Current accounts of the systems of Anaximander and Anaximenes detect the following common feature. After the formation of a world or worlds a portion of the arche, whether it be τὸ ἄπειρον or ἄπειρος ἄηρ, continues to surround it or them. This circumambient substance was, so the accounts hold, termed τὸ περιέχον. That this was a technical term, probably going back to Miletus, seems to be guaranteed by Aristotle de gen. et corr. 332 a 25. Recently, however, Michael C. Stokes has cast doubt upon the almost orthodox interpretation of Anaximenes. In a long paper he calls attention to a number of similarities between Hesiod’s Chaos and cosmogony, and the archai and cosmogonies of the Milesians. Particularly striking are the resemblances between Anaximenes’ aer and Chaos; but there is also one apparent point of difference. After the birth of the portions of the universe, there was no residue of chaos outside the Hesiodic world, whereas, on the accepted view, there was aer outside the world of Anaximenes, as well as in it (I take Stokes’ conclusion on this point for granted; it is only necessary to recall that aer supports the earth—Aristotle de Caelo 294 b 13 ff). Noting that the testimony of Aetius 1. 3. 4 is the main reason for postulating aer outside the Anaximenean universe, Stokes impugns its accuracy and is inclined to hold that before cosmogony the Anaximenean arche was co-extensive with the present cosmic boundary. In this paper I shall endeavour to support Stokes’ view and shall also try to make it probable that the apeiron of Anaximander was also coterminous with the fully-fledged world and not a περιέχον in the usually accepted sense. This goes beyond Stokes who summarises the consensus of scholars thus: ‘On the location of the unlimited there can be little doubt that it does not surround the earth in close proximity to it, but surrounds the whole universe and the other universes if there are any. It is outside our cosmos, and does not persist as an entity within it’. My view as to the extent of the apeiron will lead naturally enough to a consideration of its physical nature and thence to its relationship with the apeiros aer of Anaximenes. The core of the paper is divided, therefore, into four sections dealing respectively with the original

1. For example, see the chapters on Anaximander and Anaximenes in W. K. C. Guthrie, A History of Greek Philosophy Vol. 1, Cambridge 1962.
extent of Anaximenes’ arche, the extent of Anaximander’s arche, the nature of τὸ ἀπειρὸν and, finally, its relation to ἀπειρὸς ἀἷρ. Sections B1 and B2 are therefore mainly concerned with τὸ περιέχον, sections B3 and B4 with ἀπειρὸς.

B1

As Stokes points out, 4 except by Aetius 1. 3. 4 there is no particular inducement held out by the sources to believe that outside the developed Anaximenean world was a circumambient mass of aer. But for this one passage it would be easy to conclude that the arche was coextensive with the world. I shall first try to confirm this point and then pass on to a consideration of the awkward testimony.

Before proceeding to the objections to an extra-cosmic girdle of aer it should first be noticed that there are two forms which such a circumambient could take. The περιέχον could be either a homogeneous continuation, beyond the orbit or region of the heavenly body or bodies furthest from earth and the centre of the universe, of the aer which is also found within our world; or it could be a portion of aer adjacent to some sort of physical boundary which separates the world and its contents from τὸ περιέχον. If the former were the case, there would be hardly any point in Anaximenes having written of an external περιέχον unless the extension of aer beyond our world was extremely, or even infinitely (in a modern sense) vast. If the extension of pure aer beyond the kosmos was so very vast, then, like Metrodorus, 5 we would wonder why other worlds had not come into being throughout such an illimitable expanse. Yet one thing that is quite certain about Anaximenes is that he did not believe in the existence of more than one world 6 at a time. In this case the extent of the aer beyond the orbits or resting place of the outermost stellar bodies cannot have been excessively vast and, as remarked, there would be little point in differentiating between universe and περιέχον at all.

In fact, Aetius 2. 14. 3 (= DK 13. A 14) informs us that there was a boundary to the world, but I have discussed the other possibility nevertheless, because some scholars think that some vital words in Aetius are there by mistake. 7 The text is as follows, with the crucial and disputed words

5. See Aetius 1.5.4 (=DK 70. A 6) ἄτομον εἶναι ἐν μεγάλῳ πεδίῳ ἐνα στάχυν γεγυθῆναι καὶ ἕνα κόσμον ἐν τῷ ἀπειρῷ. If Anaximenes could have conceived of an infinitely extended body, there seems little reason why he should not have postulated multiple worlds also.
6. Cf. Simplicius Phys. 1120. 28 and Aetius 2.1.2 (from Plutarch Plac. 2.1.886 B.), also Simplicius de Caelo 202.11.

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Scholars have rejected the underlined words because according to Aetius 2.22.1 Anaximenes considered the sun to be πλατύν ὡς πέταλον. They would expel ἠλών...κρυσταλλοειδῆ as due to some sort of confusion, alter ἐνοτι, and refer the star-leaf doctrine to Anaximenes. It is more probable, however, that Anaximenes distinguished fixed stars from the sun, moon and planets and that the latter only are πέταλα-like. In this case it is merely ἐνοτι which is wrong and we could plausibly alter it. The first sentence kept, we are confronted with the problem of τὸ κρυσταλλοειδῆς. What sort of boundary is this? One immediately recalls the solid peripheries of the worlds of Parmenides and Empedocles, and if there is any connection, then Anaximenes’ firmament should be hard like theirs. For Parmenides the boundary is στερεὸν τεῖχος δίκην (Aetius 2.7.1) and for Empedocles the heaven is στερέμνιος ἕξ ἄρος συμπαγένος ὑπὸ πῦρ κρυσταλλοειδῶς (Aetius 2.11.2). If the Anaximenean firmament is solid like this—and in view of the similarity between the Aetian reports there is every reason to believe that it was—then it was presumably impervious to infiltration by whatever aer there might be outside. If that is so, why postulate it at all? It plays no part in the cosmic processes and its only possible function would be to serve as a matrix for further kosmoi; and yet, to repeat, there was for Anaximenes only one kosmos in existence at any one time. It would be more logical if Anaximenes had done what I believe he in fact did, and that is to make his solid firmament the absolute end of everything. The concept of infinite space, and problems concerning what was beyond the edge of the whole universe had not yet arisen. The question as to what was beyond the κρυσταλλοειδῆς would probably have troubled Anaximenes as little as it did Parmenides and Empedocles who set an absolute boundary to the finite sphere which contains all that is. I would suggest that what Anaximenes may have done is to assimilate quite undiscriminatingly the solid οὐρανὸς of Homer together with other reactionary features that have been detected in his cosmology. This solid terminus would then be a ‘brute fact’ and not explained in terms of the processes of densification and

8. See Guthrie, HGP pp. 135–6, also T. Heath, Aristarchus of Samos, pp. 40–43.
9. Perhaps by making ἐνοτι accusative referring to the stars.
10. See also Aetius 2.13.11; Achill. Is. 5 p. 34, 29m; Schol. Basili 22.
11. True, Empedocles calls his sphere ἀσείρων at DK 31. B 27.3 but here ἀσείρων can be taken in its old Homeric sense of ‘vast’, or as at Aeschylus Frag. 379.
13. For example, the heavenly bodies travel behind high ground and are thus invisible at certain periods: cf. Hippolytus Ref. 1.7.6 and Aristotle Meteor. 354a 22.
tenuification that went on in the region of earth and the orbiting heavenly bodies. Empedocles may be the first to have attempted a mechanical explanation of the firmament’s appearance.

