

A NEW TESTIMONIUM ON DIOGENES OF APOLLONIA, WITH REMARKS ON MELISSUS' COSMOLOGY

In the course of *Praeparatio Evangelica* I, Eusebius undertakes an examination of the Greek philosophers' views on the formation of the cosmos to determine whether Christians are right to reject them. He criticizes the cosmogonies of the early Greek natural philosophers for failing to give a proper role to God the creator and for thus making the ordered arrangement of the cosmos a chance and spontaneous occurrence without proper cause (*PE* 1.7.16, 1.8.13; cf. 14.14.7). As proof of this failure, and of the general disagreement among the philosophers in question, he presents a lengthy extract from the Pseudo-Plutarchean *Stromateis* (*PE* 1.8.1–12 = *DG* 579–83).¹ The extract treats in succession the opinions of Thales, Anaximander, Anaximenes, Xenophanes, Parmenides, Zeno of Elea, Democritus, Epicurus, Aristippus, Empedocles, Metrodorus of Chios, and Diogenes of Apollonia regarding the composition of the universe and the formation of the cosmos. The account of Metrodorus' views at *PE* 1.8.11 (Metrod.Chios 70A4 DK) is as follows:²

Μητρόδωρος ὁ Χίος αἰδίων εἶναι φησι τὸ πᾶν, ὅτι εἰ ἦν γενητόν, ἐκ τοῦ μὴ ὄντος ἂν ἦν· ἄπειρον δέ, ὅτι αἰδίων, οὐ γὰρ ἔχειν ἀρχὴν ὅθεν ἤρξατο οὐδὲ πέρας οὐδὲ τελευτήν· ἀλλ' οὐδὲ κινήσεως μετέχειν τὸ πᾶν. κινεῖσθαι γὰρ ἀδύνατον μὴ μεθιστάμενον· μεθίστασθαι δὲ ἀναγκαῖον ἥτοι εἰς πλήρες ἢ εἰς κενόν. πυκνούμενον δὲ τὸν αἰθέρα³ ποιεῖν νεφέλας, εἴτα ὕδωρ, ὃ καὶ κατιὸν ἐπὶ τὸν ἥλιον σβεννύναι αὐτόν· καὶ πάλιν ἀραιούμενον ἐξάπτεσθαι. χρόνῳ δὲ πηγνυσθαι τῷ ξηρῷ τὸν ἥλιον καὶ ποιεῖν ἐκ τοῦ λαμπροῦ ὕδατος ἀστέρας, νύκτα τε καὶ ἡμέραν ἐκ τῆς σβέσεως καὶ ἐξάψεως καὶ καθόλου τὰς ἐκλείψεις ἀποτελεῖν.

Metrodorus of Chios says that the universe is eternal, because if it were generated, it would proceed from what-is-not; and he says that it is unlimited, since it is everlasting, for it has no starting-point from whence it began nor any limit nor any end. Nor does the universe participate in motion, for it is impossible for that which does not change place to move; but change of place necessarily occurs either into the full or into the void. But when condensed the *aithēr* produces clouds, then water, which, falling on the sun, extinguishes it; and when again rarefied, it reignites. In time the sun is made solid by the dry and from the bright water produces stars, and from its extinguishing and reigniting it produces night and day and eclipses generally.

This testimonium is problematic on several counts.

The first half of the report, through εἰς κενόν, bears a striking similarity to Melissus' account of what-is. The argument here for the eternity of the universe corresponds closely to Melissus 30B1 DK; that deriving the universe's unlimitedness from its eternity mirrors Melissus 30B2 DK; and that against the universe's

¹ *DG* = H. Diels, *Doxographi Graeci*⁴ (Berlin, 1965), unaltered reprint of 1st edn (Berlin, 1879).

² The text is that of K. Mras, *Eusebius Werke* VIII.1, *Die Praeparatio Evangelica*, Die Griechischen Christlichen Schriftsteller 43.1 (Berlin, 1954); rev. repr. J. Sirinelli and É. des Places, *Eusèbe de Césarée, La Préparation Évangélique, Livre I, Sources chrétiennes* 206 (Paris, 1974).

³ αἰθέρα ABVN: ἀέρα O et fort. A^{ec}. Diels adopted the reading ἀέρα in CFG on the bases of αἰθέρα appearing to be a correction for ἀέρα in A and the (inapposite) comparison with Ps.-Plu. *Plac.* 3.9.895D3–4: Μητρόδωρος τὴν μὲν γῆν ὑπόστασιν εἶναι καὶ τρύγα τοῦ ὕδατος, τὸν δ' ἥλιον τοῦ ἀέρος. CFG, however, have no independent authority, being direct or indirect copies of O. Although O is one of the principal representatives of the second family of manuscripts, along with BVN, this is one of numerous places where Mras identifies the other representatives as preserving the genuine reading of this class. He accordingly gives the reading of O here little weight and adopts the majority reading αἰθέρα.

participating in motion corresponds to Melissus 30B7.7 DK. What are we to make of these parallels? Bicknell supposes the 'inevitable conclusion' to be that the first half of the report is actually a synopsis of Melissus' metaphysics, on the grounds that the testimonium is 'manifestly incompatible' with the rest of our evidence for Metrodorus' particular brand of post-Democritean atomism.⁴ This is all too hasty, for it may not be as difficult as Bicknell presumes to reconcile the first half of this report with Metrodorus' conception of the universe.

