original, suggest at least an attempt at emphasis.

¹¹⁰ E.g. the theory of lightning and thunder ascribed to Anaximander by Aetius (in 3.1, DK 12A23), namely that these phenomena happen when wind, enclosed in a dense cloud, bursts out violently. Even the speculative cosmogony attributed to Anaximander in pseudo-Plutarch, *Strom.* 2 (A 10) takes a similar, naturalistic, form.

¹¹¹ There is a whole literature devoted to problematic or marvellous phenomena stretching from the fourth (if not the fifth) century B.C. to late antiquity. Already

Milesians themselves, but at least we may presume that they paid considerable attention to marvellous phenomena. Furthermore our sole surviving fragment of Anaximander is generally and surely rightly interpreted as conveying an idea of the world-order through the legal metaphors of justice and reparation for wrong-doing,¹¹² and if that is correct, then it may be that he had some conception of natural phenomena as a totality as subject to determinate physical causes.¹¹³ Nevertheless we must recognise that this is far from certain. What would help to remove doubt would be an explicit statement either like that of Leucippus Fr. 2 or – clearer still – like some Hippocratic formulations, as when the writer of *On Airs Waters Places* puts it, in connection with diseases, that 'each has a nature and nothing happens without a natural cause',¹¹⁴ or the author of *On the Art* writes: 'indeed, upon examination, the reality of the spontaneous (τὸ ἀσχητόν) disappears. Everything that happens will be found to have some cause, and if it has a cause, the spontaneous can be no more than an empty name.'¹¹⁵ But no such assertion is to be found in our extant evidence for the Milesians.¹¹⁶

Moreover when we turn to the work of some of the later Presocratics for whom our information is both fuller and more reliable, we find further evidence¹¹⁷ of the dangers of assuming that engagement in the inquiry into nature was necessarily accompanied by a sceptical attitude towards traditional beliefs in, for example, the possibility of wonder-working. Empedocles¹¹⁸ illustrates the point

Herodotus pays particular attention to striking natural phenomena, and Aristotle devoted a treatise to problematic phenomena of many different kinds (though the *Problema* that passes by his name is not authentic).

¹¹² Βιβλὸν ὕψος ἀνὰ στήν καὶ τὴν ἀνάφαιτον τῆς δίκης κατὰ τὴν τοῦ γέροντος τάξιν (DK 12 B 1). 'For they pay the penalty and recompense to one another for their injustice according to the assessment of time.' On the differing interpretations of this fragment, see, for example, Kahn 1960, pp. 166ff, Guthrie 1962, pp. 76–83, Classen 1970, col. 56ff.

¹¹³ Thereafter 'necessity' and 'justice' are used to express the law-like behaviour of the cosmos in, for example, Heraclitus (Fr. 94: though for him 'justice' is 'strife', Fr. 80) and Parmenides' *Way of Seeming* (Fr. 10.6f). The importance of the notion of 'necessity' in particular in conveying the orderliness of nature was especially stressed by Cornford 1924, chh. 1 and 2, who saw the idea as having pre-philosophical origins. It should, however, be noted that general references to a principle of necessity are not equivalent to a statement of a universal rule to the effect that *all* phenomena have natural causes.

¹¹⁴ Ch. 29, *CMG* 1, 1 74–17, cf. also 75–16.

¹¹⁵ Ch. 6, *CMG* 1, 1 13.1–4.

¹¹⁶ Neither in the meagre citations, nor indeed in the secondary comments of our ancient sources.

¹¹⁷ In addition to that from Herodotus, considered above, pp. 29ff.

¹¹⁸ Admittedly Empedocles belongs to the West Greek philosophical tradition and the influences both of Pythagoreanism and of the doctrines of Parmenides are clear from his fragments. But though there are obvious broad distinctions between this and the Ionian tradition represented by the Milesians, Anaxagoras and the atomists, for example, the question at issue here is on a point where Empedocles shares an interest

dramatically. His place in the history of physical theory is assured. After Parmenides had denied the possibility of change and rejected the senses as unreliable, Empedocles reinstated sense-perception and interpreted coming-to-be in terms of the mixing and separating of the four 'roots', earth, water, air and fire. With this doctrine of 'roots' Empedocles was responsible for the first clear statement of the idea of an element in the sense of the simple substances into which other things can be analysed, and the particular four-element theory he put forward was to prove, in one version or another, the most influential physical theory not only in antiquity but through the Middle Ages and right down to the seventeenth century. Yet apart from the work *On Nature*¹¹⁹ Empedocles wrote another poem called the *Purifications*, *Καθάρσις*, which was concerned with the downfall, wanderings and eventual redemption of the *Σκιρῶν*. In Fr. 112 (which is reported to have come at the beginning of the poem) he speaks of himself as coming to the people of Acragas as 'an immortal god, no longer mortal', and he describes how they throng to him 'asking where the way towards gain lies, some desiring oracles, others seeking to hear the word of healing for every kind of disease'. Whether this 'word of healing' consisted of the sort of advice we find in such Hippocratic works as *On Regimen* and *On Affections*, or whether it was a matter simply of spells or charms – *ἐπιβάσεις* – is not clear from the text, but the fact that the term for 'word' is *βῆσις* – used of the pronouncements of oracles in particular – suggests that the latter is more likely. Nor, it seems, is it only in the *Purifications* that such claims are made. In another fragment (111) which appears to belong to the poem *On Nature*¹²⁰ he promises to teach *φάρμακα* ('drugs', or perhaps more generally 'remedies'¹²¹) that are a defence for ills and old age, and he states that his listener will be able to control the winds and rain and drought, and even will bring the dead back to life.

The relationship between the poem *On Nature* and the *Purifications* – with the Ionians and a direct comparison is possible between him and them, namely on how the 'inquiry concerning nature' was viewed.¹²²

¹¹⁹ *Τετλι φῶτες*. This title was attached rather indiscriminately (as Kirk and Raven put it) to works by early philosophers (including Anaximander, Xenophanes and Heraclitus), but we have no good grounds to doubt its applicability to Empedocles' physical poem. A text in *VAM* ch. 20, *CMG* 1, 1 51.10f, already implies, if genuine (though cf. Dübke 1963, pp. 145ff), that Empedocles wrote *τετλι φῶτες* (whether or not that was the actual title of his work) and his physical poem is referred to as *τὸ φῶτόν* by both Aristotle (*Meta.* 382a1) and Simplicius (*In Ph.* 157.27, 300.20, 381.29; he speaks of the work in two books).

¹²⁰ *On Nature* is addressed to Pausanias (Fr. 1), the *Purifications* to the Acragantines (Fr. 112). Since the addressee of Fr. 111 is singular, there is at least a prima facie presumption that that fragment belongs to the work *On Nature*.

¹²¹ On the range of meaning of the term, see below, p. 44.

and more generally that between 'science' and 'religion' in the thought of Empedocles – are among the most controversial topics in the interpretation of Presocratic philosophy.¹²² But in any case no simple hypothesis – for example that he had abandoned the views and interests of the one work when he came to compose the other – will meet the point that he appears to make claims as a wonder-worker in both poems. As to how Empedocles himself saw the relationship between those claims and his investigations into natural phenomena, we have no direct evidence, and in particular the exact status of the marvellous effects he refers to is not clear. It is certain that they are not thought of as produced at the whim of personal divine agencies like the Olympian gods. Rather they are brought about by the man with special knowledge. But the question that remains unresolved is whether Empedocles held that the wise man's knowledge enables him to *suspend* natural laws (to perform miracles), or whether the wise man merely exploits the *hidden* powers of nature to produce effects that are contrary to nature not in the sense of the supernatural, but only in the sense of the extra-ordinary.¹²³ Considerations might be suggested in favour of each of these views, and in the final analysis it may be that – whether deliberately or not¹²⁴ – Empedocles himself was ambivalent on the issue. On the one hand the poem *On Nature* was clearly largely devoted to how things are and how they come to be:¹²⁵ it included accounts of the material constitutions of compound substances and went into such problems as the processes of vision and respiration in some detail.¹²⁶ On the other hand the extravagant character of the claims he made in Fr. 111 and 112 – and the language he made them in – immediately tend to align Empedocles with other wonder-workers.¹²⁷

If the Milesians may be said to have initiated the inquiry into natural phenomena as a more or less systematic investigation, the

¹²² For a survey of the views that have been put forward on this topic, see, for example, Guthrie 1965, pp. 122ff, 192ff.

¹²³ In the former case he would, in the latter he would not, have denied the principle that *all* phenomena are law-like.

¹²⁴ It may be that the question had not occurred to Empedocles: but it is also possible that it had, and that he was deliberately hedging on the issue, even deliberately allowing some of his audience (at least) to be misled by the language of Fr. 111 and 112 (cf. the discussion of *δύστη* in Greek thought in Detienne 1967, especially ch. 6, and Detienne and Vernant 1978).

¹²⁵ Although he denies that there is any absolute coming-to-be, i.e. from nothing: e.g. Fr. 8, where the term *φῶτες* is now generally interpreted as 'birth'.

¹²⁶ Fr. 96 and 98 deal with compound substances, Fr. 84 and 100 with vision and respiration.