Despite the probability of the above view it is only fair to mention, even if to criticise it, the fascinating alternative hypothesis of Guthrie as to the nature of τὸ κρυσταλλοειδές. Noting that κρυσταλλοειδής and ἥλιος are used in medical writing in ophthalmological senses, Guthrie suggests that for Anaximenes the universe was surrounded by some kind of transparent membrane through which the kosmos inhaled from and exhaled into the circumambient aer. The stars are a kind of wart or callus growing on the membrane. If this were true (and Guthrie uses Aetius 1.3.4 to back up his view), then the extra-cosmic aer would indeed be a vital part of Anaximenes’ system. There are, however, many objections which taken cumulatively may seem annihilating. First may be noted the difference that would now exist between the view of Anaximenes and that of Parmenides and Empedocles. Secondly, there are semantic difficulties. Both the vital words are used in medical writings of the Christian era and Anaximenes could not have used them himself. Realising this Guthrie supplies the alternative suggestion that a later writer used the words to explain what he found in Anaximenes. But it is difficult to see why he should have used ophthalmological terminology and not a more general world like ὑμῖν for κρυσταλλοειδές. As for ἥλιος Guthrie himself points out that it had a perfectly good epic use. The sceptre of Achilles is χρυσίος ἥλιος πεπαρμένον (Iliad 1.245), that is with hard, golden studs. Anaximenes surely had this type of use in mind when he wrote about the fixed stars and it is hard to imagine studs or rivets adhering to some sort of membrane. Although Guthrie is sure that Baldry’s work has overthrown the dogmatic statement of Burnet that ‘in the days of Thales, the prevailing interest was not physiological but meteorological,’ it is not easy to agree with him. It is true that Anaximander may have spoken of the heat as like a φλοιός about the cold, but the comparison is a rather obvious one and it is merely fanciful to conjecture that Anaximander’s universe is a living creature like the first bark-encased denizens of the earth (Aetius 5.19.4). The shell of hot round the cold is likened to bark merely because bark covers something interior, just as the hot does, and it is the function that is the point of comparison in the cosmogonical use of φλοιός. The first animals, on the other hand, actually are covered by φλοιός ἀκανθώδεσιν. The fact is that the sole ancient support for those who posit physiological influence on cosmogony is to be drawn from a

15. Guthrie cites Celsus and Galen.
conjecture of Aristotle about Thales (Metaph. 983 b 25f). Aristotle, in default of something better, clearly retrojected the views of Hippon together with his own biological prejudices. By Theophrastus the master’s speculations were treated as virtual facts. The doxography, if it shows anything, reveals that the Milesians were fascinated by τὰ μετέωρα and Burnet is right to take this into account. Theophrastus’ own compilation assists the rejection of his borrowing from Aristotle.

Two other objections against Guthrie’s view remain. We know that Anaximenes’ earth, and also the other heavenly discs, were supported by the aer beneath them. This surely can only be if the system is airtight. If there were an exhalation of interior aer through some sort of porous membrane, then there would be room for the displacement of subterranea, subsolar, sublunar etc. aer and the terrestrial and heavenly bodies would sink. The only way to prevent a gradual laping to the bottom of the universe would be to postulate an inward contraction of the cosmic membrane to avoid an internal vacuum at the time of each exhalation, but this is surely rather fantastic. We do not, for instance, ever observe the starry warts pulsating back and forth.

Lastly, it would seem probable that as in Anaximander’s system a balanced opposition prevailed between the hot, bright, rare etc. powers in the heavens and the cold, dark, dense etc. terrestrial powers. An encroachment by the cold is compensated for by a counter-encroachment by the heat. If cyclic interchange between two groups of elements or powers accounts for the present configuration of things, why should the universe have to breathe? Inhalation and exhalation would be processes completely irrelevant to those by which the order of things is sustained. Clearly the culprit responsible for the whole idea of breathing universes, which would not otherwise have come to mind, is Aetius I. 3. 4 (=DK 13. B 2). To this passage we must now turn, and first to the text itself: 'Α... ἀρχὴν τὸν ὄντων ἀέρα ἀπεφήνατο· ἐκ γὰρ τούτου πάντα γέγνεθαι καὶ εἰς αὐτὸν πάλιν ἀναλύεσθαι (doubtless referring to successive single kosmoi). οἶον

18. Note the following passages in this connection: Hippolytus Ref. 1.6.7, Aetius 3.3.1, Hippolytus Ref. 1.7.6–8, Aetius 3.3.2, 3.5.10.
19. Kirk and Raven (PSP p. 153) believing that the surrounding air was unbounded in any way suppose that the earth is supported by aer’s infinite depth. Aristote de Caelo 294 b 18–21 says, however, that Anaximenes believed that the flat earth was supported by ὅποκειμένῳ ἀέρα, τὸν δ’ οὐκ ἔχοντα μεταστήναι τόπον ὑπον ἀέρον τῇ κάτωθεν ἱάομαι, ῥαπτέρ τὸ ἐν τοῖς κλεψύδραῖς ἱδέαν. This is surely more likely to be correct than the KR conjecture and, if so, the implication is that the contents of the Anaximenean universe were enclosed like the air and water in a clepsydra.
Stokes is sceptical about the proposed extract from Anaximenes and many other scholars have had their doubts. Particular targets are the implied macrocosmos-microcosmos parallel, and the words συγκρατεῖ, πνεῦμα and κόσμος. Some of these objections are cogent, but we should perhaps agree with Guthrie that despite some rewriting and garbling the passage is substantially authentic. Superficially it appears to support Guthrie’s view that for Anaximenes, even more certainly than for Anaximander, the world was a living, breathing creature surrounded by an aery atmosphere; but, I believe, only superficially.

It is, I think, indisputable that the macrocosmos-microcosmos parallel was a later development. This being so, it would be hazardous to identify the ψυχῆ of a human-being and the world-soul. Anaximenes’ comparison, I suggest, is between the function of the soul in a human, and that of aer in the cosmos. Aetius or a previous Stoic epitomator read later concepts into the simile. Now it is surely certain that ἡ ψυχῆ ἡ ἡμετέρα ἡ ἄηρ οὖσα which συγκρατεῖ ἡμᾶς (or whatever Anaximenes originally wrote) would be something internal. If the cosmic aer referred to was not also interior, then the comparison would be a very strange one. An external aer could surely be no more responsible for the dynamism of the universe than something outside it could be responsible for the animation of a human being. It is true that the soul was earlier connected with vapour (aer in the pre-Anaximenean sense) and that at death it left the body which it animated, but only within a living body was it an active principle. Similarly Anaximenes’ non-vaporous, invisible and equable aer could only have functioned as the dynamic matrix of the world-bodies from within the world.

All this may seem plausible enough, but it will be objected that the words τὸν κόσμον περιέχει do not suggest an internal environment. This is true, but only if τὸν κόσμον is authentic Anaximenes (as περιέχει itself surely is) and is used in what is usually regarded as a late sense. It will be shown later that Anaximander used κόσμος in one entirely different sense, and although not impossible, it is not all that likely that Anaximenes should have gone beyond it. I shall also try to show it probable that by Anaximander τὸ περιέχον and περιέχει were used of an internal environment and this fact too will militate against the authenticity of the expression under discussion.