Zeller recognized the possibility that in this portion of Eusebius' excerpt two reports, one on Melissus and one on Metrodorus, may have been intermingled. He thought such a supposition unnecessary, however, since he believed the first part of the report not inconsistent with Metrodorus' atomism.⁵ Bicknell appears unaware of Zeller's judgement. As a synopsis of Melissus' metaphysics, moreover, this report would be woefully incomplete. It moves from the eternity and unlimitedness of the universe directly to its immobility, passing over the intervening Melissan attributes of uniqueness, homogeneity, and freedom from alteration, growth, and rearrangement, as well as his view that what-is is a plenum without void.⁶ If the first half of the report were erroneously ascribed to Metrodorus, then these omissions would be surprising and would apparently have to be blamed on the laziness of the epitomator.

Before resorting to the proposed reattribution, then, we should determine whether the report can be successfully interpreted as reflecting Metrodorus' selective appropriation of Melissus' argumentation. In light of this question, the attributes of Melissan Being which the report passes over are at least as significant as those it reproduces. For Metrodorus could not, consistently with his atomist principles, accept that there is no void or that the universe is homogeneous and free from internal alteration and rearrangement. He could, however, accept that the universe as a whole, that is, the totality of atoms and void, is eternal (*ἀτὲρδιον*) and unlimited (*ἄπειρον*) and at the same time that individual *κόσμοι* or world-systems come to be within this unlimited universe. Something like this view is attested for Metrodorus in Stobaeus:

Metrodorus . . . says it is absurd for a single ear of corn to have grown in a vast field and for a single world-system to have grown in the unlimited. That they are unlimited in number is clear from their causes being unlimited. For if this world-system is limited in extent, while all the causes from which this world-system came to be are unlimited, they must be unlimited in number. For wherever the causes are unlimited, the products will also be so; and the causes are either the atoms or the elements.

(Stob. *Ecl.* 1.22.3^a, p. 199.1–8 Wachsmuth ≈ Ps.-Plu. *Plac.* 1.5.879B7–C3)⁷

⁴ P. Bicknell, 'Melissus' way of seeming?', *Phronesis* 27 (1982), 194–201, at 196 and 197.

⁵ E. Zeller, *Die Philosophie der Griechen in ihrer geschichtlichen Entwicklung*, Bd. 1.2⁶, rev. W. Nestle (Leipzig, 1920), 1186, n. 1.

⁶ Bicknell (n. 4), 196, says that the first half of the report describes an 'everlasting, motionless plenum' (my italics). If this were true, then the report would obviously be incompatible with Metrodorus' atomist stance, in which void is accorded the status of a first principle; it will become apparent, however, that Bicknell is mistaken on this point.

⁷ In Diels's edition of Aëtius, these two excerpts from Stobaeus' *Eclogae Physicae* and the Pseudo-Plutarchean *Placita Philosophorum* are printed alongside one another at *DG* 292 as Aëtii *Plac.* 1.5.4. Since Diels's reconstruction of Aëtius is in process of undergoing a thorough re-examination and revision at the hands of J. Mansfeld and D. T. Runia (and others), rather than continue to reproduce Diels's reconstruction by citing texts according to his numbering of the Aëtian lemmata, I shall instead refer throughout to the original sources from which they are derived. References to Ps.-Plutarch are according to the edition of G. Lachenaud (ed. and trans.), *Plutarque, Œuvres morales* Tome 12.2, *Opinions des Philosophes* (Paris, 1993).

This is all atomist orthodoxy. Earlier in Eusebius' excerpt from the *Stromateis* we are told that

Democritus of Abdera proposed that the universe is unlimited (τὸ πᾶν ἄπειρον), for the reason that it has by no means been fashioned by anyone.⁸ Furthermore, he says it is also unalterable (ἀμετάβλητον); and in general, taking it as a whole, he sets out in express terms that the causes of the things currently coming to be have no beginning . . . (PE 1.8.7 = Democr. 68A39 DK)

Leucippus, likewise, held that the universe is unlimited (τὸ μὲν πᾶν ἄπειρόν φησιν, D.L. 9.31 = Leucipp. 67A1 DK); and both are said to have held that innumerable world-systems arise within the universe and are eventually destroyed (e.g. Ps.-Plu. *Plac.* 2.1.886C1–3; Stob. *Ecl.* 1.22.3^b, p. 199.15–17 Wachsmuth; D.L. 9.31, 44; Simp. *in Cael.* p. 202.16–18 Heiberg; Hippol. *Haer.* 1.13.2; Dionysius *ap.* Eus. PE 14.23).

The report's subsequent demonstration that the universe does not participate in motion is incomplete as it stands. The required premise would seem to be that if the universe or the totality of the full and the void is unlimited, then there is nothing outside it. From this the rest of the argument follows neatly: since change of place occurs either into the full or into the void, and neither the full nor the void exists outside the universe, the universe cannot undergo change of place or motion. Metrodorus is said to have held that there is void outside the cosmos, that is, outside our world-system, as had again his atomist predecessors (Simp. *in Ph.* p. 648.12–15 Diels = Leucipp. 67A20 + Metrod. Chius 70A8 DK). The issue here, however, is not what is outside any particular κόσμος or world-system but whether there is anything outside τὸ πᾶν or the universe as a whole. Given that there can be nothing outside the limitless universe, there is nothing into which it can move, and so it remains stationary. Thus the first half of *Stromateis* 11 may be squared with Metrodorus' atomist principles if one is careful to observe the distinction between τὸ πᾶν and ὁ κόσμος. Particular world-systems within the universe will be generated and destroyed, limited in their extent, and subject to motion within the void, while the universe itself or the totality of atoms and void from which these world-systems arise will, as our report indicates, be eternal, unlimited, and motionless. There is no evidence that either Leucippus or Democritus said that the universe is motionless. If this view is correctly attributed to Metrodorus, it may be one of the points Theophrastus had in mind when he said that Metrodorus, while adopting basically the same principles as Democritus and his associates, in other respects produced his own particular system (Thphr. *ap.* Simp. *in Ph.* p. 28.27–30 Diels = Metrod. Chius 70A3 DK; Thphr. *Phys. Op.* fr. 8 DG, T229 FHS&G). Thus while the first half of *Stromateis* 11 clearly recalls certain elements in Melissus' deduction, it is by no means incompatible with Metrodorus' natural philosophy.

