HOMOIOTETES, *STOICHEIA* AND *HOMOIOMEREIAI* IN EPICURUS

Aëtius[1] 1.7.34, after (a) a brief report of Epicurus' views on the gods (= fr. 355b U, Ἐπίκουρος ἀνθρωποειδεῖς μὲν τοὺς θεούς, λόγῳ δὲ πάντας θεωρητοὺς διὰ τὴν λεπτομέρειαν τῶς τῶν εἰδώλων φύσεως), continues with two sentences which Usener relegates to his apparatus and describes as 'a malicious addition':

(b) ὁ δ᾽ αὐτὸς ἄλλως τέτταρας φύσεις κατὰ γένος ἀφθάρτους τάσδε, τὰ ἄτομα τὸ κενὸν τὸ ἄπειρον τὰς ὁμοιότητας· (c) αὗται δὲ λέγονται ὁμοιομέρειαι καὶ στοιχεῖα.

He also says, differently, that there are four generically imperishable natures, namely, the atoms, the void, the unbounded, and the similarities; and these are called homoeomeries and elements.

For ἄλλως in (b) Diels and Usener print the variant ἄλλας (found in inferior manuscripts of pseudo-Plutarch and Eusebius and in all those of Stobaeus); but most of the scholars who have discussed this puzzling remark have preferred the reading ἄλλως, and have taken it to mean that Epicurus elsewhere called the gods *homoiotetes*, connecting it with the references to 'similar images' in the scholium to *RS* 1[2] and Cicero, *Nat. D.* 1.49 and the uses of *homoios* and *homoiotês* in Philodemus, *On Piety*, cols. 12 and 13 Obbink (= pp. 134 and 110 Gomperz) and *On the Gods* 3.9.27.[3]

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[1] I use the name as the conventional designation for the common source of [Plut.] *Placita philos.* and the doxographic excerpts in Stobaeus. For arguments supporting Diels' identification of this source with Theodoretus' 'Aëtius', see J. Mansfeld and D. T. Runia, *Aëtiana, The Methods and Intellectual Context of a Doxographer*, vol. 1, Philosophia Antiqua 73 (Leiden, 1997); J. N. Bremmer, 'Aëtius, Arius Didymus and the transmission of doxography', *Mnemosyne* 51 (1998), 155–6, and M. Frede, '*Aëtiana*', *Phronesis* 44 (1999), 135–49, are more sceptical.

[2] ἐν ἄλλοις δέ φησι τοὺς θεοὺς λόγῳ θεωρητούς, οὓς μὲν κατ᾽ ἀριθμὸν ὑφεστῶτας, οὓς δὲ κατὰ ὁμοείδειαν ἐκ τῆς συνεχοῦς ἐπιρρύσεως τῶν ὁμοίων εἰδώλων ἐπὶ τὸ αὐτὸ ἀποτετελεσμένους, ἀνθρωποειδεῖς ('In other works he says that the gods are perceptible by reason, in some cases as individually existing, in other cases according to similarity as a result of the constant flow of the similar images to completion at the same place, human in shape'). I follow R. Philippson, 'Zur epikureischen Götterlehre', *Hermes* 51 (1916), 580, in taking οὓς μὲν . . . οὓς δὲ as adverbial with θεωρητούς and ὑφεστῶτας only with κατ᾽ ἀριθμὸν, not with κατὰ ὁμοείδειαν, and interpret both this text and the contrast between images from the same and similar sources in Philodemus as a classification of noetic images in general, not as a reference to two types of gods.

[3] So W. Scott, 'The physical constitution of the Epicurean gods', *JPhilol* 12 (1883), 231–2; C. Giussani, *T. Lucreti Cari de Rerum Natura Libri Sex* (Turin, 1896), 1.261; C. Bailey, *The Greek Atomists and Epicurus* (Oxford, 1928), 453 and n. 2; R. Amerio, 'L'Epicureismo e gli dei', *Filosofia* 4 (1953), 125; G. Freymuth, *Zur Lehre von den Götterbildern in der epikureischen Philosophie*, Akad. d. W. Berlin, Inst. f. hellenistisch-römischen Philos., Veröffentlichung 2 (1953), 13–14, n. 4; C. Moreschini, 'Due fonti sulla teologia Epicurea', *PP* 80 (1961), 371, n. 67; H. J. Krämer, *Platonismus und hellenistische Philosophie* (Berlin, 1971), 145, n. 181; J. M. Rist, *Epicurus, an Introduction* (Cambridge, 1972), 174; D. Lemke, *Die Theologie Epikurs, Versuch einer Rekonstruktion*, Zetemata 57 (Munich, 1973), 87; D. Obbink, 'The atheism of Epicurus', *GRBS* 30 (1989), 202, n. 50, and *Philodemus On Piety Part 1* (Oxford, 1996), 330–1; and M. Wifstrand Schiebe, 'Sind die epikureischen Götter "Thought-constructs?"', *Mnemosyne* 56 (2003), 706, n. 7. G. Pfligersdorffer, 'Cicero über Epikurs Lehre vom Wesen der Götter (*nat. deor.* 1, 49)', *WS* 70 (1957), 246–7, and A. A. Long and D. Sedley, *The Hellenistic Philosophers* (Cambridge, 1987), l.146 and 2.153–4, also connect 'the similarities' closely with the references to similar images, but

Like some others, who have based their interpretations entirely on these other passages without discussing Aëtius' evidence, they have either supposed that the reference is to some special kind of similarity among the gods[4] or have used it to support the 'idealist' reading of Epicurean theology, according to which the gods have no objective existence, being only streams of similar images. I intend to argue elsewhere against both these lines of interpretation;[5] since that will require more space than this entire article, I will confine myself here to positive arguments for a different interpretation of 'the similarities', one which accounts for all of the entry in Aëtius. Most of the scholars cited have ignored (c), implying that it was to be disregarded, if not, with Usener, as a malicious addition, at any rate as an inept one.[6] Foolish and irrelevant additions are certainly to be found in Aëtius' text, though most of them appear in only one branch of the tradition;[7] but an explanation which makes sense of the reference to *homoiomereiai* and *stoicheia* will obviously have something to recommend it.

   The manuscript evidence does not by itself decide the textual question, but neither do considerations of sense, since either reading presents difficulties of interpretation. With ἄλλας, even allowing for Aëtius' digressiveness, and even supposing some omission,[8] the appearance of a list of 'other imperishable natures' in an entry on Epicurean theology is somewhat surprising. On the other hand, ἄλλως need not mean, as is usually supposed, that Epicurus used *homoiotetes* as a term for the gods. If he really treated the Greek language so oddly, that fact must after all have been known from uses of the term in other contexts, and not just from its unexplained appearance in a list of 'imperishable natures'; and citing that list would be a strange way of

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regard them as distinct from the gods (reading ἄλλας), as does J. Mansfeld, 'Aspects of Epicurean theology', *Mnemosyne* 46 (1993), 207, n. 80, who considers the reification of 'similarity' a mistake. J. Purinton, 'Epicurus on the nature of the gods', *OSAPh* 21 (2001), 220–1, miscalls ἄλλως an emendation and attempts to explain ἄλλας as meaning that the gods are only one type of 'similarity'.

   [4] Or some of them; cf. n. 2 above.
   [5] Cf. M. Wigodsky, 'Emotions and immortality in Philodemus *On the Gods* 3 and the *Aeneid*', in D. Armstrong, J. Fish, P. A. Johnston and M. B. Skinner (edd.), *Vergil, Philodemus and the Augustans* (Austin, 2004), 211–28, for some arguments against the idealist interpretation.
   [6] So explicitly Scott (n. 3), 232, n. 2; only Freymuth (n. 3), 13–14, n. 4, attempts to explain (c), paraphrasing *homoiotetes* as 'aus ähnlichen Teilen bestehende Urstoffe' and taking ὁμοιομέρειαι καὶ στοιχεῖα as a misunderstanding of Philodemus's ἐκ τῶν ὁμοίων στοιχείων ἑνότητες (on which cf. at nn. 63–6 below); similarly Pfligersdorffer (n. 3), 247. The rest are silent or refer vaguely to Anaxagoras (as does E. Bignone, whose interpretation otherwise partly anticipates my own; cf. Section III below, especially at n. 82 for his later interpretation of *homoiomereiai*).
   [7] For errors common to both branches, cf. H. Diels, *Doxographi Graeci* (Berlin, 1879), 50–5; for interpolations and dislocations in P, ibid. 61–3; for a similar mistake in S I 25.1, ibid. 68 and 351.
   [8] Abridgement was suspected by P. Schwenke, 'Zu Cicero *de natura deorum* [1 § 49 f.]', *NJPhP* 125 (1882), 629, n. 4; A. Koerte, 'Metrodori Epicurei fragmenta', *JbClPh* suppl. 17 (1889–90), 544; P. Merlan, 'Zwei Fragen der Epikureischen Theologie', *Hermes* 68 (1933), 201; and N. W. DeWitt, *Epicurus and his Philosophy* (Minneapolis, 1954), 263–4, who explain πάντας in the second clause of (a) by the loss of something like the contrast οὓς μὲν . . . οὓς δὲ . . . (Diog. Laert., cited above, n. 2). Since I do not believe the scholium refers to two kinds of gods, I prefer the explanation of C. Vicol, 'Considerazioni sulla dottrina teologica di Epicuro', *GIF* 2 (1949), 199, and Moreschini (n. 3), 349, n. 15, who take λόγῳ πάντας θεωρητοὺς as an implicit reference to Plato's distinction between supra-sensible and visible gods (the stars), or that of Mansfeld and Runia (n. 1), 250, who point out that this and several other philosophers' distinctions are mentioned in the preceding entries (30–3); cf. also ibid. 182–95, 233–8 and 284–8 for arguments that our combined text of Aëtius has not suffered much abridgment. On a possible omission at the end of (c), cf. at n. 84 below.

conveying the information that he had done so. Furthermore, although ἄλλως can mean no more than ἐν ἄλλοις, more often it calls attention to some significant difference; thus, if it is the correct reading, the remark may be the vestige of a polemic like that reported by Philodemus in *On Piety*, col. 16 Obbink (= p. 111 Gomperz), its point being that Epicurus had apparently contradicted his own statements about the gods' immortality by giving a list of imperishable natures in which the gods are *not* mentioned. (If so, an interpretation consistent with a realist reconstruction of Epicurean theology will of course have to include an explanation of why he might in some context have given such a list; I will propose such an explanation in Section IV.)

