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Empedocles' Theory of Vision and Theophrastus' *De sensibus*

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I. THE EYE

Empedocles speaks in the same way about all the senses, and says that perception occurs as a result of something's fitting into each sense's passages. That is why the senses cannot discriminate each other's objects, because some have passages which happen to be too wide, and some too narrow, in relation to the sense-object, so that some things do not make contact but slip through, while others cannot enter at all.

He tries also to say what the visual organ is like. He says that its inside part is fire, while what surrounds it is earth and air, through which the fire passes, being fine like the light in lanterns. The passages are in an alternating arrangement of fire and water, and, of these, it recognises light things with those of fire and dark things with those of water; for each type fits into each. And the colours travel to the organ of vision by means of effluence.

(Theophrastus, *De sensibus* 7)

In the first part of this paper[1] I want to reconstruct the Empedoclean theory of vision outlined here by Theophrastus, and to assess his presentation of it. We are fortunate to have a significant portion of the text on which Theophrastus' summary is founded:

[1] The most important editions and discussions known to me are: H. Diels, *Doxographi Graeci* (Berlin, 1879); J. I. Beare, *Greek Theories of Elementary Cognition* (Oxford, 1906), 14-23; G. M. Stratton, *Theophrastus and the Greek Physiological Psychology before Aristotle* (London, 1917); G. E. R. Lloyd, *Polarity and Analogy* (Cambridge, 1966), 325-7; J. Bollack, *Empédocle* (Paris, 1965-9) ii 134-5, iii 2 314 ff.; A. A. Long, "Thinking and Sense-Perception in Empedocles: Mysticism or Materialism?", *CQ* 16 (1966), 256-76; D. O'Brien, "The Effects of a Simile: Empedocles' Theories of Seeing and Breathing", *JHS* 90 (1970), 140-79; M. R. Wright, *Empedocles: The Extant Fragments* (New Haven/London, 1981), 240-3; G.

... ἐξ ὧν ὄμματ' ἔπηξεν ἀτειρέα δῖ' Ἀφροδίτη ...
(fr. 85 Wright, 86 DK)

ὡς δ' ὅτε τις πρόοδον νοέων ὡπλίσσατο λύχνον,
χειμερίην διὰ νύκτα πυρὸς σέλας αἰθομένοιο,
ἄψας παντοίων ἀνέμων λαμπτῆρας ἀμοργούς,
αἵ τ' ἀνέμων μὲν πνεῦμα διασκιδνᾶσιν ἀέντων,
φῶς δ' ἔξω διαθρῷσκον, ὅσον ταναώτερον ἦεν,
λάμπεσκεν κατὰ βηλὸν ἀτειρέσιν ἀκτίνεσσιν·
ὣς δὲ τότ' ἐν μήνιγξιν ἐεργμένον ὠγύγιον πῦρ
λεπτῇσιν ⟨τ'⟩ ὀθόνῃσι λοχεύσατο κύκλοπα κούρην·
αἱ δ' ὕδατος μὲν βένθος ἀπέστεγον ἀμφιναέντος,
πῦρ δ' ἔξω διίεσκον, ὅσον ταναώτερον ἦεν.
(fr. 88 Wright, 84 DK)

5 φῶς] πῦρ *EMPYGa, add. supra* ἢ φῶς *il* 8 λοχεύσατο *Förster*: λοχάζετο *EM Yil*: λοχάζεται *Ga*: ἀχείατο *L*: ἐχεύατο *cett.*

From these divine Aphrodite made the unfailing eyes ...
And just as when someone planning a journey through the stormy night prepares a lamp, a flame of blazing fire, fitting to it lantern-sides as shields against the various winds, and these scatter the blowing winds' breath, but the finer part of the light leaps out and shines across the threshold with its unyielding beams; so at that time did she bring to birth the round-faced eye, primeval fire wrapped in membranes and in delicate garments.[2] These held back the sea of water that flowed around, but the finer part of the fire penetrated to the outside.

In interpreting this text, I shall try to adhere to the following two principles:

(1) Since it is presenting an analogy designed to persuade us that the mechanism of the eye is like that of a lantern, the more closely the two halves of the simile

S. Kirk, J. E. Raven, M. Schofield, *The Presocratic Philosophers* (Cambridge, 1983); and the forthcoming commentary on Theophrastus, *De sensibus,* by André Laks and Heinz Wisman, which the authors kindly let me see in draft. My thanks for advice on some ophthalmological points to Paul Meyer, and for comments and discussion to Jonathan Barnes, Tony Long and especially Dorothea Frede, who, as my commentator at the Eresos conference of Project Theophrastus, suggested a wealth of alternative approaches to this body of evidence. I am sorry that the paper does not do them anything like justice, but they did help me to tighten up my own argument at a number of points. None of those mentioned is in any way responsible for the views expressed here.

