Hyperboreus Vol. 3 (1997) Fasc. 2

ΑΡΧΗ*

The first recorded use of the word ἀρχή in Greek philosophy or science is attributed to the sixth century B. C. Ionian cosmologist Anaximander of Miletus: an obscure name today, but a pioneer of incomparable importance in the history of western thought – for systematic cosmology, built not on the traditions of myth but on reasoning about nature, was his invention. He is said to have applied the term to the ἄπειρον, the boundless or infinite from which 'universes and the orderings within them' come into being. His claim was presumably that the infinite is the ultimate *origin* of things: where and what they come from[1].

That is not, however, the emphasis the Aristotelian tradition of interpretation of Presocratic thought gave to Anaximander's thesis. It construed him as meaning in the first instance that the infinite was the *principle* underlying all that exists (and that ever has existed) – and all the processes of birth, death and transformation to which they are subject. This notion of ἀρχή as principle is best approached from the perspective of theory construction. The idea Anaximander was supposed to have had was one about how things are to be explained. What best accounts not only for the origin but for the continuing existence of any universe that comes into being, despite the conflict within it of elemental forces such as hot and cold, is the hypothesis that they inhere in something more fundamental – in Aristotelian parlance a substratum, viz. matter. It is this material substratum which Anaximander was conceived as designating by his use of the word ἀρχή: the infinite so interpreted functions as ontological *primitive*, i. e. as playing an irreducible and fundamental role in the theo-

---

* This paper will also appear in Italian translation, in S. Settis (ed.), *I Greci* II/2 (Torino) forthcoming.

1 Evidence: Hippolytus, *Refutation* I. 6. 1–2 (Diels / Kranz, *Die Fragmente der Vorsokratiker* [Berlin ^{5}1951–52] 12 A 11); Pseudo-Plutarch, *Stromateis* 2 (DK 12 A 10); Simplicius, *Physics* 24. 13–25 (DK 12 A 9). Discussion: C. H. Kahn, *Anaximander and the Origins of Greek Cosmology* (New York 1960); G. S. Kirk / J. E. Raven / M. Schofield, *The Presocratic Philosophers* (Cambridge ^{2}1983); M. Conche, *Anaximandre* (Paris 1991).

retical system of cosmology he had proposed[2].

This conflict over what Anaximander meant when he used ἀρχή is precisely paralleled by a disagreement about the interpretation of the thought of his mentor Thales, who in the eyes of posterity was 'the first to have revealed the investigation of nature to the Greeks'[3]. As construed by Aristotle and the Aristotelian tradition, Thales made water the ἀρχή of all things, in the sense once again of the material principle underlying all change. On Aristotle's view, water is what in his system supports and sustains e. g. the coming into being and growth of all living things; and on grounds of this kind he counts water as Thales' ἀρχή: it is the ontological primitive in *his* theoretical system. But modern scholarship takes it to be much more likely that the role Thales assigned to water was – as with Anaximander's infinite – that of ἀρχή in a different and earlier sense: the origin of things, where and what they came from[4].

The reasons for thinking that for Anaximander ἀρχή meant 'origin', not 'principle' (understood as primitive within a theoretical system), are numerous and compelling. First, as has already been indicated, there is good evidence, actually supplied by the Aristotelian tradition itself, that he posited a plurality of universes all emerging from the boundless or infinite. The boundless is their origin; and ἀρχή would have been a natural expression to use to say so. We hear of arguments designed to show that such an origin *must* be infinite: for example, that if it were not, the fuel supply for generating worlds would run out. By contrast, little favours the authenticity of the attri-

---

2 See e. g. Aristotle, *Physics* 207 b 34 – 208 a 4, *Metaphysics* 1069 b 2–24; Simplicius, *Physics* 24. 21–23, with discussion by M.C. Stokes, *One and Many in Presocratic Philosophy* (Washington, D. C. 1971) ch. 2.

3 Simplicius, *Physics* 23. 29–30; cf. Aristotle, *Metaphysics* 983 b 20–21. Some would still see Thales as a more important figure than Anaximander, if it was Thales who established the basic cosmological framework and at least embryonically abstract patterns of reasoning characteristic of Ionian speculation: see e. g. D. Panchenko, "Thales and the origin of theoretical reasoning", *Configurations* 3 (1993) 387–414; M. L. West, "Ab ovo", *CQ* 44 (1994) 289–307.

4 Evidence: Aristotle, *Metaphysics* 983 b 6–27. Discussion: B. Snell, "Die Nachrichten über die Lehren des Thales", *Philologus* 96 (1944) 170–82; J. Mansfeld, *Studies in the Historiography of Greek Philosophy* (Assen 1990) ch. 2 & 3; D. Panchenko, *op. cit.*, who takes Thales' hypothesis of water as origin to be innovative in its logical structure, particularly insofar as it is designed to avoid the danger of infinite regress (by its association – as Panchenko argues – with the idea of a cycle of transformations of matter, so that nothing comes out of nothing).

bution to Anaximander of the notion that within any given universe the infinite, while retaining its nature of being infinite, functions as the substrate of the changes to which that universe is subject. The evidence for it put forward e. g. by the Aristotelian commentator Simplicius (a quotation about change from Anaximander's book which neither says nor implies anything about a substrate) is unconvincing. And it is an obscure and implausible notion, apparently due to Aristotle's inability to refrain from imposing the straitjacket of his own categories on earlier thought. In the similar case of Thales, there is more plausibility in the notion that water somehow supports and underlies all life – but Aristotle himself makes it clear enough that this is only a speculative interpretation of his own. A better clue to Thales' thinking is given by the evidence for other Ionian thinkers of the sixth century, who are explicitly recorded as holding e. g. that dry land emerges where water once was (Xenophanes) and that land animals have evolved from ancestors who were amphibious sea-creatures (Anaximander). Such views treat water as origin, as it is also presented in the source from which Aristotle got his information about Thales: a list compiled by the late fifth century sophist Hippias of poets and others who made water the γένεσις of things – i. e. the answer to the question of how and when they *began*[5].

