

Knowing by Likeness in Empedocles

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Abstract

Contrary to the Aristotelian interpretation of Empedocles' views about cognition, according to which all cognition, like perception, is due to the compositional likeness between subject and object of cognition, this paper argues that when Empedocles says that we know one thing 'by' another (e.g. earth by earth or love by love), he is characterizing analogical reasoning, an intellectual activity quite different from perception (which is explained by the fit between effluences and pores). The paper also explores the idea that strife and love describe, in addition to physical separation and composition, the mental activities of analyzing and composing.

Keywords

Empedocles, knowledge, analogy, strife, love, Theophrastus

Fragment 109 of Empedocles reads,

γαίη μὲν γὰρ γαῖαν ὁπώπαμεν, ὕδατι δ' ὕδωρ,
αἰθέρι δ' αἰθέρα διον, ἀτὰρ πυρὶ πῦρ αἰδηλον,
στοργὴν δὲ στοργῆι, νεῖκος δέ τε νεῖκεῖ λυγρῶι.

We see earth by earth, water by water

Bright aether by aether, and obliterating fire by fire

Love by love, and strife by baneful strife. (Aristotle, *De Anima* [=DA] I.2, 404b12-15, = B109;¹ cf. *Metaphysics* [=Metaph.] III.4 1000b5-8)

¹) For the text of Empedocles I have used Diels-Kranz 1951 (on the *Thesaurus Linguae Graecae*), and in the case of the Strasbourg papyrus, Martin and Primavesi 1999. All translations are my own, but I have consulted Wright 1981, Martin and Primavesi 1999, and Inwood 2001.

Aristotle and Theophrastus after him take these lines to say that perception and knowledge require a likeness of composition between the subject and object of cognition. This paper argues that Aristotle and Theophrastus under-appreciate the force of Empedocles' words: Empedocles' talk of 'seeing' earth, water, aether, fire, love and strife 'by' earth, water, aether, fire, love and strife also describes the process of reasoning by analogy by which we acquire an intellectual grasp of the principles of the cosmos.

Below, sections 1 and 2 review Theophrastus' and Aristotle's testimony, highlighting the assumptions responsible for their interpretation of Empedocles as focused on the material conditions for cognition. Section 3 provides textual and philosophical reasons to reject such Aristotelian interpretations (including A. A. Long's neo-Aristotelian interpretation) of Empedocles. Section 4 sets out Empedocles' own contrast between thinking and perceiving. Section 5 examines what is involved in knowing love by love and uses this to develop a general account of knowing X by X as reasoning by analogy.

1. Theophrastus' Testimony

In *De Sensibus* Theophrastus classifies Empedocles as one of those according to whom perception is due to likeness (*De Sensibus* [=Sens.] 1-2, 10). Theophrastus goes on to explain that thinkers who hold that sense-perception is by likeness hold this view for any of three (remarkably heterogeneous) sorts of reasons: (i) because most things are understood by what is like them, (ii) because animals naturally recognize their kin, and (iii) because perceiving comes about by an effluence that bears like to like (*Sens.* 1-2). Theophrastus then goes on to describe Empedocles' accounts of individual sense-perceptions, which make heavy use of (iii), the idea that perception occurs by the fitting of effluences into pores. According to Theophrastus, 'after enumerating how we recognize each thing by each,' which evidently refers to B109, Empedocles concludes with the words,

ἐκ τούτων (γαρ) πάντα πεπήγασιν ἄρμωσθέντα
καὶ τούτοις φρονέουσι καὶ ἥδοντ' ἢδ' ἀνιῶνται.

Out of these are all things fitted together
And by these do they think and feel pleasure and pain. (*Sens.* 10, = B107)

Theophrastus thereby suggests that Empedocles' likeness theory of perception combines his motivations (i) and (iii).

Theophrastus then goes on to criticize Empedocles on the grounds that

δυοῖν γὰρ τούτοις ἀποδίδωσι τὴν γνῶσιν τῷ τε ὁμοίῳ καὶ τῇ ἀφῆι, διὸ καὶ τὸ
 ‘ἀρμόττειν’ εἴρηκεν· ὥστ’ εἰ τὸ ἔλαττον ἄψαιτο τῶν μειζόνων, εἴη ἂν αἴσθησις.
 ὅλως τε κατὰ γε ἐκεῖνον ἀφαιρεῖται καὶ τὸ ὅμοιον, ἀλλὰ ἡ συμμετρία μόνον ἰκανόν.
 διὰ τοῦτο γὰρ οὐκ αἰσθάνεσθαι φησὶν ἀλλήλων, ὅτι τοὺς πόρους ἀσυμμέτρους
 ἔχουσιν· εἰ δ’ ὅμοιον ἢ ἀνόμοιον τὸ ἀπορρέον, οὐδὲν ἔτι προσαφώρισεν.