[2] For safety I am omitting here the additional line pieced together by Blass and placed after line 8, which still appears in DK. See Wright's arguments, p. 241.

can be made to correspond without forcing the sense, the better.[3]

(2) Unless there is positive evidence that Empedocles knew something of the internal structure of the eye through dissection, the presumption should be that he is describing its externally visible features only. As G. E. R. Lloyd has argued,[4] human dissection at this date is out of the question, and one should be extremely cautious of expecting even animal dissection of any but a very rudimentary kind before the time of Aristotle. One might add that Empedocles, whose theory of transmigration led him to condemn animal slaughter and meat-eating as the most frightful sacrilege, seems of all Presocratics the least likely practitioner of this form of research. As a doctor, Empedocles was no doubt acquainted with eye diseases and their treatment. But that in no way implies familiarity with the eye's internal structure.[5]

Turning now to the details of the analogy, Burnet is surely right to supply Aphrodite, rather than ὠγύγιον πῦρ, as the subject of lines 7 ff., because (a) we know from the single-line fragment which I have ventured to place directly before the lantern passage, what we could have guessed anyway, that Empedocles made Aphrodite the creator of the eye; and (b) a personal subject makes a better parallel with the man who fits the lantern together (invoking Principle 1).

Therefore we must so construe the lines as to make κύκλοπα κούρην in line 8 stand in apposition to ὠγύγιον πῦρ κτλ. Aphrodite brought to birth 'primeval fire wrapped in membranes' (etc.) and that whole package is the κύκλοπα κούρην.

This latter expression has a double meaning: literally Aphrodite brought to birth 'a round-faced child', but also, more specifically and appositely, 'the round-faced eye'. I say 'eye' and not, as it is usually translated, 'pupil', for two reasons. First, assuming, in accordance with my Principle 2, that Empedocles is describing externally visible features of the eye, he would hardly be likely to make the pupil consist of fire wrapped in translucent membranes. The pupil is black, while the most fiery looking part of the eye is presumably the iris. And second, 'eye' is in any case the regular poetic use of κόρη in the fifth century.[6] The more specific identification with the pupil seems to belong to medical prose terminology.[7] So I take the description here to cover the evident overall construction of the eyeball, and not, as interpreters have tended to suppose, any hidden internal structure.

[3] *Pace* O'Brien, 154-7. In "The Proems of Empedocles and Lucretius" (*GRBS* 30 [1989], 269-96) I argue that Empedocles is Lucretius' model for his own use of the multiple-correspondence simile.

[4] "Alcmaeon and the Early History of Dissection", *Sudhoffs Archiv* 59 (1975), 113-47.

[5] Even cataract operations, if they could be dated back this early (I know of no actual evidence for them earlier than Celsus 7.7.13 ff.), would not have required more knowledge of the eye's structure than could be gathered from external observation.

[6] Aristophanes, *Vesp.* 7; Sophocles fr. 710; Euripides, *Ion* 876, *Hec.* 972, and often.

[7] E.g. Hipp., *Carn.* 8.606.7 L; *Int.* 7.284.16 L.

What then are the 'membranes and delicate garments' which surround the fire and are said to be capable of permitting the passage of light but not that of water? They have regularly been understood as membranes inside the eye, postulated by Empedocles as separating the fire from the internal water. But if I am right that the overall structure of the eye is being described, they will be more likely to be the cornea. And that seems to me the preferable interpretation on three separate grounds:

First, on Principle 1, that we should seek to maximise the correspondence between the two halves of the simile, the cornea clearly comes out as the proper analogue of the sides of the lantern, which protect the fire inside from extinction by the elements *outside*.[8]

Second, on Principle 2, that Empedocles is most likely to be describing externally visible features of the eye, there is not much to be said for identifying the items in question with internal membranes whose explanatory function is, to say the least, minor, and which, even if they meant something to Empedocles himself, can hardly have meant much to his readers. On the other hand, the cornea is something both familiar and very special, being, I suppose, the clearest transparent solid substance known to the ancient world. This is confirmed by the praise heaped upon it as a consummate product of divine craftsmanship by Cicero's Stoic spokesman,[9] whose expression 'membranis tenuissimis vestivit' sounds like a direct echo of Empedocles.