Second, 'beginning' or 'origin' is what ἀρχή standardly means in Greek, at any rate down to the fifth century B. C. Thus Homer recalls the time of the 'beginning of trouble' for Trojans and Greeks brought about by the schemes of mighty Zeus. Thucydides sees the overtures made to Xerxes by Pausanias, the Spartan king, as 'the beginning of the whole business' of his attempt to rule over the whole of Greece. Sometimes 'beginning' or 'origin' carries in addition the suggestion of cause or at least trigger of subsequent events. Hector in the *Iliad* is clear that Paris's abduction of Helen was the νείκεος ἀρχή, 'the origin of the quarrel' between Greeks and Trojans. Herodotus makes the dispatch by the Athenians of twenty ships to assist the Ionian revolt 'the beginnings of evils for both the Greeks and the barbarians'. The author of *On Ancient Medicine* observes that when people switch from one to two meals a day, the physical effects (which may include

---

[5] Evidence mainly as in nn. 1 & 4. Fuel supply: Aetius I. 3. 3 (DK 12 A 14), Simplicius, *De Caelo* 615. 15–18 (DK 12 A 17); cf. Aristotle, *Physics* 203 b 18–20. Xenophanes: Hippolytus *Refutation* I. 14. 5–6 (DK 21 A 33). Amphibious ancestors: Aetius V. 19. 4, Censorinus, *De Die Natali* 4. 7, Plutarch, *Symposium* 730 e (all in DK 12 A 30). Hippias' list: Plato, *Cratylus* 402 a–c, Aristotle, *Metaphysics* 983 b 27–33, Clement, *Stromateis* VI. 15 (DK 86 B 6).

colic and diarrhoea) often constitute 'the origin of a serious illness'. Another major use of ἀρχή, first attested in Pindar and Aeschylus (early fifth century), was already current by the time Herodotus, Thucydides and the early Hippocratic writers were at work: 'sovereignty' or 'rule' or 'control'. But although Anaximander did conceive of the boundless as somehow controlling all things, he seems to have resorted to the metaphor of steering (κυβερνᾶν) to express this idea[6].

Finally, use of ἀρχή to mean 'principle' presupposes a degree of methodological and epistemological self-consciousness which there is no reason to ascribe to Anaximander. It would suggest that he himself conceived the project on which he was engaged as the construction of a theory in which the secondary was explicitly derived from the primary, the *explananda* distinguished from the primitives expressly posited in order to explain them. These may be categories we find useful in describing what he was effectively doing. But the evidence points to a quite different conclusion about Anaximander's own presentation of his cosmology. He put it forward as a straightforward creation narrative, a secular version of Hesiod's account of the genealogy of gods in the *Theogony*. It was only fairly late on in the fifth century that speculative thinkers began to convey some sense of recognising their own activity as theory construction of the sort just described, albeit without explicit analysis of what a scientific theory is such as we find in Aristotle's *Posterior Analytics*.

We can document this development in medical writers as well as philosophical cosmologists. The philosophical context is constituted by the cosmologists' response to Parmenides' radical attack on the assumption that the inquiries characteristic of speculation about nature can ever bring about a secure grasp of truth and reality. Parmenides (active around 500 B. C.) had himself laid the foundations for a contrast between what is real and what is apparent, or between the natural and the conventional. If in elaborating these oppositions in the service of cosmology a theorist were to reflect on the explanatory structure implicit in them, then – but not until then – conditions might be ripe for the word ἀρχή to present itself as the *mot propre* for talk about the role of the real in explanations of the appearances[7].

---

[6] See *LSJ* s. v. ἀρχή. References: Homer, *Odyssey* VIII. 81, Thucydides I. 128. 4, Homer, *Iliad* XXII. 116, Herodotus V. 97. 3, Hippocrates, *On Ancient Medicine* 10. 'Steering' in Anaximander: Aristotle, *Physics* 203 b 10–15.

[7] For orientation on Parmenides and his legacy see e. g. E. L. Hussey, *The*

It took some time before any cosmologist gave this form to his reaction to the Parmenidean challenge. For example, although Anaxagoras (500–428 B. C.) appears to have endorsed the maxim: 'Appearances are a glimpse of the obscure', in his general philosophical vocabulary he does not distinguish between what is fundamental and what is not: χρήματα, 'things', serves as an all-purpose ontological designator; and he sees no need to dissolve the ambiguities of his principal thesis: 'All things in everything'. It is probably significant that he found creation narrative still an adequate vehicle for presenting his cosmology[8]. By contrast both Empedocles (c. 495–35) and the atomists (second half of the fifth century) develop the distinction between basic realities and the mixtures and compounds they form to create the things our senses perceive. Empedocles talks of the four elements as 'roots' and 'source' of all else [9]. There is no evidence as to whether the atomists used any similar metaphors of atoms and void. Democritus did propound a range of views on the related issue of the epistemic authority of sense perception in comparison to the mind[10]. But it is not clear that from any of this we may infer explicit reflection on the explanatory structure of their own theories on the part of either Empedocles or the atomists. And there is still no indication in reports of their doctrines that they employed the word ἀρχή meaning 'principle'.

Self-conscious reflection about explanation does at last emerge in the one surviving major text of Presocratic philosophy in which ἀρχαί as principles are introduced. This is a key passage (Fr. 6) from the Pythagorean Philolaus, who was active in the last decades of the fifth century. Its importance justifies quotation:

> About nature and harmony this is the position. The being of things, which is everlasting, and nature in itself admit of divine, not human knowledge – except that it was impossible for any of the things that

---

Presocratics (London 1972) ch. 5 & 7; Kirk / Raven / Schofield, *The Presocratic Philosophers* 239–62, 351; also F. Heinimann, *Nomos und Physis* (Basel 1945).