The other chief reason for suspecting the attribution of the *doxographicum* to Metrodorus advanced by Bicknell also breaks down under scrutiny. Accepting Diels's conclusion that the reports in the *Stromateis* excerpt apart from those on Epicurus and Aristippus ultimately derive from Theophrastus,⁹ Bicknell presumes that the order of thinkers in the Theophrastean stratum is meant to be roughly chronological, so that the appearance of Metrodorus prior to Diogenes of Apollonia becomes problematic.¹⁰ Unfortunately, things are not so simple. The first three thinkers treated in the

⁸ If this explanation is genuinely Democritean, Metrodorus' adaptation of Melissus' argument on this point may have been meant as something of an improvement.

⁹ See DG 157–8.

¹⁰ Bicknell (n. 4), 194.

Stromateis excerpt clearly represent the standard early Ionian succession: Thales, Anaximander, Anaximenes. The second group, an Eleatic succession: Xenophanes, Parmenides, Zeno. The order of thinkers in the remainder of the excerpt appears to reflect, albeit confusedly, a common atomist succession. Ignoring the obviously interpolated reports on Epicurus and Aristippus as well as the somewhat mysterious insertion of Empedocles, there remain the reports on Democritus, Metrodorus of Chios, and Diogenes of Apollonia. Diogenes Laertius begins his chapter on the middle atomist Anaxarchus with an account of his intellectual ancestry: Democritus or Nessas of Chios → Metrodorus of Chios → Diogenes of Smyrna → Anaxarchus (D.L. 9.58). Similar atomist successions figure in Clement and Eusebius. Clem.Al. *Strom.* 1.64.4: Democritus → Protagoras of Abdera and Metrodorus of Chios → Diogenes of Smyrna → Anaxarchus. Eus. *PE* 14.17.10: Leucippus → Democritus → Protagoras and Nessas → Metrodorus → Diogenes → Anaxarchus. Diogenes of Smyrna is an obscure figure. Confusion of him with Diogenes of Apollonia appears responsible for the position of the chapter on the latter in Book IX of Diogenes Laertius after those devoted to Leucippus, Democritus, and Protagoras and before the chapter on Anaxarchus. A similar confusion at some point in the tradition is most likely responsible for the appearance of Diogenes of Apollonia after Democritus' pupil Metrodorus in Pseudo-Plutarch.¹¹

Accepting Bicknell's proposal regarding the first half of *Stromateis* 11 requires that one also accept his conjecture that corruption in the text somehow resulted in *Μητρόδωρος ὁ Χίος* being written for *Μέλισσος ὁ Σάμιος*.¹² It is not clear, however, that we should suspect this degree of corruption in the text. Because the argument that the universe is motionless is incomplete as it stands, and the transition to the different subject matter of the second half of the report is quite abrupt, Zeller originally suspected a lacuna in the text after *εἰς κενόν*.¹³ Such problems, however, are hardly unusual in texts of this nature. Accepting textual corruption on such grounds would force one to admit corruption in the earlier excerpt on Parmenides at *Stromateis* 5, where the arguments are similarly compressed, and where there is a similarly abrupt transition to a physical opinion at the end of the report. The compiler of the *Stromateis* may well have been confused on certain points, and his excerpting of excerpts by previous doxographers may have led to certain infelicities, but this is not the same thing as textual corruption. Since the first half of *Stromateis* 11 can be understood perfectly well as reflecting Metrodorus' selective transference of the attributes of Melissus to the universe as a whole, and since the traditional reasons for suspecting corruption in the text are not in fact that strong, the proposal that the name *Μητρόδωρος ὁ Χίος* at the beginning of the report has suffered corruption is both improbable and unwarranted.

Bicknell is, however, correct in pointing out that the views ascribed to Metrodorus in

¹¹ For a fuller treatment, see especially A. Laks, *Diogène d'Apollonie, La dernière cosmologie présocratique*, Cahiers de Philologie 9 (Lille, 1983), Appendice 4, 258–63. See also E. Rohde, 'Über Leucipp und Demokrit', *Verhandlungen der 34. Versammlung deutscher Philologen und Schulmänner in Trier 1879* (Leipzig, 1880), 81, n. 1; R. D. Hicks, *Diogenes Laertius: Lives of the Eminent Philosophers*, vol. 2 (Cambridge, MA, and London, 1925), 468, n. c; and M. Gigante, 'La Vita laerziana di Diogene di Apollonia', *SIFC* ser. 3, 2 (1984), 134–7, at 136.

¹² Bicknell (n. 4), 197.

¹³ Zeller (n. 5), 1186, n. 1. Diels follows Zeller and indicates the lacuna in the text of Metrod.Chios 70A4 DK. Mras (n. 2) does not print the lacuna in his edition of Eusebius, but only because this would be a corruption in Eusebius's source rather than in the text of the *PE* itself.