Whether one reads ἄλλως or ἄλλας, if (c) is genuine, *homoiotetes* must mean something other than 'the gods'. But what meaning of *homoiotetes* could be explained by 'homoeomeries and elements'?[9] Are the latter synonyms, or subdivisions of a larger class? And does λέγονται mean 'these are what are called (by others)' or 'these are said (by Epicurus) to be'?[10] I will argue that the language is Epicurus' own; that *homoiotetes* was the equivalent in his terminology of 'natural kinds', that is, the types of compound bodies, of which he called the simplest *stoicheia* and those at the next level of complexity *homoiomereiai*; and that this meaning of *stoicheia* is also found in several other passages which, when understood in this way, support the often-controverted thesis that he had a concept resembling that of molecules.[11] I will begin (I.A) by reviewing the semantic development of *stoicheion*; in I.B I will discuss the conclusion of Epicurus' *On Nature* 14, arguing that the digression on philosophical terminology in the last five columns of the text is closely connected to the preceding criticism of Plato's account of the 'four elements', being a defence and explanation of Epicurus' use of the Platonic word with a shift of meaning from 'fundamental constituents of matter' to 'simplest types of compounds'. In I.C I will explore some implications of this text for Epicurus' theory of compound bodies, as a basis for the argument in I.D that this meaning is also found in four other fragments or testimonia. In II, I will consider Epicurus' uses of *homoiomereiai* and their Aristotelian background; after some remarks (III) on *homoiotetes*, I will end (IV) with a discussion of what is meant by '*generically*' imperishable natures.

I. *STOICHEION*

I.A. The word before Epicurus

There is a misconception about the word *stoicheion* to be avoided at the outset, namely, that it could be used as a synonym for *atomos*. This idea owes its popularity in large part to the influence of Diels' brilliant monograph *Elementum*,[12] which for all

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[9] Grammatically, this could also refer to *physeis*, i.e. *stoicheia* to the first three, with *homoiomereiai* as a synonym for *homoiotetes*.

[10] [Galen], *Hist. philos.* 35 *fin.* (Diels, [n. 7], 619), offers answers to the last two questions, adding a καὶ before ὁμοιομέρειαι, suggesting that he took them as synonyms, and τῷ αὐτῷ (with λέγονται) at the end of the sentence—the latter, I think, a luckier guess than most of his attempts at elucidation, on which cf. Diels, ibid. 13, and Mansfield and Runia (n. 1), 147-149.

[11] Giussani (n. 3), 58–9; S. Sambursky, *The Physical World of the Greeks*[2] (London, 1960), 123–8; and G. B. Kerferd, 'Epicurus' doctrine of the soul', *Phronesis* 16 (1971), 89–91, argue in favor of Epicurean 'molecules'; contra, Bailey (n. 3), 342–3 and 577–9; R. B. Todd, *Alexander of Aphrodisias on Stoic Physics*, Philosophia Antiqua 28 (Leiden, 1976), 185; and Long and Sedley (n. 3), 2.68.

[12] H. Diels, *Elementum, eine Vorarbeit zum griechischen und Lateinischen Thesaurus* (Leipzig, 1899).

its merits is marred by an excessive zeal for parallels between the uses of the Greek and Latin words. As Burkert has shown,[13] Diels was wrong to suppose that 'letter' was the primary meaning of *stoicheion* as well as *elementum*, and that the meaning 'something fundamental' was derived from it;[14] the claim that Lucretius' use of *elementum* translates some Greek atomist's use of *stoicheion* is, I think, a similar error. I begin by summarizing Burkert's account of the word's earlier history.

Etymologically, a *stoicheion* is a unit in a row (*stoichos*);[15] derivatively, it means one of any ordered, or at least countable, set. This may be a set of as few as two; in fact, one of the earliest-attested meanings of the word is 'shadow' (of a man, e.g. Ar. *Eccl.* 652, ὅταν ᾖ δεκάπουν τὸ στοιχεῖον; later, of the gnomon of a sundial), presumably because an object and its shadow form such a set.[16]

The word is used of letters as early as the fifth century (Euthydemus, quoted by Arist. *Rh.* 2.1401a28), but not as a mere synonym of *gramma*; it means one of the twenty-four type-letters of the Greek alphabet (or the corresponding phonemes), in contrast to the indefinitely many token-*grammata*.[17] Thus *grammata* is the word used in the extant reports of the atomists' comparison of atomic shapes with those of letters (Arist. *Gen. corr.* 1.315b5; Plut. *Mor.* 399E); *stoicheia*, 'letters (of the alphabet)', would be obviously inappropriate for Democritus' infinitely varying atomic shapes, and only slightly less so for Epicurus' incalculably large number of them.

The meaning 'basic principle' also occurs, perhaps as early as the fifth century,[18] and certainly by the early fourth (Xen. *Mem.* 2.1.1); the combination of the word with *megiston* in the sense 'most important' (Isocrates 2.16; Arist. *Pol.* 5.1309b16) suggests that no metaphorical connection with the meaning 'letter' was felt. An early piece of evidence for the mathematical use suggests a different origin: Proclus, *In Euc.* 72.23ff. cites Eudoxus' student Menaechmus as distinguishing two meanings of *stoicheion*, of which the familiar 'common postulates' is the second; the first is any theorem used to prove another, with the remark that 'in this sense many theorems are also *stoicheia* of each other'. If this is the older meaning, *stoicheion* must originally have referred to a presupposition as something paired with its consequence like an object with its shadow, and was then generalized to presuppositions common to many proofs (the idea 'one of a countable set' will have re-emerged with the development of axiomatization).[19]

[13] W. Burkert, 'ΣΤΟΙΧΕΙΟΝ. Eine semasiologische Studie', *Philologus* 103 (1959), 167–97. T. J. Crowley, 'On the use of *Stoicheion* in the sense of "element"', *OSAPh* 29 (2005), 367–94, is less satisfactory, concentrating too narrowly on philosophical uses and treating meanings as discrete entities, while mostly ignoring etymology and metaphor (cf. n. 20 below).

[14] J. I. Porter, 'Philodemus on material difference', *CErc* 19 (1989) 171–4 and 176, n. 49, makes in effect the opposite claim, arguing that the meaning 'letter/phoneme' was introduced by Democritus in connection with the analogy between atomic shapes and letters; but even if, as he suggests, Crates was thinking of material atomism when he defined *stoicheion* as φωνῆς μέρος ἐλάχιστον, it is unlikely that early atomists used the word in either sense–see below.

[15] Burkert (n. 13), 188–9, suggests that -ειον has instrumental force: 'something which, by its addition, forms or completes a row'.

[16] So Burkert (n. 13), 186–8; Crowley (n. 13), 374, n. 26, interprets the Aristophanes example as 'individual measures or units of a' (monumental) 'sundial'.

[17] The words are explicitly distinguished by Pl. *Resp.* 3.402A7–9 and Aen. Tact. 31.19–21 (discussed by Burkert [n. 13], 172–4), and also by Arist. *Metaph.* 3.1000a1–4.

[18] Burkert (n. 13), 193–5, argues that Proclus' report, *In Euc.* 66.7 (from Eudemus, fr. 133 Wehrli) that Hippocrates of Chios wrote the first collection of *stoicheia* indicates that he used the word; in any case, Menaechmus, cited below, implies that both the meanings he distinguishes were familiar.

[19] So Burkert (n. 13), 191–6.

According to Eudemus,[20] Plato was the first to use *stoicheion* for the Empedoclean four elements, and his testimony is confirmed by the tentative way Plato introduces the term (*Ti.* 48B), saying that we 'call [fire etc.] first principles (*archai*), making them elements of the universe, although they should not even be compared to the class of syllables . . .' A few pages later he uses the word to refer to the underlying geometrical shapes, calling the pyramid 'the *stoicheion* of fire' in 56B and the constituent types of triangle 'the two *stoicheia*' in 57C.

Plato's metaphorical application to the four elements soon became one of the word's ordinary meanings; but it was also used for whatever other philosophers thought the basic constituents of matter (whether considered as types; as tokens, when referring to corpuscular theories; or both). Aristotle (*De an.* 1.404a4) already applies it in this sense to Democritus' atoms; and the commentators frequently use it this way, but always with some comparison, explicit or implicit, to other theories. *Stoicheia* thus means 'the basic constituents of matter, whatever they may be', and *atom* in these passages is only a speaker's meaning, that is, an implicit predication whose referent can be understood only from the context.[21] The same neutral or doxographic sense is found in Philodemus' *De morte* 32.28–3l, 'Who would not be convinced that all (the dead), both those who have been laid out and the unburied, are dissolved into whatever he regards as elements? ([εἰ]ς ἅ πο[τ]ε νομίζει σ[τοιχ]εῖα)'; while when M. Aurelius (7.31, πάντα νομιστί, ἐτεῇ δὲ μόνα τὰ στοιχεῖα) substitutes στοιχεῖα for Democritus' ἄτομα καὶ κενόν (DK 68B9 = Sext. Emp. *Math.* 7.135), he is not, as Diels supposed, calling the various types of atoms *stoicheia*, but rather implying a gloss (resembling Arist. *Metaph.* 1.985b5) to the effect that 'Democritus' (two) *stoicheia* are atoms and void.'

Observing that Epicurus used *stoicheia* for the 'four elements' but not, apart from *Ep. Pyth.* 86, ὅτι ἄτομα <τὰ> στοιχεῖα, for his own 'basic principles' of matter, Diels[22] suggested that he avoided it in order to avoid confusion between his own doctrine and four-element theories. He took the passage in *Ep. Pyth.* as evidence for the letter's spuriousness, attributing it to a later atomist who used *stoicheion* in the same way as Lucretius' supposed source,[23] but only because, not recognizing the

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[20] 'He also distinguished the elemental first principles (τὰς στοιχειώδεις ἀρχὰς) from the others among the natural and generated things, and was himself the first to call such first principles *stoicheia*' (fr. 31 Wehrli = Simpl. *in Phys.* 7.10–14; cf. Favorinus *apud* Diog. Laert. 3.24). Crowley (n. 13), treating all uses of the word for constituents as one meaning, argues that its application to the Empedoclean elements was no real innovation, and *CQ*'s reader suggests that Eudemus was asserting only Plato's priority in restricting it to the ultimate first principles (his triangles); 'we call', quoted above, *could* be a true plural, but the question does not much affect my interpretation of Epicurus, *Nat.* 14.

[21] I have examined all the passages produced by a TLG search of Alexander, Philoponus, Simplicius and Themistius for occurrences of στοιχει- within ten lines of ἀτομ-, Δημοκριτ-, or Ἐπικουρ-. One example which makes it particularly clear that *stoicheia* did not *mean* 'atoms' is Philoponus, *In GC* 160.26–8, ' they explain the origin of the elements themselves by means of their own (elements) (αὐτῶν τῶν στοιχείων . . . ἐκ τῶν οἰκείων); for they say that they come to be and perish by the combination and separation of the atoms'; cf. Simpl. *in Cael.* 632.16–18, 'Democritus also says that his own elements, the atoms, come into being from one another, being separated from the mixture . . .', and *in Phys.* 28.8–9 (= Theophr. *Phys. op.* fr. 8 D), (Leucippus) 'posited infinite and eternally moving elements, the atoms'. For the 'word's meaning/speaker's meaning' distinction, cf. C. S. Lewis, *Studies in Words* (Cambridge, 1960), 14–17, and P. Grice, *Studies in the Way of Words* (Cambridge, MA, 1989), *passim*.

[22] (n. 12), 8–9.