[8] Maxim: Sextus Empiricus, *Adversus Mathematicos* VII. 140 (DK 59 B 21 a). Principal thesis: Aristotle, *Physics* 187 b 1–7, Simplicius, *Physics* 27. 2–11, 164. 20 – 165. 1 (DK 59 B 11, 6). Discussion in M. Schofield, *An Essay on Anaxagoras* (Cambridge 1980) ch.4.

[9] Aetius I. 3. 20 (DK 31 B 6), Simplicius, *Physics* 160. 10 (DK 31 B 23. 10).

[10] Sextus Empiricus, *Adversus Mathematicos* VII. 135–40 (DK 68 B 6–11), Galen, *On Medical Experience* p. 113 Walzer (DK 68 B 125). Discussion: J. Barnes, *The Presocratic Philosophers* II (London 1979) 257–62; Kirk / Raven / Schofield, *The Presocratic Philosophers*, 409–13; D. N. Sedley, "Sextus Empiricus and the atomist criteria of truth", *Elenchos* 13 (1992) 19–56.

> exist and are known by us to have come into being, unless there preexisted the being of the things from which the world-order was composed, both the limiters and the unlimiteds. And since these principles (ἀρχαί) preexisted but were neither alike even akin, it would have been impossible for them to be ordered if harmony had not supervened – in whatever manner it came into being.

Philolaus presents the subtle argument that what we can know about the real being of things (which – following Parmenides and other Eleatics – he takes to be eternal) is only, but at least, this: it is whatever is the *sine qua non* for the existence of the things (i. e. temporal, phenomenal things) with which we are acquainted. He evidently supposes that on this basis we are justified in inferring the existence of what he calls 'limiters and unlimiteds' as ultimate principles of things. Their status as ἀρχαί, principles, seems to derive in the first instance from their being what the universe (or any ordered entity within it) is composed from or out of. But before the word ἀρχαί is used Philolaus has already in effect explained how 'from' or 'out of' is to be construed: in terms of the conditions necessary for the existence of the things we experience. And this explanation is presented not as part of an account (still less a cosmological narrative) of how things came to be, but as a specification of what *we* can *know* about transcendent reality. In short, the introduction of the notion of ἀρχαί is intimately tied to a reflexive turn in cosmological inquiry[11].

Fr. 6 was not the only passage where Philolaus talked of ἀρχαί. Fr. 13 summarizes – obscurely and (in its present state of preservation) ungrammatically – a system of physiological explanation, which associates the brain with the ἀρχή of the man, the heart with the ἀρχή of the animal, the navel with the ἀρχή of the plant, and the genitals with all of them. Here it looks as though Philolaus, while still primarily concerned with specifying conditions requisite for something's existence, had in mind something rather more specific, at any rate if we follow the way Aristotle perhaps read the theory. In the entry on ἀρχή in his philosophical lexicon he identifies a use of the word to specify what one might call the originating part of a thing: the constituent whose presence will enable the rest of an artefact to be con-

---

[11] Text: Stobaeus, *Eclogae* I. 21. 7 d (DK 44 B 6). Discussion: W. Burkert, *Lore and Science in Ancient Pythagoreanism* (Cambridge, Mass. 1972) ch. 3; M. C. Nussbaum, "Eleatic conventionalism and Philolaus on the conditions of thought", *Harvard Studies in Classical Philology* 83 (1979) 63–108; C. Huffman, *Philolaus of Croton* (Cambridge 1993) 123–45.

structed or of an organism to grow. He gives as examples the keel of a boat, the foundations of a house – and for animals the heart or the brain (depending, presumably, on which among rival theories you subscribe to)[12]. This interpretation works particularly well for the navel, associated with the plant (i. e. the plant-like aspect of us): Philolaus explains that it is how we are rooted, presumably to our mothers, and acquire our first growth. On the other hand the point about the heart and the brain might be better construed as the claim (exploiting the quite different use of ἀρχή to mean 'rule' or 'control') that they are parts of the body which *control* respectively our animal and our distinctively human functions – just as Aristotle was to speak of the heart as the site of control or authority (τὸ κύριον) over the sensory system, and the Stoics were to make it the location of the 'commanding faculty' (ἡγεμονικόν). The genitals – the final item on Philolaus' list – are an ἀρχή simply inasmuch as they are the source of the seed which generates new life. It is hard to resist the suspicion that his enthusiasm for the new concept of an ἀρχή outran his ability to use it discriminatingly[13].

Roughly contemporaneous philosophical and medical texts yield further instances of ἀρχή, frequently in what I am calling reflexive contexts. (In so doing they give incidental support to the much-debated authenticity of the Philolaus passages just discussed[14].) Thus the late fifth century writer Diogenes of Apollonia, often seen as the last of the long line of Presocratic philosophers, began one of his books with the statement that an author should make his ἀρχή uncontrovertible and his mode of expression simple and dignified. Here ἀρχή is simultaneously the starting-point of the exposition and the principle, i. e. the primordial idea, from which all subsequent explanations will be derived. Parallels from early medical treatises in the Hippocratic corpus are easy to find. *On Ancient Medicine* begins with a critique of those who narrow down 'the ἀρχή of the explanation of death and disease', and make it the same in all cases: here, too, ἀρχή is both starting-point and the principle governing explanation. The author of *On the Art* claims that the ἀρχή of *his* presentation will be agreed by all: this time the starting-point is not a principle of explana-

---

[12] Aristotle, *Metaphysics* 1013 a 4–7.