Third, as I now want to go on to argue, Empedocles' account of the eye apparently did not even mention internal water. So any internal waterproof membranes would have been left high and dry, without an explicit function.

What is the water which the membranes are said to keep out? Not, I think, the liquid inside the eyeball, but the moisture on the surface of the cornea—the lachrymal fluid.[10] Again, I can list three reasons for preferring this view:

By Principle 1, wind outside the lantern prevented from getting in should correspond to water outside the eye, not to water trapped inside.

By Principle 2, if Empedocles did not practise dissection, he cannot be assumed to have known whether the space under the cornea contains air or water, or indeed

[8] This is also Alexander's interpretation in his commentary on Aristotle, *Sens.* 437b23 ff. (In *De sensu* 23, 8 ff., see B84 DK). It is also worth noticing that the cornea is the 'hornlike' (κερατοειδής) tunic of the eye, thus positively inviting the analogy with lantern-sides, themselves commonly made of horn. The technical term may not predate the 3rd-century BC Alexandrian anatomists (cf. Galen, *UP* 10.3), whose motive was no doubt to distinguish the cornea from the other membranes of the eye. But the comparison of its transparency with fine slices of horn (Galen, *loc. cit.*) may well have already been familiar by then.

[9] Cicero, *ND* 2.142.

[10] βένθος, 'the deep', or 'the ocean', is of course an extravagant term for a thin film of water, but the extravagance is not untypical of Empedocles (whole for part, cf. B 96, 98), and ἀμφιναέντος, 'flowing round', is appropriate to water on the outside of the eye.

whether the cornea itself extends back to the iris. Even if the evidence of an accidentally severed eye had happened to be available to him,[11] it need not necessarily have altered his view. After all, the common knowledge that an accidentally severed artery pours blood did little to discourage the commonplace view, still held by Erasistratus in the third century BC, that the arteries are air ducts. Watery liquid leaking from a severed eye could likewise have been supposed to have intruded merely as a result of the damage. If, however, as remains possible, Empedocles did acknowledge the existence of transparent humours within the eye (just as he presumably acknowledged, but did not mention, their proper analogue, the air within the lantern), his failure to mention them is quite adequately explained by their assumed lack of an active role in seeing. He may, for instance, have thought them merely the reservoir from which the lachrymal fluid was drawn.[12]

Third, even Alcmaeon, who did practise dissection, attributed vision partly to the agency of the *external* water,[13] because of its reflectivity, and did not mention the internal water.

We have arrived at the following set of correspondences:

lantern-maker	Aphrodite
lantern	eyeball
flame	fire in eye (iris?)
translucent lantern-sides	transparent cornea
wind	moisture on cornea

If this is right, we have vindicated the text of Theophrastus. He has often caused consternation by failing to include any mention of the water in the passage with which I opened:

> He says that its inside part is fire, while what surrounds it is earth and air, through which the fire passes, being fine like the light in lanterns.

This has led a number of scholars, following Diels, to reinsert the water by way of emendation. And even those who have resisted emendation have at least had to face the implication that a crucial part of the eye's structure has been somehow

[11] Cf. Hipp. *Loc. hom.* 2, 6.280.5-6 L, *Carn.* 17, 8.606.10 ff. L, where accidental lesion is the sole source of knowledge about the eye's internal fluid.

[12] At Plato, *Tim.* 68A, tears seem to come from inside the eye. But at Hipp. *Loc. hom.* 2, 6.278.23-280.1 L the lachrymal fluid comes from the brain (whether *via* the eye is unspecified).

[13] Theophrastus, *Sens.* 26, ὀφθαλμοὺς δὲ ὁρᾶν διὰ τοῦ πέριξ ὕδατος. Stratton's suggested identification, 'the water that bathes the eye', gives the overwhelmingly obvious meaning, and I remain puzzled why the great majority of interpreters have taken the reference as being to internal water.

suppressed in his account. By contrast, the water outside the eye, however important its role in vision, is not easily thought of as part of the eye's structure, and it would be only natural for Theophrastus to omit it here. On the other hand, his inclusion of earth and air as surrounding the central fire means that they *are* a crucial part of the eye's structure, and it is an easy conjecture that either the earth is the cornea while the air is a putative empty space between it and the iris, or the cornea itself is an amalgam of earth and air. I tend to prefer the latter: the earth would give the cornea its solidity, while the air would add transparency.