¹²⁷ Note particularly that Empedocles suggests that the person whom he addresses will be able to control the winds 'at will', Fr. 111.5.

aims and presuppositions with which that inquiry was undertaken varied greatly from one Presocratic philosopher to another. It could be, and often was, conducted by men who did not make use of, and may have intended directly to supplant,¹²⁸ traditional beliefs in divine interventions in natural phenomena, who sought determinate physical causes of whatever appeared striking or exceptional, and who held that every physical phenomenon could be so explained. At the same time it was sometimes assumed that the knowledge gained from the investigation could be used to bring about effects that – at the least – run counter to the regularities of nature herself. When Aristotle records the views of the ‘physiologists’, the emphasis is very much on their accounts of the material causes of things, of change and coming-to-be, and on their attempts to provide explanations of particular natural phenomena.¹²⁹ Again Plato, in some of his comments on those who investigated nature,¹³⁰ particularly attacks those¹³¹ whom he represents as atheists because they saw the world as a whole as the product of ‘nature’ and ‘chance’ as opposed to ‘reason’ ‘god’ and ‘art’, where ‘nature’ stands primarily for the interplay of mechanical causes and effects,¹³² and where the chief thrust of Plato’s polemic is that these theorists denied or neglected the role of a benevolent and divine creative intelligence.¹³³ Yet on the other side Empedocles can be taken as the prime¹³⁴ representative

¹²⁸ This may be thought likely in the case of Democritus, in particular, if he saw belief in the gods as in part a mistaken inference from terrifying natural phenomena (Sextus, *M.* ix 24, cf. above, p. 14). Cf. also his reported enthusiasm for *deixiologiai* (Fr. 118, together with the titles of a series of works in the list in Diogenes Laertius, ix 47).

¹²⁹ To Aristotle (as also to Plato, see below, n. 132) some of the natural philosophers, and especially the atomists, appeared as determinists, that is as having explained everything in terms of necessity, but this is chiefly because they denied teleology. He himself reinstates ‘chance’, *τύχη*, as well as ‘the spontaneous’, *τὸ ἀσυντόμα*, against those who denied that it existed at all (*Ph.* 195b36ff.), but for him ‘chance’ events are themselves capable of explanation in other terms (*Ph.* ii chh. 4–6 especially). Nature is a matter of what happens ‘always or for the most part’: but what happens *παρὰ φύσιν*, contrary to nature, is what is unusual, irregular, not ‘supernatural’. Cf. e.g. Wieland 1962, pp. 256ff.

¹³⁰ Especially *Lg.* x 888e–ff.

¹³¹ Again it is likely that he had the atomists particularly in mind. Two prominent natural philosophers had, in fact, attempted cosmologies in which reason, *νοῦς*, plays an important role, namely Anaxagoras (Fr. 12, especially) and Diogenes of Apollonia (Fr. 3 and 5). But Plato makes Socrates complain that Anaxagoras failed to put his principle to adequate use (*Phd.* 97b ff.).

¹³² As is clear from the example of the interactions of hot and cold, dry and wet, soft and hard things, at *Lg.* 889bc.

¹³³ Cf. Vlastos’ comment, 1975, p. 97 (cf. also p. 66), on the role of the Craftsman in Plato’s own cosmology: ‘If you cannot expunge the supernatural, you can rationalize it, turning it paradoxically into the very source of the natural order, restricting its operation to a single primordial creative act which insures that the physical world would be not chaos but cosmos forever after.’

¹³⁴ But it may well be not the only one: see below, p. 37 and n. 135 on the evidence for the Pythagoreans.

of a very different view, according to which the knowledge of nature might be used in some sense to transcend nature herself.

HEALING AND HEALERS IN THE CLASSICAL PERIOD

If we now turn back to *On the Sacred Disease*, we can see that the relationship between that treatise and the work of those whom we conventionally group together as the Presocratic philosophers is an intricate one. On the one hand the insistence that all diseases have natural causes may be compared with similar assumptions underlying the philosophers’ more general physical investigations and with Leucippus’ statement of the principle that everything happens for a reason and by necessity. On the other, Empedocles has, from some points of view, more in common with the opponents of the Hippocratic author than with the Hippocratic author himself. Where Empedocles Fr. 111 talks of raising and quelling the winds, and of bringing rain or drought,¹³⁵ *On the Sacred Disease* attacks those who ‘claim to know how to . . . make storms and fine weather, rain and drought . . . and all the rest of their nonsense’, calling them all ‘impious rogues’.¹³⁶ Moreover among the prescriptions he attributes to his opponents are some that can be paralleled in our admittedly late evidence for Pythagorean beliefs:¹³⁷ Thus he says that the quacks recommend not eating certain fish, including the mullet and the blackail,¹³⁸ and we find similar prohibitions in our sources for Pythagoreanism.¹³⁹ Again the quacks are said to recommend avoiding black clothing,¹⁴⁰ and Diogenes Laertius, for example, attributes to Pythagoras an association of black with evil.¹⁴¹

Now despite what has sometimes been suggested,¹⁴² the conclusion

¹³⁵ Our secondary literature for Empedocles contains a variety of stories – most, if not all, no doubt apocryphal – relating to his wonder-working; see, e.g., D.L. viii 59–61. Pythagoras, too, was frequently represented as a wonder-worker, perhaps, indeed, already by Empedocles (Fr. 129): see also Heracles Ponticus in D.L. viii 4, Timon in D.L. viii 36, as well as D.L. viii 11, 14, 21, 38, Iamblichus, *VP* 60ff., 140ff. (cf. Porphyry, *VP* 29ff., 27ff.), and cf. Burkert 1972a, pp. 136ff.

¹³⁶ *Med. Sacr.* ch. 1 paras. 29f and 31 (C) (L vi 358, 19ff.), see above, p. 19.

¹³⁷ Cf. especially Burkert 1972a, pp. 176ff, who mentions other evidence relating, for example, to initiation rites and to the mystery religions.

¹³⁸ *Med. Sacr.* ch. 1 para. 13 (C) (L vi 356, 1).

¹³⁹ E.g. Diogenes Laertius viii 19 and 33, Porphyry, *VP* 45, Iamblichus, *Protr.* 21 (5). With the prohibition on eating certain birds, including the cock, mentioned at *Med. Sacr.* ch. 1 para. 15 (G) (L vi 356, 4), one may compare the Pythagorean prohibition on eating or sacrificing a white cock (see D.L. viii 34, Iamblichus, *VP* 84 and cf. *Protr.* 21 (17)).

¹⁴⁰ *Med. Sacr.* ch. 1 para. 17 (G) (L vi 356, 6f.).

¹⁴¹ D.L. viii 34.

¹⁴² See, for example, Wellmann 1901, p. 29 n. 1, Burnet (1892) 1928, p. 202, Jouanna 1961, pp. 460ff, for a connection with followers of Empedocles. For one with Pytha-

we should draw from all this is not that the opponents of *On the Sacred Disease* are to be identified as Pythagoreans or as followers of Empedocles. On the contrary, there are good grounds for resisting any such hypothesis. First, some of the similarities in question merely reflect popular Greek beliefs,¹⁴³ such as the association of black with misfortune. Secondly, whereas the Hippocratic writer's opponents are suggesting remedies for a *particular illness*, the Pythagorean rules are rules for *general behaviour*.¹⁴⁴ Thirdly, the idea that sufferers from the sacred disease may be purified with blood¹⁴⁵ is one that Empedocles himself, at least, with his horror of blood-shedding, would certainly have repudiated.¹⁴⁶ Yet if any such simple identifications should be ruled out, the comparison between these texts certainly illustrates the survival and systematisation of certain popular or traditional beliefs in parts of Presocratic philosophy and shows that on certain issues the Hippocratic author not only did not endorse, but was concerned to expose, a view that can be exemplified in an important natural philosopher.

We have seen in considering Empedocles how complex and ambivalent the assumptions underlying the Presocratic 'inquiry concerning nature' could be. The writer of *On the Sacred Disease*, for his part, exemplifies only one of the many different strands that go to make up Greek medicine in the fifth and fourth centuries B.C. Apart from the various kinds of doctors represented in the Hippocratic Corpus,¹⁴⁷ many others laid some claim to be able to alleviate diseases. They included people who would be known not as *iatroi*, but as herb-collectors or 'root-cutters' (*ρίζοτομοί*), 'drug-sellers' (*φαρμακωταί*), midwives and gymnastic trainers,¹⁴⁸ as well as priests and attendants who practised 'temple-medicine' at the shrines of healing gods and heroes,¹⁴⁹ and the dividing lines between some of these broad categories were far from sharply defined. There was, in

the ancient world, no equivalent to the modern, legally recognised, professional medical qualification. It was undoubtedly an advantage to an ancient doctor – when dealing with certain types of client or employer – to have been associated with one of the centres of medical training, such as Cos or Cnidus.¹⁵⁰ Yet even if he could claim such an association, a doctor's title to practise might always be called in question. An accusation of charlatanism (*ἀλαγορεία*) was easy to make and hard to rebut,¹⁵¹ and, understandably, many Hippocratic authors were evidently much concerned to establish that medicine, as they practised it, is a true art, and to insist on the distinctions between doctors and laymen on the one hand and between true doctors and quacks on the other.¹⁵²

In some cases there were, to be sure, certain fairly well-marked differences in the doctrines and procedures of some of the medical writers and those of some of the groups from which they were keen to be dissociated. Yet there was also, in practice, a considerable to the faithful (see further below, pp. 40f.). They were, however, generally much more closely integrated into the state religion than the purifiers attacked as 'vagabonds' in *Morb. Sacr.* (that the latter did *not* take their patients to the temples seems to be implied at *Morb. Sacr.* ch. 1, paras. 41ff (G) (L vi 362.10ff). See below, p. 48 n. 209). We should, in fact, recognise differences and gradations within 'religious', as much as within 'rationalistic', medicine. (I am grateful to Professor Vernant for first stressing this point to me.)

¹⁵⁰ This is clear from the high proportion of doctors from Cos who – at least from the third century on – were given appointments as 'public physicians': see Cohn-Haft 1956.

¹⁵¹ In some of the (generally rather late) Hippocratic works that deal with medical etiquette there are some interesting, and conflicting, evidences on the question of the sanctions exercised against the medical profession. Thus the treatise *Lex* complains that the only sanction used against bad medical practice is that of dishonour (ch. 1, *CMG* 1, 1 7.5ff) and a similar view seems to be implied in *Pract.* ch. 1 (*CMG* 1, 1 30.18ff). Yet in *Dieret.* ch. 2 (*CMG* 1, 1 25.14f) reference is made to the banishment of corrupt practitioners from certain states. Antiphon IV 3.5 is one classical text that shows that the law absolved the physician of blame if his patient died.