[13] Text: *Theologoumena Arithmeticae*, p. 25. 17 ff. De Falco (DK 44 B 13). Discussion: Huffman, *Philolaus* 78–92, 307–23.

[14] Burkert, *Lore and Science*, ch. 3, is the classic modern defence of the authenticity of Fr. 1–7, 13, and 17. The latest major review of the issues is by Huffman, *Philolaus*, pt. I.

tion, but a premiss which underlies the rest of his argument – the modest premiss that some of those treated by medicine recover their health[15].

What emerges clearly enough from these late fifth-century texts is a climate of controversy. This is quite explicit in the case of the Hippocratic treatises, which are expressly devoted to defending medicine against detractors or rival accounts of what it is. But it is also presupposed by Diogenes' way of introducing the theory he is going to put forward. And even Philolaus sees the need to be present himself as exercising care and modesty about what he is claiming and why. There is other evidence of the competitiveness of the environment in which intellectuals of this period operated. One of the leading figures among them, Gorgias of Leontini, refers to the disputes of philosophers and cosmologists in his display oration *Helen*, and treats them as comparable with the public contests of the law-courts. Plato's caricature in his *Protagoras* of the rivalry between the sophists Protagoras, Hippias and Prodicus would lose much of its point if it did not reflect historical reality. No doubt the growth of a preoccupation with methodology – and with starting-points and principles – was in part a response and a contribution to professional competition. The threat posed by competitors must have suggested both the need to defend and explain one's own stance, and an opportunity to comment explicitly on its advantages over other positions[16].

In *On Ancient Medicine* ἀρχή is introduced in close proximity with two other expressions indicating methodological preoccupations. The error wrongheaded theorists make is further specified as *hypothesizing* as their hypothesis just one or two factors, such as hot or cold or moist or dry. They ignore what medicine has possessed for a long time: an ἀρχή (i. e. a *proper* starting-point) and a *'way'* or method which it has discovered, viz. experience and experimentation. Here the author introduces a perspective which is often taken to be the salient characteristic of the practice as well as the theory of the early Hippocratic school, and indeed the chief reason for seeing in the development of Hippocratic medicine the beginnings of a scientific approach to the study and treatment of disease. Perhaps he exaggerates

---

[15] Diogenes: Diogenes Laertius IX. 57 (DK 64 B 1); *On Ancient Medicine* 1; *On the Art* 4.

[16] Gorgias, *Helen* 13 (DK 82 B 11. 13); Plato, *Protagoras* 314 e – 319 a, 333 d – 338 e. On the competitive context: G. E. R. Lloyd, *Magic, Reason and Experience* (Cambridge 1979) 86–98; *The Revolutions of Wisdom* (Berkeley / Los Angeles / London 1987) ch. 2; *Demystifying Mentalities* (Cambridge 1990).

the gulf which separates Hippocratic theory and practice from the alternatives he rejects. What is important for our purposes is that *On Ancient Medicine* is the first surviving document from ancient Greece to ask explicitly and in general terms whether the ἀρχή of explanation is a matter for speculative and reductive hypothesis or for the lessons of long and various experience[17].

The suggestion by its writer that mistaken principles of explanation function as hypotheses or postulates in the theories of other authors probably transfers to medicine vocabulary at home originally in mathematics[18]. At any rate, in the *Meno* Plato (428–348 B. C.) makes Socrates advocate using in ethical inquiry the technique employed in geometry of investigating a problem by means of a hypothesis or postulate. As Gregory Vlastos has described it, instead of investigating the truth of proposition *p* directly 'you hit upon another proposition *h* ("the hypothesis"), such that *p* is true if and only if *h* is true, and then investigate the truth of *h*, undertaking to determine what would follow (quite apart from *p*) if *h* were true and, alternatively, if it were false'[19]. The same method, under a revised description, is proposed for the search for explanations in general in the *Phaedo*; and here Plato, like the author of *On Ancient Medicine*, refers to hypothesis so understood as ἀρχή, principle of explanation, at one point in his theoretical account of the method[20]. It may well be that mathematicians themselves, as well as doctors and philosophers, talked of ἀρχαί in this kind of context. The composition of the first work on geometry later writers would recognise as a treatment of 'elements' (στοιχεῖα) by Hippocrates of Chios, perhaps around 430 B. C., enhances the possibility. But among the exiguous remains of pre-Euclidean mathematics no clear evidence of it survives[21].

---

[17] *On Ancient Medicine* 1–2. Discussion: Lloyd, *Magic, Reason and Experience*, ch. 3.

[18] See further G. E. R. Lloyd, *Methods and Problems in Greek Science* (Cambridge 1991) ch. 3.

[19] Plato, *Meno* 86 d – 87 c; cf. G. Vlastos, *Socrates: Ironist and Moral Philosopher* (Cambridge 1991) ch. 4 (quotation from p. 123).

[20] Plato, *Phaedo* 99c-102a (ἀρχή: 101 e). For Plato's method or methods of hypothesis see e. g. R. Robinson, *Plato's Earlier Dialectic* (Oxford ²1953); I. Mueller, "Mathematical method and philosophical truth", in R. Kraut (ed.), *The Cambridge Companion to Plato* (Cambridge 1992) ch. 5.