23. That it was indeed only the functions of soul and aer that Anaximenes was comparing is suggested by the fact that at De anima 405a 21 ff., where Aristotle is talking about the view of Diogenes and others that the soul is air, he does not name the earlier Anaximenes. But cf. Philoponus de anima 9.9, a typical misapprehension.
24. It will be argued later that he may be responsible for a new use of ἄηρ, but for this there were special reasons.
What has surely happened here is that the post-Theophrastean epitomators have tried to read into Anaximenes the Stoic view of πνεύμα surrounding the universe.

Theophrastus carefully reported a view of Anaximander that the arche surrounds all the οὐρανοὶ and κόσμοι. This was distorted under atomistic influence by later epitomators (as we shall presently see). A similar process has doubtless progressively warped the original account of Anaximenes’ system. The biased rephrasing of an epitomator should not therefore seduce us into adopting an interpretation of Anaximenes’ simile which makes nonsense of it. The only sensible interpretation does not require any belief in extra-cosmic aer.

To summarise, there is no overwhelmingly compelling evidence for ascribing the notion of a circumambient portion of aer to Anaximenes, and for rejecting the historically more probable view that in its original state his arche was coextensive with the developed universe. The Milesians, after all, were on the threshold of speculative thought about the universe, and it is unlikely that they would have conceived of anything outside the observable bounds of the world in which we live. Hesiod certainly will not have been aware of such questions as what is beyond chaos or beyond the developed world, and Stokes has shown that the Milesian thinkers were deeply imbued with Hesiodic concepts or with concepts drawn from Hesiod’s Middle-Eastern sources. Why should Anaximander and Anaximenes have asked questions that did not occur to the later Parmenides and Empedocles, and have broken so radically and suddenly from the ideas amongst which they had grown up and which so powerfully dominated other aspects of their work? Yet, whatever the truth about Anaximenes, it is regularly supposed that Anaximander did, and it is to him that we must turn.

B2

The following testimonies will prove basic to discussion: (a) Aristotle Phys. 203 b 10 (=DK 12. A 15) (from a discussion of τὸ ἄπειρον, and perhaps the passage at first sight most strikingly suggestive of an external περιέχον).

... τὸ τάύτης (sc. ἄρχη, here=τὸ ἄπειρον), ἄλλα σύγχρονα τῶν ἄλλων εἶναι δοκεῖ καὶ περιέχειν ἄπαντα καὶ πάντα κυβερνάν, ὡς φασὶν δόσι μὴ ποιῶσι παρὰ τὸ ἄπειρον ἄλλας αἴτιας... (with certain reference to Anaximander). τούτ’ εἶναι τὸ θείον· ἀθάνατον γὰρ καὶ ἀνώλεθρον, ὡς

25. Anaximenes may have talked of κόσμοι as parts of the single universe using the word in the same way as Anaximander. This could have been altered by epitomators who knew that Anaximenes only believed in one world at any time and who associated κόσμοι with the atomistic theory.

26. Discussed in the next section.
Aristotle now goes on to enumerate five reasons for belief in the \( \text{όπειρον} \). First, time is regarded as having no limit; second, mathematicians treat divisibility of magnitudes as possible without limit. Third, the \( \text{όριον} \) \( \text{oιχον} \) \( \text{ού} \) \( \text{ποιεω} \) \( \text{πάσιν} \) \( \text{διά} \) \( \text{γάρ} \) \( \text{ό} \) \( \text{νόησει} \) \( \text{μή} \) \( \text{υπολείπειν} \), and \( \text{ό} \) \( \text{άριθμός} \) \( \text{δοκεῖ} \) \( \text{όπειρον} \) \( \text{εἶναι} \) \( \text{καὶ} \) \( \text{τὰ} \) \( \text{μαθηματικά} \) \( \text{μεγάθη} \) \( \text{καὶ} \) \( \text{τὸ} \) \( \text{ἐξω} \) \( \text{τοῦ} \) \( \text{οὐρανοῦ} \). \( \text{όπειρον} \) \( \text{δ’} \) \( \text{όντος} \) \( \text{τοῦ} \) \( \text{ἐξω} \), καὶ σάμα \( \text{άπειρον} \) εἶναι \( \text{δοκεῖ} \) καὶ \( \text{κόσμο} \).

(b) Simplicius \( \text{Phys.} \) 24.13 (=Theophrastus \( \text{Phys. Opin.} \) Frag. 2=DK 12. A 9) \( \lambdaέγει \) \( \delta’ \) \( \αὐτὴν \) (sc. \( \text{τὴν} \) \( \text{ἀρχήν} \)) \( \ldots \) \( \ἐτέραν \) τινὰ \( \φύσιν \) \( \άπειρον \), \( \εξ \) \( \ ἂν \) \( \παντας \) \( \γίνεσθαι \) τοὺς \( \οὐρανοὺς \) καὶ τοὺς \( \ἐν \) \( \αὐτοῖς \) \( \κόσμοις \).

(c) Hippolytus \( \text{Ref.} \) 1.6.1 (=DK 12. A 11) \( \tauαυτὴν \) \( \δ’ \) (sc. \( \text{ἀρχήν} \)=τὸ \( \άπειρον \)) \( \άδιον \) εἶναι καὶ \( \άγηρα \), \( \赁 \) καὶ \( \πάντας \) \( \περιέχειν \) τοὺς \( \κόσμοις \).

The fifth reason given by Aristotle for belief in the \( \text{όπειρον} \), namely that there is infinite extension beyond the heavens and therefore an infinite amount of body, is ascribed to \( \text{πασίν} \). If this is meant to include Anaximander, then the suggestion is that his \( \text{ἀπείρον} \) was a body of infinite extension surrounding our world, and honey-combed with other worlds. Reason for believing that Anaximander is to be included in \( \text{πασίν} \) might be drawn from the third argument, for this has been accepted by some scholars as a major Anaximandrian motive for postulating the boundless. However, it is by no means certain that this \( \text{πίστις} \) is to be ascribed to Anaximander, although Theophrastus and Simplicius evidently believed that Aristotle had the Milesian in mind. The only extant Anaximandrian sentence virtually compels us to believe that all change in the world takes place between two sets of opposing constituents and that there is no wastage. Anaximander’s conception, indeed, seems to be expressed by Aristotle himself at \( \text{Phys.} \) 208 a 8 ff, and what he probably thought Anaximander’s real reason for postulating \( \text{όπειρον} \) is given at \( \text{Phys.} \) 204 b 22 ff. If the \( \text{ἄρχη} \) was a constituent characterised by an opposite (e.g. fire or water), then the complementary opposite could never have appeared. Thus, Aristotle here supposes that for Anaximander \( \text{όπειρον} \) meant qualitatively indeterminate rather than inexhaustibly huge, and it would follow that argument three in passage (a), as normally understood, could not be Anaximander’s.

28. Aetius 1.3.3.
30. See the discussions of Kahn, \textit{AOGC} Chapter 3; Guthrie, \textit{HGP} pp. 78 ff.
Recently, F. Solmsen has suggested that the *pistis* is after all Anaximandrian, and that the Peripatetics have understood 'the cessation of γένεσις too liberally and with too exclusive reference to the material'. Anaximander simply meant that were the *apeiron* not amongst the world bodies and steering them, then the world, the domain of *genesis* and *phthora*, would simply collapse. This could be true, but it seems a little forced, and I still prefer to believe that Theophrastus was mistaken.