We also have the answer to the old problem: if Empedocles explains vision by effluences *entering* the eye, why does he also need to have fire passing out of the eye? We can take our lead from Theophrastus' next words:

> The passages are in an alternating arrangement of fire and water, and, of these, it recognises light things with those of fire and dark things with those of water; for each type fits into each. And the colours travel to the organ of vision by means of effluence.

If water cannot get into the eye but fire can get out, this mixture of passages of water and fire must take place on the surface of the cornea. That is why fire has to pass out of the eye, to mix with the water on its outer surface. The idea that it is the reflective surface of the eye that is responsible for vision can be paralleled in Hippocratic writings,[14] and is reported by Theophrastus to be commonplace (*Sens.* 36).[15] It is a natural assumption to make, not only because of the small reflected image visible in the pupil, but also because what we see appears to be outside our eyes.

It contains, besides, more than a grain of truth. The surface of the cornea is in fact the most important refractor in the eye. An eye deprived of lachrymal fluid has its vision more seriously impaired[16] even than an eye with no lens. Given the likelihood that Alcmaeon's and Empedocles' medical experience had made them familiar with such diseases as trachoma, their emphasis on the lachrymal fluid's crucial role in vision is entirely in place.

But what actually happens in the mixture of water-passages and fire-passages on the eye's surface? According to Theophrastus (*Sens.* 500,25-7 Diels), the passages

[14] Cf. Hipp., *Carn.* 17, 8.606 L.

[15] Alcmaeon (Theophrastus, *Sens.* 26) not only shares this view, but also seems to anticipate Empedocles in invoking water plus fire as the agents of the eye's reflectivity. Having mentioned the eye's external water and the internal fire, he goes on to attribute the reflectivity by which the eye sees to 'the shining and the transparent', presumably referring to the fire and the water respectively.

[16] 'Dry eye-diseases' (ὀφθαλμίαι ξηραί), to use the generic name from the Hippocratic treatises (*Aer.* 10, *Aph.* 3.12, 14). Cf. Hipp. *Loc. hom.* 2, 6.278.23-280.2 L: when the supply of reflective moisture to the eyes dries up, the sight is quenched.

of water receive dark effluences, those of fire light effluences. These are the effluences which neither bounce off because too fat nor slip right through because too thin (*Sens.* 500,20-3 Diels; Plato, *Meno* 76C-D). Instead of escaping in either of these ways, they 'fit into' (ἐναρμόττειν) the passages, and thus, we must take it, cumulatively build up a picture on the eye's surface.

According to Theophrastus' report of the theory at chapter 8, daysighted animals have not got enough fire in their eyes to produce an even balance of fire and water; so they need fire from outside, i.e. daylight, to make up the balance. Nightsighted animals have too much fire in the eye, and so need darkness (= water) from outside to even the balance. Empedocles has thus turned the old belief about fire in the eye into a handy explanation of the role of light in vision.

At this point it seems appropriate to stand back and evaluate Theophrastus' presentation of the Empedoclean doctrine of vision. If my general reconstruction is right, he has done rather well. He has, for example, not followed Aristotle's mistake[17] of conflating it with Plato's visual ray theory in the *Timaeus*. Nor does he omit any important functional part, such as internal water, in his brief but adequate summary of the lantern passage. If his account is to make overall sense, I have argued, it must be locating the seeing process at the surface of the eye, and the only serious ground for complaint is his failure to make this fact explicit. But even here, given the widespread currency of the assumption that the eye sees thanks to its reflectivity, it is unlikely that ancient readers were misled in the way that modern ones have been.

II. LIKE BY LIKE

In his critical section on Empedocles (12-20), Theophrastus asks some extremely pertinent questions. For example, what is there in the passages before the effluences enter them (13-14)? Not void, at least, he points out, since Empedocles denies its existence. I doubt if any of the objections are unanswerable, however. Empedocles might reply to the challenge about void by insisting that even a closed eye is seeing something, namely darkness, i.e. has its passages filled with dark effluences. This would be a natural extension of Parmenides' thesis (Theophrastus, *Sens.* 4) that even a corpse perceives something, viz. cold, dark and silence.