[23] Ibid., 10. E. Bignone, *L'Aristotele perduto e la formazione filosofica di Epicuro*[2] (Florence, 1973), 2.309–10 (= *AIPhO* 5 [1937], 95–6), and J. Mansfeld, 'Epicurus Peripateticus', in A. Alberti

doxographic meaning, he missed the distinction between predicating indivisibility of the elements (neuter), or 'elements' of the atoms (αἱ ἄτομοι sc. φύσεις), and using the words synonymously. *Elementum* did indeed become the standard translation for *stoicheion*, when applied to the Empedoclean elements, once this usage had been introduced by Cicero (*Acad.* 1.27); but it does not necessarily follow that Lucretius, writing a decade earlier and using the word in a different sense, was translating the same Greek word for letter: *littera* in the oblique cases was after all unavailable for metrical reasons.

I.B. Epicurus, On Nature *14 fin.*

The most direct evidence for Epicurus' use of *stoicheion* for the 'four elements' is found in the last ten columns of his *On Nature* 14 (P. Herc. 1148, 29.22–31 Arr.[2] = 34–43 Leone),[24] where the word occurs three times (29.22.11, 24.2, and 27.3, quoted below) in the criticism of Plato's theory of the elements; this is followed by a digression on philosophical terminology which I interpret as a defence of Epicurus' earlier use of the word. This connection has not hitherto been recognized,[25] since *stoicheion* does not occur in the surviving text of 28–31; but the papyrus is split horizontally and we have only the upper half, so that these columns consist of fragments of 56–86 words (= 16–22 lines), each followed by a gap of comparable length.[26]

   Epicurus, of course, thought that what Plato called *stoicheia* were themselves types of compounds. The earlier part of 14 seems to have dealt with the Epicurean doctrine of compound bodies,[27] which in the preceding section (29.16–21) is contrasted with monist theories of matter. The general argument seems to have been, as in Lucretius 1.635–829, that the diversity of phenomena cannot be explained by the rarefaction and condensation of a single substance, nor, turning in 22 to four-element theories, by the combinations and transformations of a small number of substances:

(ed.), *Realtà e ragione, studi di filosofia antica*, Studi Acc. Toscana 'La Columbaria'140 (Florence, 1994), 47, defend the letter's authenticity, taking στοιχεῖα to imply a comparison with opposing views, i.e. what I call the doxographic meaning; for other arguments pro and contra, cf. J. Bollack and A. Laks, *Epicure à Pythoclès*, Cahiers de Philologie 3 (Lille, 1978), 45–55, and A. Angeli, *Filodemo, agli amici di Scuola (PHerc. 1005)*, La Scuola di Epicuro 7 (Naples, 1988), 289–94.

   [24] For the Greek text see A. Vogliano, *I frammenti del XIVᵒ libro del Περὶ φύσεως di Epicuro* (Bologna, 1932); G. Arrighetti, *Epicuro, Opere*[2] (Turin, 1973), 263–77 and 605–9; and G. Leone, 'Epicuro, *Della natura*, libro XIV', *CErc* 14 (1984), 17–107; cf. also W. Schmid, *Epikurs Kritik der platonischen Elementenlehre* (Leipzig, 1936, dealing only with 22–7); R. Philippson, review of Vogliano and Schmid, *GGA* 199 (1937), 466–89; M. Isnardi Parente, *Opere di Epicuro* (Turin, 1974)), 225–30 (translation and notes); E. G. Schmidt, in F. Jürss, R. Müller, and id., *Griechische Atomisten, Texte und Kommmentare zum materialistischen Denken der Antike*[2] (Leipzig, 1977), 254–9 and 524–6 (translation and notes); G. Leone, 'La chiusa del XIV libro "Della natura" di Epicuro', *CErc* 17 (1987), 49–76 (27–31 only; largely vitiated by her misinterpretation of 27.11–19, on which cf. n. 30 below); and H. Baltussen, 'Early reactions to Plato's *Timaeus*: polemic and exegesis in Theophrastus and Epicurus', in R. W. Sharples and A. Sheppard (edd.), *Ancient Approaches to Plato's Timaeus*, *BICS* suppl. 78 (2003), 57 (translation of 22–3 and part of 26). My complete translation of 22–31 is available at http://traumwerk.stanford.edu/philolog/.

   [25] Cf., however, n. 35 below.

   [26] The original length of the columns has been estimated at 28 or 36 lines; cf. Leone (n. 24, 1984), 22–3.

   [27] The scholium to *Ep. Hdt.* 40 says that the distinction between atoms and compounds was treated both in 2 and in 14–15, and this is confirmed by repeated occurrences of σύγκρισις and one of ἄθροισμα earlier in 14; cf. Leone (n. 24, 1984), 30–2.

those who assign a specific shape to fire or earth or water or air, that/because (ὅτι) they are more absurd than those who do not assign (any), but concerning the juxtapositions would nevertheless have agreed, willingly or unwillingly, that there are some specific types of shapes corresponding to each of what one might call essential/substantial compounds (7–10, γίνεσθαί τινα σχημά[τ]ων ἴδια εἴδη καθ᾽ ἑκάστην [οὐ]σιώδη ῥηθεῖσαν ἂν σύγ[κρ]ισιν). For the latter are mistaken about the elements (10–11, τοῖς μὲν [στ]οιχείο[ι]ς ἁμαρτάνουσιν), but in speaking thus, and certainly (or 'in general', ὅλως) in asserting the difference/change (παραλλαγήν) in the mixtures, they would be saying something more consistent with these (elements); but the former . . .

In 23 Epicurus argues that a body can be divided into any number of shapes and not just into Plato's regular solids and triangles; in 24 he continues

(We can agree that some of the atomic) shapes (found in) the other elements (correspond) to these shapes of them which are apparent (1-3, [σ]χημάτων τοῖ[ς] λοιποῖς στοιχείοις κατὰ τὰ φαινόμεν᾽ αὐτῶν εἴδη ταυτεί); but it would not seem that only the (pyramidal) shape which he assigns appears in fire, if (it appears there) at all (4-8, οὐχ[ὶ] μόνον, εἰ ἄρα, ἐπὶ τοῦ πυρὸς ἂν τοιαύτη τις φαντασία σχήματος οἵαν ἐκεῖνος ἀποδίδωσίν ποτε δόξαι γίνεσθαι),[28] nor that (it is) always this shape (which appears), nor in every kind of fire, but only in actual flame, and there only when the surrounding (air) is in a certain condition.

Plato (*Ti.* 56A–B) does not in fact infer the pyramidal form from the conical shape of a flame in still air, but rather from the mobility and penetrating nature of fire, to which Epicurus turns at the beginning of 25:

(fire would) escape being enclosed[29] by the air, since it is itself entirely composed of fine parts and cannot be received by the air in an aggregate capable of combination (3-7, οὐ δυνάμενον ὑπὸ τοῦ ἀέρος ἐν ἀθροισμῶι λαμβάνεσθαι συναγωγὴν ἐπιδεχομένωι); for it is not a certain degree of weight nor (a certain degree of) fineness-of-parts that permits enclosure, but a certain degree of similarity in size that helps to bring about this sort of thing as well. . . .

The objection that substances as different as the elements must be made up of particles too different in size to form stable compounds applies to four-element theories in general; along with the reference in the preceding column to the presence of different atomic shapes in different fires, it implies that the 'four elements' are not single types of substances, but rather classes differentiated by the sizes of their constituent atoms.

In 26 Epicurus asks whether Plato regarded his constituent triangles as indivisible, and calls his account generally absurd; but, he adds at the beginning of 27, it may be admitted that

the shape which he attributes is (similar) to the sensations which are produced by these four elements (3, στοιχείων), and especially the first two, or at least that which has some similarity-as-a-part (7, ὁμοιομέρειαν) to the appearance. Enough of that; but I wish to reply

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[28] I take μόνον with τοιαύτη, following Philippson (n. 24), 481 and Arrighetti (n. 24), 266 and 607. Word order by itself would slightly favour taking it with ἐπὶ τοῦ πυρός; but Epicurus' main point is that the 'elements' are not made up of single types of atoms, not that the same types of atoms are found in different substances. Furthermore, Plato would have agreed that the shape found in fire occurs in other substances, that is, compounds with other elements; thus to serve as an argument against him, 'not only in fire' would have to imply a contrast, not with 'other substances' in general, but with 'the other elements', begging the question whether the 'elements' are themselves compounds.

[29] ἐξέφευ[γε] Leone, confirming Usener's supplement; Philippson's interpretation of τὴν ὑπὸ τοῦ ἀέρος στο[λ]ήν, 'being enclosed as though by a cloak' (n. 24), 482, seems closer to Plato's περιλαμβανόμενον (56E) and a likelier usage than Schmid's 'held in place' (from στέλλειν) (n. 24), 41.

briefly to those who think that, when someone calls a substance by some name, (he) is imitating in all respects those who use these expressions, and furthermore (that) when he makes some necessary disposition of language, (he is imitating) those who engage in sophistry on the basis of these details (11–21, πρὸς δὲ τοὺς οἰομένους καταζηλοῦν, ὅταν οὐσίαν τις ὀνομάζηι, τοὺς ταύταις ταῖς φωναῖς χρωμέ[ν]ους, [καὶ π]άλιν, ὅ[τ]αν λέξεως ἀναγ[κ]αίαν τινὰ δ[ι]ά[θ]εσιν ποιήσηται, τοὺς σοφιστεύοντας ἀπὸ τούτων τῶ[ν] μερῶν, μικρὰ βούλομα[ι] διαλεχθῆναι).