the second half of *Stromateis* 11 are difficult to reconcile with the evidence in other sources for his cosmological and meteorological views.¹⁴ Since this is an important point, it will be worthwhile setting out somewhat more fully the relevant views of Metrodorus, reported primarily in texts belonging to the Aëtian tradition, regarding the structure and operation of this particular world-system while indicating how they conflict with the views attributed to him in our text. Metrodorus, as we have seen, holds this world-system to be merely one among a limitless number. The sun is the highest of all the heavenly bodies; below it is the moon, and below it in turn are ranged the fixed stars and planets (Ps.-Plu. *Plac.* 2.15.889B10–13 ≈ Eus. *PE* 15.46.6; cf. Stob. *Ecl.* 1.24.1^h, p. 203.5–6 Wachsmuth). Metrodorus supposed the different positions of the heavenly bodies to be due to their relative weights. According to Plutarch, he believed that the sun, like an inflated wineskin, had been extruded into the upper region because of its lightness and that the other stars had come to occupy their relative places just as bodies of different weights sink to different levels when placed in a scale (*Fac. Lun.* 928B). While this passage (which inexplicably failed to find its way into Diels–Kranz) is consistent with the reports of texts in the Aëtian tradition concerning the relative positions of the heavenly bodies, it may appear somewhat more difficult to square with the doxography's descriptions of the sun itself as fiery, or more precisely as a fiery stone or lump of metal (Stob. *Ecl.* 1.25.1^c, p. 208.20–1 Wachsmuth; Ps.-Plu. *Plac.* 2.20.890A6–7 ≈ Eus. *PE* 15.23.5 and Ps.-Gal. *Hist. Phil.* 62.6–7). Elsewhere, however, the *Placita* reports Metrodorus' description of the sun as the precipitate or 'lees' of the air, just as the earth is that of the water (Ps.-Plu. *Plac.* 3.9.895D3–4 ≈ Eus. *PE* 15.55.5); and it would seem no more implausible for the precipitate of air to be solid and fiery than for that of water to be solid and cold. Thus the Aëtian tradition is in fact consistent with the independent evidence here in Plutarch. In ascribing to Metrodorus the view that the sun is the uppermost of all the heavenly bodies, furthermore, both would seem to be at odds with the account in *Stromateis* 11 of the condensed *aithēr* producing clouds and then water which *falls* on the sun and extinguishes it. Likewise, the picture in our text of clouds being produced by the condensation of the *aithēr* conflicts with the reports stemming from Aëtius according to which Metrodorus held clouds to be formed from the watery element being carried upwards by the air (Ps.-Plu. *Plac.* 3.4.894A6–7 ≈ Stob. *Ecl.* 1.31.3, p. 243.7–8 Wachsmuth and Ps.-Gal. *Hist. Phil.* 77.5–6). We shall see, however, that these inconsistencies may not be as serious as they appear. What does finally tell against the views in the latter portion of *Stromateis* 11 being attributable to Metrodorus is that there is no hint elsewhere in the reports of his views of the remarkable explanation of the alternation of night and day and the occurrence of solar eclipses in terms of the sun's being extinguished and reigniting periodically. This theory is in fact incompatible with those reports according to which Metrodorus believed that the moon and the fixed stars are made to shine by the sun, since this view implies that the sun itself continues to shine at night (moon: Stob. *Ecl.* 1.26.2, p. 220.13–15 Wachsmuth; fixed stars: Ps.-Plu. *Plac.* 2.17.889D1–2 ≈ Stob. *Ecl.* 1.24.3, p. 206.5–6 Wachsmuth, Ps.-Gal. *Hist. Phil.* 59, Eus. *PE* 15.48.1). Again, although the stars shine with the sun's reflected light, there is no indication in the Aëtian tradition, as there is in *Stromateis* 11, that they are actually *produced* by the sun.

The incompatibility of the second half of *Stromateis* 11 with Metrodorus' views as recorded in the main doxographical tradition, coupled with the belief that the first half

¹⁴ See Bicknell (n. 4), 196.

of *Stromateis* 11 is properly regarded as a testimonium on Melissus, leads Bicknell to suppose that the second half of the testimonium is also a report of Melissus' views. He concludes that the second half of *Stromateis* 11 constitutes evidence that Melissus developed a detailed cosmology in a portion of his treatise that would have been the analogue of Parmenides' *Doxa*. Even if one accepted the ascription of the first half of *Stromateis* 11 to Melissus (for which we have seen there is no good reason), Bicknell's further conclusion would be far from secure. The single most important reason he gives for attributing the cosmological portion of the passage to Melissus is that he can think of no other *physiologos* who might have occupied a place in this particular doxography between Melissus and Diogenes and to whom one could conceivably attribute the views reported therein. This is not so surprising. For the list of thinkers at the beginning of Eusebius's excerpt indicates that *no* thinkers were treated between Metrodorus [Melissus] and Diogenes. Bicknell concludes that the views here must be assigned to Melissus. He completely fails, however, to consider the rather obvious possibility that these views are to be attributed to Diogenes himself.

The possibility I want to explore, then, is that the second half of *Stromateis* 11 is the transposed conclusion of the report concerning Diogenes of Apollonia immediately following:

Diogenes of Apollonia posits air as element. All things are in motion, and there are unlimited world-systems. He describes the production of the cosmos as follows: everything being in motion and becoming rare here and dense there, where the dense came together it created a concentrated mass, and so analogously for the rest. The lightest parts, occupying the upper region, produced the sun.

(Ps.-Plu. *Strom.* 12 ap. Eus. *PE* 1.8.12 = Diog.Ap. 64A6 DK, T22 Laks)

This compressed account of Diogenes' cosmogony ends with a description of the sun's formation. The second half of *Stromateis* 11, concerned primarily with the sun's activity, would follow smoothly and without interruption.¹⁵ The terminology of the second half of *Stromateis* 11 is Diogenean throughout. The pattern of explanation in terms of condensation and rarefaction would continue that found in *Stromateis* 12 and is consistent with the basic principles of Diogenes' physics. Most significantly, Pseudo-Plutarch and Stobaeus both report that Diogenes believed the sun to be periodically extinguished: *Διογένης ὑπὸ τοῦ ἀντιπίπτοντος τῇ θερμότητι ψύχους σβέννυσθαι τὸν ἥλιον*, 'According to Diogenes, the sun is extinguished by the cold colliding with its heat' (Ps.-Plu. *Plac.* 2.23.890E4–5 = Diog.Ap. 64A13 DK, T28 Laks); *Διογένης κισσηροειδῇ τὸν ἥλιον, εἰς ὃν ἀπὸ τοῦ αἰθέρος ἀκτίνες ἐναποστηρίζονται ὑπὸ δὲ τοῦ ἀντιπίπτοντος τῇ θερμότητι ψυχροῦ σβέννυσθαι*, 'According to Diogenes, the sun is like pumice-stone, in which rays from the *aithēr* fix themselves, and it is extinguished by the cold colliding with its heat' (Stob. *Ecl.* 1.25.3^c, p. 210.5–7 Wachsmuth = Diog.Ap. 64A13 DK, T27 Laks).