The first argument also need not be relevant to Anaximander, and the second certainly is not (speculation on τὸ ἀπειρὸν τὸ πλήθος being post-Zenonian), while the fourth argument is reminiscent of Melissus Fragment 7. All this being so, it is perhaps reasonable to connect the fifth argument too with later thinkers and not to press πασίν. Talk of ἀπειρὸν σῶμα has an atomistic ring, as do multiple coexistent κόσμωι, not to mention the idea of the void introduced a line later and talk of this *apeiron* as τὸ ἔξος. There is no need, therefore, to feel compelled by the fifth Aristotelian *pistis* to posit multiple Anaximandrian worlds in an entity surrounding our own world. Nevertheless, the τὸ περιέχον in the earlier part of the passage may appear to refer to a vast circumambient *apeiron*, even if this is not riddled with other cosmoi.

An attack on such a deduction may be developed from consideration of (b) and (c). Above it was stated that multiple worlds are unacceptable in Anaximander's system. This I agree with Guthrie and others to have been indubitately proved by Cornford in one of his most incisive articles. There are some who now hesitate to adopt his conclusions, but I myself would find it particularly difficult to accept plural worlds in Anaximander, when for Anaximenes, whose *arche* was also ἀπειρὸς, there was only one world. Even for the much later Anaxagoras, who was so profoundly

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32. For atoms as σῶμα cf. Aristotle *de Caelo* 300b 9. The atomistic worlds and atoms were infinite in number, the void infinite in extent. Simplicius *de Caelo* 202. 16 puts this succinctly: (Leucippus and Democritus) ἄπειροι τῷ πλήθει τοῦ κόσμου ἐν ἀεί, ἀπὸ τὸ κενὸ καὶ ἔξο ἄπειρον τῷ πλήθει τῶν ἀτόμων συνιστασθαι φησι. It is hard to believe that Aristotle's fifth *pistis* does not have this system and its twin infinities of number and extent in mind. For the atomist *apeiron* void as τὸ ἔξο cf. Simplicius *Phys.* 648. 12, οἱ περὶ Δημόκριτον καὶ Λέοντιον οὗ πάνω ἐν τῷ κόσμῳ κενὸν εἶναι τι λέγοντες, ἄλλα καὶ ἔξο τοῦ κόσμου. If they had a precedent for an external *apeiron* this was no doubt Pythagorean (cf. Aristotle Frag. 201 (Rose 9) and *Phys.* 213b 22 ff.), but the infinity of the void would follow necessarily from its definition as τὸ μὴ ὅν.


influenced by Miletus, there was still only a single world. 

Plural worlds are first attested for Leucippus, then for Diogenes of Apollonia who was influenced by him, and subsequently for the rest of the atomists.

Cornford, followed by Kahn, has shown that the farther away the doxography gets from the original Theophrastus, the more Anaximander’s views are assimilated to the atomistic conception of innumerable worlds. Whereas Theophrastus, as reported by Simplicius, carefully spoke about τοὺς οὐρανοὺς καὶ τοὺς ἐν αὐτοῖς κόσμους, many epitomators mentioned only κόσμιοι and thought Anaximander’s view to resemble that of Democritus. But the fact that Theophrastus did employ such odd terminology seems to show for certain that he did not regard atomistic and Anaximandrian doctrine as being at all similar. Our confidence that this view is correct is strengthened by comparison with Aristotle de Caeio 303 b 10-13. Here the ‘intermediate’ ἀρχή (by which is meant Anaximander’s ἀπειρόν) is said to περιέχειν πάντας τοὺς οὐρανοὺς ἀπειρόν δν. If Aristotle had envisaged atomistic type plural worlds in Anaximander, he would surely have made this clear by writing κόσμιοι as at the atomistically orientated Phys. 203 b 26.

We can take it that ἄπαντας τοὺς οὐρανοὺς καὶ τοὺς ἐν αὐτοῖς κόσμους which the ἀπειρόν περιέχει (substituting the probably authentic expression, supplied by Theophrastus through Simplicius, for the truncated τοὺς κόσμιους of Hippolytus) have nothing to do with plural worlds. What, in that case, are they? It is impossible to guess with absolute certainty and Kahn warns us that it is hazardous to do so. However, as he says, there is the plausible hypothesis of Zeller revived by Cornford and recently commended by Guthrie that Anaximander’s ὀυρανοί are the rings or tubes of the various heavenly bodies which wheel about the central earth. These include the sun ring, the moon ring and the countless star rings, the sun being furthest from earth, the moon closer and the stars closer still. For Cornford ‘the κόσμος or κόσμιοι in them may be the region or regions of the world order framed by them.’ Kahn speculates that they may be ‘some lower arrangements of atmosphere or earth within the framework of the one and only world system concerning which the testimonia for Anaximander give us any real information’. He further mentions a couple of relatively early uses of κόσμος which tend to support such a hypothesis. Another possibility is that οὐρανός is used of the whole structure of an ‘inner-tube’ of fire surrounded by an ‘outer-tube’ of aer, and that the

35. Despite the doubts of Kirk and Raven (PSP pp. 389-390) inspired by Simplicius Phys. 157. 9., Cornford (IWPP p. 6) who points out that the bulk of the evidence favours one world, is almost certainly correct. Particularly convincing is Aristotle Phys. 250 b 18 ff.
37. Kahn, AOGC p. 50.
38. Cornford, IWPP p. 11.
40. De Hebd. 2 and Philolaus as reported by Aetius 2.7.7.
κόσμος is the actual appearance of the heavenly body at the emitting vent. Such an idea is suggested by Aeschylus Agamemnon 350 where night is μεγάλων κόσμων κτάτειρα and κόσμοι might be the stars regarded as ornaments of the night sky. Kahn, however, draws attention to an equally plausible counter-interpretation of Aeschylus’ expression. Supposing the above view of kosmoi and ouranoi to be substantially correct, there must follow a curious corollary.

On the Zeller-Cornford view we ought to say that it is the heavenly rings in the single world which τὸ ἀπείρον περιέχει. The expression might, I suppose, mean that the apeiron surrounds them collectively, lying beyond all the ouranoi and kosmoi, and yet this is surely not the obvious meaning. The natural sense is that τὸ περιέχον surrounds all the rings individually, and thus that at least a portion of the apeiron is, like Anaximenes’ aer, within the single universe and not entirely beyond the orbit of the furthest (sun-) ring.

The περιέχον is, therefore, an internal environment, and this sense could be understood in the Aristotelian passage. Here the apeiron is said περιέχεν ἀπαντα καὶ πάντα κυβερνάν. If Aristotle thought that the apeiron was outside the Anaximandrian cosmos why did he write ἀπαντα and not τὸν κόσμον? Surely because the neuter plural refers to the various intra-cosmic bodies for which the residue of the apeiron, left over after genesis, supplies an environment. Aristotle talks about the apeiron ‘steering’ everything, and it is easier to believe that an entity in immediate proximity to the contents of the world could do this, rather than a remote circumambient isolated beyond the cosmic confines.