I follow Philippson in understanding αὐτὸν or τινὰ from ὅταν . . . τις as the subject of the *hapax* καταζηλοῦν, and in translating 'imitates in all respects'.[30] On this inter-pretation, Epicurus is replying to opponents who had mistakenly inferred from his use of borrowed terminology that he meant the same thing as the earlier philosopher or philosophers whose language he was imitating, regarding his distinctions[31] as mere sophistry. What expression, and what philosopher, is he referring to? Philippson proposed *atomos* or other Democritean terms; but the differences between Epicurus' and Democritus' conceptions of the atom have only a remote relevance to anything discussed in what survives of 14, and are not really differences in the meaning of the word. On the other hand, if the borrowed expression was *stoicheion*, there is a close connection with the preceding criticisms of Plato, in which, even while arguing that the so-called four elements are not simple substances but types of compounds, Epicurus had used *stoicheia* in something like its Platonic sense.[32] To be sure, there must have been, if this was to be intelligible to anyone besides Epicurus himself, some explicit reference to the word in the lost part of 27 or 28; but the space seems insufficient for indicating a return to something discussed much earlier, while a few words would suffice to mention that he had sometimes, even where the reference was not made clear by the polemical context, used *stoicheia* for what he calls *ousiodeis*

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[30] 'Ahme er ganz und gar nach', Philippson (n. 24), 486; similarly Arrighetti (n. 24), 271–2, and Isnardi Parente (n. 24), 228. Schmidt (n. 24), 257 and 526, n. 78, also takes Epicurus to be defending his own use of borrowed expressions, but interprets the participles as the subjects rather than the objects of καταζηλοῦν, which he translates absolutely as 'seien . . . *blosse* Nachahmer' (my italics). His explanation, that Epicurus is criticizing philosophers who attempted or demanded the creation of an entirely new philosophical vocabulary, seems implau-sible, and requires him to supply 'later' with τοὺς χρωμένους, while his translation of the second half of the sentence, 'und dasselbe gelte . . . für alle, die von diesen Dingen *klugen* Gebrauch machen' (my italics), is even less convincing. Leone (n. 24, 1984), 62 and 98–9 (with nn. 696–7), and (n. 24, 1987), 52, n. 7, and 55–7, takes the point to be that these opponents had misused expressions borrowed from Epicurus, translating τοὺς οἰομένους καταζηλοῦν as 'those who think that *they* are imitating'. This is, to be sure, a frequent construction with οἴεσθαι, but it requires her to understand, not τινά, but αὐτῶν depending on τις, which seems to me more difficult (and if Epicurus had meant that, he would probably have written ὀνομάζωσι ['when *they* call'] and ποιήσωνται). She also has to supply 'by chance' with ὀνομάζηι and 'correctly' with τοὺς . . . χρωμένους and, like Schmidt, give a favourable meaning to τοὺς σοφιστεύοντας (at [n. 24, 1987], 57 she paraphrases 'anche quando, *nel ritenere necessario* un certo modo . . . di esprimersi, *presumono di scendere in gara con i sofisti, la loro non è più che una sciocca presunzione*'—my italics). LSJ s.v. καταζηλοῦν translate 'create prejudice against', probably implying that οἴεσθαι means 'intend' (s.v. 6.3); this interpretation, like Leone's, adds the difficulty of making the plurals τοὺς χρωμένους and τοὺς σοφιστεύοντας refer to τις to that of giving a positive meaning to σοφιστεύοντας. Finally, none of these interpretations does anything to explain the connection with the preceding section.

[31] Leone (n. 24, 1984), 62, reads δ[ι]ά[θ]εσιν, and interprets, (n. 24, 1987), 52–3, n. 9, as 'arrangement of sounds to produce a vocabulary'. I take it as a distributive version of θέσις ὀνομάτων, meaning much the same as Gomperz's δ[ιαστολὴ]ν, printed by previous editors.

[32] 24.2 and 27.3; in 22.11 it may have either this meaning ('they are mistaken about those substances which they call elements') or the doxographic one ('they are mistaken about what the elements, i.e. the fundamental constituents of matter, are').

synkriseis (22.9–10), that is, with a similar extension to Plato's usage but a different intension.

In 28 he contrasts his own consistency with

one who has mixed together some particular correct doctrine with other, inappropriate doctrines, even if he happens to have hit upon it first. For the 'incoherent'[33] (philosopher) is not the one who unites the wide-spread[34] doctrine with other, unrelated doctrines of his own, but rather the one who puts together contradictory ideas, whether (they come) from himself or from someone else. And if someone says that one of Empedocles's doctrines is acceptable, but happens to (conclude?) that another is foolish . . .

The reference to Empedocles supports the view that Epicurus is still thinking about Plato's version of the four-element theory.[35] All previous scholars have taken the phrases πρὸς νοῦν and ἄνευ νοῦ as adverbial, 'if someone asserts one of Empedocles' doctrines reasonably and another foolishly'. If so, Epicurus is turning here to a contrasting example of foolish consistency in adhering to an earlier philosopher's views; he would also have to complete this example and return to the proper kind of consistency before the beginning of the next column. It seems to me more likely that there is no change of subject, and that τις here, as in 27.13, refers to Epicurus himself. I therefore take the phrases as predicates, 'if someone says that one of Empedocles' doctrines is acceptable,[36] but that another is foolish . . .' The reference to Empedocles is perfectly in place if the word Epicurus has in mind is *stoicheion*; he agreed with Empedocles and Plato that the four elements were important classes of phenomena, but disagreed about their nature.

In 29–30 Epicurus repeats with variations his claim to have borrowed only what was consistent with his own doctrines, and concludes by turning his critics' accusations back on them (31):

for it is just to say that *they* 'misuse language' or are 'incoherent', since they have spoiled even the correct type of conclusion which they themselves[37] have arrived at by (some) natural chance (4–6, καὶ τὸ ἀπὸ τύχης τ[ῆ]ς φύσ[ε]ως αὐτῶν ὀρθὸν ἐπ[ι]φορᾶς εἶδος). As for those who because of the ambiguity of some indifferently used word or expression, which is present for both the careful writer and the ordinary person, have lost sight of the distinction, let them altogether hold their peace (6–14, οἱ δὲ δὴ δι[ά] τινος ὀνόματος ἢ ὀνο[μασ]ίας ἀδιαφόρ[ο]υ κοινότητα. τῶι τε λελογισμέ[ν]ωι καὶ τῶι τυχόντι γ[ι]νομένην, τῆς διαφορᾶς οὐκέτι ἐπαισθανόμενο[ι], παντελῶ[ς] ἡσυχίαν [ἐ]χέτωσαν).

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[33] If συμπεφορημένος (literally 'with one thing piled on another') and σολοικίζειν (30.4 and 31.2) are quoted from Epicurus' opponents, there is no need to give either a special meaning here ('eclectic', on which cf. Leone [n. 24, 1987], 55, n. 42, or 'to be guilty of an absurdity', LSJ s.v. σολοικίζειν).

[34] δι[ε]σπαρμένον, following Philippson's translation ('weitverbreitete', [n. 24], 487). Arrighetti gives '*scattered elements* of a doctrine'; Schmidt, '*detached* from its context'; Leone, '*besprinkled* with extraneous doctrines'.

[35] Isnardi Parente (n. 24), 229, n. 1, observes this but does not connect it with the use of *stoicheion*.

[36] I.e. to the subject, agreeing with *his* thoughts. The only close parallels are Phld. *Mus.* 27.39–40 and Sext. Emp. *Math.* 10.108 and 340, where πρὸς νοῦν appears to mean 'relevant, to the point'. The translations 'reasonably, correctly' were no doubt suggested by the contrast with ἄνευ νοῦ, which I interpret as a slight play on words. For whatever it is worth, ὀρθόν in Eust. *Il.* 3.649.21 (Hera λαλεῖ μὲν πιθανὰ τῷ Διὶ ἀνδρί, οὐ μὴν πρὸς νοῦν ὀρθόν) suggests that πρὸς νοῦν by itself did not mean that to Eustathius or his source.

[37] I take αὐτῶν with the following ὀρθὸν ἐπ[ι]φορᾶς εἶδος (emphatic position), rather than, as editors have done hitherto, with the preceding τ[ῆ]ς φύσ[ε]ως.

In 31.9–11, all previous translators have taken τῶι τε λελογισμέ[ν]ωι καὶ τῶι τυχόντι as neuter. This is not completely impossible; but even if it is right, since τε . . . καὶ can hardly mean 'either . . . or',[38] Epicurus could not be making a general remark that ambiguity can occur in two ways. 'Resulting *both* from reasoning *and* from chance' would rather imply that, while Plato hit upon the metaphor by chance, because he mistakenly believed that the four elements corresponded to the shapes of elemental particles, he himself had retained the term for good reason, perhaps because he recognized them as classes of simple compounds which, without being the basic constituents of matter, do certainly form a countable and ordered set. (If this is right, his contempt for those who misunderstood him might suggest an excessive confidence in the transparency of his own metaphor because of its closer connection with the literal meaning;[39] but 'imitating those who engage in sophistry' may refer to some explanation of his meaning which his critics had overlooked.)

Τῶι τυχόντι is, however, an odd way of saying 'by chance',[40] and the masculine, 'any chance person, the man in the street', is much commoner than the neuter. There are also parallels for ὁ λελογισμένος, 'one who has given the matter some thought'.[41] On this interpretation, the passage is only implicitly relevant to Epicurus' view of metaphor, but shows that he did not believe ambiguity could be entirely eliminated by sticking to the original meanings of words.

I.C. The theory of compound bodies

If the end of *Nat.* 14 is a defence of Epicurus' use of *stoicheion* to denote the so-called four elements, we may find examples of this usage in other fragments and testimonia; but before discussing such examples, it will be necessary to say something about why Epicurus regarded the 'elements' as compounds.

Our only explicit evidence is in Lucretius, who claims (2.581–97) that nothing perceptible is made up of atoms of a single kind, and that 'whatever possesses in itself more capacities and powers thus shows that there are in it the most kinds of atoms and various shapes'. Springs are produced and plants and animals nourished, he argues, from the earth; but this is clearly insufficient to establish the claim about all perceptible objects, since they are not all observed to supply matter for substances of other kinds. 'Capacities and powers' (*vis . . . atque potestates*), however, suggests that the example represents only one type of change, implying the general claim made at *Ep. Hdt.* 54, 'that the atoms display none of the qualities of perceptible things except shape, weight, size, and all those necessarily connected with shape; *for every quality changes*'. Stated so broadly, this must refer not only to changes of kind but also to the capacity for being perceived differently under different conditions, as, for instance,

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[38] None of them comment on this rendering; Arrighetti and Schmidt, however, give 'which *can* occur either deliberately or by chance,' for which one would expect γ[ι]νομένην ἄν.

[39] I consider the supposed Epicurean hostility to metaphorical language as a myth, and take his advice to keep in mind 'the primary concept corresponding to each word' (*Ep. Hdt.* 38) as implying, not that metaphorical language should or can be avoided, but rather that there are no truly dead metaphors; cf. M. Wigodsky, 'The alleged impossibility of philosophical poetry', in D. Obbink (ed.), *Philodemus and Poetry: Poetic Theory and Practice in Lucretius, Philodemus, and Horace* (New York, 1995), 62–3, and 'Abstractions and metaphors in the Epicurean theory of language' (in preparation).

[40] The neuter ought rather to mean, like τὸ τυχὸν in Pl. *Ti.* 46E, '(by) *any* chance outcome'.

[41] M. Aur. *Med.* 9.3; Poll. *Onom.* 4.11; Porph. *Abst.* 1.44; LSJ cite Euripides and Lucian for the neuter passive, but ignore this use of the middle. (I owe this interpretation, and the parallels, to Prof. David Armstrong.)

even a nugget of gold will appear to change colour under different conditions of light. The implicit argument is that, since all differences of perceived quality result from the presence of atoms of different shapes, individually or in combination, every perceptible object must be made up of atoms of more than one kind.

Lucretius' references to atoms in compounds 'joining their motions' (*consociare motus*, 2.111) and having 'suitable motions,' or more literally 'motions which come together' (*convenientis*, 1.1030, 2.712–13 and 941–2, 5.442), suggest that the empirical argument from change may have been supported by a more theoretical one. All that survives in Epicurus' own words about the mechanism of compounding is the statement (*Ep. Hdt.* 43) that 'some of the atoms keep their oscillation within limits, when they happen to be enclosed in an interlacing or shut in by those which intertwine'. Philodemus confirms the association between atomic shapes and characteristic motions by using 'oscillations' (*palmoi*) as an equivalent for 'types of atoms' (or 'of compounds');[42] and Lucretius adds that the atoms in solid bodies rebound within narrower limits than those in gases (2.100–8).