¹⁵² Apart from the frequent references to these themes in the treatises dealing with medical etiquette, the work *de Arte* is devoted to showing that medicine is a veritable art (see, e.g., ch. 8, *CMG* 1, 1 14.23ff on the difference between true physicians and those who are doctors only in name). The contrast between what is brought about by the art and what is due merely to chance recurs, e.g., in *Morb.* 1 chh. 7 and 8, L vi 152.9ff, 154.5ff, *Aff.* ch. 45, L vi 254.9ff, and, especially, *Loc. Hom.* ch. 46, L vi 342.4ff. For the distinction between the doctor and the layman, see, e.g., *Acut.* ch. 1, L ii 224.3ff, ch. 2, 234.2ff; ch. 11, 316.13ff, *VM* ch. 2, *CMG* 1, 1 37.7ff and 17ff, ch. 9, 42.6ff, ch. 21, 52.17ff; for that between the doctor and the quack, see, e.g., *Acut.* ch. 2, L ii 236.4ff, *VM* ch. 9, *CMG* 1, 1 41.25ff, *Art.* ch. 42, L iv 182.15ff, ch. 46, 198.5ff, *Fract.* ch. 1, L iii 414.1ff. References to bad practice are especially frequent in the surgical treatises, see also *Art.* ch. 1, L iv 78.5ff, ch. 11, 104.20ff, ch. 14, 120.7ff, *Fract.* ch. 2, L iii 418.1ff, ch. 3, 422.12ff, ch. 25, 496.11ff, ch. 30, 518.11ff, ch. 31, 524.17ff, and cf. further below, pp. 89ff and 91 n. 174. Interestingly enough the writer of *VM* suggests that medicine originated from dietetics (ch. 4, *CMG* 1, 1 38. 27ff) and he compares the doctor with the gymnastic trainer to make the point that both arts are being continually improved (ch. 4, 39.2ff).

goreanism, see Delatte 1922, p. 232, Boyancé 1937, pp. 106f, Burkert 1972a, p. 177 n. 87, but cf. the more cautious assessment in Moutinier 1992, pp. 134ff.

¹⁴³ This emerges clearly from the analysis of Greek popular assumptions concerning the pure and the impure in R. C. T. Parker 1977.

¹⁴⁴ As was noted by Boyancé 1937, p. 106.

¹⁴⁵ *Morb. Sacr.* ch. 1 para. 40 (G) (L vi 362.8ff).

¹⁴⁶ See Empedocles *Fr.* 128, 136 and 137 especially, and cf. also Heraclitus *Fr.* 5, quoted above, p. 12. Contrast, e.g., A. *Ev.* 280ff.

¹⁴⁷ The Corpus includes some treatises, such as *de Arte* and *Flat.*, that are sophistic displays and are probably not the work of men who actually practised as doctors (see further below, ch. 2, pp. 88f). Moreover the doctrinal positions of the authors who did so practise varied enormously, see, for example, Lloyd 1975b, pp. 183ff.

¹⁴⁸ Surgeon-barbers would be a later addition to this list.

¹⁴⁹ The priests and attendants gave advice and suggested 'treatment' usually on the basis of the interpretation of the dreams and signs that supposedly came from the god

overlap both in ideas concerning the nature of some diseases¹⁵³ and in techniques of treatment. Once again *On the Sacred Disease* provides evidence on the point. The author describes his opponents as not merely using charms or spells (ἐταροῖσσι) and purifications (καθαροῖσι) as remedies for the sacred disease, but also making certain dietary and other recommendations, although these were of a negative sort, about what was to be avoided, rather than about what was to be taken.¹⁵⁴ Moreover when reporting some of their dietary rules, the Hippocratic writer sometimes adds his own glosses to the effect that the foods in question are indeed harmful to the sick,¹⁵⁵ thereby indicating that he saw some point in their recommendations in these instances, even though he would probably have given rather different reasons as their justification.

A further aspect of this overlap can be illustrated by referring to the inscriptions relating to the cult of Asclepius at Epidaurus.¹⁵⁶ These show that apart from cases where the treatment involved the god touching a patient's body with a ring, for example,¹⁵⁷ the god was sometimes represented as employing foods or drugs, for instance in one case an emetic, to heal the sick.¹⁵⁸ Indeed on several occasions the god appears in a vision or a dream in the role of a surgeon, using the knife to effect spectacular, in some cases quite fantastical, cures.¹⁵⁹ Clearly the faithful who attended the shrines of Asclepius were used to the god behaving – and they expected the god to behave – in

¹⁵³ As Kudlien has suggested in relation to some of the diseases discussed in the pathological treatise *Morb.* II especially, for example the 'bad-sorrow' disease of ch. 72 (L vii 108,25ff) and the 'murder' fever of ch. 67 (107,4ff), see Kudlien 1968, pp. 326ff, 330f.

¹⁵⁴ E.g. the recommendation to abstain from baths, ch. I para. 12 (G) (L vi 354,20).

¹⁵⁵ See ch. I para. 13 (G) οὐτοι γὰρ ἐπιπύρετον εἶσι ('for these are most dangerous', cf. L vi 356,2) and para. 14 (G) (L vi 356,3f) τὰτα γὰρ κερὰν τοπακτικὰντὰ ἐκ τῆς κοιλίας ('for of meats these most disturb the digestive organs'). The present indicatives indicate that these statements contain the writer's own views. Contrast the infinitive in para. 19 (G) (L vi 356,9) πύρετα γὰρ τὰτα κοιλίωτα εἶσι ('for all these are impediments') where he is reporting his opponents' beliefs in oratio obliqua.

¹⁵⁶ *IG* iv 951–953, *IG* 4² 1, 121–4. The inscriptions belong to the latter part of the fourth century B.C. They have subsequently been edited by Herzog 1931, and cf. also Edelstein 1945, I pp. 221ff.

¹⁵⁷ As in case 62, where an epileptic patient is cured after seeing the god touching parts of his body with a ring in a dream: see Herzog 1931, pp. 32 and 109ff.

¹⁵⁸ As in case 41 (Herzog 1931, p. 24). Other cases where the god is represented in visions or dreams as using drugs are case 9 (to cure an eye complaint, Herzog 1931, p. 12) and case 19 (to cure baldness, Herzog 1931, p. 16). While that does not prove that the temple treatment involved the actual use of drugs in those cases, it is likely enough, to judge from the later evidence in such writers as Aelius Aristides, that it sometimes did so.

¹⁵⁹ As in cases 13, 21, 23, 25 and 27 (Herzog 1931, pp. 14–18 and cf. pp. 75ff).

visions in ways which were in certain respects very similar to those of the doctors represented in our extant Hippocratic treatises.¹⁶⁰

What we know of the practice of religious medicine in later periods confirms this picture. Thus the instructions that Aelius Aristides claimed to have had from the god (usually through dreams) include not only, for example, a command to take a ritual mud bath and run three times round the temples at Pergamum (*Or.* xlviii 74f) but also prescriptions concerning foods (e.g. xlvii 45 xlix 6, 24, 34, 35, 37), and drugs (xlviii 13, where the sign from the god is interpreted as referring to hellebore), the use of poultices (e.g. xlix 25) and blood-letting (e.g. xlviii 47). But if Asclepius' treatment is often strongly reminiscent of that of contemporary medical men, there is this difference, that his diagnoses and cures are deemed to be infallible. Aristides is in no doubt as to whose advice to follow when, as frequently occurs, merely mortal physicians, and the true, immortal healer are in disagreement.¹⁶¹

Conversely it was not merely in a spirit of conventional piety that some of the medical writers of the classical period invoke divine patronage for their art. Apollo the healer, Asclepius, Hygieia (Health) and Panacea ('All-Heal') are called as witnesses at the beginning of the Hippocratic *Oath*;¹⁶² the *Law* borrows the language of the mystery religions when talking of the secrets of the art;¹⁶³ and *On Ancient Medicine* says that the art is rightly dedicated to a god.¹⁶⁴

¹⁶⁰ Edelstein and Edelstein 1945, II p. 112 n. 4 ('it is interesting to observe again and again how closely the concept of the god resembles that of the medical practitioner'). See Behr 1968, pp. 168f, and cf. Ilberg 1931, p. 32, commenting on a fragment of Rufus preserved in Orbanus xlv 30 (*CMG* vi, 2, 1 191,1ff, Raeder, IV 83,1ff, Busse-maker and Darenberg): 'Der Gott hat offenbar Medizin studiert, man sieht den Einfluss der Wissenschaft auf die Tempelpraxis um 100 nach Chr.'

¹⁶¹ *Just.* I, *CMG* I, 1 42ff. Although many of its ideals were widely shared, the *Oath* as such probably belongs to a group of practitioners, not to Greek doctors as a whole: certainly some of the specific injunctions it contains, for example not to operate 'even for the stone', run counter to common Greek medical practices of the fifth and fourth centuries B.C. Cf. e.g. Edelstein (1943) 1967.

¹⁶² *Lex* ch. 5, *CMG* I, 1 8,15ff τὰ θεῶν ἐπιθυμία τῶν ἐπιπέμων ἁγιωτάτων, βίβη-λαον θεῶν ἁγίων, ἡμῶν ἡ τὰθεῶν δόξασιν ἐπισημαίνονται. 'Holy things are revealed only to holy men. Such things must not be made known to the profane until they are initiated into the mysteries of knowledge.'