κυβερνάν, of course, makes us think of the active function of the aer within the world of Anaximenes, and the ideas of both Milesians are picked up in a passage of Diogenes of Apollonia who uses the language of Anaximander and the ideas of Anaximenes: (DK 64. B 5) καὶ χοί ὁ ἁμαρθών ἐφεξοῦς ὁ ἄνθρωπος κυβερνάντων, καὶ πάντας καὶ τὴν νόησιν ἐφεξοῦς ἀνθρώπων κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων, καὶ τὸ ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνάντων καὶ τὸν κόσμον κυβερνάντων καὶ τὸν ἄνθρωπον κυβερνά

41. Kahn, AOGC p. 223. As he says, Aetius 2.13.15 is irrelevant.
Anaximander there are none. It is reasonable to suppose, then, that beyond the sun ring Anaximander's universe came to an absolute stop. The boundary may have been a solid firmament, an aitherial shell, or Anaximander just may not have bothered to describe the periphery of his spherical universe. Anaximenes, on the other hand, needed something solid to which to attach the fixed stars that his predecessor had located between earth and moon. He therefore retained the mythic ouranos.

Before summing up the section we may look at the only extant appearance of τὸ περίἐχον in Ionian speculation. If this is consistent with the view of περίἐχον as internal environment more confidence can be felt in the above interpretations.


This sentence refers to the situation when nous first began to form the world. All opposites and seeds were inextricably mixed and as result of the activity of nous the dark, dense, cold etc. (collectively aer) began to gravitate to the centre of the original mass, while the bright, rare, hot etc. (collectively aither) remained outside this core. Now at the beginning of the process there was nothing but a homogeneous mixture, and it could not be said that anything surrounded anything. Yet even at this stage Anaxagoras talks about τὸ περίἐχον. Over the great expanse of this the sifting process begins. Clearly the term can, in this context, only mean 'environment' and the notion of surrounding has been almost completely lost. It is easy to see that the present sense could develop from an earlier use of τὸ περίἐχον as an entity or environment within the world and surrounding its contents; not at all easy to derive it from τὸ περίἐχον applied only to a circumambient mass left outside a developed universe. At Anaxagoras Fragment 14 τὸ περίἐχον is used in a sense nearer to that of the Milesians and we are told that when the world is formed, nous is in the products of proskrisis and apokrisis and also in their environment. A later use of τὸ περίἐχον is close to that in Anaxagoras Fragment 2. At Aristotle de anima 404 a 10 and elsewhere (cf. LSJ περίἐχω—1 c) it means 'atmosphere'.

The conclusion of this section is, then, that τὸ περίἐχον was used by the Milesians to refer to the internal environment in which the cosmic bodies were located. Anaximander's apeiron thus resembles Anaximenean aer, and like it should have been originally coextensive with what Anaximander regarded as the boundary of the sole world, the one in which we live. On this view Anaximander's system would, as one might expect a priori, remain close to the mythological constructs of his predecessors, and would be consistent with the elsewhere apparent Milesian reliance on observation.\footnote{For example, this faithfulness to the results of observation dictated the Milesian retention of a flat earth contrary to the requirements of symmetry which demanded a sphere (cf. Kahn, AOGC p. 117).}
There is now no need to retroject the concepts of infinity and the ‘beyond’ which are in all probability post-Eleatic.

The next step is to see whether something that is ἀ-πείρον can after all be the arche of a finite and closed universe.

B3

Anaximander’s *apeiron* has been taken as qualitatively indeterminate, infinitely extended, finite and spherical, or ascribed various combinations amongst these possibilities.43 The only near contemporary occurrences of the word all have a spatial sense,44 and for this reason the other possibilities are probably to be ignored. The question, then, is does ἀπείρον mean infinite in the sense that moderns talk of infinite space. If it did, and Anaximander’s *apeiron* stretched endlessly in all directions (as Kahn believes),45 then it would be odd if there was only one world.

In spite of Kahn’s view to the contrary, his discussion46 of the derivation of *apeiron* does, I believe, assist the conclusion that the Milesian archai were not infinite. He points out that in the Homeric poems the cognate ἀπείρον is not inconsistent with πείρατα or limits. The sea is ἀπείρον and so is the earth, but both are bounded.47 This leads to the suggestion that ἀπειρος and its cognates are not derived from ἀ- and πεῖρας but from the verbal root *per-* which appears in πείρα, πέραω and περαίνω. The true sense of ἀπειρος is ‘what cannot be passed over or traversed from end to end’ and this is confirmed by the discussion of Aristotle (Phys. 204 a 2 ff) and the remarks of Simplicius (Phys. 470 f.) who opposes ἀπειρος to διεξοδοτος and διαπορευτος. Kahn believes that ‘what cannot be traversed to the end’ easily passes into ‘enormous’ and that, as a result of philosophic usage beginning with Anaximander, the term was systematically opposed to πέρας. In his view Anaximander ‘probably defined τὸ ἀπειρον by opposition to πέρας’.

This does not necessarily follow. It is surely after the Pythagoreans began to emphasize the importance of structure and limit that the ἀπειρον—πέρας opposition became important and yet even as late as Empedocles the world can be ἀπείρον and still bounded.48 In the Ionian world too ἀπειρον should have kept its old associations for some time, and there is

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43. The various opinions of modern scholars on the subject are well summarised by H. B. Gottschalk, ‘Anaximander’s Apeiron’, *Phronesis* 10 (1965), pp. 37–53. Like the majority of the most recent writers, Gottschalk accepts the spatial infinity of the *apeiron*.
44. Kirk-Raven, *PSP* p. 109; Gottschalk, op. cit. 51.
47. *Iliad* 1. 350 ἐπ’ ἀπειρον πόντον; *Iliad* 8. 478 πείρατα γαίης καὶ πόντου. For collection of all relevant Homeric passages see Mondolfo, *L’Infinito nel Pensiero dell’Antichità Classica*, Chapter 5.
48. Cf. note 11.

39
some evidence that it did. For Xenophanes (Fragment 28) the earth τὸ κατω ἐς ἄπειρον ἦκεν ταῖ. He was surely denying that the earth is μεταβοτ at the centre of the spherical cosmos and entirely bounded by τὸ περὶ ἄπ. not stating that the depth of the earth was infinite. Similarly when (according to Aetius 2. 24. 9) he said τὸν ἡλίον εἰς ἄπειρον μὲν προέκυψεν he could only have meant that the sun went a very long way, for elsewhere we are told it burnt out at night (cf. Hippolytus Ref. 1. 14. 3). Xenophanes is later than Anaximander, and even later was another Ionian, Herodotus, who can also use ἄπειρον in its older sense. At 2.204.1 he mentions a plain πλήθος ἄπειρον ἐς ἄπωσιν. It cannot be seen across, but it naturally has a boundary. Finally, and most striking of all, an Ionian later yet again than Herodotus writes, if only we avoid emendation of the best manuscripts, of δικάδες ἄπειροι τὸ μεγέθει tossed about on the sea. It is already feasible, then, that ἄπειρος could for both Anaximander and Anaximenes mean enormous or vast and yet not imply absence of πέρας, and if Solmsen were correct that Aristotle had Anaximander in mind when he recalled a definition of the ἀπείρον as ὁ μῆδεν ἐξ ἐν (Phys. 207 a 1), it would be practically certain. It would surely be quite illogical to describe a spatially infinite body in such a way, despite Solmsen’s feeling to the contrary. What, then, was the exact nature of the Anaximandrian arche?