Elsewhere Lucretius says that the hardest solids, such as stones and metals (2.444–50, 6.1084–9), and also viscous and bitter-tasting liquids (2.394, 405), consist of atoms with branching shapes that hook on to one another. Hooked atoms are attested for Democritus by Aristotle (fr. 208 R^3 = DK 68A37) and by Aëtius, who says that Leucippus and Democritus thought the cosmos was enclosed by a shell of such atoms (2.7.2 = 67A23), but also reports that Epicurus denied the possibility of atoms of these and some other 'easily broken' shapes (1.3.18 = fr. 270 U). Lucretius may have conflated Epicurus' ideas with the earlier atomists', or Epicurus may have changed his views.[43]

Even on Lucretius' account, however, most liquids, and perhaps also less rigid solids, are held together not by jigsaw-puzzle shells, but because their rebounds fall into a more or less stable internal equilibrium. The shells of hooked atoms must consist of atoms of differing shapes, except when the hooks find suitable 'eyes' on other faces of similar atoms; but the balancing rebounds were probably also thought of as resulting only from the combination of atoms of different shapes and, consequently, different motions.[44]

In 2.405, cited above, and elsewhere, Lucretius appears to attribute perceptible qualities directly to the presence in the compound of single types of atoms; but consideration of the effluences which cause sensation shows that this must be an oversimplification of Epicurus' view. Visual images are themselves compounds,[45] which can persist for some time, and which therefore, whether they are held together by interlocking or by rebounds, must, as I have argued, consist of atoms of more than

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[42] *De Dis* 3 fr. 41.20–1, on which cf. Wigodsky (n. 5), 214 and 226, n. 11.

[43] Perhaps in *Nat.* 14–15, in response to criticism of 2. I am not persuaded by D. Sedley, *Lucretius and the Transformation of Greek Wisdom* (Cambridge, 1998), either that Lucretius used all of *Nat.* 1–15 or that it was his only source; I will address the question in 'Epicurean objections to Stoic *lekta*' (in preparation). Bailey (n. 3), 345–7, questions Lucretius' reliability on different grounds.

[44] I assume, *pace* D. Konstan, 'Problems in Epicurean physics', *Isis* 70 (1979), 414, that Epicurus thought the direction of rebounds was somehow determined by such factors as the angle of incidence of colliding atomic surfaces. Konstan's view leaves the association of characteristic motions with atomic shapes unexplained, and adds (as he acknowledges, ibid., n. 52) a random element, which would make the swerve otiose and Epicurus' attribution of determinism to Democritus inexplicable.

[45] [ἀ]λλη[λού]χοι φύσεις, *Nat.* 2, 24.49.4 Arr.².

one kind. The effluences which affect hearing[46] and the other senses[47] may also have been thought of as compounds with some degree of coherence like that of images; in any case, since single atoms are as a rule unable to move the sense organs, probably at least some perceptions besides visual ones were attributed to simultaneous or rapidly successive impacts of atoms of more than one shape.

Each effluence contains atoms of some, but not necessarily all the shapes found in the source; *PHerc.* 19/698 (cols. 23–4) cites Apollodorus (probably the second-century scholarch)[48] as saying that colour is produced on the surface of a compound body by a fraction of the atoms in it, while touch is affected by all of them,[49] including those which produce flavours and odours. Epicurus or his successors seem also to have made explicit what Democritus probably left unclear, that changes in the qualities perceived by a single sense may also result from differences in the atomic shapes represented in the effluences. Since the *palsis* which causes the emission of effluences originates deep within the compound body (*Ep. Hdt.* 50), the 'blow of light' (Lucr. 2.808) probably causes, not just 'a rearrangement in (the) surface atoms'[50] of bodies but also some variation in the atoms which are dislodged from the surface and from deeper layers; the earlier account of the changing colour of the wind-swept sea (2.769–70, *materies ubi permixta est illius et ordo / principiis mutatus et addita demptaque quaedam*) may refer to this as well as to atoms added by the wind. This variability of effluences renders somewhat moot the question whether Epicurus' claim that 'all sensations are true' means 'true about the sources' or only 'about the images':[51] when he says that 'whatever impression we receive with attention by means of thought or the senses either of shape or of properties, that is the shape of the solid body' (*Ep. Hdt.* 50), this need not mean that the impression represents *all* its properties.[52]

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[46] According to *Ep. Hdt.* 52–3, 'this stream is split up into homoeomerous masses, which preserve both a certain correspondence of qualities (συμπάθειαν) with one another and a unity of a particular kind extending back to the source . . .' *Sympatheia* with their sources is also attributed to visual images, *ibid.* 48 and 50, as is *homoiomereia* in *Nat.* 2, 24.33.2–3 Arr.² (quoted below, n. 76); and *ongkoi* here is usually understood likewise as compounds, which are similar as parts of the whole stream of sound to each other and the source; cf. E. Asmis, *Epicurus' Scientific Method*, Cornell Studies in Classical Philology 42 (Ithaca, 1984), 112–14 and 162–3. Bailey (n. 3), 405, however, refers it to the similarity of streams of sound going in various directions, and E. N. Lee, 'The sense of an object: Epicurus on seeing and hearing', in P. K. Machamer and R. G. Turnbull (edd.), *Studies in Perception, Interrelations in the History of Philosophy and Science* (Columbus, 1978), 31–40 and 55–7, to the segments which carry each distinct sound; on Bignone's interpretation cf. n. 82 below.

[47] T. G. Rosenmeyer, 'Sensation and taste in Lucretius', *SCI* 15 (1996), 135–41, attributes all kinds of sensation (even touch; but cf. n. 49 below) to 'films' (i.e. 135, n. 4, 'structured replicas or extensions of the source-object') and explains Lucretius' 'ascription of atomic shapes to films' as synecdoche.

[48] See A. Monet, '[Philodème, *Sur les Sensations*] *PHerc* 19/698', *CErc* 26 (1996), 108–9, and, on Apollodorus, 58.

[49] I.e. by the resistance of the body as a whole; I interpret Lucr. 2.268, *duritiem penitus saxi sentimus in alto*, similarly.

[50] D. Furley, 'Democritus and Epicurus on sensible qualities', in J. Brunschwig and M. C. Nussbaum (edd.), *Passions and Perceptions, Studies in Hellenistic Philosophy of Mind* (Cambridge, 1993), 89.

[51] This is observed by Rosenmeyer (n. 47), 144–5; cf., for the 'images only' interpretation, S. Everson, 'Epicurus on the truth of the senses', in id. (ed.), *Companions to Ancient Thought: 1, Epistemology* (Cambridge, 1990), 176–82, and contra Furley, ibid., 91–2.

[52] The extension of the claim to shapes remains problematic for such cases as the round image of a square tower; but man-made objects like buildings, and so presumably their images, are mere aggregations, not compounds with internal coherence. Epicurus may also have considered

If this was Epicurus' account of qualities, the problem whether he posited anything comparable to molecules[53] becomes a question of definition, and we need to distinguish among the implications of the word in modern chemistry. He must have thought that there was a minimum number of atoms of each type required to make up any type of compound, and either a fixed proportion among them or proportions varying within limits. He need not have supposed that larger masses of these compounds were composed of multiples of such minimal units persisting separately; indeed, he does not seem to have drawn a clear line between such units and larger compound bodies, even including living organisms.[54] On the other hand, many perceived qualities, including, I have argued, all visible ones, result from the simultaneous action on the sense organs of atoms of more than one shape. Thus when new compounds are produced by mixture, if any qualities of the previous compounds persist, this may show that some of those combinations have persisted as smaller compounds. This is probably the meaning of *spermata* and *semina* in some of the passages collected by Bailey;[55] I suggest that it is also implied by *stoicheia* in those I will now discuss.

I.D. Other Epicurean examples

I have found four such passages besides *Nat.* 14 *fin.* and Aëtius 1.7.34, although the interpretation of all four is disputed. I begin with Alexander of Aphrodisias, *Mixt.* 214.18–215.8, a passage whose evidentiary value has often been denied by scholars[56] who have taken *stoicheia* as a synonym of *atomoi*, and therefore have supposed that Alexander was making a distinction without a difference between Democritus and Epicurus. He says that

Democritus, thinking that what is called mixing takes place through juxtaposition of bodies, with the things being mixed being divided into little bits [εἰς μικρὰ] and forming the mixture by being placed next to one another, says that no things at all are really mixed, but that the apparent mixing is the juxtaposition to each other of bodies each of which retains, in these little bits [κατὰ μικρὰ], its proper nature, which it had before the mixing . . .

He praises Democritus as 'a lover of truth and a philosopher' for accepting without hesitation the consequences of his theory, while

Epicurus, wishing to avoid what was said by Democritus to follow . . . claims that the bodies which are mixed together . . . [are] not themselves preserved in their separation (ἐν τῇ διαιρέσει, i.e. by the interposition of bodies of other types) but rather dissolved into the elements and the atoms (ἀναλυομένων εἰς τὰ στοιχεῖα καὶ τὰς ἀτόμους) of which each of them being somehow composed was formerly, one wine, another water . . . it is not water and wine which are mixed together, but what one might call water-producing atoms are mixed with the wine-producing ones.

distorted images generally as representing *part* of the true shape of the object in the same way the effluences which affect other senses represent some of its qualities, by a skewed sample of its atoms. Purinton (n. 3), 226, emends to μορφῆς, 'is (an impression) of the solid body's shape'.

   [53] Cf. below on Alexander, *Mixt.* 214–15.
   [54] Cf. at n. 84 below.
   [55] Bailey (n. 3), 343–4.
   [56] H. H. Joachim, *Aristotle on Coming-to-be and Passing-away* (Oxford, 1922), 183–4 (on *Gen. corr.* 28a1–2); Schmid (n. 23), 57–8; Todd (n. 10), 184–5; and Long and Sedley (n. 3), 2.68; defended (in different ways—see following note) by S. Sambursky, 'Conceptual developments in Greek atomism', *AIHS* 11 (1958), 254–5, and Kerferd (n. 10), 90.

The scholars cited take τὰ στοιχεῖα καὶ τὰς ἀτόμους as a hendiadys,[57] and argue that Alexander mistakenly applied to Democritus and Epicurus Aristotle's contrast (*Gen. corr* 1.10.327b34–8a18) between 'composition' (*synthesis*) and 'blending' (*krasis*); that is, they take him to mean that Democritus' *mikra* is not one of his usual vague expressions for the atoms, but refers to small compounds preserved in the mixture, while Epicurus asserted that the ingredients are completely broken down into their constituent atoms, also called 'elements'. This is, I think, the exact reverse of the truth. If Alexander had taken Democritus to mean compounds, he should have criticized him, rather than Epicurus, for inconsistency with his own atomism; and he is unlikely to have been so careless or confused.