He attributes recognition to two things, likeness and contact, on account of which he says ‘fit’. The result is that if the smaller should touch the larger, there would be perception. And indeed, on his view as a whole, likeness too is taken away, but commensurateness by itself is sufficient [for perception]. On account of this he says that things do not perceive one another because they have incommensurate pores, but whether the effluences are like or unlike, he has not yet defined. (*Sens.* 15)

As Sedley 1992 points out, Theophrastus is here admitting that Empedocles is silent about the compositional likeness between the effluences and the sense-organs that receive them. Indeed, although Theophrastus introduces Empedocles as a likeness theorist, he recounts Empedocles’ views about perception solely in terms of effluences fitting into pores (*Sens.* 7), in particular explaining vision in terms of the entry of dark and light into alternating pores of fire and water in the eye (7–8), hearing in terms of an external blow that resounds once again in the ear (9), and so on. Theophrastus’ first mention of likeness in the report of Empedocles’ opinions (as opposed to in his classification of views) is when he says that Empedocles accounts for pleasure by likeness and pain by unlikeness, thinking by likeness and ignorance by unlikeness (10). According to Sedley, Theophrastus has to squeeze Empedocles’ account of perception into the ‘by likeness’ schema – which he does on the strength of the word ‘fitted’ (ἀρμοσθέντα) in B107, even though the context shows that it must refer instead to the even blending of the principles in the blood, the organ of thought – after which he complains that Empedocles’ account of perception makes use only of commensurateness, rather than likeness!²

But, Sedley argues, by ‘we see’ (ὁπώπαμεν) in B109 (‘we see earth by earth, fire by fire,’ and so on) Empedocles must mean something like ‘we comprehend’, since we are supposed also to ‘see’ love by love and strife by strife. He surmises that B109 and B107 are about thinking and feeling pleasure and pain, not about perception.

²) Sedley 1992, 27–31.

It might be objected here that while *ὁπώπαμεν* can have an intellectual sense, it also has a perceptual sense, which Sedley's reading excludes from B109. And if B107 follows directly on B109 (as Theophrastus tells us) and B107 is about pleasure and pain, then surely – at least as Theophrastus reasons – perception is also involved. Theophrastus says, 'They consider pleasure and pain to be perceptions or things that accompany perception' (16) – although he does not say whether 'they' are Empedocleans, likeness theorists, or even all the predecessors under consideration.

Theophrastus' reasoning, I propose, rests in part on the authority of Aristotle's judgment that the Presocratics assimilate thinking to perceiving. Theophrastus supposes that for a Presocratic, what is true of thinking (that it is by likeness) must be true of perceiving, and what is true of perceiving (that it is by effluences fitting into pores) is true of thinking. That this is the reasoning by which Theophrastus concludes that Empedocles is a likeness theorist of perception is confirmed by *De Sensibus* 9-10:

περὶ δὲ γεύσεως καὶ ἀφῆς οὐ διορίζεται καθ' ἑκατέραν οὔτε πῶς οὔτε δι' ἃ γίνονται, πλὴν τὸ κοινὸν ὅτι τῷ ἐναρμόττειν τοῖς πόροις αἴσθησίς ἐστιν· ἥδεσθαι δὲ τοῖς ὁμοίοις κατὰ τε †³ μόρια καὶ τὴν κρᾶσιν, λυπεῖσθαι δὲ τοῖς ἐναντίοις. ὡσαύτως δὲ λέγει καὶ περὶ φρονήσεως καὶ ἀγνοίας. τὸ μὲν γὰρ φρονεῖν εἶναι τοῖς ὁμοίοις, τὸ δ' ἀγνοεῖν τοῖς ἀνομοίοις, ὡς ἢ ταυτὸν ἢ παραπλήσιον ὄν τῇ αἰσθήσει τὴν φρόνησιν. διαριθμησάμενος γὰρ ὡς ἕκαστον ἐκάστῳ γνωρίζομεν ἐπὶ τέλει προσέθηκεν ὡς... [here Theophrastus quotes B107]

Concerning taste and touch he does not define them one by one, either how or on account of what they come to be, except [to say] what is common [to them], that perception is by the fitting into pores. And feeling pleasure is by likes in respect of both parts and mixture, feeling pain by contraries. He speaks similarly also concerning thinking and being ignorant. For [he says that] thinking is by likes and being ignorant by unlikes, *on the grounds that thinking is either the same as or pretty close to perception*. For having enumerated how we know each by each, in the end he has set it down that... (*Sens.* 9-10; my emphasis)⁴

³ I do not think it makes a difference to the sense of the passage whether or not a τὰ is inserted here.

⁴ At *Sens.* 39 Theophrastus is very clear that he is *inferring* that Diogenes of Apollonia thinks perception is by likeness, and the contrast with his reports of Parmenides, Empedocles, and Plato may suggest that in these cases he (equally clearly) knows he does not have to make an inference. But perhaps Theophrastus is more careful about Diogenes because he lacks an Aristotelian precedent for saying that Diogenes thinks perception is by likeness.

It looks as if Theophrastus has reasoned: Empedocles thinks that pleasure is by likeness and infers from this that thinking is by likeness; his inference must be based on the idea that perception, which accompanies pleasure, is by likeness, and the assumption that perception is the same as thinking.