¹⁶³ *VM* ch. 14, *CMG* I, 1 45,17f. Cf. *Vit.* I ch. 11 (L vi 486,14f) which implies that men learnt the arts from the gods, and *Vit.* IV ch. 93 (66a,8f) where the writer says that his discoveries in regimen have been made with the help of the gods. To these passages may be added others whose interpretation is more obscure. In *Deant.* the writer, having just spoken of medicine as wisdom and of the physician as 'having most things', says that knowledge of the gods is entwined with medicine in the mind (ch. 6, *CMG* I, 1 27,13, reading οὐτῶς, as opposed to Litteré's αὐτῶν). Nor is it clear precisely what the author of *Prog.* had in mind when he wrote that one of the tasks of the doctor is to learn whether there is anything divine in diseases (cf. τὸ θεῶν ἐκείνῃ τῶν νόσων, ch. 1, L II 112,5f; cf. also *Nat. Med.* ch. 1, L vii 312,1ff and 9). The interpretation of

Although many popular remedies were implicitly¹⁶⁵ or explicitly rejected by certain of the medical writers, such questions as the efficacy of amulets (τεπλάματα), of spells and prayers, and of music continued to be much debated. Thus amulets¹⁶⁶ were counted among the 'natural remedies' by Rufus (Fr. 90), and even Soranus, who rejects them, suggests that they should not be forbidden since they may perhaps make patients more cheerful.¹⁶⁷ Galen, who is, in general, critical,¹⁶⁸ offers a naturalistic explanation of one amulet that he claims to have tested and found to be effective: either parts of the root used as the amulet came off as effluences and were inhaled, or the air round the root was itself modified in some way.¹⁶⁹ Although incantations are firmly rejected by *On the Sacred Disease*,¹⁷⁰ the writer of *On Regimen* IV first criticises those who rely on prayer alone on the grounds that, while prayer is good, men should also help themselves at the same time as they call on the gods,¹⁷¹ but then goes on to give some specific instructions about which gods to pray to when the signs seen in dreams are favourable or unfavourable.¹⁷² Stories about healing by music were common,¹⁷³ but although, of the later medical writers, Soranus was critical of the use of music as a remedy,¹⁷⁴ that was not the only view expressed. Galen, who wrote

that text (which some modern editors, such as Kühlewein and Jones, have treated as an interpolation) was already the subject of dispute among the ancient commentators, as we learn from Galen, who believed that 'divine' here must be taken to refer to atmospheric influences (*CMG* V, 9, a 205-28ff. K. xviii a 17,9ff.) (see most recently Kudlien 1966, pp. 38ff., Thivel 1975 and Lain Entralgo 1975, pp. 315ff.).

¹⁶⁵ Thus the final aphorism (*Aph.* vii 87, L iv 608, 1ff.) gives as possible types of treatment drugs, the knife and cautery (though the term for 'drugs', φάρμακα, is capable of a wide extension, see below, p. 44).

¹⁶⁶ Theophrastus is one non-medical writer who is critical of the use of amulets, claiming that most of what is said about them is the work of men 'who wish to magnify their own arts' (*HP* ix 19.2-3). On the whole subject see Stemplinger 1919, pp. 82ff.

¹⁶⁷ *Gyn.* iii 10.42, *CMG* iv 121.26ff., cf. 1 19.53, *CMG* iv 47.16ff.

¹⁶⁸ E.g. K xi 792.14ff.

¹⁶⁹ A boy never had epileptic fits when he wore the amulet in question, but did when it was removed, only again to cease to have fits when he wore it once more: K xi 859.12ff., cf. also xii 573.5ff.

¹⁷⁰ The uselessness of incantations and purifications in the treatment of epilepsy, insisted on in *Med. Sacr.*, can be paralleled, outside medical literature, by Thucydides' remarking, in his account of the plague at Athens, that supplications and oracles were useless (though so indeed were all the other remedies tried, ii 47) and cf. Democritus Fr. 234 (men seek health from the gods with prayers, but they do not realise that they have power over it in themselves).

¹⁷¹ *Vid.* iv ch. 87, L vi 642.6ff.

¹⁷² *Vid.* iv ch. 89, L vi 652.17ff and ch. 90, 656.22-658.1.

¹⁷³ See, for example, Ptolemy, *De Musica* 114b-bc. Aulus Gellius (iv 13) quotes Theophrastus as saying that 'many men believe that flute-playing is good for pain in the hip, and Democritus to the effect that flute-playing cures snake-bites and is good for many other sicknesses (cf. Athenaeus, xiv 624ab). Iamblichus, *VP* 64, 110-11, 164 and Porphyry, *VP* 33, speak of a Pythagorean belief that music contributes to health.

¹⁷⁴ According to Caelius Aurelianus, *Med. Chron.* v 23, cf. 1 175f and 178.

at length on the effects of psychic disturbances on the body as also on those of bodily temperament on the soul, attempted to explain the benefits obtained from music in naturalistic terms.¹⁷⁵

Although it was generally recognised that dreams could be misleading, it was not only those who advocated the practice of incubation in the temples¹⁷⁶ who saw dreams as indicators – whether of the disease troubling the patient or of its cure. The belief that dreams may be useful guides to diagnosis can be traced in a whole series of medical writers. In the Hippocratic collection the work of *On Regimen* IV is devoted to setting out a comprehensive theory of the interpretation of dreams, and other treatises too acknowledge their role in diagnosis.¹⁷⁷ Extraordinarily elaborate theories were developed concerning the different categories of dreams.¹⁷⁸ Of the later medical writers, Herophilus gave a comparatively simple classification,¹⁷⁹ and Galen was prepared to take dreams seriously as signs.¹⁸⁰ Thus at K xi 314.18ff he refers to a therapy suggested to him by a dream, and he sets out some systematic ideas on diagnosis from dreams in his commentary on book 1 of the *Epidemics*.¹⁸¹

Finally, as Artelt and others have long ago shown,¹⁸² there is a deep-seated ambiguity in many of the terms used by the medical

¹⁷⁵ *CMG* V, 4, 2 19.24ff., K vi 40.4ff.

¹⁷⁶ The classic study of incubation is that of Deubner 1900: cf. also Hamilton 1906 and Edelstein and Edelstein 1945, n pp. 145ff.

¹⁷⁷ E.g. *Epid.* 1 10 (L ii 670.8), *Hum.* ch. 4 (L v 460.17), *Hed.* ch. 45, pp. 66f Roscher (L ix 460.17ff). Aristotle rejects the idea that dreams are sent by the gods, though he says they are bewitching, giving as his grounds for this that nature herself is bewitching (*Div. Somn.* 463b.13ff.). He endorses the view he attributes to the more discerning doctors according to which careful attention should be paid to dreams since they may provide information about movements and changes occurring in the body, and he concludes from this that some dreams may be both signs and causes of future events, even though most of what were believed to be prophetic dreams are mere coincidences (*Div. Somn.* 463a.4-b.11).

¹⁷⁸ Our most extensive source on the subject, Artemidorus' *Oneirocritica* (second century A.D.), distinguishes two main groups, *εμναια*, which include φαντασμα (visions), *ανδρα*, which is the case and are not predictive, *δωπον*, on the other hand, which include *οψηματα* and *χρησμοι* (dream-oracles), are signs of what will come to be: they comprise *θεομητορικ* and *δαιτυποικ* *δωπον*, the former non-allegorical, as when the events themselves seem to be seen in the dream, the latter allegorical or symbolic dreams – and he distinguishes five species of these (I chh. 1-2, pp. 3ff Hercher, 3-9ff Pack). But many other classifications were suggested (see, for example, Behr 1968, ch. 8, pp. 171-95).

¹⁷⁹ One of his three classes of dreams was the 'god-sent': see Aetius v 2.3. Cf. also Rufus, *Quaestiones Medicinales*, *CMG* Suppl. iv 34.13ff Garner, 205.3ff Darenberg-Ruelle.

¹⁸⁰ Galen tells us that his father decided that he should take up a medical career after a dream (e.g. K x 609.8ff. xix 59.9ff.).

¹⁸¹ *CMG* V, 10, 1 108.1ff. K. xvii A. 214.7ff: the short treatise on the diagnosis from dreams that appears in Kühn's edition, vi 832ff. is thought to be a compilation from this passage.

¹⁸² Artelt 1937, cf. also Wachter 1910, Pfister 1935, and Dodds 1951, e.g. pp. 35ff.

writers and popularly for remedies for 'ills' of one type or another, whether diseases or other kinds of misfortune.¹⁸³ The term φάρμακον, which is the regular word for 'drug' and – with or without a qualifying adjective – for 'poison' in medical literature and elsewhere,¹⁸⁴ is also used more generally of any kind of remedy or device.¹⁸⁵ As Moulmier has illustrated in his examination of classical material and as most recently Mary Douglas has emphasised in a more general anthropological context,¹⁸⁶ notions of the 'clean' and the 'dirty' usually reflect fundamental assumptions concerning the natural, and the moral, order, and the Greek terms for purification and cleansing span both spheres and permit no hard and fast distinction between them. Thus καθαροί, the term which is used of the purifications criticised in *On the Sacred Disease*,¹⁸⁷ by Empedocles of his religious poem concerning the salvation of the Σαφίλων,¹⁸⁸ and elsewhere of the rites used to remove pollution, for example after the shedding of blood,¹⁸⁹ is also used of natural evacuations, as, for instance, in Aristotle of the premature discharge of the amniotic fluid in childbirth.¹⁹⁰ The term καθαροί covers a similar range. This was the word used by the doctors of natural, or medically induced, evacuations from the body,¹⁹¹ but it too could refer to ritual purifications after moral pollution.¹⁹²

¹⁸³ Just as νόσος is used of many other types of ill besides diseases, so conversely ὕγις is used generally of 'the sound' in many other contexts besides medical ones. In both cases the degree to which these 'extended' uses were understood as metaphors is far from clear. ¹⁸⁴ φάρμακον is generally used in Homer with a qualifying adjective, e.g. *τελεῖα* and *Ανυλό* *Od.* iv 230, *φίμα* *Il.* iv 218, *δυσήγερα* *Il.* v 401, *οὐδαιόων* *Od.* x 394. For φάρμακον used without a qualifying adjective to mean 'poison', see, e.g., Thucydides ii 48, Plato *Phd.* 115a.

¹⁸⁵ As in Herodotus ii 85 (when Oebares says he has a trick to ensure that Darius will become king). Cf. also, e.g., Hesiod, *Op.* 485, Euripides, *Ba.* 283, Plato, *Phdr.* 274c.

¹⁸⁶ Moulmier 1952, Douglas 1966, and cf. R. C. T. Parker 1977.