Only Schmid has attempted to spell out how the mistake could have occurred, and the far-fetched scenario which he was forced to create would by itself be an argument against so interpreting *stoicheia*. According to Schmid, Democritus himself did use *mikra* to refer to atoms, but Alexander mistook his meaning, and 'later, when he had forgotten its origin, mistakenly put Aristotle's distinction to use as a contrast between Democritus and Epicurus'. It is simpler and more plausible to suppose that Alexander's use of Aristotelian language is misleading, and that he correctly interpreted Democritus' *mikra* as atoms and Epicurus' εἰς τὰ στοιχεῖα καὶ τὰς ἀτόμους as '(partly) into simple compounds and (partly into) atoms'; his objection was precisely to Epicurus' theory of compound bodies, for which Democritus seems to have had no clearly formulated equivalent.[58]

In my second example, Aëtius 4.3.11 (= fr. 315 U), we are told that soul has four constituents, of which the first three are respectively fire-like, air-like, and breath-like, while the fourth, which is nameless, 'produces sensation in us; for sensation is found in none of the named elements (ἐν οὐδενὶ τῶν ὀνομαζομένων στοιχείων)'. *Stoicheia* here can hardly mean '(types of) atoms', in view of the argument in *Nat.* 14 that fire, and presumably the other elements, are compounds of atoms of different shapes.[59] It could just mean the constituents of soul itself, whether simple substances or compounds; but if the language is Epicurus' own, it probably means 'classes of simple compounds' once more; its application to the 'pneumatic' constituent, and implicitly

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[57] Kerferd (n. 10), 90, takes molecules to be, not denoted by στοιχεῖα, but implied in the reference to recombination.

[58] Cf. n. 46 above. Theophrastus' references to shapes in explaining sensations are generally taken to mean atomic shapes, but C. C. W. Taylor, *The Atomists, Leucippus and Democritus*, Phoenix suppl. 36 (Toronto, 1999), 112, n. 107, suggests that he is 'misrepresenting a more careful presentation' which distinguished 'structural features of atomic aggregates'. Similarly, G. M. Stratton, *Theophrastus and the Greek Physiological Psychology before Aristotle* (London, 1917), 192–3, nn. 148 and 151, argues that τὸ σχῆμα μεταπῖπτον in *Sens.* 63 must refer to the shape 'of the atomic complex'; but P.-M. Morel, *Démocrite et la recherche des causes* (Paris, 1996), 222, explains it by the replacement of some atoms in the effluences with others of different shapes. This is how Theophrastus explains changes of flavours at *Caus. pl.* 6.7.2 (= DK 68A132), which, as W. K. C. Guthrie, *A History of Greek Philosophy* (Cambridge, 1965), 2.439, n. 1, points out, implies that Democritus did not specify what kind of change he meant. Arist. *Gen. corr.* 316a1 (= 68A123) says that Democritus denied the reality of colour because he attributed it to 'turning' (*tropê*); and Philoponus, *In Gen. corr.* 17.16–18.3 (on 314b15) expands this, no doubt conjecturally (ἀμέλει, 17.29), to explain changes of colour by changes in orientation of atoms of the same shape; cf. however A. P. D. Mourelatos, 'Intrinsic and relational properties of atoms in the Democritean ontology', in R. Salles (ed.), *Metaphysics, Soul, and Ethics in Ancient Thought: Themes from the Work of Richard Sorabji* (Oxford, 2005), 39–63, arguing that the terms *tropê* and *diathigê* themselves imply some version of compounding.

[59] I understand the 'very smooth and round atoms' of the scholium on *Ep. Hdt.* 66 as one constituent of the nameless element.

to the nameless one, would show that he included more than the Empedoclean four under this description.

The other two passages are fairly certainly Epicurus' own words, coming from another papyrus book of *On Nature* and from an apparent direct quotation in Philodemus. Unfortunately, both are too obscure to add much to the evidence already cited; the interpretation of *stoicheion* in them must be argued from the passages already discussed and from the lack of evidence for its use as a synonym of *atomos*. According to *Nat.* 25, 35.10.7–15 Arr.² (images of things previously perceived by the senses make an impression on the soul), προοδοποι[η]ηθῆναι τά γε δὴ πολλὰ ἐχούσης μὲν καὶ αὐτῆς τῆς συστάσεως τῆς διὰ τῶν στοιχείων αἰτίας παρὰ τὴν τῶν ἀτ[ό]μων διαφορὰν καὶ τῶν προυπαρχόντων πόρων ('the compound itself which is responsible [for the thought or impulse in question?] by means of the elements also being able, on the one hand, to have a path prepared for itself, at least in most cases, in accordance with the difference of the atoms and of the pre-existing pores . . .').[60] *Stoicheia* and *atomoi* have sometimes been taken as synonyms here;[61] but even supposing that Epicurus ever used the word this way, the variation seems pointless, while if *stoicheia* means types of compounds present in the noetic image, the specification that they have different effects by virtue of containing different kinds of atoms is natural. Thus it probably refers to the Empedoclean elements,[62] or rather, in the light of Aëtius 4.3.11, to classes of simple compounds including but not restricted to them.

Finally, there is Philodemus, *On Piety* 13.350–64 O, 'for (a unity) existing by similarity can possess complete happiness forever, since unities can be formed from the same no less than from similar elements, and are allowed by Epicurus, as (he says) in his *On Holiness* in exactly this way' (δύναται γὰρ ἐκ τῆς ὁμοιότητος ὑπάρχουσα διαιώνιον ἔχειν τὴν τελείαν εὐδαιμονίαν, ἐπειδήπερ οὐχ ἧττον ἐκ τῶν αὐτῶν ἢ τῶν ὁμοίων στοιχείων ἑνότητες {ι} ἀποτελεῖσθαι δύναὶν′ται καὶ ὑπὸ τοῦ Ἐπικούρου καταλείπονται καθάπερ ἐν τῶι Περὶ ὁσιότητος αὐτότατα).[63] The 'unities from similar elements' have usually been understood to be the gods.[64] Scott took 'unities formed from the same elements' as other types of compound bodies;[65] but Philippson pointed out that no compound body remains numerically the same, since they all constantly lose matter in images and replace the losses from their environment, and interpreted 'unities of the same elements' as the atoms, which are made of unchanging least parts.[66] His objection loses its force, however, if *stoicheia*

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[60] For text and commentary cf. S. Laursen, 'The early parts of Epicurus, *On Nature*, 25th Book', *CErc* 25 (1995), 91 and 52–3.

[61] By K. Kleve, 'Wie kann man an das Nicht-Existierende denken? Ein problem der epikureischen Psychologie', *SO* 37 (1961), 53, n. 5, and M. Gigante, 'Atakta IV', *CErc* 12 (1982), 64.

[62] Following Diels (n. 12), 8, and Arrighetti (n. 24), 640.

[63] Text as in Obbink, except that I accept Gomperz's corrections ὑπάρχουσα and ἀποτελεῖσθαι in 351–2 and 359.

[64] Or some of them: DeWitt (n. 8), 264–5, identifies them with the 'numerically existing' gods of the scholium on *RS* 1 (n. 2 above).

[65] Scott (n. 3), 232, followed by P. Merlan, *Studies in Epicurus and Aristotle*, Klassisch-philologische Studien 22 (Wiesbaden, 1960), 54–5; Rist (n. 3), 175; Obbink (n. 3, 1996), 330–3; and Wifstrand Schiebe (n. 3), 706. Purinton (n. 3), 184–95, interprets 'unities of similar elements' as streams of similar images, and 'unities of the same elements' as *both* perceptible bodies *and* the residues left by such streams of images in the senses and minds of observers.

[66] Philippson (n. 2), 589–92, and 'Nachträgliches zur epikureischen Götterlehre', *Hermes* 53 (1918), 376 (attributing Scott's interpretation to his own earlier article, apparently by a slip of the pen), followed by Bailey (n. 3), 454; Vicol (n. 8), 203; Freymuth (n. 3), 13–15, and 'Methodisches zur epikureischen Götterlehre', *Philologus* 99 (1955), 238–9; and Lemke (n. 3), 65, n. 50 and 86–7.

are understood as types rather than tokens (of simpler compounds, or generally of the unities' constituents, atomic or molecular). I have suggested elsewhere[67] that the 'unities formed of the same (kinds of) elements' are inanimate objects, which replace the atoms and compounds they lose with others of the same kinds, and that those 'from similar elements' include not only the gods but all living things, whose chemical composition varies with their age, state of health, and so on. I will offer arguments in support of this interpretation elsewhere, since the extended reconsideration of the problems of Epicurean theology which they require would be out of place here.

II. *HOMOIOMEREIAI*

As with *stoicheia*, there is a misconception about *homoiomereiai* which needs to be disposed of, namely, that the word is necessarily connected with Anaxagoras' theory of matter. To be sure, readers generally encounter it first in modern accounts of his doctrines, or (in the singular) at Lucr. 1. 830, *nunc et Anaxagorae scrutemur homoeomerian*,[68] while the plural, apart from Aëtius 1.7.34 and one other, textually suspect passage,[69] seems to occur only in references to Anaxagoras' *spermata*. Most scholars, however, do not believe that Anaxagoras himself used the word,[70] dismissing as misinformed or careless the testimonia which attribute it to him.[71] It is not found in his fragments, and indeed the plural first appears in extant literature in Plutarch (*Per.* 4) (unless, of course, Aëtius is earlier), while the singular, which first appears in Epicurus, is used both by him and by later writers more often in applications unconnected with Anaxagoras.[72] The adjective, however, occurs first in Aristotle, and it is with this that consideration of the noun's meaning and history must begin.