[21] Hippocrates on 'elements': Proclus, *Commentary on Euclid I*, p. 66. 4–8 Friedlein. There has been much dispute over the intellectual context of interest in first principles, definitions, proof, etc. in early mathematics. See e. g. A. Szabó, *Anfänge der Griechischen Mathematik* (München / Wien 1969) pt. III;

Plato reserves his most celebrated discussion of the notions of ἀρχή and hypothesis for the central metaphysical books of the *Republic*. Having in earlier dialogues exploited with enthusiasm the procedures of mathematics, he now introduces some criticism too. The critique concerns the relationship between a hypothesis and an ἀρχή properly understood. Plato complains that there is a mode or level of thinking, characteristic of mathematics, which for all its merits is content to postulate hypotheses without ever seeking to give an account of why they are correct. Thus mathematicians posit odd and even and the various figures and three sorts of angle, as though they possessed genuine knowledge about them. And they then use them without further ado as principles (ἀρχαί) from which they proceed to derive conclusions. The method of true dialectical thinking treats hypotheses as just that – postulates; and it makes them merely stepping-stones and spring-boards for the discovery of something higher: described variously as an *unhypothetical* ἀρχή or as the ἀρχή of the whole of reality. The identity of this ἀρχή is specified as the form of the good, conceived of as cause or explanation of both knowledge and reality. The dialectician must be able not merely to grasp it but to give an account of it (otherwise it too will remain for him a hypothesis, presumably). Someone who achieves this understanding will then be in a position to confirm his original lower-level hypotheses, so that their status as postulates is done away with, and they become genuine knowledge[22].

With the *Republic* we move one step beyond the introduction of ἀρχή into reflexive discourse about intellectual inquiry. Plato here raises the question of what conditions a starting-point for explanation must satisfy if it is to count as a genuine ἀρχή. To put it differently, he reflects on the reflexive discourse itself. There is another exercise in broadly the same genre in one of his other dialogues, the *Phaedrus*. This time Plato makes some points about the ontological status of a principle. He has been arguing that soul is an unceasing and therefore

---

W. R. Knorr, "On the early history of axiomatics: the interaction of mathematics and philosophy in Greek antiquity", in J. Hintikka / D. Gruender / E. Agazzi (eds.), *Theory Change, Ancient Axiomatics, and Galileo's Methodology* (Dordrecht 1981) 145–86; Lloyd, *Magic, Reason and Experience*, ch. 2; *Demystifying Mentalities*, ch. 3.

[22] See *Rep.* VI. 509 d – 511 e, VII. 532 d – 535 a. These passages are the subject of an enormous volume of commentary. For orientation consult J. Annas, *An Introduction to Plato's Republic* (Oxford 1981) ch. 10 and 11; M. F. Burnyeat, "Platonism and mathematics: a prelude to discussion", in A. Graeser (ed.), *Mathematics and Metaphysics in Aristotle* (Bern / Stuttgart 1987) 213–40.

immortal self-mover, and also 'source and principle (ἀρχή)' of motion or change for everything else that moves or changes (245 c). Then follows some reflection on what must be true with respect to any ontological primitive whatsoever. The discussion is apparently no longer confined to principles of motion; and what is said with respect to the more general notion of coming into being could be applied not just to things with temporal careers, but to anything that has any kind of *derivative* existence (245 d):

> Now a principle cannot come into being. For everything that comes to be must come to be from a principle, but it cannot itself come from anything: for if a principle did come to be from something, it would not come to be from a principle[23]. Furthermore, since it cannot come into being, it must also be indestructible. For assuredly if a principle ceases to be it will never itself come into being from anything, nor will anything else come into being from it, given that everything must come into being from a principle.

As in Philolaus an ἀρχή or principle is conceived of as what something is from or out of. And Plato is in effect undertaking to show what Philolaus had merely asserted: that a principle so conceived must exist eternally or everlastingly.

As well as exploring what it is to be a principle, Plato shifts the main focus of inquiry away from explaining things in terms of first principles to determining what those principles actually are. In both of these enterprises the *Republic* is pregnant and suggestive, not even in intention a definitive treatment. This is true especially of its vision of the form of the good, introduced with many disclaimers of knowledge and authority (504 a – 509 c). But the *Republic's* discussion of ἀρχαί was immensely influential, as may be inferred from the writings of Plato's great pupil Aristotle (384–22 B. C.).

"It is clear, says Aristotle at the end of the first chapter of his *Metaphysics* (982 a 1–3), that wisdom is knowledge about certain principles and causes." It is a measure of the transformation in the conception of science and philosophy charted in the preceding pages that he can claim this to be something everyone supposes to be true. In his accustomed fashion he supports the assertion by appealing to popular beliefs. Those he cites mostly relate to contrasts between ex-

---

[23] This translates the MSS. reading, wrongly emended in Burnet's OCT. Plato's assumption is that a principle would not be a principle if it was itself from a principle: presumably because *it* would no longer be the beginning or starting-point.

pertise and experience or sense-perception. Those with expertise are taken to be wiser than those with experience only, because they have not just factual knowledge but are aware of the explanation and the reason why. Similarly master-craftsmen are held in greater esteem than artisans and are reckoned to have more knowledge than them, again because they know the explanations for the things that are being made. We don't think there is any wisdom in the senses: they tell us *that* fire is hot, but not why[24].

Aristotle actually thinks he can find support from common opinion for a more ambitious thesis than has so far been indicated: people suppose that the kind of wisdom he is talking about is concerned not just with explanations and principles, but with *primitive* or *primary* causes and principles (981 b 27–29). As we might put it, people in general are broadly speaking Platonists in their view of what it is to count as having wisdom or understanding. To support this contention Aristotle lists a number of 'the assumptions we have' about the wise person. So far as is feasible he knows everything, not just individual facts; he knows things that are difficult for a human being to know (one reason why wisdom is not associated with sense-perception); he is more exact and better at teaching explanations in every branch of knowledge. Wisdom is knowledge pursued for its own sake rather than knowledge desirable for its results, a governing or architectonic science rather than a subordinate one. Armed with these commonly accepted criteria, Aristotle then proceeds to argue that sciences or forms of knowledge best satisfy them the more universal they are, the more primary their objects, and the more concerned they are with explanations. In particular, what is most worth knowing for its own sake is what most qualifies as knowledge, and this is knowledge of what is primary and of causes – since it is by virtue of them that we grasp everything else. And the supreme kind of architectonic knowledge grasps what is best (understood in terms of its purpose) in the case of nature taken as a whole. All the criteria point in the same direction: to a form of knowledge concerned with the theoretical study of primary principles (ἀρχαί) and causes[25].