A clearer exposition of the sequence of events described in our text is called for so that we may better judge how well it fits with what else we know of Diogenes' cosmology. For ease of reference, the text itself, again, reads as follows:

πυκνούμενον δὲ τὸν αἰθέρα ποιεῖν νεφέλας, εἴτα ὕδωρ, ὃ καὶ κατιὸν ἐπὶ τὸν ἥλιον σβεννύναι αὐτὸν καὶ πάλιν ἀραιούμενον ἐξάπτεσθαι. χρόνῳ δὲ πῆγνυσθαι τῷ ξηρῷ τὸν ἥλιον καὶ ποιεῖν ἐκ τοῦ λαμπροῦ ὕδατος ἀστέρας, νύκτα τε καὶ ἡμέραν ἐκ τῆς σβέσεως καὶ ἐξάψεως καὶ καθόλου τὰς ἐκλείψεις ἀποτελεῖν.

¹⁵ Accepting that there has been such a transposition would help explain the corruption of the majority reading *αἰθέρα* to *ἀέρα* at Eus. *PE* 1.8.11.6 (see above, n. 3), *ἀήρ* being Diogenes' first principle.

I tentatively identify six principal stages of activity: (i) the *aithēr*, condensed, produces first clouds, then water; (ii) this water, descending on the sun, quenches it; (iii) this water, rarefied (that is, vaporized by the sun's heat), is itself reignited; (iv) the sun is eventually solidified by the dry (and then itself rekindles); (v) the sun produces stars from the bright water (that is, the ignited vapour); (vi) the sun's quenching and rekindling produce both night and day as well as eclipses.¹⁶ Several details of the theory elaborated here are admittedly perplexing, a problem exacerbated by the fact that the text itself is ambiguous between different understandings at key points. In discussing the interpretative problems internal to the report itself, I shall not pretend to resolve all of these ambiguities definitively. However, such problems should not be allowed to obscure the text's clear compatibility with our existing evidence for the relevant features of Diogenes' cosmology, which we shall see is illuminated by and in turn illuminates certain details of our text.

While the text presents a more or less clear picture of what occurs at stages (i), (ii), and (vi), it should be noted that the clouds mentioned here need not be those of the earth's atmosphere. A *testimonium* in the section of Pseudo-Plutarch on solar eclipses records that certain anonymous figures thought them due to a concentration of invisible clouds coming over the disk of the sun—'Ἐνιοὶ πύκνωμα τῶν ἀοράτως ἐπερχομένων τῷ δίσκῳ νεφῶν (Ps.-Plu. *Plac.* 2.24.891A4–5). In his note on this *testimonium*, Lachenaud draws attention to Anaxagoras' and Anaximenes' comparable explanations of celestial phenomena in terms of the intervention of invisible bodies of an earthly nature.¹⁷ Since the invisible celestial bodies introduced by Anaximenes and Anaxagoras reappear in Diogenes,¹⁸ it seems legitimate to take the clouds figuring in *Stromateis* 11 to belong to the celestial rather than the terrestrial region. This in any case makes better sense than supposing them to be the clouds we see, for no one could suppose that *these* clouds are in the right position to be capable of extinguishing the sun. It is even tempting to suppose that there is some more specific connection between this anonymous *testimonium* and our text, for even though it does not explicitly state that water from the clouds quenches the sun during an eclipse, what it does say is not necessarily incompatible with such a conception.

Difficulties emerge with stage (iii). Here the phrase καὶ πάλιν ἀραιούμενον ἐξάπτεσθαι is ambiguous between two possible understandings. Bicknell supposes that 'The subject of ἀραιούμενον must surely be the same as that of πυκνούμενον',¹⁹ apparently on the assumption that mention of condensation must be matched by mention of rarefaction, such that the process of rarefaction described at the end of the first sentence reverses the process of the *aithēr*'s condensation described in the previous phrase. On this reading, the portion of *aithēr* that has been condensed into cloud and

¹⁶ No serious significance should be attached to καθόλου at the end of the report. The phrase καὶ καθόλου seems to be one of the author's favourite devices for simply tacking on a point, and its frequent occurrence in the *Stromateis* (see also Eus. *PE* 1.8.2.3, 1.8.4.6, and 1.8.7.2–3) was one of the points Diels cited as indicative of the text's generally crude style (*DG* 156, n. 1).

¹⁷ Lachenaud (n. 7), 119, n. 7. Anaxagoras, on lunar eclipses: Ἀναξαγόρας, ὥς φησι Θεόφραστος, καὶ τῶν ὑποκάτω τῆς σελήνης ἔσθ' ὅτε σωμάτων ἐπιπροσθούτων (Stob. *Ecl.* 1.26.3, p. 221.20–2 Wachsmuth = Thphr. *Phys. Op.* fr. 19 *DG*, T236 FHS&G). Anaximenes, on the substance of the stars: Ἀναξίμενης πυρίνην μὲν τὴν φύσιν τῶν ἀστρων, περιέχειν δέ τινα καὶ γεώδη σώματα συμπεριφερόμενα τούτοις ἀόρατα (Stob. *Ecl.* 1.24.1⁴, p. 203.13–15 Wachsmuth; cf. Hippol. *Haer.* 1.7.5).