However, my object here is not to discuss the merits of Theophrastus' objections in general, but to focus on one strand that runs through them. This is the complaint that Empedocles fails to live up to his own principle that perception is of like by like. Here are the main instances:

(*Sens.* 13) Empedocles has not allowed any difference between external fire and 'the fire in the animal', such that the former is seen by the latter but not vice

[17] Aristotle, *Sens.* 437b9-438a5. Cf. O'Brien, and KRS p. 310n.

versa. The relation between them—that of 'fitting in' or likeness—would normally be a reciprocal one.

(*Sens.* 15) When it actually comes to it, Empedocles talks not of likeness but of commensurateness of effluences to passages, and does not go on to specify any further (οὐδὲν ἔτι προσαφώρισεν) whether in cases of commensurateness any kind of actual resemblance obtains.

(*Sens.* 16) Pain is a kind, or concomitant, of perception, yet Empedocles makes pain the result of opposites. So perception is not all of like by like.

(*Sens.* 17) If, in the eye, fire and water perceive what is *like* them, these must be light and dark respectively. Then with what does it perceive grey and other 'mixed' colours?

(*Sens.* 19) 'Like' is too loose a term to be helpful. You don't need to have a smell already in your nose in order to perceive a smell. On the contrary, it makes it harder. A similar objection applies in the cases of hearing and taste.

All these objections depend on Empedocles' being somehow committed to a like-by-like doctrine of perception. What, then, is Theophrastus' evidence that he was? The letter of Theophrastus' own text suggests to me that neither with regard to specific sense-objections nor as a general principle did Empedocles announce any such commitment.

First, Theophrastus effectively concedes at 15 that Empedocles did not discuss the elemental composition of the various effluences, thus leaving it unclear how far, if at all, they resembled the composition of the receiving organs.[18] And we can work out for ourselves that, since the eye's component earth plays no direct part in seeing comparable to the roles of fire and water,[19] unless external earth is to be invisible its effluences must be commensurate with passages of either fire or (more likely) water. So here at least there will be *no* elemental likeness between the effluence and the substance whose passages receive it. The mere 'fitting in' of effluences to passages in the sense organs is clearly an inadequate ground for inferring that perception is of 'like by like'.

Second, Theophrastus in section 10 makes it pretty clear what his textual warrant is for attributing to Empedocles the general principle that all perception involves 'fitting in', and hence is of like by like. It is the passage of five lines from which every ancient source quoted when attributing a like-by-like doctrine to Empedocles:[20]

[18] Only one source, Aetius 1.15.3 (see 31 A 92 DK) correlates all four elements with specific colours, and this may simply derive from too literal a reading of B 71 (cf. Diels p. 222, O'Brien p. 164). However, for anyone accepting the Aetius evidence at face value, my next comment is pertinent.

[19] Cf. also O'Brien p. 164.

[20] See the many context passages listed by Wright in the note to her fr. 77, pp. 123-4. That the two fragments are continuous is strongly suggested by Theophrastus' own comment in *Sens.* 10, and is accepted as probable by Wright.

γαίῃ μὲν γὰρ γαῖαν ὀπώπαμεν, ὕδατι δ' ὕδωρ,
αἰθέρι δ' αἰθέρα δῖον, ἀτὰρ πυρὶ πῦρ ἀΐδηλον,
στοργὴν δὲ στοργῇ, νεῖκος δέ τε νείκεϊ λυγρῷ. (B 109 = 77 Wright)
ἐκ τούτων (γὰρ) πάντα πεπήγασιν ἁρμοσθέντα
καὶ τούτοις φρονέουσι καὶ ἥδοντ' ἠδ' ἀνιῶνται. (B 109 = 78 Wright)

For it is with earth that we see earth, with water water, with air divine air, with fire destructive fire, with love love, and with grim strife strife. For all are constructed and fitted together out of these, and it is with these that they think and feel pleasure and pain.

Now it is very nearly certain that Empedocles is here explaining the combination of elements that makes up the blood which in turn constitutes the seat of thought. Each element in the blood 'sees' its like, but in the sense of grasping or comprehending it, rather than literally seeing it. It has often been pointed out that in the case of the motive forces Love and Strife, at least, literal seeing would scarcely make sense here.[21]

Theophrastus, who himself quotes the last two lines verbatim in section 10, at times seems aware that the passage deals with thought and feeling rather than sense-perception. At least, it is clearly his direct source for the attribution to Empedocles of a like-by-like treatment of pleasure, pain and thinking or intelligence (9-10).