This conception of wisdom or understanding certainly governs Aristotle's own procedure in every field of theoretical inquiry. Physics

---

[24] See *Metaph.* A. 1, 981 a 24 – b 13, with the commentary of W. D. Ross, *Aristotle's Metaphysics* I–II (Oxford 1924); cf. also J. Lear, *Aristotle: the Desire to Understand* (Cambridge 1988) ch. 1. 'His accustomed fashion': see G. E. L. Owen, *Logic, Science and Dialectic* (London 1986) ch. 13.

[25] This paragraph summarises *Metaph.* A. 2. See further Ross ad loc.

is taken to be concerned with the first principles of change in general and natural change in particular. In biology discussion is everywhere shaped by the drive to find explanations: whether how e. g. the parts of animals are necessarily as they are or serve a purpose, or what fundamental principles dictate sexual reproduction as the means whereby species perpetuate themselves[26]. Aristotle's most comprehensive essay in metaphysics (Book XII of the *Metaphysics*) is presented as a study of the principles of substance, and ends with a proof of the existence of an ultimate or first principle governing nature as a whole: the activity of pure thinking which he identifies as the life of god, and which the rest of nature is to be construed as striving to emulate in whatever way it can. In working out this view Aristotle mentions and dismisses the alternative positions of a variety of other thinkers, notably those of his rivals in Plato's Academy, Speusippus and Xenocrates, discussed at greater length in Books XIII and XIV. What is important for present purposes is that he portrays his disagreements with them precisely as disputes over first principles. All parties within the Academy are represented as holding that everything else is ultimately to be explained by reference to a primary unchangeable reality. The questions are whether this is constituted by the twin principles of unity and otherness or indefiniteness (as the Pythagorizing Platonists held) or by Aristotle's own divine unmoved mover, and what sort of relationship other things have with the primary principle or principles[27].

When Aristotle turns to review the work of previous philosophers he sees it through the same lens. Presocratic philosophy, too, is rewritten as a debate about ἀρχαί. The rewriting requires a *tour de force* on Aristotle's part. We have already noted the distortions to which the physical theories of Thales and Anaximander were subjected to make them preoccupied with the 'material principle': Heraclitus is another 'materialist' victim of the same regimentation. An even greater difficulty confronting Aristotle's project was posed by

---

[26] See e. g. *Phys.* I. 1, *PA* I. 1, *GA* II. 1, V. 1. Discussion: A. Mansion, *Introduction a la Physique Aristotélicienne* (Louvain / Paris 1945); W. Wieland, *Die aristotelische Physik* (Göttingen ²1970); S. Waterlow, *Nature, Change, and Agency in Aristotle's Physics* (Oxford 1982); A. Gotthelf / J. G. Lennox (eds.), *Philosophical Issues in Aristotle's Biology* (Cambridge 1987); D. Devereux / P. Pellegrin (eds.), *Biologie, Logique et Métaphysique chez Aristote* (Paris 1990).

[27] See further H. Cherniss, *The Riddle of the Early Academy* (Berkeley / Los Angeles 1945); W. D. Ross, *Plato's Theory of Ideas* (Oxford 1951); Graeser (ed.), *Mathematics and Metaphysics in Aristotle.*

the absolute monism of Parmenides and Melissus, who did not recognise the existence of anything other than the perfect being they argued for, and consequently would have seen no logical space for the operation of the notion of a principle 'out of' or 'from' which something else might emerge. Aristotle himself makes just this point about the logical structure of Eleatic monism, and resorts to a variety of unconvincing devices for making his story simultaneously include and exclude its proponents[28].

The most striking feature of that story, however, is what is most distinctively and admirably Aristotelian about it. It has been remarked that Aristotle's 'standard complaint against other philosophers is that they over-simplify'; and the over-simplification shows up most characteristically, as he sees it, in a naive view of the univocity of language[29]. His own assumption is that any linguistic expression suitable for important philosophical work is likely to be polysemous. That assumption surfaces throughout his writings, but is explicitly articulated above all in his philosophical lexicon (Book V of the *Metaphysics*). Here he runs through no less than 34 different terms, teasing out their many different meanings or uses. The first entry is inevitably: ἀρχή. Aristotle distinguishes, with definitions and examples, but without any evident high theoretical purpose, meanings which we might label: starting-point, right starting-point, originating part, causal origin, governing principle, principle of knowledge (e. g. the hypotheses assumed in a proof). Thus – to give a sample – what I have dubbed causal origin is introduced as follows (1013 a 7–10):

> that non-constituent from which a thing first comes to be and from which change and alteration in it characteristically first begin, as for instance a child comes to be from its mother and father, and fighting out of swearing.

In every case except governing principle, where Aristotle is clearly picking up the distinct use of the word to mean 'rule' or 'control' (1013 a 10–14), he builds 'out of' or 'from' into his definition. He emphasises this feature of the analysis in his summing-up (1013 a 17–

---

[28] Principal texts: *Metaph.* A. 3–5, *Phys.* I. 2–4. Heraclitus: *Metaph.* 984 a 7–8; cf. Simplicius, *Physics* 23. 33 – 24. 4 (DK 22 A 5). Parmenides and Melissus: *Metaph.* 984 a 29 – b 3, 986 b 8 – 18; *Phys.* I. 1–2 ('out of ' point: 185 a 1–5). 'Tour de force': see H. Cherniss, *Aristotle's Criticism of Presocratic Philosophy* (Baltimore 1935).