We know that at the beginning of the cosmogonical process two entities, τὸ θερμὸν and τὸ ψυχρὸν, were separated out (ps-Plutarch Strom. 2). These are substantial entities characterised by their most prominent quality. A good term for them would perhaps be ‘activity-things’, for their essential aspect is their δύναμις (as it was later to be called) to produce certain effects. It is hard not to believe that what Anaximander is doing is to demythologise early systems. These talked of Earth and Sky as active personal powers on a cosmic scale and Anaximander may have wished to shun terms that encouraged such a way of looking at things. His primary entities are therefore τὸ θερμὸν etc., which have no personal connotations, although being active powers they still have the innate activity which is characteristic of living things. Thus the activity of the old mythical persons remains but their volition and caprice are stripped away to yield to the rule of law. Now, we know that in mythological systems Sky and Earth (and others) were the offspring of Chaos. Perhaps just as Hot and Cold are depersonalised versions of Sky and Earth, so τὸ ἄπωσι is a demythologised version of Chaos called, like Hot and Cold, by its leading characteristic which in this case is enormous extension.

49. The author of περὶ φυσῶν (3).
51. I am unable to share the conviction of U. Holscher (‘Anaximander und die Anfänge der Philosophie’, Hermes 81 (1953), pp. 266 ff.) that these terms are anachronistically applied. Anaximander’s motivation for their use appears below.
This will be the only ‘characteristic’ that the arche possesses and it will therefore share none of the activities of the opposites, the hot, bright, dry and rare, or cold, dark, moist and dense. It is not surprising then that Aristotle could decide that it was by nature the intermediate that it was in effect, and that modern scholars should attempt to interpret the word apeiron as meaning ‘qualitatively indeterminate’. In effect it is, but that is not what apeiron meant for Anaximander. Again, Cornford will have been correct in regarding this apeiron as a spherical thing, but not because the word apeiron bears of itself any such sense. The apeiron is spherical because in its original state it was coterminous with the present cosmos which appears spherical to the observer (or rather hemispherical, the other half follows from observation of the movements of the heavenly bodies, and is demanded by the dictates of symmetry). As in the case of the Hot and the Cold, the apeiron retains a self-motive power which is equivalent to the life of Chaos from whose womb sprung the first personalised world-constituents. From the apeiron the world-bodies originate.

The details can, with some confidence, be pieced together from Pseudo-Plutarch and other doxographical notices:

(a) Pseudo-Plutarch Strom. 2 (=DK 12. A 10) φησι το ἑκ τοῦ αἰδίου γόνιμου θερμοῦ τε καὶ ψυχροῦ κατὰ τὴν γένεσιν τοῦτο τοῦ κόσμου ἀποκριθῆναι καὶ τινα ἑκ τοῦτοῦ φλογὸς σφαίραν τῷ περὶ τὴν γῆν ἄδρι αὐτῷ δὲν ὕψῳ ἡ ἕστιν ἀπορροφεῖσις καὶ τοῖς τινάς ἀποκλεισθείσις κύκλως ὑποστῆται τὸν ἥλιον καὶ τὴν σελήνην καὶ τοὺς ἀστέρας.

(b) Hippolytus Ref. 1.6.2. (=DK 12. A 11) κύνησιν αἰδίου εἶναι (of the apeiron) ἐν ἑ συμβαίνει γίνεσθαι τοὺς ὀὐρανοὺς.

(c) Theo Smyrn. p. 198. 18 Hill (=DK 12. A 26) ἡ γῆ... κεῖται περὶ τὸ τοῦ κόσμου μέσον.

Somewhere from the apeiron things are ‘separated out’, and we are reminded by the word ἀποκριθῆναι of the situation at the beginning of Anaxagoras’ cosmogony. Nous acts upon an inextricably confused mass and to the centre gravitate the cold, dense and associated powers, and around it gravitate their opposites, the hot, rare, etc. The separating out is caused by a ‘rotary motion’ imparted by nous. It is surely likely that a similar rotary motion was responsible for ‘separating out’, in Anaximander’s system, although in this case motive power was innate in the apeiron, a relic of the older ‘animistic’ systems. As Theophrastus evidently reported, the apeiron may have had an eternal motion and this, since the apeiron was spherical, will most likely have been rotary. Eventually a cold core appears

54. Rotary motion of or in the apeiron is, of course, a difficult question. Kirk-Raven tend to dismiss it entirely (pp. 126 ff.), despite Heidel’s ‘The ἔθιν in Anaximenes and
at the centre of the *apeiron* and is retained there, like the earth later, due to the rotary motion of the whole, and to the absence of any reason for falling or shifting in one direction rather than another.\(^5\) It is to be noted that no specific physical mechanism accounts for the appearance of the Cold and that we are still very close to the mythological concept of the birth of personalised world constituents from a living matrix. The Cold is virtually a child of the *apeiron*.

The next step is the growing around the Cold of a shell of the Hot, although Ps-Plutarch is so compressed that the appearance of the Hot may be simultaneous with that of the Cold, as it is in Anaxagoras. In that case the Hot and the Cold will be twin offspring of the *apeiron*.\(^6\) We now have three concentric spheres. The Hot around the Cold and the *apeiron* around both, and all turning with the original rotary motion of the *apeiron* now imparted to its products. But such a system can retain only a momentary stability. The Hot and the Cold immediately interact and the core of the Cold densifies as the Hot draws out the Moist (water) and vapour or *aer* (probably identified with the Dark).\(^7\) The densified core is earth; due to its bulk and mass it alone of the cosmic bodies is able to resist the universal rotatory motion.

The expanding vapours could not long be compressed within the incandescent shell and an explosion occurred which must have hurled masses of *aer* and fire into the surrounding *apeiron*, some of it as far as 14 earth diameters from the central earth and probably near to the limits of the universe (see Aetius 2. 20. 1). From the material scattered by this explosion the heavenly bodies were formed which consist of fiery rings enclosed in vaporous tubes. At one point there is a hole in the tube from which fire is emitted and the rotation of tube and nozzle accounts for the motion of the apparently disc-like sun, moon and stars. Now surely the formation of the rings out of scattered explosion products and their subsequent rotation can

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\(^5\) See Aristotle *de Caelo* 295 b 10 ff. and Hippolytus *Ref*. 1.6.3 for the equilibrium theory of earth's (the densified core of the Cold) remaining at the centre of the universe. Theo Smyrn. 198. 18 and Hippolytus *Ref*. 1.6.2 suggest that the motion of the *apeiron* might also have had something to do with it. Presumably the rotary motion would have some tendency to hold the central body without falling but not sufficient, therefore the equilibrium principle was called in.

\(^6\) Ps-Plutarch is not at all as clear as he might be. His account is almost consistent with the view that the Hot was spawned by the Cold, but if this could be, Anaximander would not have required an arche 'uncharacterised' by any of the opposites. Cf. Anaxagoras *B*4; B12.

\(^7\) See Plutarch *Prim. Frig.*, 948 e. The concept may have persisted.
only be accounted for on Hippolytus’ report. The motion of the *apeiron* into which the material is hurled outwards is responsible for the celestial rotations. (Winds and vaporisation can only account for the movement of the sun between solstices and the declination of the moon, not for the east-to-west movements.)\(^{58}\) And it is surely this which accounts for Aristotle’s remark that the *apeiron* ‘steers’ all. Thus the innate movement of the *apeiron* is not only responsible for the formation of the original world bodies whose interaction produced the phenomenal world. It steers and guides these products by catching them up in its own motion, sweeping along the *ográfωi* and *kósmoi* within them.