Nevertheless, Theophrastus elsewhere seems determined to extend the same principle to the individual senses. And the word that is evidently doing most of the work for him is ἁρμοσθέντα in the penultimate line, coming as it does hot on the heels of the like-by-like theme. This word is standardly, and with obvious justification,[22] taken to mean 'fitted together', describing the elemental blending of the components of blood. Theophrastus, on the other hand, reads it as alluding to the fitting (ἐναρμόττειν) of effluences into the passages of the sense organs. And he leans on it as the term with which Empedocles seeks to convey the likeness relation between sense and sense-object. Thus at the end of 13, having already quoted the lines in question (10), he says

δῆλον γὰρ ὡς ἐναρμόττει, καθάπερ φησί, τὸ ὅμοιον.

For it is clear that what 'fits in', as he puts it, is that which is like.

And shortly after, in 15, he develops one objection with the following remarks:

[21] Cf. B 17.23 DK. Aristotle, *Met.* 1000b3-9, limits himself to ἡ δὲ γνῶσις τοῦ ὁμοίου τῷ ὁμοίῳ. But Theophrastus may have extended the significance of this by combining it with Aristotle's remark (*Met.* Γ 5, 1009b12-15, taken up by Theophrastus at *Sens.* 25) that the Presocratics do not distinguish thought from perception.

[22] Wright aptly supplies the parallels of B 71, 75, 86 DK.

ἔτι δὲ εἰ καὶ μὴ ἐναρμόττοι τὸ ὅμοιον, ἀλλὰ μόνον ἅπτοιτο, καθ' ὁτιοῦν εὔλογον α�ίσθησιν γίνεσθαι· δυοῖν γὰρ τούτοιν ἀποδίδωσι τὴν γνῶσιν, τῷ τε ὁμοίῳ καὶ τῇ ἁφῇ, διὸ καὶ τὸ "ἁρμόττειν" εἴρηκεν· ὥστ' εἰ τὸ ἔλαττον ἅψαιτο τῶν μειζόνων, εἴη ἂν αἴσθησις.

Furthermore, even if that which is like did not fit in but only made contact, it is reasonable that perception should take place anyhow. For he attributes recognition to two things, namely likeness and contact—*which is why he uses the word 'fit'*. Hence if that which is smaller made contact with things bigger than itself, there would be perception.

There are points that I find obscure in this criticism.[23] But for my present purposes it is enough to notice that it is the verb ἁρμόττειν which Theophrastus is taking to indicate Empedocles' view of the relation between any sense-object and the relevant sense-organ, and that he treats this as at least *including* the notion of likeness. We have also noted that in reality the occurrence of the verb in the lines quoted has nothing at all to do with sense-perception, let alone with likeness.

Thus the conflation of the fitting-in model with a like-by-like principle may be no more than Theophrastus' own false construal of B 109. That 'fitting in' is indeed the operative notion at least for *vision* we have seen.[24] But the evidence which I have aired could raise the suspicion that Theophrastus may have had no better than the spurious warrant of B 109 for his often repeated claim that, for Empedocles, *all* perception depends on 'fitting in' and involves likeness. Certainly Theophrastus' exiguous report on the workings of the senses other than vision (*Sens.* 9) does nothing to weaken that suspicion.

In view of all this, and of the apparent unavailability to our ancient sources of any verbatim fragment in which Empedocles actually spoke of likeness as the basis of sense-perception, we must retain some doubt as to how far Empedocles even intended to adopt any such principle.

The trouble seems to be that Theophrastus is the prisoner of an over-schematised doxographical view, according to which Empedocles has *got* to come out as a like-by-like theorist. This unhappy state of affairs is confirmed by the shape of the whole first part of the treatise (1-58). He opens with a confident announcement:

Concerning perception, the majority of general doctrines fall into two kinds. Some people make it due to what is like, others to what is opposite.

[23] I think Theophrastus is saying: since the 'fitting' relation invoked in perception combines likeness with contact, why shouldn't *any* case of contact produce perception? If so, he is muddling conjunction with disjunction.

[24] This is confirmed by Plato, *Meno* 76C10, ἁρμόττειν.