But if Empedocles held that likeness is the cause of both perception and pleasure, he would be committed to holding that every perception is pleasant. (And conversely, if unlikeness were the cause of both ignorance and pain, then pain could not be perceived.) Not only is there no evidence of his holding such views, but also the Empedoclean lines Theophrastus cites as evidence (in *Sens.* 16) that pain is due to unlikeness and pleasure to likeness (B22.6-7) are very unclear about the causes of pleasure and pain.

ὡς δ' αὐτως ὅσα κρήσιν ἐπαρκέα μᾶλλον ἔασιν,
 ἀλλήλοισ ἔστερκται ὁμοιωθέντ' Ἀφροδίτη.
 ἐχθρὰ <δ' ἄ> πλεῖστον ἀπ' ἀλλήλων διέχουσι μάλιστα
 γέννηι τε κρήσει τε καὶ εἴδεσιν ἐκμάκτοισι,
 πάντη συγγίνεσθαι ἀήθεα καὶ μάλα λυγρὰ
 νεικεογεννέστησιν ὅτι σφισι γένναν ὄργα.⁵

As many as are more suited for mixture
 Having been made like to one another by Aphrodite, long for each other
 But as many hostile ones as differ from one another most of all
 In birth and mixture and moulded form,
 Are entirely unfit for combining and much pained
 Because they, strife-generated, were born in anger. (B22.3-8)

Line 8, the line which purports to explain pain, only says that the mutually hostile things experience pain because of their birth in anger. It is silent on whether these things combine painfully, or, alternatively, are pained at their inability to combine. The verse contrasts the condition of the many hostile things with that of things that Love has caused to become like to one another so as to long for one another – but is what contrasts with Love meant to be Strife's use of painful force to combine things or Strife's segregating power? It is the latter, not the former, which is paralleled in other lines that tell of Strife. In any case, the context does not link pleasure and pain to perception.

So far, I have questioned an interpretation of B109 according to which it makes all cognition – thought and perception, not to mention the feel-

⁵ Wright's (1981) emendation.

ing of pleasure – depend on the compositional likeness between subject and object of cognition, and I have proposed that this interpretation depends on the assumption that Empedocles identifies perceiving, thinking, and being pleased, and so must attribute all three to compositional likeness as well as to the fit between effluences and pores. Let us turn now to Aristotle, the source of the view that as far as Empedocles goes, what holds for thinking also holds for perceiving, and vice versa.

2. Aristotle's Testimony

Aristotle quotes B109 twice. First, in *De Anima* (I.2), he quotes it to support the claim that Empedocles, like all Aristotle's predecessors who considered the soul as a subject of cognition, identifies the soul with the principles of nature. He follows his report of Empedocles with a report that in the *Timaeus*, Plato composes the soul out of his principles and elements on the grounds that like is known by like; the implication is that Empedocles' subject of cognition too must be made up of earth, water, and so on, so that it can know them. In a later chapter (I.5), Aristotle is more explicit, attributing to Empedocles the view that 'each thing is known by bodily elements and in relation to some like' (410a27-29), and explaining that Aristotle's predecessors take the soul to be composed of the elements 'in order that the soul may perceive and know everything that is' (409b24-25). (Notice that the gloss 'by bodily elements (τοῖς σωματικοῖς στοιχείοις)' does not quite fit the cases of knowing strife by strife and love by love, since strife and love are not bodily elements.)

Second, in the *Metaphysics* (III.4), examining his predecessors' views on the question whether the principles are perishable or imperishable, Aristotle attacks Empedocles' principles and their generation of the cosmos on two grounds. One ground is that strife, although a principle of destruction, is the cause of the generation of all things with the exception of the One or God (which is identical to the stage in Empedocles' cosmogony when all the roots are united into a single sphere). The second ground (of greater interest for our purposes) is that God, since he is blessed, and therefore does not have any strife in him, cannot know strife and so must be less wise than others – for, according to Empedocles, knowledge is of like by like (an attribution Aristotle supports by quoting B109). But is the problem presented by Aristotle really a problem for Empedocles? Has Aristotle understood Empedocles' account of knowing like by like?

Above I argued that to read Empedocles' lines as saying that cognition is by compositional likeness, Theophrastus must assume that Empedocles regards thinking, perceiving, and feeling pleasure as the same. Aristotle presents evidence to justify this assumption. He quotes,

πρὸς παρεὸν γὰρ μῆτις ἀέξεται ἀνθρώποισιν.

For humans wisdom grows in relation to what is present. (*DA* III.4 427a23-24, = B106)

and

ὅσον <γ'> ἀλλοιοί μετέφυν, τόσον ἄρ σφισιν αἰεὶ
καὶ τὸ φρονεῖν ἀλλοῖα παρίσταται...

However much they change in their nature, so much does thinking come to be changed for them. (*Metaph.* IV.4.1009b19-20, = B108, cf. *DA* 427a24-25)

Now the identity of thinking and perceiving does not just fall out of these lines. In B106, Empedocles is characterizing wisdom (μῆτις) and saying that experience contributes to it; this is far from saying that all cognition is experiential – indeed in B3 (discussed below), Empedocles points out that error is due to overgeneralizing from perceptual experience. And in B108 he is saying that a changed character involves a change in thinking, in which case he need not be assuming that thought and perception are the same.