Adjectives in -μερὴς are rare before Aristotle; Plato, *Prt*. 329D–30A, where the contrast between things like a piece of gold, the parts of which are also gold, and a

[67] Wigodsky (n. 5), 216–17.
[68] The collective singular is also found, if the Armenian version can be trusted, in Philo's doxographical passage *de Prov.* 1.22; similarly, Simplicius, referring to Anaxagoras, has the singular (ἐν τῇ ὁμοιομερείᾳ, i.e., 'in any particular homoeomery') at *in Phys.* 162.31, and uses the noun abstractly, for the property of homoeomerousness, at *in Cael.* 605.19, .25, and 606.3.
[69] Aëtius 5.26.4; the manuscripts make this the end of an entry on Empedocles, but probably the beginning of a new lemma with Anaxagoras' name has been lost—cf. C. W. Müller, *Gleiches zu Gleichem, ein Prinzip frühgriechischen Denkens*, Klassisch-Philologische Studien 31 (Wiesbaden, 1965), 70–2, and M. Schofield, 'Doxographica Anaxagorea', *Hermes* 103 (1975), 12–13).
[70] So E. Zeller and W. Nestle, *Die Philosophie der Griechen in ihrer geschichtlichen Entwicklung*[6] (Leipzig, 1920), 1.1211–14 (with earlier bibliography, 1212, n. 2); R. Mathewson, 'Aristotle and Anaxagoras: an examination of F. M. Cornford's interpretation', *CQ*, n.s., 8 (1958), 77–81; D. Lanza, 'Le omeomerie nella tradizione dossografica Anassagorea', *PP* 18 (1963), 256–93; Guthrie (n. 58), 2.325–6; Schofield (n. 69), 3–5; and D. W. Graham, 'The postulates of Anaxagoras', *Apeiron* 27 (1994), 81–3 (the list could easily be extended). A. L. Peck, 'Anaxagoras and the parts', *CQ* 20 (1926), 64–7, and Bailey (n. 3), 551–5 defend ascribing the word to Anaxagoras; I have seen nothing supporting this position more recent than G. Vlastos, 'The physical theory of Anaxagoras', in A. P. D. Mourelatos (ed.), *The Pre-Socratics* (Garden City, 1974), 476 n. 65a.
[71] Lucr. 1.834; Aëtius 1.3.5; and Simpl. *in Phys.* 1123.23.
[72] The occurrence of this general sense outside of Epicurus seems to have gone unnoticed pre-TLG; Ptolemy (*Alm.* 1.3.14.15) applies it to the homogeneity of the aether, Simplicius to that of the heavens (*in Cael.* 535.14) and of all the elements (ibid. 532.25), and Joannes Lydus to that of water (*Mens.* 4.46.6); Damascius (*in Parm.* 144.14) uses it of the One, and Proclus of the soul (*in Ti.* 2.252.26) and of intersecting lines and their extensions (*in Euc.* 301.4—cf. the adjective, of the cylindrical spiral, ibid. 105.1–10).

face, whose parts are mouth, nose and so on, is explained without using *homoiomerês*, is often cited as evidence that the word had not yet been coined. Aristotle uses it in his biological works (his fullest list is *Hist. an.* 487a1–10) to make a similar contrast between parts of animals like flesh and bone, whose own parts 'are called by the same name', and organic parts like hands and faces; he also applies it to parts of plants[73] and to metals and stones (*Mete.* 388a13–20), and occasionally to the Empedoclean elements (*Metaph.* 992a7, *Top.* 135a24–b6), in effect extending its range to everything which appears homogeneous to the naked eye; but when he is using the term strictly, in his own system, he distinguishes the elements from *ta homoiomerê* which are made up of them (*Mete.* 4.384b30–3. 388a20-6, and 389b26–7; *Part. an.* 646a20–1; *Gen. an.* 715a11). He also says (*Cael.* 302a31–b3; *Gen. corr.* 314a18–20) that Anaxagoras made *ta homoiomerê* his elements, and adds 'I mean, for instance, bone, flesh and marrow', indicating that he is using the word in his own sense and not necessarily attributing it to Anaxagoras.

The coining of the noun, whether in reference to Anaxagoras' theory or in a more general sense, was a natural development; it has been argued that Epicurus introduced the word,[74] but it is more economical to suppose that Theophrastus was the innovator, given his influence on both Epicurus and the doxographical tradition.[75] Epicurus uses the noun in the singular for the similarity of images (probably) to the bodies from which they originate,[76] and for the supposed similarity of atomic shapes to flames (*Nat*. 14, 29.27.7). Forms of the noun or adjective also occur several times in *Nat.* 15;[77] in one place (30.12.5) Sedley has restored the plural, interpreting it as a reference to Anaxagoras. This may be right; but possibly, given Epicurus' other uses of the words, some or all of their occurrences in 15 refer to his own theory.

Whether or not Epicurus (or Theophrastus) used *homoiomereiai* for Anaxagoras' seeds, his applications of both noun and adjective vary so greatly that there is no reason to doubt Aëtius' evidence that he also gave it a special meaning in his own system. Finding it paired with *stoicheia*, it is natural to conjecture that this meaning was a similar one, and that if Epicurus' *stoicheia* were the simplest types of compounds, roughly corresponding to the Empedoclean elements, his *homoiomereiai* were those at the next level of complexity, corresponding to Aristotle's *homoiomerê*. He will thus have borrowed, not in this instance his predecessor's exact word, but the paronymous noun, and probably, as in the case of Plato's *stoicheia*, with some change to Aristotle's intension. For Aristotle, that is, the *homoiomerê* were the simplest compounds of the elements, while Epicurus, just as he allowed, in *On Nature* 14.29.24, that some of the subspecies classed under the name 'fire' (and presumably the other elements) might contain atomic types not represented in others, may have thought that some or all of the *homoiomereiai* contain atomic types not found in any of the

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[73] As does Theophr. *Hist. pl.* 1.1.12 and 1.2.1; he calls plants more *homoiomerê* than animals, *Caus. pl.* 5.2.1.

[74] So Lanza (n. 70), 283–9, and Schofield (n. 69), 4–7, arguing from λόγῳ θεωρητὰ μόρια in Aëtius 1.3.5 (279a17 and 21 Diels, preceding *homoiomereia* in 23) for interpolation in an otherwise Theophrastan context, or an Epicurean doxographic source, respectively.

[75] So H. Diels and W. Kranz, *Die Fragmente der Vorsokratiker*⁵ (Berlin, 1935), 2.18n., and Sedley (n. 43), 125–6 and 183 (and, on Theophrastus' influence on Epicurus generally, 165–85).

[76] *Nat.* 2, 24.33.2–4 Arr.², [τὴν α]ὐτὴν [ὁ]μοιο[μέρε]ιαν τοῦ [στερεμνίου δ]ιασώζου[σιν]; cf. n. 46 above for the adj. applied to auditory effluences.

[77] 30.7.5; 12.5 ἐξ ὁμοιομε[ρειῶν] Sedley, [ὁ]μοιομε[ρείας] Arrighetti, ὁμοιομε[ρῶν] Millot; 28.4; and possibly 26.5, ὅμοιο . . .

stoicheia, that is, shapes which could enter into a stable pattern of rebounds only as part of more complex compounds.

III. *HOMOIOTETES*

If *stoicheia* are the simplest types of compound bodies and *homoiomereiai* those at the next level of complexity, *homoiotetes* must be the general term for such types, the atomistic equivalent of natural kinds. This is a natural way of understanding the Greek word, unlike the various interpretations which make it a designation of the gods; and it seems to have been simply his feeling for Greek usage that led Bignone to anticipate part of my interpretation[78]—but only part, since his intuition that *homoiotetes* meant the natural kinds was not based on anything resembling my account of *stoicheia* and *homoiomereiai*. It is typical of Bignone's work that he coupled his valid intuition with an egregious error, identifying the natural kinds with the varieties of atomic shapes;[79] and it is equally typical of his work's reception that the error has been remembered longer than the correct interpretation.[80]

Bignone barred his own way to an understanding of *stoicheia* and *homoiomereiai* by denying Epicurean 'molecules'. In 1910 he said nothing about (c) except that Epicurus' atomic shapes 'represent something similar to Anaxagoras' homoeomeries'; but in a later article he interpreted both words as synonyms of *homoiotetes*,[81] and claimed to have discovered a special Epicurean meaning for *homoiomereiai*, namely the resemblances of atoms of similar shapes, which he supported by interpreting the *homoiomereis ongkoi* of *Ep. Hdt.* 52 as atoms rather than molecules.[82] He does not explain how the words could mean this: 'similar to the entire stream of sound' is a context-determined speaker's meaning, and I can only conjecture that he based taking the word to mean 'similar in shape' in other contexts on interpreting it as 'similar in

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[78] E. Bignone 'Delle ὁμοιότητες nella filosofia di Epicuro', *BFC* 17 (1910–11), 135–8; endorsed by Philippson (n. 3), 591, n. 1.

[79] Bignone explains *homoiotetes* (n. 78), 137, as '*both* the formal equivalences of the atoms of each shape *and* the equivalences of specific characteristics of the individuals of the same species' (my italics).

[80] Bailey (n. 3), 453, n. 3, Freymuth (n. 3), 14, n. 4, and Pfligersdorffer (n. 3), 247 refer to both species and atomic shapes; Lemke, (n. 3), 27, n. 1, mentions only 'Atomarten'.

[81] 'Ancora delle ὁμοιότητες nella filosofia di Epicuro', *BFC* 26 (1919–20), 60–3; contrast his later view of *stoicheia* in *Ep. Pyth.* 86 (n. 23 above).

[82] Ibid. 61–2, citing Aul. Gell. 5.15.8, *Democritus ac deinde Epicurus ex individuis corporibus vocem constare dicunt, eamque ut ipsis eorum verbis utar ῥεῦμα ἀτόμων appellant*; Epiphanius, Diels (n. 7), 588, Ἐπικούρειοι ἄτομα καὶ ἀμερῆ σώματα ὁμοιομερῆ τε . . .; and Aëtius 4.19.2, where he (Bignone) explains εἰς ὁμοιοσχήμονα θρύπτεσθαι θραύσματα as meaning that each mass which produces a particular sound is made up of atoms of similar shapes. Gellius may simply have conflated Epicurus, whose *ongkoi* (on which cf. n. 46 above) were after all composed of atoms, with Democritus; while Epiphanius' evidence is worthless, since Epicurus cannot have called his atoms partless, nor, if he called them collectively *homoiomerê*, have intended Bignone's meaning, 'having similar shapes'. As for Aëtius, 4.19.2–4 forms a single entry, contrasting Democritus and Epicurus with each other and the Stoics, and εἰς ὁμοιοσχήμονα θρύπτεσθαι θραύσματα recurs and is explained by the principle of like-to-like in 3, on Democritus. But neither the similarity of the fragments to each other nor to the source-object is an example of the attraction of like *to* like, and Müller (n. 74), 99, must be right that fragments of voice attach to air-fragments of the same types. But this very text reports that, with sound as with vision, Epicurus dispensed with Democritus' air medium, so that if he did borrow the phrase, he must have given it a different meaning; Aëtius may, however, simply have identified Epicurus' *homoiomereis ongkoi* with Democritus' *homoioschêmona thrausmata*, or the (parenthetical) remarks about atomic shapes in 2 may be misplaced, really belonging to Democritus.

the arrangement of (least) parts', for which there is no parallel. Even if *homoiomerês* and *homoioereiai* could bear this meaning, it would be odd to make the atoms and their shapes two distinct items in the list of 'imperishable natures'; and even if Epicurus' account of compounds was less elaborated than I have argued, he could not simply have identified atomic shapes, the necessary condition for species, with the species themselves, nor have supposed that species could be determined by single types of atoms.[83]

If the *homoiotetes* are the natural kinds, that is, the types of compound bodies, the question arises why our text mentions only elements and homoeomeries, and not also the species of animals and plants, which are after all the standard examples of natural kinds; indeed, Lucretius (2.711–29) infers that every compound is made up of a distinctive combination of atomic shapes from the observation that living things retain some matter from their nourishment and excrete the rest. Accidental omission is a possible explanation; but one would expect this to occur at the end of the sentence, leaving as a remnant '*stoicheia* and *homoioemereiai*' rather than the reverse order. I am more inclined to press the implications of λέγονται and say that what we have here is a note on terminology: Epicurus did not have any special names for ζῷα καὶ φυτά (*Ep. Hdt.* 74).[84]

Like *zoa* and *phyta*, and unlike *stoicheia* (in its natural philosophy sense) and *homoiomereiai*, *homoia* and *homoiotes* are ordinary Greek words. Epicurus' use of *homoiotetes* may nevertheless echo another earlier philosopher's language, namely Speusippus, who dealt with the classification of plants and animals in the second book of his *Homoia*.[85] If so, the shift in meaning was even more drastic than with the other two words, since Speusippus' *homoia* seem to have been the similar species within a genus, while Epicurus' *homoiotetes* were the similarities of individuals of the same species. Speusippus' treatise, that is, built on Plato's divisions and prepared the way for Aristotle's and Theophrastus' classifications of plants and animals,[86] while the absence from Epicurus' fragments of the contrast between κατὰ γένος and κατ᾽ εἶδος, and, apart from Aëtius 1.7.34, the word γένος itself, shows his lack of interest in taxonomy.[87] I do not mean to suggest that Aëtius is paraphrasing rather than quoting; but before discussing the meaning of κατὰ γένος and why Epicurus did not use his customary word, εἶδος, it will be necessary to say something about what it means to call these four things φύσεις.