¹⁸ See Thdr. *Graec. affect. cur.* 4.17.5–18.4, Stob. *Ecl.* 1.24.1⁴, p. 202.13–18 Wachsmuth, and Ps.-Plu. *Plac.* 2.13.888E1–5, all quoted below.

¹⁹ Bicknell (n. 4), 199, n. 9.

water, losing its fiery nature in the process, is at some point rarefied and reignited. Alternatively, one might suppose that just as σβέσεως picks up σβεννύναι, the sun's extinction being referred to in both cases, so ἐξάψεως is most naturally understood as picking up ἐξάπτεσθαι. Since ἐξάψεως quite clearly refers to the sun's rekindling, this should be the case with ἐξάπτεσθαι as well. On this reading, the periodic processes of the sun's extinction and rekindling, which the end of the text points to as the cause of the succession of day and night and the occurrence of eclipses, have been more fully described in the earlier portion. There is, moreover, no compelling grammatical reason not to take the sun itself as the understood subject of ἐξάπτεσθαι, although one might expect the subject of ἐξάπτεσθαι to be the same as that of σβεννύναι (sc. ὕδωρ). Despite the ambiguity of the text here, I tentatively opt for the first reading since it allows for identification of the otherwise mysterious 'bright water' of the next sentence. What the phrase καὶ πάλιν ἀραιούμενον ἐξάπτεσθαι appears to be describing, then, is the vaporization of the water as it quenches the hot sun, which in turn makes the resulting vapour clouds incandescent.

The second sentence of our text (χρόνῳ . . . ἀστέρας), describing stages (iv) and (v), is problematic on several counts. In the first place, it is difficult to tell whether it is supposed to describe an event occurring each day or a long-term process occurring during the cosmos's formation. Although χρόνῳ would normally point to a long-term process, such that χρόνῳ δὲ πηγνυσθαι τῷ ξηρῷ τὸν ἥλιον would describe the sun's initial formation during the cosmogonic phase, the transition this reading requires from description of the sun's present activity to its original formation and then back again is rather awkward. It therefore seems reasonable to take this phrase as describing what happens to the sun prior to its rekindling. Since the sun is subsequently described as reigniting, it cannot be the case, *pace* Bicknell, that the sun's daily extinction involves its complete dissolution and destruction.²⁰ There is no indication in the text that the water which quenches the sun destroys it completely. We should, it seems, think more in terms of the sun's being like a lump of coal which is doused by water and then relit once it has dried out or been 'made solid' once more by the dry. The subsequent phrase, καὶ ποιεῖν ἐκ τοῦ λαμπροῦ ὕδατος ἀστέρας, is perhaps the most obscure in the entire passage. For although the 'bright water' can with a fair degree of probability be identified with the incandescent vapour produce by the sun's previous extinction, both how and when exactly the sun produces the stars from it remain unclear. It is difficult to picture the sun producing the stars only after it has undergone the process of solidification preparatory to its rekindling described in the preceding phrase, since its rekindling brings on the new day; but it is just as difficult to imagine the sun producing anything at all while still in its dormant phase.

As already indicated, the portion of *Stromateis* 11 under consideration tallies well with the reports in Stobaeus and Pseudo-Plutarch attributing to Diogenes a theory according to which the sun is periodically extinguished by the cold colliding with its heat. A certain problem with these reports that threatens the parallel must be dealt with before the connection can be accepted. Whereas Stobaeus' report occurs in a chapter which treats *en masse* numerous points concerning the sun (*Ecl.* 1.25, Περὶ οὐσίας ἡλίου καὶ μεγέθους σχήματός τε καὶ τροπῶν καὶ ἐκλείψεως καὶ σημείων καὶ κινήσεως), the corresponding report in Pseudo-Plutarch occurs in a chapter

²⁰ Bicknell (n. 4), 195: 'At the end of each day as the sun sets on the western horizon it is put out *and dissolved* by water that has condensed from "clouds" themselves the products of condensed air. Every dawn the sun is *reintegrated*, kindled and compacted on the eastern horizon *from air progressively rarefied to incandescence*' (my italics).

devoted to the sun's turning at the solstices (*Plac.* 2.23, *Περὶ τροπῶν ἡλίου*). Although this might lead one to think that Diogenes' theory of the sun's periodic extinction was designed specifically to explain its turning at the solstices, one should be careful about rushing to such a conclusion. Neither Xenophanes nor Heraclitus, who had their own versions of periodic solar extinction and rekindling,²¹ seems to have connected them with the sun's retrograde motion. Conversely, none of the other explanations of the solstices in *Placita* 2.23 appeals to the sun's extinction. It is in fact difficult to understand how it would be of use in explaining this particular phenomenon. Thus Diels followed the suggestion by Corsini, in his 1750 edition of the *Placita*, that this particular *testimonium* was mistakenly transferred here from the subsequent chapter on solar eclipses.²² Rather than resort to this supposition, Laks speculates that Diogenes may have intended there to be a certain analogy between his explanation of the sun's retrograde motion and its daily extinction and rekindling.²³ Whatever the case may be it remains true that, the second half of *Stromateis* 11 aside, there is no serious reason to doubt that Diogenes posited the sun's periodic extinction and rekindling as a means of explaining the alternation of night and day. Our text simply confirms the indications of these less definitive reports and adds that he extended the *explanans* to cover solar eclipses as well. Whether or not he also extended his theory to the explanation of the solstices remains somewhat unclear.