To see why – or in what sense – Aristotle thinks Empedocles identifies thinking and perceiving, we need to see what is for Aristotle the crucial difference. According to Aristotle, thinking involves non-perceptible properties in a way that perception does not, and while perception requires the presence of the object of perception, thought (and in a different way imagination) are distinctively different from perception in that they do not. Thus in Aristotle's eyes, Empedocles' claim that thought is determined by what is present in B106 and 108 shows him to be assimilating thought to perception at just the point they need to be contrasted. Whether Empedocles distinguishes thought and perception in other respects is not Aristotle's concern (it will be ours in section 4 below).

This exposition of Theophrastus' and Aristotle's interpretive assumptions should raise doubts about whether they correctly identify the motivation for Empedocles' account of cognition, that is, whether Empedocles' words about cognition are aimed at explaining cognition in material terms, by the compositional likeness between the subject and object of cognition.

3. Thinking and Perceiving by Like-to-Like

The previous two sections of this paper sought to raise questions about the authority of Aristotle's and Theophrastus' interpretations of Empedocles on cognition (their interpretation being that Empedocles tries to establish cognition on the basis of the compositional identity between subject and object of cognition), by uncovering their interpretive assumptions. But of course we are much further removed from Empedocles' text and thought than were Aristotle and Theophrastus, and so raising questions is not enough. In this section I draw out the high philosophical costs of accepting Aristotle's and Theophrastus' interpretations, especially if we work out the account of cognition Empedocles would have to hold according to their interpretation. (Section 4 will focus more on textual matters.)

In section 2, I suggested that, *pace* Aristotle, knowing X by X is not likely to be a matter of composition, on the grounds that love and strife are not ingredients. But perhaps this is too restrictive and too literal an understanding of the notions of ingredient and composition. Perhaps Empedocles is saying that insofar as we are made up of earth, water, air and fire, and ourselves are agents of love and strife, we can know these things; or even that insofar as the combinations of the elements in us are the results of love's and strife's work, love and strife characterize us and that characterization enables us to know them elsewhere.

If this is right, then we may ask: what sort of mechanism or process or event does the 'by' involve, in knowing X by X? Although Aristotle and Theophrastus do not say, Long 1966 extends their framework and proposes that Empedocles explains thinking and perceiving (along with nutrition, growth, magnetic attraction, reflection in a mirror, and mixture in general) by the mechanism of attraction between likes. Long finds in B110 an instance of the like-attracts-like mechanism of thinking.

εἰ γὰρ κέν σφ' ἀδινῆσιν ὑπὸ πραπίδεςσιν ἐρείσας
 εὐμενέως καθαρῆσιν ἐποπτεύσης μελέτησιν,
 ταυτά τε σοι μάλα πάντα δι' αἰῶνος παρέσονται,
 ἄλλα τε πόλλ' ἀπὸ τῶνδ' ἐκτήσεαι· αὐτὰ γὰρ αὖξει
 ταυτ' εἰς ἦθος ἕκαστον, ὅπη φύσις ἐστὶν ἑκάστωι.
 εἰ δὲ σύ γ' ἀλλοίων ἐπορέξεαι, οἷα κατ' ἄνδρας
 μυρία δειλὰ πέλονται ἅ τ' ἀμβλύνουσι μερίμνας, (20)
 ἦ σ' ἄφαρ ἐκλείψουσι περιπλομένοιο χρόνοιο
 σφῶν αὐτῶν ποθέοντα φίλην ἐπὶ γένναν ἰκέσθαι·
 πάντα γὰρ ἴσθι φρόνησιν ἔχειν καὶ νόματος αἴσας.

If you plant these under your close-packed heart
 And watch over them with goodwill and pure care
 Not only will every one of them be with you all your life long
 You will also acquire many others out of them. For those (*viz.* the things planted under
 the heart) will augment⁶
 These into each character wherever the nature is for each [to be].
 But if you reach out for things of another sort
 The many worthless human things which come to be and dull our concerns
 They will leave you at once when the time comes round
 Longing to reach their own dear kind:
 For know that all things have thought (*φρόνησιν*) and a share in knowledge
 (*νόματος*).

According to Long, these lines treat thought as identical to the elements. Thoughts grow because the blood, the organ of thought, is made up of an evenly-balanced mixture of elements and so is able to attract to itself, in the proper ratios, the elements that compose things in the world – thereby achieving a balanced grasp.⁷ Thus the elements that comprise the truth in Empedocles' teachings add to their counterparts (*ἦθος*, l. 5, cf. B17.28 where this is clearly the term for the roots) in the blood, as long as it is

⁶ Inwood 2001 takes the verb to be intransitive and translates, 'for these things themselves/ will expand to form each character according to the growth [lit. nature] of each' (p. 219). I read the verb as transitive for the following reasons: there are parallels for the transitive use of the verb in *ἀλλ' ἄγε μύθων κλυθι μάθη γάρ τοι φρένας αὔξει* (B17.14) and *αὔξει δὲ χθὼν μὲν σφέτερον δέμας, αἰθέρα δ' αἰθήρ* (B37); the (intransitive) sense of 'grow' is given by the middle (*αὔζεται*) in *καὶ φθίνει εἰς ἄλληλα καὶ αὔζεται ἐν μέρει αἵσης* at B26.2 and in *πρὸς παρεὸν γὰρ μῆτις ἀέξεται ἀνθρώποισιν* at B106.