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[83] Lucretius (2.583–8) says only that nothing perceptible is made up of only one kind of atom, but 2.711–29, cited below, implies also that no atomic type is confined to one species (cf. Section I.C above); Bignone acknowledges this principle at (n. 78), 137, n. 3, but replies that *only* the types with 'suitable motions' determine species (apparently implying 'only *a few*' for each species).

[84] ἄθροισμα is appropriately translated as 'organism' in *Ep. Hdt.* 63–5; *RS* 9; and *Nat.* 25 35.2.1 Arr.², but this is a contextual meaning for a word which properly means simply 'compound'—cf. *Ep. Hdt.* 62 and 69; *Ep. Pyth.*100 and 108; *Nat.* 25.34.11.1 and 5; and Plut. M*or.* 1109F (= fr. 59 U).

[85] I owe this suggestion to Prof. Henry Mendell.

[86] Cf. J. Dillon, *The Heirs of Plato: A Study of the Old Academy (347–274 BC)* (Oxford, 2003), 77–82.

[87] Demetrius Lacon, *PHerc*. 1012 15.1–2 Puglia, uses the phrases to contrast the infinite number of atoms with the finite number of shapes, but this is probably his own paraphrase of *Ep. Hdt.* 42; cf. 36.3–5 and 44.3–4, and E. Puglia (ed.), *Demetrio Lacone, Aporie Testuali ed Esegetiche in Epicuro (PHerc. 1012),* La Scuola di Epicuro 8 (Naples, 1988), 207–9 and 263.

IV. *ΦΥΣΕΙΣ ΚΑΤΑ ΓΕΝΟΣ ΑΦΘΑΡΤΟΥΣ*

'The similarities' are not the only problematic item in Aëtius's list of 'four imperishable natures'; it is also somewhat surprising to find void distinguished from 'the unbounded'. The distinction, and the meaning of *physis*, can be illuminated by considering another phrase containing the word, ἡ ἀναφὴς φύσις, which is both used as a synonym for 'void' and distinguished from it.[88] To call something a *physis* means at least that it is something real, that is, existing by nature; thus calling void (or space) an intangible *physis* implies something like Democritus' assertion that 'thing (δἐν) is not more existent than nothing' (DK 68B156).[89]

The terms are treated as synonyms at *Ep. Hdt.* 40, τόπος δὲ[90] εἰ μὴ ἦν, ὃν κενὸν καὶ χώραν καὶ ἀναφῆ φύσιν ὀνομάζομεν, but are distinguished by Sext. Emp. *Math.* 10.2 (*Spic. ad* fr. 271 U),

according to Epicurus some of the nature which he calls intangible is named κενὸν, some τόπος, and some χώρα, the names being chosen according to different applications, since the same nature is called κενὸν when it is deserted by all body, τόπος when occupied by body, and χώρα when bodies are moving through it; but in general it is called 'intangible nature' in Epicurus' writings because it lacks resistant touch.

The disagreement over the value of this testimony[91] can be obviated if one supposes that, if not Epicurus' theory, at least his terminology underwent some change over time; and I think this is what he is saying in *On Nature* 28 fr. 8, col. 4 = 31.4 Arr.[2], where I understand him (following Vogliano and Philippson) to be contrasting his usage with that of Leucippus and Democritus,[92] rather than with ordinary language:

(the intangible) nature there according to the opinion of the first man who thought of void as (existing) along with (body) and at a particular time and place.[93] Therefore this (word) is understood in this way in those expressions which we wrote in the book about those who first recognized them ([αὐ]τοὺς sc. τοὺς λόγους, 'the arguments' for the existence of void?); but later we took up the book again and made (the language more) precise . . .'

In the following column he acknowledges that it is not always possible to 'change names', referring, I think, not only to introducing new terms such as ἡ ἀναφὴς φύσις, but also to shifting the meanings of those already in use;[94] this implies that at an

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[88] The importance of the passage for Epicurus' concept of space seems to have gone unrecognized, perhaps in part because of Usener's rejection of (b)–(c) as an interpolation; it is not mentioned by A. Brieger, 'Epikurs Lehre vom Raum, vom Leeren und vom All und die Lucrezischen Beweise für die Unendlichkeit des Alls, des Raumes und des Stoffes', *Philologus* 60 (1901), 510–40; F. Solmsen, 'Epicurus on void, matter and genesis', *Phronesis* 22 (1977), 263–81; B. Inwood, 'The origin of Epicurus' concept of void', *CPh* 76 (1981), 273–85; or D. Sedley, 'Two conceptions of vacuum', *Phronesis* 27 (1982), 175–93.

[89] Cf. Solmsen (n. 88), 268–9 and n. 24, and, on the connection between reality and imperishability, 274–81.

[90] Usener's emendation, on which cf. Sedley (n. 88), 183–4, is supported by synonymous uses of τόπος in Plut. A*dv. Col.* 1112E = fr. 76 U and Aëtius 1.20.2.

[91] It is rejected by Inwood (n. 88), 280–1; defended by Sedley (n. 88), 187–9 and 192, nn. 19–20.

[92] Cf. A. Vogliano, *Epicuri et Epicureorum Scripta in Herculanensibus Papyris Servata* (Berlin, 1928), 99, and R. Philippson, 'Neues über Epikur und seine Schule', *NGG* (1929), 132; D. Sedley, 'Epicurus, On Nature book XXVIII', *CErc* 3 (1973), 41 and 58, refers this to 'the meanings given to words by the earliest men to use them'.

[93] This fits Democritus' conception of void as existing wherever there is no atom at a given time, in contrast with Epicurus' idea of space (following Sedley [n. 88]), which can be either occupied or not.

[94] Contra Sedley (n. 92), 58 on col. 5.

earlier period he had used κενὸν generically as well as in its proper meaning, either exclusively or as an alternative to his new coinage. In *Ep. Hdt.* 39, τὸ πᾶν may be meant as a synonym for ἡ ἀναφὴς φύσις, denoting space rather than the sum total of atoms and void;[95] but if so, it is unfortunately ambiguous, especially since it is used in the latter sense in the following paragraph. Τὸ ἄπειρον, in Aëtius' list, may be a later attempt at an unambiguously spatial designation.

In itself, *physis* has the same type-token ambiguity we have noted in *stoicheion,* though the meanings 'natural entities' and 'natural kinds' are usually clearly distinguished by context; when used in the plural of four items two of which, atoms and similarities, are themselves plural, it must designate kinds, and of course the similarities are themselves kinds. Epicurus is usually described as a nominalist, and it might be supposed that he would have regarded species, as well as genera, as mere names, designating only mental classifications of the objects presented by our senses. On the other hand, he thought that preconceptions arise naturally in response to real similarities among the objects and properties thus presented, and the species of both inanimate natural objects and living things can be cashed out as regularly recurring, and thus in a sense imperishable, clusters of properties.

To include the natural kinds as a fourth *physis* acknowledges the reality of compound bodies as well as that of atoms; but what is added by describing all four as κατὰ γένος ἀφθάρτους? κατὰ γένος has generally been ignored, I suppose because scholars have understood it more or less vaguely as meaning 'each according to its own kind'.[96] Atoms, void, space, and the natural kinds certainly do differ in kind, but that difference is already indicated by word *physis* itself; κατὰ γένος might indicate a particular difference in the senses in which they are imperishable, but that difference concerns the applicability of the contrasted term in another common use of the phrase, in which genera are contrasted not with each other or with species but with individuals. Atoms are imperishable both as a genus, as species, and individually; void is imperishable as a genus, but any individual bit of void, that is, void in a particular place, perishes when a body moves into it; the unbounded, or space, is imperishable as a unique individual, the only one of its genus; and the natural kinds are imperishable as a kind and individually as kinds because there are always in existence tokens of each of them, in our world or elsewhere.[97] The fact that, according to Epicurus, the tokens of one sub-class of them, the gods, are individually imperishable,[98] is irrelevant to the constitution of such a list.[99] As I suggested in the introduction, Aëtius was wrong to include the list in his entry on Epicurus' theology, and the scribe responsible

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[95] So J. Brunschwig, 'Epicurus' argument on the immutability of the all', in *Papers in Hellenistic Philosophy* (Cambridge, 1994), 1–20; contra, T. Martin, 'Effecting change in the translation of Epicurus' argument for the immutability of the all', *Hermes* 129 (2001), 353–61.

[96] G. Lachenaud, however, *Plutarque, Oeuvres Morales* 12.2 (Paris, 1993), 89, translates 'qui ont la spécificité d'être impérissable', apparently taking the phrase to mean 'according to their common kind'.

[97] *CQ*'s reader points out that this is also true of non-natural kinds (in inhabited worlds; but cf. n. 52 above on the distinction between compounds and aggregates), and of properties, including abstractions like justice; preconceptions of all kinds do indeed correspond to ordinary-language similarities of either bodies or accidents, but that need not have kept Epicurus from giving the word a technical meaning restricted to compound bodies.

[98] Though only contingently, as a result of their own self-preserving activity; cf. Wigodsky (n. 5), 213–20.

[99] Bignone recognizes this, (n. 96), 137–8, but nevertheless reads ἄλλας, while Bailey, (n. 3), 453, n. 3, says that on Bignone's interpretation 'the general argument will not be affected' by the choice of reading, 'as the gods will be an example of ὁμοιότητες, if not the only example'.

for the *Verschlimmbesserung* ἄλλας was probably acting on a misunderstanding of that misunderstanding: he must have thought, like most modern scholars, that ἄλλως had to mean that ὁμοιότητες designated the gods, and being, unlike them, a native speaker of Greek, found that incredible. But we can be grateful for this accumulation of misunderstandings, since it has preserved to us a precious scrap of information about Epicurus' technical vocabulary, and thus helped us to reconstruct an important part of his theory of matter.[100]

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