[29] See Owen, *Logic, Science and Dialectic*, ch. 11 (quotation from p. 215), who lists among those Aristotle criticises Socrates, Plato and *all* earlier thinkers who attempted explanations of nature.

19): "Common to all the sorts of ἀρχή is that they are the first thing from or out of which something else is or comes to be or is known."

Just before this summary Aristotle observes that there are as many uses of ἀρχή as there are of αἴτιον, cause or explanatory factor (1013 a 16–17). He does not integrate this remark into the rest of his account of ἀρχή. But it is no casual aside. His idea about the diversity of what might be meant by 'cause' or 'explanation' (half-anticipated by Plato in the *Phaedo*) is what enables him to fit most of the Presocratics into a single story about first principles, and to pinpoint a common failing in their attempts to offer explanations. They all hit upon one or other form of explanation more or less surely – but few on more than one. None appreciated the key point: which is that explaining is an essentially polymorphous activity. When I ask: "Why is *X* as it is?", I may mean: "What is it about *X* that makes it possible for it to change as it does?", or: "What is the causal origin of *X*?", or: "What is it to be an *X*?", or (most importantly of all): "What is the purpose or good of *X*?" Aristotle represents e. g. Thales and Heraclitus as effectively answering a question of the first category, but e. g. Empedocles and Anaxagoras as seeing that questions of the second category also have to be answered by cosmologists. No Presocratic, on his view, appreciated the overriding importance of the fourth – teleological – category of question. But the student of nature will not achieve an adequate understanding of his subject until he has put questions of all four types to the phenomena under investigation, and seen how all other principles are subordinate to the ἀρχή supplied by reflection on teleology[30].

No less than Plato Aristotle insisted that the search for ἀρχαί must be pursued – and 'why?' questions reiterated – until principles are reached which admit of no further questioning. While he rejected Plato's notion of a single ultimate ἀρχή explaining all knowledge and reality, he argued in his *Posterior Analytics* that each of the various sciences must have a deductive explanatory structure governed by its own set of principles if it is to be a genuine system of knowledge. In spelling out the conditions that the principles of such systems must satisfy, Aristotle works out in detail the ideas about wisdom and knowledge he claimed at the beginning of the *Metaphysics* were implicit in common beliefs. Thus demonstrative knowledge must proceed from premisses that are true, primary and unmediated; and – in

---

[30] Diversity of 'cause': *Phys.* II. 2; half-anticipated: Pl. *Phd.* 96 a – 102 a; story on Presocratics: *Metaph.* A. 3–5; inadequate grip on teleology: A. 7, 988 b 6–16; subordination point: *Phys.* II. 7–9, *PA* I. 1.

relation to what is derived from them – prior, relevant, explanatory, and intrinsically more intelligible (this last proves to be a recipe for positing principles of the highest universality). If they did not meet these criteria, demonstration would be threatened by either circularity (principles being understood in terms of their own consequences) or infinite regress (explanation never coming to an end)[31].

The *Posterior Analytics* is prepared to be specific not only about the requirements principles must meet if they are to function as principles, but about what different sorts of principle there are. Aristotle distinguishes axioms or common principles, true of everything there is (like the law of non-contradiction), or at any rate true of everything in a general domain (e. g. the principle that if equals are taken from equals, equals remain, is true of all quantities); and theses necessary for the exposition of a particular science, which divide into hypotheses that something exists or is the case (e. g. that there are units) and definitions (e. g. a unit is an indivisible quantity). These distinctions are evidently very similar to Euclid's subsequent division between common notions on the one hand, and definitions and postulates on the other – perhaps because Aristotle is already reflecting the ideas of contemporary mathematicians on the foundations of geometry and arithmetic, as presented in the books of *Elements* which continued to appear in the course of the fourth century B. C.[32]

Aristotle's account of first principles in the *Posterior Analytics* is in many ways remarkably Platonic. A sharp divergence between the two thinkers, however, opens up in the very last chapter of the treatise. Here Aristotle asks two questions about our knowledge of principles: how do we acquire it, and what sort of cognitive state does it constitute? To the second question his answer is exactly the same as Plato's. The state of mind we are in when we grasp and understand

---

[31] Text: *An. Post.* I. 1–3. Discussion: W. D. Ross, *Aristotle's Prior and Posterior Analytics* (Oxford 1949); M. Mignucci, *L'Argomentazione Dimostrativa in Aristotele* (Padova 1975); E. Berti (ed.), *Aristotle on Science: The 'Posterior Analytics'* (Padova 1981); J. Barnes, *Aristotle's Posterior Analytics* (Oxford ²1994).

[32] Texts: *An. Post.* I. 2, 72 a 14–25; I. 10; Euclid, *Elements* I. The relationship between these texts is much disputed. See e. g. T. L. Heath, *The Thirteen Books of Euclid's Elements* I (Cambridge ²1926) 114–51; K. von Fritz, "Die APXAI in der griechischen Mathematik", in his *Grundprobleme der Geschichte der antiken Wissenschaft* (Berlin / New York 1971) 335–429; Knorr, "On the early history of axiomatics", in Hintikka et al. (eds.), *Theory Change*; I. Mueller, "On the notion of a mathematical starting point in Plato, Aristotle, and Euclid", in A. C. Bowen / F. Rochberg-Halton (eds.), *Sources and Studies in the History and Philosophy of Classical Science* (New York / London 1991) 59–97.

the principles of a science is νοῦς. This term is sometimes wrongly translated 'intuition' (intuition is a way of arriving at knowledge, not a state of mind). What it really means has to be worked out from the contrast with the derivative understanding Aristotle calls demonstrative knowledge, since he gives few positive indications. It signifies a form of comprehension which is *not* dependent on understanding something else: it is immediate or unmediated – and in this way rather like sense perception, to which Aristotle elsewhere compares it. Plato would not have disagreed. Not so where the acquisition of knowledge of principles is concerned. For Aristotle gives an inductive empiricist account[33]. From sense perception we develop memory, the retention of our perceptions and ability to recall them. This matures into experience, involving the connection of memories and perceptions. Finally we learn to generalise to universal concepts, which sometimes – presumably always when we grasp a principle – involves the formulation of an articulated account. Plato by contrast makes the ascent from hypotheses to ἀρχαί a matter of rejecting any reliance on sensory images, which can on his view only bring confusion and contradiction to the attempt at independent and purely intellectual comprehension of principles[34].