If the second half of *Stromateis* 11 is in fact the transposed conclusion of the summary of Diogenes' views at *Stromateis* 12, it can be seen to provide a more detailed picture of the process which lies behind Pseudo-Plutarch and Stobaeus' bare description of the sun's extinction due to the impact of the cold with its heat. Although these reports speak of *the cold* (τοῦ . . . ψυχροῦ, τοῦ . . . ψύχους) colliding with the sun's heat, while our text specifically says that *water* extinguishes it, there need be no genuine conflict here since it is common enough for τὸ ψυχρόν to be elliptical for 'cold water' (e.g. Thgn. 263, Hdt. 2.37). Our text simply clarifies the meaning of the corresponding reports. Furthermore, as Stobaeus' testimony indicates, Diogenes believed that the sun has the porous consistency of pumice-stone and that it shines because rays from the *aithêr* fix themselves in it. Combining this evidence with the *Stromateis* *testimonium*, and filling in some of the gaps in the account, we get a picture

²¹ For Xenophanes, see especially Hippol. *Haer.* 1.14.3 = Xenoph. 21A33.3 DK; Ps.-Plu. *Plac.* 2.20.890A1–3 = Stob. *Ecl.* 1.25.1^{ab}, pp. 207.17, 207.23–208.2 Wachsmuth = Xenoph. 21A40 DK (on the intricacies of which see D. T. Runia, 'Xenophanes or Theophrastus? An Aëtian *doxographicum* on the sun', in W. W. Fortenbaugh and D. Gutas [edd.], *Theophrastus: His Psychological, Doxographical, and Scientific Writings*, Rutgers University Studies in Classical Humanities 5 [New Brunswick and London, 1992], 112–40); Ps.-Plu. *Plac.* 2.24.890F11–891A3 = Stob. *Ecl.* 1.25.1^a, p. 207.18–21 Wachsmuth (in which the description of the sun's extinction Diels, following Reinhardt, supposes must be meant to explain its setting rather than, as stated, its eclipse). Xenophanes' view of the sun is fraught with difficulties; see e.g. W. K. C. Guthrie, *A History of Greek Philosophy*, vol. 1 (Cambridge, 1962), 391–4; P. Bicknell, 'Xenophanes' account of solar eclipses', *Eranos* 65 (1967), 73–7; G. S. Kirk, J. E. Raven, and M. Schofield, *The Presocratic Philosophers*² (Cambridge, 1983), 172–5. For Xenophanes' view that the stars too undergo extinction and rekindling, see Ps.-Plu. *Plac.* 2.13.888F1–4 = Stob. *Ecl.* 1.24.1^a, p. 204.14–20 Wachsmuth. For Heraclitus, see Arist. *Mete.* 2.2.355a13–15 = Heraclit. 22B6 DK; D.L. 9.9–10; Ps.-Plu. *Plac.* 2.28.891D11–E6 = Stob. *Ecl.* 1.26.2, p. 220.16–22 Wachsmuth = Heraclit. 22A12 DK.

²² *DG* 62: 'Diogenis de solis extinctu placitum inseritur capiti περὶ τροπῶν ἡλίου. ambiguum non est quin transferendum sit post c. 24 4. talia fuerint Plutarchi. est tamen ubi Aëtius quoque dormitaverit.' Since Diels presumes (with little explanation) that the error goes back to Aëtius himself, he continues to print the report in ch. 23.

²³ Laks (n. 11), p. 194.

according to which, once doused by the cold water of the surrounding clouds so that it is extinguished at the end of the day, the pumice-like sun gradually dries out through the night and becomes porous enough for the rays of the *aithēr* once again to be impacted in it so that it is rekindled at dawn. While it is tempting to suppose that the obscure phrase *πήγνυσθαι τῷ ξηρῷ τὸν ἥλιον* in our text could be a somewhat garbled reference to the impacting of the *aithēr*'s rays in the sun as described by Stobaeus, it is probably better to take the two texts as referring to associated events rather than to the exact same event. In this way it becomes possible to identify the impacting of the *aithēr*'s rays in the sun as the cause of its rekindling, just as the collision of the cold with its heat is said by Stobaeus to be responsible for its extinction. Conversely, the sun's solidification owing to the dry described in the *Stromateis* will be one result of the action of the surrounding *aithēr* on the extinguished sun at precisely the stage where we have seen it necessary to locate its rekindling.

Does accepting the *Stromateis* excerpt as a *testimonium* on Diogenes allow for any clarification of the equally difficult phrase, *καὶ ποιεῖν ἐκ τοῦ λαμποῦ ὕδατος ἀστέρας*? Three substantially overlapping reports in Theodoretus, Stobaeus, and Pseudo-Plutarch furnish the bulk of our knowledge of Diogenes' view of the stars:

Thdrt. *Graec. affect. cur.* 4.17.5–18.4 = T26a Laks: 'Ὁ δὲ Διογένης κισηροειδὲς λέγει εἶναι τοὺτους, διαπνοὰς τινὰς ἔχοντας' . . . Διογένης δὲ καὶ ἐμπέτειν εἰς τὴν γῆν τινὰς τούτων ἔφησε καὶ σβεννυμένους ἐλέγχεσθαι, ὅτι λίθων ἔχουσι φύσιν, καὶ μάρτυρι χρήται τῷ ἐν Αἰγὸς ποταμοῖς πυροειδῶς κατενεχθέντι ποτέ.