⁷ This requires combining two fragments: B105, in which Empedocles asserts that the blood around the heart is thought,

αἷματος ἐν πελάγεσσι τεθραμμένη ἀντιθορόντος,
 τῆι τε νόημα μάλιστα κικλήσκειται ἀνθρώποισιν·
 αἷμα γὰρ ἀνθρώποις περικάρδιόν ἐστι νόημα. (B105)

Nourished in seas of blood coursing to and fro
 There is what is most of all called thought by humans
 For humans, the blood around the heart is thought.

and B98, where he claims that blood is made up of all the roots in a ratio 1:1:1:1. It is tempting to think that by making the blood (which is composed of the principles in an even ratio) the organ of thought, Empedocles is defending thought against Parmenides B16's claim that thought is [determined by] what is preponderant in the mixture of our constitution.

properly constituted – if it is not, these teachings escape, and the listener forgets.⁸ Teachings add to bodily parts by mixture, elements in the truth/ thought attracting, and thus augmenting, elements in the body. Here Long draws on Theophrastus *De Sensibus* 11 and 24, which describe the different skills, of orator or artist, as involving the development of organs and tissues in different places (ὄπη, l. 5) in the body (the throat, the hands).

Despite the ingenuity of Long's extension of the Aristotelian interpretation through B110, the interpretation faces new difficulties at every turn. Here are three. First, positing attraction as the mechanism by which compositional likeness makes cognition possible commits Empedocles to the view that a representational content determines the material constitution of the bearer of that content, and/or vice versa. So, for example, a thought about air must itself be airy – else how would the mechanism of attraction between likes draw the thought about air to the bits of air in the blood? But I see no reason for Empedocles to suppose that a thought about air is more airy than a thought about fire, given that they are both thoughts.⁹

Second, the likes-attract view makes it mysterious how we can ever retain anything. The same mechanism, operating in different directions, explains learning and forgetting: when you learn, the elements in your blood attract the elements 'in' the truth; when you forget, the elements in the world attract the elements in the truth away from your blood. But there is always more air outside you than inside, and also fire, and love, and so on – what could hold the air, fire, or love, in the blood, so as to enable you to remember? Something other than the attraction of likes must have the job of holding together, in the blood, elements that on their own would rush off from one another. The mechanism of like-to-like cannot do this job.

And that leads to my final set of difficulties with the 'likes-attract' account of cognition: the mental description of like-to-like segregation would seem to be analysis or discrimination. Possibly B4.3 (γνώθι διασσηθέντος ἐνὶ σπλάγχνοισι λόγιοι) indicates that Empedocles gives critical or analytical thinking a role in the attainment of understanding.

⁸) Note that B110 itself does not speak of teachings escaping the foolish; in B110 it is the many worthless things (μυρία δειλὰ) that escape from a man who does not properly cultivate the teachings, to return to their own kind. The point would be that material assets decompose.

⁹) The philosophical implausibility of this view may not be a very strong reason against attributing it to Empedocles. Plato's Socrates seems to believe it, cf. *Phaedo* 79d.

However, this cannot be the whole of thinking,¹⁰ which so clearly in Empedocles' verses includes the synthetic and creative activity of planning or designing (see section V below). Further, like-to-like is strife's mechanism, which love works in opposition to. But unlike thinking, strife is negatively valenced: strife is 'baneful' (λυγρῶι, B109.3), 'raving' (μαινόμενῶι, B115.14), 'destructive', (οὐλόμενον, B17.19); 'wrath' (Κότῶι, B21.7 cf. B22.9); strife's one 'blameless' act is to move out to the furthest limits of the circle (B35.9).

While I have raised these difficulties for Long's account of the mechanism which enables cognition in terms of like's attraction to like, Long's account is highly plausible given the Aristotelian assumption that knowing X by X is a matter of the likeness of composition between the two X's, for how else, other than by the attraction between likes, would compositional likeness enable knowledge? So if the difficulties raised are sufficient for rejecting Long's account of the likes-attract mechanism for cognition, they should also be sufficient for rejecting its Aristotelian basis, the view that for Empedocles, compositional likeness between subject and object enables cognition.

A couple of closing thoughts on B110: this fragment concludes with the claim that all things think and have a share in understanding. This fact is supposed to explain the decomposition of the material (and petty) things we wrongly strive for – so rather than a materialist explanation of an intellectual process, the lines seem to provide a mentalistic explanation of a material process. Note also that if Empedocles is serious that all things think, and not just that all composed things think, then thinking is not the product of mixture (let alone particularly well-blended mixture), but belongs also to the four roots and the two principles.¹¹ This is not to say that thought is a further ingredient or principle, however, since it is a property possessed by all things (as is, for instance, being). But thought's being a property of all things could explain the tendency of things to long for what is like them, and the capacity of things to 'learn' (μεμάθηκε, 17.9) to be united with unlikes under the influence of Love.