When the various world-constituents have been formed and carried into their regular motions by the movement of the *apeiron*, the interaction between the earthly powers of cold, dense, dark and moist and the celestial activities of hot, rare, bright and dry does not, of course, cease. Each group exerts its powers on its rivals and a cyclic interchange of substance results. But a balance is kept, for each encroachment by one group is immediately avenged by the counter-encroachment of the other. For the opposites locked in this conflict the *apeiron* provides an environment filling the gaps created by the disruption of the concentric spheres of the Hot and the Cold and encompassing all within the cosmic limits. If the *apeiron* were absent from within the world, not only would the heavenly bodies not move but between heavenly rings and between earth and clouds there would be intervals of sheer emptiness. This is hardly possible, for as Kahn states,\(^{59}\) at this stage of thought space was not thought of in abstraction from material filling it. ‘That where οὐχ οὖν are not’ is a pre-Eleatic conception. Thus where fire, earth, water, etc. (to translate Anaximander’s activity-things) are not, there must be some other substance and this can only be the *apeiron*, itself devoid of any opposite power and which, having been responsible for the formation of the world and being still responsible for the celestial motions, continues to permeate the universe, the environment of the struggling powers, but taking no part in their interactions.

This means that one resemblance between Chaos and τὸ ὀμφατον which Stokes felt compelled to reject is saved, and possibly another too. Stokes believes that Hesiod’s Chaos was gloomy and dark,\(^{60}\) whereas Anaximander’s *apeiron* was not. But Hesiod\(^{61}\) tells us that the first offspring of Chaos were Erebus and Night, and that Day is the child of Night. Surely Chaos would have possessed neither the characteristics of Night nor of Day. It would, in fact, be rather as the *apeiron* was, something with no other property than that of being a yawning expanse (see further

Addendum part ii). It is for this reason probably that the Peripatetics felt able to identify it with empty space.62

To summarise, the \textit{apeiron} was a vast expanse with no other characteristics, the pre-existent matrix of the other world constituents. From it all the world bodies were produced and it persisted in the world amongst them, and was responsible for the celestial motions. It was not infinite but something over 28 earth diameters across, which if the earthy sea could be called ἄπειρον, certainly deserved a similar appellation.

\section*{B4}

It may seem that in strengthening Stokes’ case for a relationship between Chaos and τὸ ἄπειρον, we have weakened that for a similarity of the former to Anaximenean aer, which Stokes believes was, like Chaos, dark and gloomy. What exactly was Anaximenean aer? For Stokes it is vaporous and dark,63 while Kirk-Raven\textsuperscript{64} tentatively and Guthrie\textsuperscript{65} confidently identify it with invisible atmosphere aer. The crucial testimony is that of Hippolytus \textit{Ref.} 1.7.2 (=DK 13 A 7) τὸ δὲ εἴδος τοῦ ἄέρος τοιούτου· ὅταν μὲν ὁμαλώτατος ἦ, ὃς ἄδηλον, δηλούσαι δὲ τῷ ψυχρῷ καὶ τῷ θερμῷ καὶ τῷ νοτερῷ καὶ τῷ κινομένῳ. κινεῖσθαι δὲ ἀεὶ· οὐ γὰρ μεταβάλλειν δυνάμει μεταβάλλει, εἰ μὴ κινοῦτο.

This passage implies that aer was a characterless stuff, and Guthrie accepts it at face value. Kirk-Raven suggested that non-Theophrastean interpretation has been interpolated, perhaps by Hippolytus, and following their lead Stokes launches a full-scale attack on the passage. He remarks for example, that ‘the contrast between (1) the notion of air that when “equable” is not visible, but becomes visible by movement, and (2) the portrayal of it as always in motion is piquant. Since it is reasonably certain that Theophrastus attributed eternal motion to the Milesians, it seems most likely that the statement which prima facie contradicts this is non-Theophrastean . . . ’ Stokes’ argument is surely not cogent. Why should not the aer when invisible still have some sort of inherent basic movement (which it would have to in a system without an ‘efficient cause’) and therefore κινεῖσθαι ἀεὶ but require a change of motion (brought about by itself) in order to condense or rarify and thus become truly visible. Hippolytus’ words do not exclude this possibility even if they are not as lucid as one might desire. The fact is that elsewhere Hippolytus shows himself a faithful reproducer of Theophrastean material and there is no reason why he should

\begin{itemize}
  \item \textsuperscript{62} MXG 976 b 14–17 (following Aristotle \textit{Phys.} 208 b 27 ff.).
  \item \textsuperscript{63} Stokes, \textit{Phronesis} 8 (1963) pp. 23–29.
  \item \textsuperscript{64} Kirk-Raven, \textit{PSP} p. 146.
  \item \textsuperscript{65} Guthrie, \textit{HGP} p. 126.
\end{itemize}
speculate on his own account here. The onus probandi is on those who do not believe in the substantially Theophrastean origin of the summary. Stokes continues his argument by recalling that for the poets and apparently for Anaximander, air was some sort of vaporous suspension. This is true, but does it make it as unlikely as he claims that it could have been used in a new meaning by Anaximenes, especially in view of the fact that the almost contemporary Xenophaeanes clearly used aer of atmospheric air? Stokes is also forced to come to terms with the Kirk-Raven argument for taking aer as atmospheric air and invisible. This is that since winds, which are already a condensed form of aer, are invisible, the original aer must be invisible too. This is surely unanswerable. The best that Stokes can do is to argue that greater density did not necessarily mean less transparency or brightness and to point out that the wind can disperse visible clouds. Yet Hippolytus and others clearly place clouds after wind in the scale of densities and the rare and bright and the dark and dense are regularly associated in the pre-Socratic systems, the rarer being proportionally brighter and the denser darker. In addition, there are phenomena which Anaximenes could easily have observed which suggest the existence of atmospheric air. For example, the swirling haze over flames and over hot metal which could be interpreted as aer turning into fire.

We can conclude with confidence, I believe, that Anaximenes' aer was invisible and was where the other world constituents are not, and that he held such a view is consistent with the view taken above of Anaximander’s apeiron. In fact Anaximenes’ aer is little more than the Anaximandrian apeiron under a new label, with the one great difference that it is now involved in the intra-cosmic processes. As well as providing an environment for the interacting celestial and earthly world constituents, and like the apeiron steering the heavenly bodies by means of its eternal rotary motion (cf. Hippolytus and Aetius 1. 3. 4), it was also a neutral point through which the opposites passed as they travelled the ways up and down.

Dissatisfied with the lack of a physical mechanism to explain the evolution of the Anaximandrian activity-things, Anaximenes hit upon the idea of accounting for genesis and phthora by condensation and rarification. Essential was an arche in an equable state between rare and dense which altered both ways. Further, since the hot was associated with tenuousness and the cold with compactness, the ‘Urstoff’ must also be without either of these activities. Also it must be between the concomitant powers bright-

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67. Hippolytus Ref. 1.7.3 and Simplicius Phys. 24. 26 (=Theophrastus Phys. Opin. Frag. 2.).
68. See Plutarch de prim. frig. 447 F. το γάρ συστελλόμενον αὐτῆς καὶ πυκνοῦμενον υψηλόν εἶναι φησι, τὸ δ’ ἄραιόν καὶ τὸ χαλαρόν . . . θερμόν.
dry, dark-moist, and therefore invisible. Anaximander’s *apeiron* characterised solely by its vastness was in effect this very intermediate, invisible as required, and all-pervasive or *περιέχων*. It was therefore adopted and rechristened.