¹⁸⁷ *Morb. Sacr.* ch. 1 paras. 4, 12, 23, 25, 39, 42, 46, ch. 18 para. 6 (G) (L vi 352.8, 354.19f, 358.3, 7, 362.6, 13, 364.8, 366.8).

¹⁸⁸ See above, p. 34.

¹⁸⁹ As in Aeschylus, *Ch.* 968, *Eu.* 277, 283, Sophocles, *OT* 99, 1228, cf. Euripides, *Ba.* 77, and the practices referred to by Plato, *R.* 364c f.

¹⁹⁰ *HA* 587b 1. Cf. Plato, *Sph.* 226d ff where καθαρός is a generic term, the genus τὸ καθαρόν εἶδος being divided into two kinds, purgings – καθαροί – relating to bodies (which include those brought about by gymnastics and medicine) and those relating to souls.

¹⁹¹ E.g. of the purging of the menses, *Afr.* ch. 4, *CMG* i, 1 58.31, *Aph.* v 60, L iv 554.7, Aristotle, *HA* 572b29, *GA* 775b5, and of the afterbirth, *Afr.* ch. 7, *CMG* i, 1 60.35; Aristotle, *HA* 574b4. The noun καθαρός, like the verb καθαίρω, is regularly applied to the action of purgatives, e.g. *Aph.* ii 35 (L iv 480.3), *Acat.* ch. 7 (L ii 276.6 and 7), cf. pseudo-Aristotle, *Pr.* 864a34. In *Morb. Sacr.* the term is used in connection with a theory about the origin of phlegmatic constitutions, which arise because of inadequate καθεύδων of the brain before birth, ch. 5 paras. 1–9 (C) (L vi 968.10ff, e.g. 13).

¹⁹² As in Herodotus i 35, of the purificatory rites used by Lydians and Greeks to remove the pollution of murder, cf. Plato, *Lg.* 873c f. At *Cra.* 409ab Plato expressly links the καθαροί and καθαίρω of doctors and priests.

Two main points that emerge quite clearly from a considerable body of evidence are (1) that the methods of healing used both in what we may call 'rationalistic' and in temple medicine had much in common – the priests had recourse to drugs, prescriptions concerning diet, and phlebotomy,¹⁹³ just as some of the rationalistic doctors did not rule out amulets and prayers; and (2) that in describing what they were attempting to bring about the rationalistic doctors might employ some of the very same terms (such as 'purification') that had a wide analogous use in religious contexts. Prognosis, explicitly recognised as an important means of winning over patients to accept treatment (see below, pp. 60f), may well have seemed to some a kind of soothsaying. Indeed it is sometimes referred to by the doctors in terms that are obviously reminiscent of the role of the prophet. Thus the writer of *Prognosis* recommends that the doctor should 'tell in advance' 'the present, the past and the future' in the presence of his patients,¹⁹⁴ and so too does the writer of *Epidemics* i ch. 5.¹⁹⁵

At the same time, despite these important signs of the overlap between the different strands that go to make up Greek medicine in the fifth and fourth centuries B.C., those strands remain, in certain respects at least, none the less distinct, and indeed the practitioners in question were evidently in direct competition with one another. Some of the common features we have identified appear to reflect a desire not so much to compromise with other approaches, as to outdo them. A theorist such as the author of *On Regimen* iv does not merely accommodate the traditional belief in the predictive value of dreams: he produces a systematic framework for their interpretation as diagnostic signs. Conversely, to be seen to be not just as good as, but far better than, mortal physicians, the god – through his priests or interpreters – saw fit to incorporate many of their techniques, as well as adding some special ones, such as temple incubation, of his

¹⁹³ Thus phlebotomy was practised on the god's command in the time of Aelius Aristides, to judge from xviii 47 (cf. above, p. 41).

¹⁹⁴ *Prag.* ch. 1, L ii 110.2f: προφητικῶν... καὶ προφήτων κατὰ τοῖσι νοσήτων τὰ τε παρόντα καὶ τὰ πρῶτα καὶ τὰ μετὰ ταῦτα ἐρεῖσθαι, cf., e.g., *Il.* i 70 on the prophet Calchas: ἔξ ἡνὶ τὰ τ' εἴματα τὰ τ' ἐσθλῆματα πρὸ τ' εἴματα and cf. Hesiod, *Th.* 38.

¹⁹⁵ *Epid.* i ch. 5, L ii 634.6f: Ἀφῆναι τὰ προφητικῶν γινώσκων τὰ παρόντα προφήτευτάδηναι. Cf. such other texts as *Prag.* ch. 35, L iii 538.6, *Afr.* ch. 9, L iv 100.4 (it is the business of the doctor to foretell, κεραιαυτεροσθέναι, such things) and ch. 38, 392.14f (which speaks of 'brilliant and competitive – δύσωνομά – forecasts'). On the other hand *Acat.* ch. 3, L ii 242.3ff, insists that medicine should not be confused with divination, and *Prorrh.* ii ch. 1f, L ix 6.1ff, criticises doctors for 'marvellous' predictions: the author says he will not himself engage in such divinations (ὅτι δὲ τὰντα θεοὶ νοσήσαναι, ch. 1, 8.2, cf. προφητικὰ δεικνυμένωσσι ch. 2, 8.11), and insists that his own predictions will be based on signs, σημεῖα, e.g. ch. 1, 8.2ff and ch. 3, 10.23ff.

own.¹⁹⁶ We have considered in detail the attack mounted by the author of *On the Sacred Disease* against the 'purifiers': but we also have evidence that the practitioners of temple medicine were critical of ordinary doctors. Thus one of the documents from Epidaurus describes a cure achieved by the god when the first instruction the god gives the patient is to forbid him to follow the treatment (cauterisation) that had been recommended by the doctors.¹⁹⁷

There is no question of the practitioners of temple medicine *not* claiming to bring about what we can describe as practical results. In the Epidaurus inscriptions this is precisely what is asserted: the god is represented as tackling, and curing, an extraordinary variety of ailments,¹⁹⁸ ranging from headaches and insomnia to cases of stone, worms, gout, dropsy, tumours, consumption, blindness, epilepsy and injuries from wounds of different kinds. Although in some instances the question of what counted as a successful treatment would obviously be highly debatable, in others there was less room for doubt.¹⁹⁹ Of course we cannot now say what – if anything – underlies the cures claimed:²⁰⁰ we are in no position to assess either the workings of suggestion on the patients,²⁰¹ or the elements of wishful thinking – or even plain fraudulence²⁰² – on the part of the

¹⁹⁶ The fact that the Epidaurus inscriptions also record how the god's advice proved efficacious in some non-medical cases as well (as in the consultations about finding hidden treasure, case 46, or a lost child, case 24, or the recovery of a deposit, case 03) suggests another respect in which the priests of the cult of Asclepius would claim superiority to merely mortal medical men.

¹⁹⁷ Case 48, Herzog 1931, p. 28. There may, of course, have been a particular added reason for the god to forbid a treatment that was generally recognised as being drastic (cf. the remarks concerning the hazards and misuse of cauterisation in *Att.* ch. 11, L. IV 104.22ff. and Lamblichus' report that the Pythagoreans avoided the use of cautery, *VP* 163, 244). From a later period Aelius Aristides provides many examples where the god overrules the diagnoses or therapies of ordinary physicians, e.g. *Or.* XLVII 61–4, 67–8, cf. 54–7, XLIX 7–9.

¹⁹⁸ As well as non-medical problems, see above, n. 196.

¹⁹⁹ In such 'surgical' cases as the extraction of a spear from the jaw (case 12) there could be little doubt about the end-result said to have been achieved. Again in the cases where a barren woman consults the god in order to conceive (e.g. cases 31, 34, 42), whether or not she had a child was fairly easily verifiable.

²⁰⁰ The various views that have been expressed by modern scholars on the cures claimed at Epidaurus and elsewhere in the ancient world are summarised in Edelstein and Edelstein 1945, II, ch. 3, especially pp. 142ff.

²⁰¹ The need for faith, and the folly of doubting or scoffing at the god, are recurrent motifs in the inscriptions (e.g. cases 3, 4, 9, 10, 35, 37: in case 36 the god punishes a scoffer by crippling him). From a later period we may compare a text in which Galen remarks on the psychological effects of belief in divine healing. *At CMGV*, 10, 2, 2 199–4ff. K XVII B 137–7ff. he observes that the faithful will submit to a course of treatment they would never normally agree to – from ordinary doctors – when they believe that the god recommends it.

²⁰² We may note, at least, that the question of due recompense to the god is another recurrent theme in the inscriptions (e.g. cases 4, 5, 8, 10, 25: in case 22 a man who was cured for blindness but omitted to make his thank-offering becomes blind again,

priests who had the inscriptions made. But that does not affect the point that the inscriptions *claimed* practical results in a wide variety of cases: they were indeed in all probability set up in large part to *advertise* what the god could do.

The importance of this becomes apparent when we refer back to the anthropologists' debate on the general aims of magical behaviour in traditional societies. As we noted at the outset (pp. 2f), the view that such behaviour should be seen as expressive or affective, rather than as would-be efficacious, has been argued forcefully, and evidently with a good deal of justification, since it provides a clearer understanding of the meaning and function of many magical beliefs and practices. Yet so far as our evidence for Greek medicine of the fifth and fourth centuries B.C. is concerned, the practitioners of temple medicine appear to have accepted a battle on the same grounds as the Hippocratic doctors – in that both sides appeal to, and look to be judged by, the practical results they achieved.