Stob. *Ecl.* 1.24.1^d, p. 202.13–18 Wachsmuth = 64A12 DK, T26b Laks: Διογένης κισηροειδὴ τὰ ἄστρα, διαπνοὰς δὲ αὐτὰ νομίζει τοῦ κόσμου. εἶναι δὲ διάπυρα. συμπεριφέρεσθαι δὲ τοῖς φανεροῖς ἄστροις ἀφανεῖς λίθους καὶ παρ' αὐτὸ τοῦτ' ἀνωρύμους· πίπτοντας δὲ πολλάκις ἐπὶ τῆς γῆς σβέννυσθαι καθάπερ τὸν ἐν Αἰγὸς ποταμοῖς πυροειδῶς κατενεχθέντα ἀστέρα πέτρινον.

Ps.-Plu. *Plac.* 2.13.888E1–5 = T26c Laks: Διογένης κισηρώδη τὰ ἄστρα, διαπνοὰς δ' αὐτὰ νομίζει τοῦ κόσμου· πάλιν δ' ὁ αὐτὸς ἀφανεῖς μὲν λίθους, πίπτοντας δὲ πολλάκις ἐπὶ τὴν γῆν σβέννυσθαι, καθάπερ τὸν ἐν Αἰγὸς ποταμοῖς πυροειδῶς κατενεχθέντα ἀστέρα πέτρινον.

Stobaeus also reports that Diogenes held that comets are stars (Stob. *Ecl.* 1.28.1^a, p. 228.7 Wachsmuth = 64A15 DK, T30 Laks). Immediately relevant to our purposes is the information that the stars, like the sun, resemble pumice-stones in substance, that they shine because they are suffused with fire, and that their fire is subject to extinction, as is implied by their comparison to the normally invisible stones or meteors like that which fell at Aegospotami in 468/7 B.C. There is no reason to suppose that the only way the stars can be extinguished is by falling to earth. The observation of the meteor at Aegospotami merely provided Diogenes with the basis for an inference regarding the substance of the stars and their being similarly subject to extinction. Nothing is implied about the conditions under which they may be extinguished. In the absence of any evidence to the contrary, it is natural to suppose that since the stars and the sun have essentially the same nature,²⁴ the stars will also be subject to periodic extinction. Thus the account in the latter portion of *Stromateis* 11 of how the stars are produced. When the sun is extinguished by the water which descends upon it from the surrounding clouds, the sun's extinction vaporizes the

²⁴ As well as the moon; see Stob. *Ecl.* 1.26.1e (p. 218.15 Wachsmuth) = 64A14 DK, T29 Laks: Διογένης κισηροειδὲς ἀναμμα τὴν σελήνην. If the moon like the sun is thought to be like an inflamed pumice-stone, presumably lunar eclipses like solar eclipses would be explained in terms of a periodic extinguishing of this fire.

water which descended upon it, and the escaping heat causes the vapour to become bright.²⁵ Apparently this 'bright water' in turn kindles the pumice-like stars, which then shine through the night and are extinguished as they too set.

In summation, the explanation of the alternation of night and day and the occurrence of solar eclipses in terms of the sun's being extinguished and reigniting periodically is without analogue in our other evidence for Metrodorus and in fact conflicts with portions of this evidence. The only other pre-Socratics for whom such a theory is attested are Heraclitus, Xenophanes, and Diogenes of Apollonia. Only in the case of Diogenes is there a ready explanation for how his views came to be ascribed to Metrodorus, namely through a transposition at some point in the transmission of our text of the latter portion of *Stromateis* 12 to the end of the preceding chapter. The second half of *Stromateis* 11 is in fact consistent overall with the other relevant evidence for Diogenes' views. Although I have made no effort to hide the difficulties in understanding the details of the theory elaborated in the second half of *Stromateis* 11, these difficulties should in no way be allowed to undermine the main conclusion that this text is in all likelihood the transposed conclusion of the report of Diogenes' views at *Stromateis* 12, for some of these difficulties are internal to the *testimonium* itself, while others are no greater than one should expect in a *testimonium* which overlaps reports stemming from Aëtius without having the same provenance (compare the situation with the report at Plu. *Fac. Lun.* 928B discussed above).

There is, furthermore, little serious reason to doubt that the first half of *Stromateis* 11 is correctly attributed to Metrodorus. It should be seen as reflecting his selective use of key Melissan arguments in the service of his own elaboration upon the atomist conception of the universe. Even if one rejects this essentially conservative conclusion and feels pressed by the passage's Melissan tone into supposing that the philosopher whose views are reported here can be none other than Melissus himself, this would still be an insufficient basis for taking the second half of *Stromateis* 11 as evidence for a Melissan Way of Seeming. Given the problems with this text and the absence of any other doxographical reports attributing specific cosmological theories to Melissus, one should be very wary indeed of relying on this passage to support a claim that Melissus' treatise included his own cosmology. If he did develop a cosmology in a portion of his treatise sufficiently lengthy for explanations of the type of phenomena we find discussed in our text to have their place, it is very surprising indeed that none of his views on such matters made their way into the rest of the doxographical tradition. The same type of reason that leads Bicknell to reject the second half of *Stromateis* 11 as evidence for Metrodorus, namely its apparent irreconcilability with more solid evidence for his views, tells against accepting it as evidence for a Melissan cosmology.²⁶

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²⁵ The pattern of explanation relating to this part of the process is roughly comparable to that employed in Diogenes' account of how thunder and lightning result from the impact of fire on clouds: Διογένης ἔμπρωσιν πυρὸς εἰς νέφος ὑγρόν, βροντὴν μὲν τῇ σβέσει ποιοῦν, τῇ δὲ λαμπρόνι τὴν ἀστραπήν, 'For Diogenes, it is the rushing in of fire upon a watery cloud which produces thunder by the extinction and lightning by the flash' (Stob. *Ecl.* 1.29.1, p. 232.17–18 Wachsmuth = Diog. Ap. 64A16 DK, T31a Laks).

²⁶ I am grateful to CQ's anonymous referee for detailed comments and criticisms which have proved of invaluable benefit in strengthening the argument of this essay.