¹⁰ Cf. Wright 1981: 'taking in E.'s words is not going to increase the fieriness of the fire in Pausanias. Moreover, the thought is composite, and its activity as separate elements is the result of rejection, not assimilation.' (pp. 259-60)

¹¹ As is suggested by Hippolytus *ad loc.* Note that if this is right, Empedocles would be rejecting Parmenides B16, which makes thought depend on mixture.

4. Distinguishing Thinking from Perceiving

As a bridge to my positive account of Empedocles on knowing X by X, this section introduces some passages that, I argue, show Empedocles distinguishing thinking and perceiving – at least enough to make it illegitimate to infer his views about perceiving from his views about thinking and vice versa (as we have seen Aristotle and Theophrastus do).

ἀλλ' ἄγ' ἄθρει πάσῃ παλάμῃ, πῆι δῆλον ἕκαστον,
 μήτε τιν' ὄψιν ἔχων πίστει πλέον ἢ κατ' ἀκοῆν
 ἢ ἀκοῆν ἐρίδουπον ὑπὲρ τρανώματα γλώσσης,
 μήτε τι τῶν ἄλλων, ὅποσῃ πόρος ἐστὶ νοῆσαι,
 γυῖων πίστιν ἔρυκε, νόει δ' ἦι δῆλον ἕκαστον.

But come observe by means of every organ how each thing is clear,
 Not holding any sight greater in trust than sound
 Nor ringing sound above piercing taste,
 Nor withhold trust from any of the other parts, insofar as it is a channel for thinking,
 But think by what is each thing clear. (B3.9-14)

In B3, Empedocles urges Pausanias to observe (ἄθρει) and think (νόει) how the senses make each thing clear. Parmenides (B7) had called for a rejection of the testimony of the senses, perhaps on the grounds that in sense-perception, one's thought is determined by whatever one happens to encounter in experience dominating the physical constitution of one's sense-organs (B16).¹² Empedocles seems to be replying that the senses may be used intelligently. The instruction not to privilege any sense over any other aims to reform our normal practice, for we do ordinarily privilege sight over sound and sound over taste. Empedocles points out, however, that each of these is a channel for understanding (πόρος... νοῆσαι) that makes something clear.¹³ So rather than disqualify taste and attend only to sight, we should perhaps be critical in specifying just what is made clear to us by a taste, by a sound, and so on. This critical activity itself is not deter-

¹² ὡς γὰρ ἕκαστος ἔχει κρᾶσιν μελέων πολυπλάγκτων,
 τῶς νόος ἀνθρώποισι παρίσταται· τὸ γὰρ αὐτὸ
 ἔστιν ὅπερ φρονέει μελέων φύσις ἀνθρώποισιν
 καὶ πᾶσιν καὶ παντί· τὸ γὰρ πλέον ἐστὶ νόημα.

¹³ Picot 2004 gives a compelling account of Empedocles' use of irrigation imagery for the relationship between the accumulation of knowledge and the deliverances of the five senses conceived of as channels (which he identifies with the κρηνάων... πέντε, the five streams, of B143).

mined by whatever dominates our sense-organs in a sensory experience; thinking, then, seems capable of assessing and using the deliverances of the senses. We can think *how* each thing is made clear by each sense, and then perhaps direct each of our senses to retrieve information as appropriate.

B2's explanation of the limitations of the senses can help to extend our understanding of Empedocles' reasons for diverging from Parmenides' blanket rejection of sensory testimony.

στενωποὶ μὲν γὰρ παλάμαι κατὰ γυῖα κέχυνται·
πολλὰ δὲ δεῖλ' ἔμπαια, τὰ τ' ἀμβλύνουσι μέριμνας.
παῦρον δ' ἐν ζωῆσι βίου μέρος ἀθήσαντες
ἰσχυροὶ καπνοῦο δίκην ἀρθέοντες ἀπέπταν
αὐτὸ μόνον πεισθέντες, ὅτῳ προσέκυρσεν ἕκαστος
πάντος' ἐλαυνόμενοι, τὸ δ' ὅλον <πᾶς> εὐχεται εὐρεῖν·
οὕτως οὐτ' ἐπιδεκτὰ τὰ δ' ἀνδράσιν οὐτ' ἐπακουστά
οὔτε νόω περιληπτὰ. σὺ δ' οὖν, ἐπεὶ ᾧδ' ἐλιάσθης,
πεύσειαι οὐ πλέον ἢ βροτεῖη μῆτις ὄρωρεν.