Further confirmation of the point comes from the data provided by our chief Hippocratic text. The symbolic nature of some of the recommendations that are ascribed to the 'purifiers' in *On the Sacred Disease* – for example the prohibition against wearing black or against crossing the hands or legs²⁰³ – is clear enough. At the same time the burden of one of the main charges the Hippocratic writer brings against his opponents is that they neither know what causes the disease nor treat it properly, and he evidently thinks of them as making claims on both scores. He says that they pretend to have superior knowledge, among other things about what causes and cures the disease.²⁰⁴ Throughout his opening polemic he describes the purifiers as attempting to alleviate epilepsy by the use of charms and the like,²⁰⁵ even though their ministrations are all useless, and most importantly he says that they take the credit should any of those whom they treat recover, although they guard themselves against failure by saying that the gods are to blame.²⁰⁶ All through his attack, in fact, he treats the actions of the purifiers as if they were to

although he is once again healed by the god after incubation; in case 7 a man is punished with marks on his face for not giving the god the money he had received from a patient for being healed).

²⁰³ *Morb. Saer.* ch. 1 paras. 17 and 19 (G) (L VI 356.6f, 8f). At ch. 1 paras. 33ff (G) (L VI 360.13ff) we have an outline sketch of what may have been a quite elaborate symbolic schema associating certain behaviour on the part of the patient with particular deities, e.g. 'if he utters a higher-pitched and louder cry, they say he is like a horse and blame Poseidon'.

²⁰⁴ See especially ch. 1 paras. 11, 20 and 27 (G) (L VI 354.15, 356.9ff, 358.13ff).

²⁰⁵ E.g. ch. 1 paras. 4, 23f, 26 (G) (L VI 352.7ff, 358.1ff, 11ff).

²⁰⁶ Ch. 1 para. 20 (G) (L VI 356.9ff), cf. above p. 18.

be assessed not – or certainly not merely – in terms of their felicity or appropriateness, but in terms of the practical results that were obtained.

Although it has, in the past, often been argued that magical beliefs and practices are particularly common in relation to situations beyond the technological control of the group or society concerned,²⁰⁷ here too our Greek evidence provides grounds for caution. First, it is not the case that the help of the gods was invoked only, or even mainly, for particularly difficult or intractable cases. On the contrary, to judge from the cures claimed,²⁰⁸ it seems that the god was consulted on what the Greeks themselves considered straightforward cases (such as injuries from wounds) as well as on more difficult 'acute' diseases (such as consumption).²⁰⁹ Conversely, and more

²⁰⁷ This was Mahnowski's view and it is one that figures prominently in Evans-Pritchard's study of the Zande (Evans-Pritchard 1937). One may compare, more recently, Horton on the Kalahari ('Sometimes, however, the sickness does not respond to treatment, and it becomes evident that the herbal specific used does not provide the whole answer. The native doctor may re-diagnose and try another specific. But if this produces no result the suspicion will arise that "there is something else in this sickness" . . . It is at this stage that a diviner is likely to be called in. . . Using ideas about various spiritual agencies, he will relate the sickness to a wider range of circumstances – often to disturbances in the sick man's general social life', Horton 1967, p. 60) and Tambiah ('Although we should not judge their *raison d'être* in terms of applied science, we should however recognize that many (but not all) magical rites are elaborated and utilized precisely in those circumstances where non-Western man has not achieved that special kind of "advanced" scientific knowledge which can control and act upon reality to an extent that reaches beyond the realm of his own practical knowledge', Tambiah 1973, p. 226, with a reference to Evans-Pritchard's conclusion that Zande rites were most 'mystical' 'where the diseases they dealt with were the most acute and chronic'), but cf. also the critical remarks of Thomas 1971, pp. 774ff, 798ff.

²⁰⁸ See above, p. 46. Similarly Aelius Aristides invokes divine assistance for every kind of medical problem.

²⁰⁹ The question of whether a condition is beyond cure – even beyond treatment – is, however, one that occupied several of the Hippocratic writers. *De Aëre* even makes it one of the defining characteristics of the art of medicine 'to refuse to undertake to cure cases in which the disease has already won the mastery, knowing that everything is not possible in medicine' (ch. 3, *CAMG* 1, 1 10.21ff). Cf. *Fract.* ch. 36, L II 549.9ff on the dangers attending the reduction of the thigh and upper arm ('one should especially avoid such cases if one has a respectable excuse, for the favourable chances are few and the risks many'). Finally *Prog.*, too, is aware of the problem: 'by realising and announcing beforehand which patients were going to die, he would absolve himself from any blame' (ch. 1, L II 112.10ff). Yet at no stage do any of these writers suggest that in difficult, or hopeless, cases their patients should have recourse to temple medicine. The one passage that has been taken to be an exception to this rule is in *Morb. Sacr.* itself, ch. 1, paras. 41ff (G) (L VI 362.10ff) where the writer says that what the charlatans should have done is not to treat the epileptics as if they had committed sacrifice, but to 'take the sick into the temples, there by sacrifice and prayer to make supplication to the gods', not to bury the kedopoul or throw them into the sea, but to take them into the temples as offerings. Herzog 1991, p. 149, concluded from this that the author himself actually *approved* of temple medicine: yet he is, rather, merely arguing that his opponents are *inconsistent*. What they should have done, *if* the god had been responsible for the disease, is to take the patients to the temples. But that

importantly, the testimony of *On the Sacred Disease* would tend to run counter to any thesis to the effect that the undermining of magical beliefs follows an increase in the control that could be exercised over the areas of experience to which the beliefs in question related. It is striking that our chief critical text deals with a topic – epilepsy – where the author himself, so far from having any effective means of treating the disease, was – *we* should have said – just as helpless as the charlatans he attacks. True, the writer *states* that epilepsy, like every other disease, is curable.²¹⁰ Yet we have only to consider how he intended to treat it – that is, principally, by the control of the temperature and humidity of the body by variations in the diet – to appreciate that, as with the 'purifiers' he was attacking, such comfort as his patients derived from his ministrations must have been very largely of a psychological nature, and thanks to their confidence in his ability or authority, rather than the result of his having, in this case, any real means of cure at his disposal.

No straightforward account, in which 'science' and 'philosophy' together and in unison stand opposed to 'magic' and the 'irrational', can be sustained in the face of the evident complexities both *within* and *between* the theory and practice of medicine on the one hand and those of the investigation concerning nature on the other. Our next task is to go back to the two key concepts of nature and of cause to examine what the different strands of speculative, rationalistic inquiry owed to pre- or at least non-speculative thought, as a first step towards determining how far the former should be seen as marking a radical break with the latter.

THE NOTIONS OF 'NATURE' AND 'CAUSE'

The idea of nature as implying a universal nexus of cause and effect comes to be made *explicit* in the course of the development of Presocratic philosophy, though we have emphasised the dangers of representing the Presocratic philosophers as having a uniform set of beliefs and attitudes on the subject. Yet an assumption of the regularity of natural phenomena is *implicit* in much of human behaviour. Whatever other factors the farmer may believe he has to

argument is based on a premise – that the god is responsible for the disease – that the Hippocratic writer himself rejects. As we have seen (p. 26), the only sense in which he is prepared to say the disease is divine is that in which all diseases are divine – because the whole of nature is.

²¹⁰ *Morb. Sacr.* ch. 18 paras. 1ff, especially 6 (G) (L VI 394.9ff, 396.5ff), see above pp. 21f.

take into account in order to insure a good crop of wheat, he knows that he will have no crop at all unless he sows seed. The hunter takes it that his arrows will normally fly straight: they will not be deflected from their course; it is not as if his chances of making a hit are as good if he points his bow in any direction and takes no aim at all, as if he takes careful aim at his target. We all take it for granted that stones fall, fire and smoke rise, however imprecise our ideas about 'heavy' and 'light' may be. To understand, let alone to learn from, experience at all presupposes some idea of the regularity of phenomena, although that idea may well be neither explicit nor universalised.²¹¹ It may be believed, for instance, that that regularity is subject not just to exceptions,²¹² but to interference from divine powers. Indeed the notion of what takes place normally or regularly may be, and often is, the basis of inferences that such an interference has taken place. A clear instance of such an inference in Homer is Teucer's reaction when his bow-string snaps when he aims at Hector in *Iliad* xv 458ff.²¹³ That a bow-string that he fitted new that morning (ἡρόστροφον, τρώϊον, 469f) should have snapped, is taken as a sign that there must be some δαίμων thwarting him, since new bow-strings are not expected to break – and similar inferences that the hand of heaven is at work can, naturally, be paralleled extensively throughout Greek literature.²¹⁴

²¹¹ Although, in Homer, what *we* should call natural phenomena are often associated with the gods, divine beings are not always invoked in their description, especially in the similes, e.g. *Il.* v 864f, xiv 16ff, xv 618ff, xvii 269ff.

²¹² One should distinguish cases where what is regular corresponds to what is always the case (for example that the sun rises in the East) from others where it admits of exceptions (for instance that the growth of a crop of wheat). 'Nature' for the Presocratic philosophers and Hippocratic writers encompasses both types of phenomena, but they do not distinguish explicitly between them as Aristotle was to do with the principle that nature is what happens 'always or for the most part' (see above, p. 36 n. 129).

²¹³ Other notable occasions when the exceptional character of an event is used as the basis of an inference that the gods are at work are *Il.* viii 199f, xiii 68ff, xv 290ff, xvii 119f and xxiv 563ff (where Achilles infers that a god brought Priam through the Achaean camp, since without divine help he would have dared to come), and even more commonly the general run of the battle is cited as evidence of whom the gods are favouring. Cf. also *Od.* xvi 194ff, xx 98ff (Zeus, asked for a sign, hunders from a cloudless sky).

²¹⁴ To cite an example from the classical period, at 1.174 Herodotus notes that in the digging of the canal across the isthmus at Cnidus the workforce suffered an exceptional number of injuries, particularly in the eyes, from which they concluded that they should consult Delphi to find out what was hindering them. τέφρα, ποτῆς or μόνστη were, of course, generally interpreted as signs from heaven or expressions of divine anger, though what was believed to be an exceptional phenomenon varied with the state of knowledge of the individuals concerned at the time. Archilochus expresses consternation at an eclipse of the sun (Fr. 74, D): but the famous case of the false hesitation of the Athenian army under Nicias when an eclipse of the moon occurred in their retreat from Syracuse in 413 B.C. (Th. vii 50) shows that such eclipses were still generally feared in the late fifth century.