It is consistent with Anaximenes’ more ‘mechanist’ approach that he preferred not to talk of the Hot and the Cold, but of fire and earth, of substances rather than activities. 69 Anaximander, we conjectured, deliberately cut himself off from the old mythological world view and the personal protagonists on the cosmic stage of the poets, and did this by labelling the world-constituents by such unevocative names as the Hot etc. When Anaximenes wrote, we may believe that the old theogonical associations of Earth etc. were more remote and that the younger Milesian could return to the old names stripped of their earlier allusiveness. He may indeed have felt that Anaximander’s activity-things were themselves redolent of an animistic way of thinking and that a different vocabulary was required to express his new view of the world process. That his *aer*, like the *apeiron* imbued with self-motive power, was still close in one respect to its mythological forerunners probably did not strike him. He was so hypnotised by his discovery of a mechanical means whereby it produced the derivative world-bodies that he did not trouble to ask how the processes of condensation and rarification themselves were set in motion. A similar blindness enabled him to assimilate the Rhipaean mountains and a solid firmament without realising their incongruity. Nevertheless, although the process of world formation was, to judge by the doxography, not very dissimilar in details to that of Anaximander, Anaximenes’ system marks a real advance. Although also ultimately responsible, like the *apeiron*, for celestial motions and thus steering all, as well as being its environment, Anaximenes’ *aer* is not so mysteriously apart from everything else. As already mentioned, it is itself involved in the struggle of the earthly and heavenly bodies through their respective powers, for it marks a transition stage between them. They are its offspring not in an almost crude mythological sense, but derived from it by a common-place process.

Finally, why should Anaximenes, inspired by Anaximander’s *apeiron*, label his intermediate *άηρ*? Perhaps because *άηρ* was a word that contemporarily denoted entities that also had other labels, like *άνεμος* and *νέφος*, and was so to speak superfluous. 70 In an older sense it was also

69. Plutarch *de prim. frig.* 447 F. καθάπερ Ἡ. ὁ παλαιός ἤτο, μήτε τὸ ψυχρὸν ἐν ὀσίῳ μήτε τὸ θερμόν ἀπολέσκεις, ἀλλὰ πάθη κοινὰ τῆς ὅλης ἑπιγενέσθαι ταῖς μεταβολαῖς. This is terminologically anachronistic but there is no need to doubt that it is substantially true.

70. The broadness of the reference of *άηρ* in Anaximander can, perhaps, be legitimately inferred from Hippolytus *Ref.* 1.6.7 ἄνεμος δὲ γίνεσθαι τῶν λεπτότατον ἄτμων τοῦ ἄηρος ἀποκρινομένων. For a discussion of the vicissitudes of *άηρ* cf. Kahn, *AOGC* pp. 143–145.
connected with the ψυχή which was, as an amalgam of Homeric θυμός and ψυχή, as intimately involved in the activity of a human organism as Anaximenes wished his aer to be involved in the dynamism of the universe. As well as being termed ἄηρ the arche was also ἀπειρος. Its hugeness was still emphasised, although instead of being actively vast, Anaximenes’ arche was a vast thing.

C

In this paper the following suggestions have been made: Both τὸ ἀπειρὸν of Anaximander and the ἀπειρός ἄηρ of Anaximenes could, as far as our present sources are concerned, be taken as huge, ‘intermediate’ bodies of finite extension, coterminous in their original state with the present bounds of the universe and persisting in that universe as a guiding environment or περιέχον for the other world bodies—for Anaximander the Hot, the Cold and other activity things, for Anaximenes the densified and rarified products of aer, which are fire, winds, clouds, water, earth and stones. Such a view, although as conjectural and as fraught with difficulties as any other, has the advantage of purging the Milesians’ systems of some later concepts (such as infinity) and of putting them in a closer relationship to earlier mythological constructs. Another advantage is that in some respects the systems of Anaximander and Anaximenes are brought into a closer relationship than has been envisaged hitherto.

ADDENDUM

It will be apparent that my view, if correct, makes it harder to detect a connection between Milesian thought and early Pythagoreanism, either via a breathing cosmos71 (supposedly connected with Anaximenes) or via the apeiron which is one of the Pythagorean principles. Perhaps the loss of a bridge between breathing universes is not so regrettable as it seems. It may be that early Pythagoreanism did not, after all, employ such a concept. It has already been suggested that when Aristotle writes of a breathing Pythagorean universe (and supposing that he is referring to pre-Diogenean Pythagoreanism) he may be using respiratory terminology metaphorically.72 The earliest Pythagoreanism that we can be sure we know something about, that is the system which employed the ten pairs of contraries, puts male under peras and female under apeiron.73 This suggests a sexual, not a respiratory relationship between the two principles.

71. See Aristotle Phys. 213 b 22 ff. and apparatus, and Stobaeus Anth. 1. 18 c (quoting Aristotle).
73. Aristotle Metaph. 986 a 22 ff.
As for the *apeiron*, it never could be seriously maintained that this was similar in all respects to the Anaximandrian variety. For example, the Pythagorean *apeiron* is dark. It is surely quite plausible to accept that the Pythagorean preoccupation with limit and structure and the necessity that they saw for conjoining it with something else, led to an entirely new conception of *apeiron* meaning no longer 'uncrossable' (*a-*per) but 'unstructured' (*a*-peras).

For the Pythagoreans it would appear that none of the items in one column can turn into those of the other. Pythagoreanism eschews genesis and pmthora from the beginning and its dualism—perhaps Oriental in origin—is fundamental. Thus a new mode interaction (sexual) must be found to replace genesis and instead of the two congeries of opposite activities proceeding from one *arche*, they must be manifestations of two. Perhaps it is not surprising that between concepts of the *apeiron* as well as of the cosmic processes there should be a great dissimilarity.

It may seem that in the text the point that Chaos was not murky is passed over somewhat rapidly. Further comment here avoids some cluttering earlier. Simultaneously it will be convenient to state briefly the grounds for accepting Stokes' view of Hesiodic Chaos as an originative world body, rather than the supposition of Cornford and Kirk74 that Chaos is merely a gap formed after the separation of Heaven and Earth.

On behalf of a gloomy Chaos the following line from the *Theogony* could be adduced (814) Τεττήνες ναιόνσι, πέρην χάςος ζοφερότερο.

This looks conclusive, but the probability is that lines 807 to 819 are not original. As Stokes75 points out the variant *Tartari descriptio* is quite irrelevant after that at 736 ff. There is, then, nothing in the *Theogony* which militates against the argument in the text, namely that Chaos need not be gloomy merely because its offspring are Night and Erebus. Indeed, if we follow this reasoning we are logically bound to add that Erebus and Night are bright and light because their offspring are Aether and Day (124-5)!

As to the view that Chaos appeared after the separation of Earth and Sky, this seems incompatible both with *Theogony* 116-117 and with 739 ff. The χάςωμα μεγύ of 740 which is surely subterranean Chaos is the πηγή (cosmogonical)76 of *Earth*, Tartarus, sea and heaven. Tartarus is gloomy (ηφορείζε) and so is Night who lives there (744), but not the χάςωμα itself, except, presumably, insofar as it is permeated with vapours from below.

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