But it immediately transpires that actually only Anaxagoras and Heraclitus fall into the 'opposites' group, and that, even of these, only Anaxagoras has any specific teaching on the matter (27-37). Hence when Theophrastus turns to the second group, at 25, they have become 'those who do not make perception due to likes'—a catch-all expression which enables totally heterogeneous theories like those of Alcmaeon, Clidemus and Diogenes of Apollonia to be thrown in along with Anaxagoras'. Even then, Diogenes *could* be thought to hold a like-by-like view, he says (39). And Democritus gets his own heading (49), as interpretable either way.

Detailed discussion of the like-by-like group itself starts abruptly in section 3 (499,1 Diels). Parmenides is comfortably enough placed in it (3-4),[25] but he has nothing to say about the individual senses. Then follows Plato (5-6), whose accounts of seeing and hearing in the *Timaeus* are drastically condensed into a few lines. On seeing, Theophrastus says:

> Vision he makes of fire. (That is why he also makes colour a kind of flame coming from bodies, having its parts commensurate with vision—on the ground that effluence occurs and they must fit into each other.)[26] It passes out of the eye for a certain distance and coalesces with the effluence, and that is how we see.

I shall by-pass the general question how far this summary distorts the Platonic account, and just make one point, germane to my present topic. In the *Timaeus* (45C) like-by-like is invoked only as the relation which enables the fiery visual ray to coalesce with *daylight*. This produces a homogeneous visual medium external to the eye, along which any colliding object transmits motions through the eyes to the soul. Only much later (67C-D) does it transpire that colour is itself a kind of flame streaming from objects, and Plato makes no comparable effort to bring out the like-by-like relation of colour to vision. Theophrastus' parenthesis is not strictly speaking a report of Plato, but his own explanation, in terms of the like-by-like principle, of why Plato, having made vision consist of fire, did the same for its object, colour. At the same time, he altogether omits the role of light—the aspect to which Plato himself chooses to attach the like-by-like principle. Thus we can see him selecting in such a way as to confirm his classing of Plato as

[25] The qualification at 500,1-6 Diels, ὅτι δὲ καὶ τῷ ἐναντίῳ καθ' αὑτὸ ποιεῖ τὴν αἴσθησιν, is not a concession that Parmenides has one foot in the 'opposites' camp, but a partial restriction of the earlier assertion (499,16-17 Diels) that perception depends on a *ratio* between two opposite elements. In the special case of a corpse, it is exclusively (καθ' αὑτό) the cold dark element that perceives; but it still of course perceives its own like.

[26] The text printed by Diels and Stratton is ungrammatical, as far as I can see, and I have repunctuated in order to remedy this. The new sentence which I make starts at 500,11 Diels; a connective probably needs to be supplied, e.g. ἐξιοῦσαν ⟨δὲ⟩ μέχρι.

holding a like-by-like theory of vision. I doubt if that schematisation is an altogether unjust one. But it is instructive, and cautionary, to see how it helps determine the emphases in Theophrastus' doxographical report.

What motivates Theophrastus to tie his hands in this way? The answer, I think, is his Aristotelianism. Aristotle's own schematisations of earlier thought are well known to reflect his view of it as groping towards the truths he has himself established. Dealing with nutrition in *De anima* 2.4, 416a29-b9, Aristotle classifies his predecessors into those who say that it is of like by like and those who say that it is of opposite by opposite. He then produces his own characteristic synthesis of the two views: both parties are half right, because food is unlike before digestion, but like after digestion.

Aristotle is apparently referring back to this passage a little later, at 2.5, 417a18-20, where he is dealing with the general character of perception:

> Hence in a way the action is by that which is like, in another way by that which is unlike, as we said. For that which is unlike is acted upon, but once acted upon it is like.

But Aristotle is wise enough this time not to tie his synthesis to an explicit doxographical schema.[27] He does *not* say 'Some hold that perception is by likes, others by opposites.' We have, indeed, learnt by now how difficult it is to divide pre-Aristotelian theories of perception into two such neat groups.

Theophrastus, it seems, was incautious enough to step in and remedy the omission.[28]

[27] Even Aristotle's rather sweeping remarks about 'the ancients' as holding a like-by-like view of perception, at *DA* 427a21-9, imply nothing nearly as precise as Theophrastus' schema—even though it may well be the passage which Theophrastus took as his warrant for classifying Empedocles as he does (just as he may rely on *ibid.* 404b16-18 for Plato).

[28] Theophrastus' cautionary remark at 31 about whether perception really is an ἀλλοίωσις reflects a concern with Aristotle's arguments in this same chapter (2.5) of the *De anima*.