Narrow pores are spread throughout their limbs
And many wretched things burst in, and dull their thoughts.
Having observed a small part of life in their lifetime
Fated to quick death, they fly away borne up like smoke
Persuaded of only that which each has come upon
Driven every which way, but each boasts of having found the whole;
Not thus are these things to be seen by men, nor heard,
Nor grasped by the mind. But you, since you have retired [from the ordinary run of people?]
Will inquire as far as mortal wisdom has ventured. (B2)

It is true that the powers of sense are narrow – perhaps because capable of representing only an aspect of anything, for instance its color or its sound – and that, combined with the shortness of life – which affords us access to only a time-slice of anything we encounter in the world – makes experience a very limited source of knowledge. But the error of supposing the small fragment one experiences to be the whole seems corrigible.¹⁴ It

¹⁴ Cf. the characterization of the foolishness of believing in absolute coming-to-be or destruction as a matter of lacking far-reaching thoughts, B11:

νήπιοι· οὐ γὰρ σφιν δολιχόφρονές εἰσι μέριμναι,
οἷ δὴ γίγνεσθαι πάρος οὐκ ἐὼν ἐλπίζουσιν
ἢ τι καταθήσκειν τε καὶ ἐξόλλυσθαι ἀπάντηι.

also seems to be a prerequisite for expanding one's knowledge by inquiry. At any rate, Pausanias' departure from the ordinary run of people would seem to consist in his not assuming that he knows the whole – which would explain why Empedocles promises him the full extent of mortal wisdom.

Finally, B17 develops the contrast between thinking and seeing.

δίπλ' ἐρέω· τοτὲ μὲν γὰρ ἓν ἠὺξήθη μόνον εἶναι
 ἐκ πλεόνων, τοτὲ δ' αὖ διέφυ πλέον' ἐξ ἑνὸς εἶναι,
 πῦρ καὶ ὕδωρ καὶ γαῖα καὶ ἠέρος ἄπλετον ὕψος,
 Νεϊκός τ' οὐλόμενον δίχα τῶν, ἀτάλαντον ἀπάντηι,
 καὶ Φιλότης ἐν τοῖσιν, ἴση μῆκός τε πλάτος τε·
 τὴν σὺ νόοι δέρκευ, μηδ' ὄμμασιν ἦσο τεθηπῶς·
 ἦτις καὶ θνητοῖσι νομίζεται ἔμφυτος ἄρθροις,
 τῆι τε φίλα φρονέουσι καὶ ἄρθμια ἔργα τελοῦσι,
 Γηθοσύνην καλέοντες ἐπώνυμον ἠδ' Ἀφροδίτην·
 τὴν οὐ τις μετὰ τοῖσιν ἐλισσομένην δεδάηκε
 θνητὸς ἀνὴρ· σὺ δ' ἄκουε λόγου στόλον οὐκ ἀπατηλόν.

I will tell a double [tale]: at one time it was one alone having grown
 From many, and at another time again having separated it was many from one
 Fire and water and earth and air unlimited in height,
 And destructive Strife apart from these, equivalent in every way
 And Love among these, equal in both length and breadth.
 You, look at her with your mind, not with your eyes; do not sit there astonished
 She is considered even by mortals to be inborn in their limbs
 And by her do they think friendly [thoughts] and accomplish deeds of unity
 Calling her the eponymous 'Delight' and Aphrodite.
 No mortal man has seen her whirling among these
 But you, listen to the undeceptive progress of my speech. (B17.16-26)

Also, B129 suggests that an individual, probably Pythagoras, has overcome the limitation due to shortness of life:

ἦν δέ τις ἐν κείνοισιν ἀνὴρ περιώσια εἰδώς,
 ὅς δὴ μήκιστον πραπίδων ἐκτήσατο πλοῦτον,
 παντοίων τε μάλιστα σοφῶν <τ'> ἐπιήρανος ἔργων·
 ὀππότε γὰρ πάσησιν ὀρέζαιτο πραπίδεσσιν,
 ῥεῖ' ὅ γε τῶν ὄντων πάντων λεύσσεσκεν ἕκαστον
 καὶ τε δέκ' ἀνθρώπων καὶ τ' εἴκοσιν αἰώνεσσιν.

In these lines, Empedocles explains the difference between seeing with the mind (νόοι δέρκευ)¹⁵ and with the eyes (ᾧμμασιν) – the latter resulting in amazement¹⁶ rather than comprehension – by means of a familiar example. While it takes Empedocles' account to reveal that love is a cosmic principle, uniting even the elements, Pausanias can begin by recognizing love in one of its operations, as the inborn power of sexual desire and pleasure in the body. Even ordinary mortals recognize love in this case; this is why they name it not only after its felt effect, 'Delight' (Γηθοσύνην... ἐπόνυμον), but also after the goddess whose power it is to cause this effect, 'Aphrodite'. When Pausanias comes to see that friendly thoughts (φίλα φρονέουσι) and peaceful relations (ἄρθμια ἔργα) are caused by the same power of love, he will be going beyond his narrow experience.¹⁷ As these familiar effects are traced back to the workings of one cause, love, Empedocles identifies this power with the cosmic principle of Love which unites the elements by harmonizing them. For unlike Strife, which stands apart (Νεϊκός τ' οὐλόμενον δίχα τῶν), Love works from within (Φιλότης ἐν τοῖσιν).¹⁸ Noticing similarities between the cases of sexual desire, friendly thoughts, and peaceful relations; reasoning from similar effects to a single cause – these activities constitute seeing with the mind rather than with the eyes.