This serves to illustrate both a connection, and a difference, between natural philosophy and pre- or non-philosophical thought. The connection is that the notion of φύσις may be said to build directly on ordinary experience of the regularities of nature:²¹⁵ in particular inferences to divine interventions based on the breaching of those regularities presuppose a firm idea of those regularities themselves. But the difference lies in the fact that the idea that every physical phenomenon has a natural cause is neither stated – nor, it would appear, assumed – as a universal rule before philosophy. As we saw, some idea of nature does not, by itself, exclude all beliefs in personal divine interventions,²¹⁶ but once the notion of nature as a universal principle is grasped, then those interferences must be seen as 'double determination' – where the god works through physical causes. The explicit expression of a universalised concept of nature involves a corresponding development or clarification in the notion of marvels or miracles: the category of the 'supernatural' develops, in fact, *pari passu* with that of the 'natural'.²¹⁷ Even in the philosophers, indeed, as we noted when discussing Empedocles, quite intensive investigations of nature may be combined with a belief in the possibility of wonder-working – although the exact status of the marvellous effects that Empedocles claimed could be produced is not clear.²¹⁸

Yet if there is a distinct ambivalence in the position of some philosophers and of some medical writers, in others the emphasis is more clearly²¹⁹ on the all-embracing character of the principle that every physical event has a determinate natural cause. While the idea of what is natural in the sense of what is usual permits exceptions, the notion of what is contrary to nature, τὰ πρὸ φύσις, comes to be used in that sense (the unusual, the irregular) not in a sense that implies that such events either have no physical cause or have causes that lie outside the domain of nature. It is the conception of a domain of nature encompassing *all* physical phenomena that is eventually – developed by some philosophers and that in some medical writers becomes the cornerstone of the rejection of the belief in the possibility of divine intervention in physical conditions. 'Marvels' ²¹⁹ Cf. Vlastos 1975, ch. 1.

²¹⁵ Cf. Vlastos 1975, ch. 1.

²¹⁶ See above, pp. 29ff, especially 30, on Herodotus.

²¹⁷ Not only is the category of the 'supernatural' the correlative of that of the 'natural', but what are treated as 'marvellous' phenomena come to be more clearly defined once the senses of 'nature' are distinguished.

²¹⁸ See above, pp. 33ff.

²¹⁹ In some cases, however, reservations are in order: cf. above, p. 32 n. 109 on Leucippus.

(δαυματα) and 'monsters' (τεπορα) then pick out phenomena that are unusual but in principle intelligible, even if not yet understood:²²⁰ and on such a view 'double determination' is otiose.

The second, related, key notion that we identified as underlying the attack on the purifiers in *On the Sacred Disease* is that of cause. Here too there are certain apparent connections, as well as differences, between the philosophical and medical writers and earlier thought. It is obvious that in the context of human behaviour, especially, the questions of who initiated or performed an action, of what human or indeed non-human agent was at work and thus in some however imprecise sense responsible or to blame for it, are of universal human interest and concern, although the assumptions made about the notion of 'responsibility' may differ profoundly from one society to another,²²¹ and in particular the idea that an event is due to some god or to fate may well be combined with – rather than thought of as alternative to – the notion that a human or humans are to blame. In the context of the development of Greek views on causation, it has long been recognised that much of the terminology, and some of the key ideas, originate in the human sphere. Of the words that came to be applied to causation in general, αἰτία and the cognate adjective αἰτιος are originally used primarily in the sphere of personal agency, where αἰτία may mean 'blame' or 'guilt'.²²²

Mythological 'aetiologies' are explanations only in a quite restricted sense. To attribute earthquakes to Poseidon is, from the point of view of an understanding of the nature of earthquakes, not to reduce the unknown to the known, but to exchange one unknown for another. While Poseidon's motives can be imagined in human terms (providing an answer of a kind to the question 'why?'), how an earthquake occurs is not thereby explained nor indeed at issue. If there is no question of assigning a historical origin to an interest in causal explanations of some kind, the deliberate investigation of how particular kinds of natural phenomena occur only begins with the

²²⁰ By the time we come to Aristotle, at least, where τήματα are seen as failures of the final cause (*Ph.* 199b4), they are said to be contrary to nature not in its entirety, but in what occurs in the generality of cases. 'As for the nature which is always and by necessity, nothing occurs contrary to that: unnatural occurrences are found only among those things which happen as they do for the most part, but which may happen otherwise... Even that which is contrary to nature is, in a way, in accordance with nature' (*GA* 770b9ff).

²²¹ The slow development of a coherent notion of responsibility in Greek thought has been traced by Adkins 1960.

²²² E.g. *Ph. O.* 1.35; cf. αἰτιος in the sense of 'culpable' in *Il.* 1.53. Some of the residual social and political associations of Greek terms for causes are discussed briefly in Lloyd 1966, pp. 230f.

philosophers: it was they who first attempted to explain what thunder, lightning, eclipses and the like are in terms of more familiar phenomena and processes.

Nevertheless to document the development of ideas about causation *as such*, we have, once again, to supplement our meagre evidence for the Presocratic philosophers from our other sources. The questions of establishing responsibility for an action, and of motivation and intention, are of recurrent concern both in the orators and, in certain contexts, in the dramatists, and passages in Herodotus and Thucydides show a developed interest in the problems of isolating the causes not just of historical events,²²³ but also of certain physical phenomena.²²⁴ On the latter question, however, it is again the medical writers who provide our richest mine of information.

The topics of what brought about a particular illness or was responsible for the amelioration in a patient's condition – and more generally of the causes, and cures, of particular types of disease – are repeatedly discussed in the Hippocratic Corpus. *On Regimen in Acute Diseases* is one work that draws attention to the fact that the same condition may have different causes:²²⁵ *On Regimen III* remarks that 'the sufferer always lays blame – αἰτιῆται -- on the thing he may happen to do at the time of the illness, even though this is not responsible – οὐκ αἰτιος εἶναι'.²²⁶ *On Ancient Medicine* also notes that 'if the patient has done something unusual near the day of the disease such as taking a bath, or going for a walk, or eating something different (when such things are all rather beneficial than otherwise), I know that most doctors, like laymen, assign the cause (αἰτίην) [of

²²³ Thucydides' views and comments on historical causation can be studied in many other passages besides those that deploy the terms αἰτία and ἄπορατος (as in the famous and much discussed text I 23, on which see most recently De Ste Croix 1972, pp. 52–8, and Rawlings 1975). One passage of special interest in relation to the question of the survival of traditional beliefs is II 17, where he remarks that the oracle given to the Athenians that 'it were better for the Pelagian ground to be unoccupied' came true in the opposite sense to what was expected. It was not because of the unlawful occupation of the sanctuaries that the city suffered calamities, but rather it was because of the war (and its calamities) that the sanctuaries were occupied.

²²⁴ Thus in Herodotus' discussion of the Nile's flooding (II 20ff) he argues against the theory that the Etesian winds are responsible (αἰτιος) on the grounds (α) that the Nile floods even when the Etesian winds do not blow, and (β) other rivers are not affected in a similar way by the Etesians.

²²⁵ *Acut. ch.* 11, I II 314.12ff (cf. Theophrastus, *HP IX* 19.4). Cf., e.g., *Frat.* ch. 25, I III 496.11ff, on the harmful effects of bad bandaging – which the physicians in question do not recognise as the cause, αἰτία, 500.10, of the exacerbations – and the more general discussion in *de Arte* ch. 4ff, *CMG I*, 11.5ff, concerning what is brought about by the art, and what is merely fortuitous, in disease and the recovery of health. *Fiat. ch.* 1, *CMG I*, 1 91.16ff is one text that points out the importance of knowing what is responsible (ἴδι αἰτιος) for diseases for determining effective remedies.

²²⁶ *Vit.* III ch. 70, I VI 606.20ff.

the disease] to one of these things, and in their ignorance of the responsible factor (αἴτιον), they stop what may have been most advantageous'.²²⁷ The same treatise attacks the hypothesis that 'the hot', for example, is an important cause of diseases by suggesting that it is not 'the hot' itself, but the other powers it is compounded with, that brings about illnesses,²²⁸ and the writer states the criteria that he believes a cause must fulfil: 'We must, therefore, consider the causes (αἴτια) of each condition to be those things which are such that, when they are present, the condition necessarily occurs, but when they change to another combination, it ceases.'²²⁹ The idea of a necessary condition is first expressed in the form of the 'that without which' (ἄκείνο δένε οὔ) in Plato's *Phaedo*.²³⁰ But without any special terminology,²³¹ the author of *On Ancient Medicine* certainly has a working notion of the distinction between causal and merely concomitant factors and conceives the former in terms of a set of factors that (as we should say) are together both necessary and sufficient conditions of the disease.²³² We should, however, add first that, like most Hippocratic writers, he is, in practice, both vague and dogmatic in his pronouncements on the causes of diseases, and, secondly and more importantly, that neither he nor any other Hippocratic writer engages in systematic testing in this context, varying the conditions of the patient or his treatment in an attempt to isolate the causal factors at work.

²²⁷ *VM* ch. 21, *CMG* 1, 1 52.17ff. *Epid.* II sec. 4 ch. 5, L v 126.10ff is one text that implies a distinction between treating the symptom and treating the underlying cause.

²²⁸ E.g. *VM* ch. 15, *CMG* 1, 1 46.18ff. In ch. 16ff he argues that hot and cold have little 'power' in the body partly on the grounds that heat is readily countered by cold and vice versa (48.10f, 49.16ff, 50.9ff), and in ch. 17 he concludes that heat is merely a concomitant (συμπόσεται) in fevers (48.21ff, 49.2).

²²⁹ *VM* ch. 19, *CMG* 1, 1 50.7ff: cf. the insistence, in ch. 20, on knowing not merely what a pain is but also why it comes about (62.7f, 51.24, cf. others, 52.3).