Platonists and Aristotelians throughout antiquity remained committed to the idea and practice of philosophy as the search for principles. Scientists and philosophers of other persuasions were happy to appropriate the notion of an ἀρχή as a useful term of art; and in articulating their systems they often made the identification of first principles play a key role. But preoccupation with explanation and the principles of explanation was not the dominating concern of either Stoicism or Epicureanism, for example; and among the doctors there were those – the Empiricists and Methodists of the early Roman empire – who thought the attempt to make medicine a matter of speculation about causes of disease a radical mistake. Mathemati-

---

[33] This is his official methodological position. In practice his approach to first principles is often more dialectical, in a sense explained and debated e. g. by Owen, *Logic, Science and Dialectic*, ch. 13; W. Wieland, "Aristotle's physics and the problem of inquiry into principles", in J. Barnes / M. Schofield / R. Sorabji (eds.), *Articles on Aristotle* I (London 1975) ch. 8; and various studies in Devereux / Pellegrin (eds.), *Biologie, Logique et Métaphysique*.

[34] Texts: Pl., *Rep.* VI. 510 b – 511 e, VII. 532 a – 534 e, Ar., *An. Post.* II. 19, with Barnes' commentary, in *Aristotle's Posterior Analytics*. Further discussion: Owen, *Logic, Science and Dialectic*, ch. 11; M. Frede, "Aristotle's rationalism", in M. Frede / G. Striker (eds.), *Rationality in Greek Thought* (Oxford 1996) ch. 5.

cians did remain committed to the project of axiomatizing their findings, but had little interest in reflection on the notion of a first principle. So the philosophical impulse which led Aristotle to devote his exceptional powers of analysis to explication of the idea of an ἀρχή, and to exploring its role in explanation and its epistemological status, was not to be recaptured by any later thinker. With Aristotle, accordingly, our story may come to an end[35].

Malcolm Schofield
St John's College
Cambridge

В статье прослеживаются изменения в употреблении термина ἀρχή в греческой философской и научной литературе от Анаксимандра до Аристотеля. Анаксимандр, который первым рассуждал о "начале" и считал таковым "беспредельное", имел в виду, согласно интерпретации Аристотеля и следовавшей ему доксографии, субстрат, лежащий в основе вещей. Однако более конкретные свидетельства об учении Анаксимандра, а также обычное для VI в. значение слова ἀρχή, говорят за то, что Анаксимандр понимал под "началом" источник, откуда происходят вещи. Только учение Парменида, в котором впервые противопоставлено реальное кажущемуся, явилось предпосылкой для появления хода мысли, предполагаемого Аристотелем у Анаксимандра – объяснение явлений как чего-то вторичного при помощи первичных начал. Подобные рассуждения обнаруживаются у авторов космологических и медицинских учений, которые стремились в противоположность Пармениду обосновать возможность достоверного естественнонаучного знания и потому должны были осмыслить соотношение между явлениями и первичной реальностью, а именно возможность объяснить первые при помощи второй. Теперь ἀρχή приобретает новое значение: субстрат, лежащий в основе вещей и их изменений. Впервые во фрагменте Филолая (B 6) "пределы" и "беспредельное"

---

[35] For an example of the treatment of principles in the later Platonist / Aristotelian tradition see E. R. Dodds, *Proclus: The Elements of Theology* (Oxford ²1963); Stoicism and Epicureanism: A. A. Long / D. N. Sedley, *The Hellenistic Philosophers* I–II (Cambridge 1987); Empiricists and Methodists: R. Walzer / M. Frede (eds.), *Galen: Three Treatises on the Nature of Science* (Indianapolis 1985); mathematicians: T. L. Heath, *A History of Greek Mathematics* (Oxford 1921). 'Not to be recaptured': except perhaps by Galen, as e. g. in P. De Lacy (ed.), *Galen: On the Doctrines of Hippocrates and Plato* I–III (Berlin 1980–84); R. J. Hankinson (ed.), *Galen: On the Therapeutic Method, Books I and II* (Oxford 1991). An overview: G. E. R. Lloyd, *Greek Science after Aristotle* (London 1973).

предстают как ἀρχαί уже не как источник, из которого происходят вещи, но как предпосылки существования явлений. Появление примерно в ту же эпоху, во 2-й половине V в., в философской и медицинской литературе термина ἀρχή в значении "исходный принцип" объяснений, "посылка", отражает рост интереса к методологическим вопросам в связи с ростом соперничества в различных профессиональных сферах.

Дальнейшим углублением в методологическом плане понятие "начала" обязано Платону, который обсуждает, каким условиям должен удовлетворять исходный принцип рассуждений, а в онтологической сфере обосновывает вечность и неизменность первопринципа. Наконец, у Аристотеля учение о первопринципах приобретает наиболее разработанный характер, и сквозь его призму подвергается переосмыслению все предшествующее развитие философской мысли. Напротив, эллинистические философские и научные школы проявляют меньше интереса к обсуждению принципов объяснения, и аристотелевская теория представляет собой последнюю значительную фазу в осмыслении идеи ἀρχή.