²³⁰ *Phd.* 99ab, where Socrates denies that the 'that without which' can truly be said to be an αἴτιον, for the αἴτιον of an event must state why it occurs in terms of the good aimed at.

²³¹ Rawlings, following Weidauer 1954, has argued that the Hippocratic writers develop τπόσεται as a special term (a lexeme from ποσάω, not from ποῦ) for the pre-condition of a disease: 'a *prophasis* is by its very nature... visible... it is... from outside... it precedes a disease and can be useful in predicting the course of the disease' (Rawlings 1975, p. 43). In this sense it is close to οἰσῶν (and in certain contexts to αἴτιον) but to be firmly contrasted with αἴτιον (the term for a necessary or primary cause). Reservations must, however, be expressed both about how far the two lexemes remained distinct, and about the extent to which the Hippocratic use was standardised and specialised. Generally used for an external sign or accessory cause, as opposed to necessary cause, it is sometimes a synonym for αἴτιον in the latter sense (as Rawlings recognises to be the case at *Mul.* 1 ch. 62, L viii 126.14ff, though he explains this as a later development).

²³² It is perhaps not too far-fetched to see the principle stated in *VM* ch. 19 as a remote ancestor to Mill's Canons of Agreement and Difference or at least of Bacon's *Tabulae Essentiae et Praesentiae* and his *Tabula Declinationis sine Absentiae in proximo*.

Evidence of reflection on the nature of causation can be cited from a number of medical texts. The importance of this for the criticism of traditional beliefs is clear when we turn back to some of the arguments that the author of *On the Sacred Disease* brings against his opponents. At one point he maintains that if the purifiers prohibit certain foodstuffs and the wearing of certain clothes on the grounds that these are relevant to the sacred disease, then this conflicts with their claim that the gods are at work: 'If contact with or eating of this animal generates and exacerbates the disease while abstinence from it cures the disease, then no god can be blamed (αἴτιος) and the purifications are useless: it is the foods that cure and hurt, and the idea of divine intervention comes to naught.'²³³ From the Hippocratic writer's point of view it is what is regularly associated with the disease that must be held responsible for it. Now the purifiers themselves might well remain unmoved by this argument, and maintain that divine causation operates *in addition* to the physical factors they pick out as significant. Moreover there is an even greater difficulty in positively excluding supernatural causes when the main 'evidence' adduced that they are at work is the very events they are supposed to bring about – when the causes are not known independently of the effects.²³⁴ Nevertheless the more that *regular observable* connections of physical causes and effects can be established in diseases, the easier it will be for any doctor who chooses to do so to argue that the invocation of other factors is unnecessary and unjustified, and that this is so whether the gods or divine beings are imagined as acting according to moral principles or quite capriciously, and whether the divine is cited as the sole, or an additional, explanation of diseases. The Hippocratic writer has an *ad hominem* argument against the purifiers, that if eating certain foods brings about the disease and abstinence its cure, then to appeal to the gods is superfluous and mistaken: and in general he evidently hopes or assumes that his audience at least – if not his opponents themselves – will agree that whatever explanation is offered, it must consist in physical factors to the exclusion of any reference to divine or supernatural agencies.

We may now try to take stock of some of the conclusions from this

²³³ *Morb. Sacr.* ch. 1 para. 23 (G) (L vi 358.1ff).

²³⁴ We may contrast the appeal to divine causes to explain a class of phenomena (such as all cases of epilepsy) with invoking such causes to account for exceptional individual events (where what happens is unusual or abnormal, and where that fact may even be cited as evidence that the gods are at work, as in the case of Teucer's bowstring, cf. p. 50 above).

first inquiry. We have found that a number of popular beliefs and practices come to be challenged not only in the context of religion (from at least the sixth century) but also (from the late fifth) in the domain of medicine. 'Magic' and 'magician' are among the terms employed to disparage some such practices and their practitioners. The connotations and denotations of these terms are not fixed (any more than those of 'charlatan', *ἀρχαῖον*, were): rather they are used of what particular writers happen to disapprove of, the association with a little known foreign tribe no doubt contributing to their derogatory undertones.²¹⁵ Nevertheless the grounds for the rejection of one set of such beliefs are made plain enough in the main text that engages in a sustained polemic against them. The writer of *On the Sacred Disease* has a conception of nature, and a view of what constitutes causal explanation, that rule out supernatural intervention in diseases.

The background of debate to which the discussion in this treatise belongs is an intricate one of complex relations both within medicine and within philosophy – and between the two. Although it is in the context of the philosophers' inquiries that the key move – the explicit expression of the idea of nature as a universal principle – is made, it is out of the question to represent all the Presocratic philosophers as sharing precisely the same views on this topic – and out of the question, too, to see them all as having adopted a uniformly sceptical and critical attitude towards traditional beliefs. Equally or many theoretical and practical issues the dividing lines that separate healers of different kinds are anything but clear-cut.

The weaknesses and vulnerability of the position of the Hippocratic rationalists are striking. This is firstly a matter of the insecure demarcations between different kinds of medical practitioners that we have just mentioned. Healers of very varied persuasions share many therapeutic and diagnostic practices and often used the same terms to describe their aims. Secondly, there is the inexact and fanciful nature of the actual anatomical and physiological 'knowledge' that the Hippocratic writers generally claimed: we have illustrated this from *On the Sacred Disease*, and the Hippocratic collection is full of similar examples. Thirdly, although many commentators have connected the rejection of magic with an increase in the effective technological control that could be exercised over the phenomena in question, we have seen reason to doubt this. In the case of epilepsy, at least, the claims that *On the Sacred Disease* make concerning the possibilities of cure are wishful thinking.

²¹⁵ Cf., e.g., Mauss (1950) 1972, p. 31, on the connection between sorcery and foreign

Nevertheless it is on (among other things) the question of practical effectiveness that the Hippocratic writer finds a weak spot in his opponents' position. He clearly represents them – and equally those who set up the Epidaurus inscriptions represent their god – as making claims concerning the cures effected, and this gives his attack a purchase it would not otherwise have had. Once battle was joined on that ground, the Hippocratic writers and the purifiers were, and could be seen to be, in direct competition with one another.

But if the issue in medicine was partly a matter of results, the reasons offered for success or failure varied with the individuals or groups concerned. If neither the Hippocratic writers nor – we may imagine – the temple healers were unduly deterred by failures, this was because each side had some confidence in the *kind* of explanation they proposed. Against the purifiers, the Hippocratic rationalists insisted on aetiologies, and on treatments, that referred exclusively to physical factors (though there was, as we have seen, plenty of disagreement about what came under that head). How far they persuaded their own contemporaries was another matter. Temple medicine, after all, not only continued to flourish, but actually expanded, after the fifth century B.C. The Hippocratic writers certainly had no knock-down refutation of double determination, particularly as a stubborn opponent might always multiply *ad hoc* explanations. Moreover the element of over-optimism – or pure bluff – in the Hippocratics' own position is clear: many of their treatments were ineffectual and many of the correlations and causal connections they announced as fact (such as restriction of epilepsy to those of phlegmatic constitution) were imaginary. Yet what they could and did do was – negatively – to undermine their opponents' doctrines by arguing that appeals to the gods are arbitrary and superfluous, and that secondary elaborations were indeed just that, excuses or screens for failure, and – positively – to offer an alternative explanatory framework. If some awareness of the determinate characters of things and of the regularities of natural causes and effects is part of all human experience, the plausibility of the Hippocratic rationalists' view rested partly on the fact that it was an extension or extrapolation of that awareness, now made explicit, universalised, and treated as the sole valid explanatory principle. Finally while many of their proposed correlations might be challenged and overthrown, they could hope that their overall position would be strengthened as more observable regularities were established and successful explanations achieved.

The problem of the social conditions that may have furthered or allowed the developments we have described will be discussed in our final chapter. The topic of the growth of observation and research – of the extension of the empirical base of Greek science – will occupy us in chapter three. We have found that the strength of some of the writers who were at the centre of the debate we have considered in this chapter lies in the modes of argument, both constructive and destructive, that they deployed, and this aspect of the development of Greek science will form the subject of our next study.

DIALECTIC AND DEMONSTRATION

SOME COMPARATIVE CONSIDERATIONS

There can be few societies that do not, in some degree, prize skill in speaking, and the variety of contexts in which it may be displayed is very great. Apart from in the arts of the poet or story-teller¹ and of the seer or prophet, eloquence may be exhibited in a number of other more or less formalised situations, including eulogies of the powerful² and contests of abuse such as the song duels reported from the Eskimos.³ Good speaking and good judgement – and the two are often not sharply distinguished – need to be shown wherever groups of individuals meet to discuss matters of consequence concerning the running of the society, its day-to-day life and internal affairs and its relations with its neighbours.

In the context of law and justice, especially, the members of some non-literate societies are considerable connoisseurs of the speaking skills of litigants and judges, of, for example, their ability to present a case, to cross-examine witnesses and to give judgement. Thus in his study of Barotse law Gluckman reports a rich vocabulary of terms used in Lozi to 'describe different modes of expounding arguments, judicial and other'. They include separate single words for being 'able to classify affairs', for being 'clever and of prompt decision', for 'a judge who relates matters lengthily and correctly', for 'a judge who has good reasoning power and is able to ask searching questions', and again, among terms of disapproval, for 'to speak on matters without coming to the point', for 'to wander away from the subject when speaking', for 'a judge who speaks without touching on the important

¹ The poets may, but need not be, specialists: see, for example, Finnegan 1977, pp. 170ff.

² See, for example, Finnegan 1977, pp. 188ff on Zulu praise poems.

³ See Hoebel 1964, p. 93: 'Song duels are used to work off grudges and disputes of all orders, save murder. An East Greenlander, however, may seek his satisfaction for the murder of a relative through a song contest if he is physically too weak to gain his end, or if he is so skilled in singing as to feel certain of victory. Inasmuch as East Greenlanders get so engrossed in the mere artistry of the singing as to forget the cause of the grudge, this is understandable. Singing skill among these Eskimos equals or outranks gross physical prowess.'