The Strasbourg papyrus extends B17 by thirty-three lines, the last ten of which are relevant to these remarks on thinking.

[Σπεῦ]δε δ' ὅπως μὴ μόνον ἀν' οὐατα [μῦθος ἵκηται]
 [ἠδέ] μευ ἀμφις ἔοντα κλύων [ν]ημερτ[έα δέρκευ·]
 [δεί]ξω σοι καὶ ἀν' ὅσσ(ε) ἴνα μείζονι σώμ[ατι κύρει,]
 [π]ρῶτον μὲν ξύνοδόν τε διάπτυξίν τε [γενέθλης]
 ὅσ[σ]α τε νῦν ἔτι λοιπὰ πέλει τούτοιο τ[όκοιο,]
 τοῦτο μὲν [ἄν] θηρῶν ὀριπλάγκτων ἀγ[ρότερ' εἶδη,]
 τοῦτο δ' ἀν' ἀ[νθρώ]πων δίδυμον φύμα, [τοῦτο δ' ἀν' ἀγρῶν]
 ριζοφόρων γέννημα καὶ ἀμπελοβάμ[ονα] βότρυν·]

¹⁵ Cf. Parmenides B4.1: λεῦσσε δ' ὅμως ἀπεόντα νόοι παρεόντα βεβαίως.

¹⁶ τεθηπώς is a perfect, but there are no present-tense uses of τάφω/ταφέω; LSJ suggests that the root τάφ- is cognate with θάμβος.

¹⁷ So I disagree with Sedley 2008, pp. 46–47, that Empedocles thinks that sexual desire is strife's work. Empedocles recommends (hetero-)sexual abstinence, but presumably this is because a regular outcome of heterosexual sex is offspring, and by participating in it one becomes an agent of incarnation.

¹⁸ Cf. B21.7–8: ἐν δὲ Κότῳ διάμορφα καὶ ἄνδιχα πάντα πέλονται/σὺν δ' ἔβη ἐν Φιλότητι καὶ ἀλλήλοισι ποθεῖται.

ἐκ τῶν ἀψευδῆ κόμισαι φρενὶ δείγματα μ[ύθων·]
 ὄψει γὰρ ξύνδόν τε διάπτυσζίν τε γενέθλη[ς.]
 (B17.60-69, = Martin and Primavesi 1999 pp. 136-39, ll. 291-300)

[Press on] lest [my account reach] only your ears
 [But] hearing from me about the unerring things around you [look]
 [I will show] to your eyes too where [they find] a greater body¹⁹
 First the coming together and spreading out [of the stock]
 However many as now remain of this [generation]
 [The wilder species?] among the mountain-roaming beasts
 And the twofold offspring of humans
 The offspring of root-bearers and the vine-mounted cluster
 From these carry unerring evidence to your mind
 For you will see the coming together and the spreading out of the stock.

Here Empedocles admonishes Pausanias not only to hear his account but also to look at the evidence with his eyes: the wild animals, male and female humans, grapevines and so on. These are unerring sensory evidence that he should then carry to his mind. This echoes the claim of B3 that the senses are channels for information to be collected in the mind.

Now it may be objected that just because Empedocles contrasts thought or intelligence with the sense-powers, it does not follow that Aristotle and Theophrastus are wrong to say that Empedocles identifies thinking and perceiving. For their point is not really that he fails to enumerate these as distinct faculties, but that he assimilates thinking to perceiving because he fails to recognize the distinctiveness of the activity of thinking and of the mental resources on which thinking draws.²⁰

¹⁹⁾ The (unsupplemented) text reads *ωσοικαιανοσσειναγειζονισω*. Martin and Primavesi translate 'I will show you [*sic*] to your eyes too, where they (i.e. the elements) find a larger body'. They seem to take the eyes (*οσσ*) as an accusative of respect; Inwood takes the eyes as an instrumental (?) dative, translating 'through the eyes'.

²⁰⁾ For instance, the way he distinguishes them in the following lines is compatible with thought involving effluences and pores only of a finer grade than are involved in perception:

οὐκ ἔστιν πελάσασθαι ἐν ὀφθαλμοῖσιν ἐφικτόν
 ἡμετέροις ἢ χερσὶ λαβεῖν, ἢ ἰπέρ τε μεγίστη
 πειθοῦς ἀνθρώποισιν ἀμαξιτὸς εἰς φρένα πίπτει. (B133)

To approach in our eyes is not attainable
 Nor to grasp by hand, by which the greatest
 Carriage-way of persuasion for humans comes to the mind.

But while it is true that Empedocles does not take thinking to draw on intelligible as opposed to sensible contents, B3 shows that he does take thinking to be an activity in which one uses and assesses perceptions; B2 shows that he takes ignorance to be due to overgeneralizing on the basis of narrow experience, and B17 (along with its Strasbourg continuation) shows that he takes thinking to involve something like causal reasoning on the basis of the testimony of the senses. Even if from Aristotle's point of view Empedocles' conception of thinking still assimilates it to perceiving, we can see that Empedocles has distinguished thinking and perceiving enough to invalidate inferences from his characterization of one of these activities to a characterization of the other. I turn now to the positive characterization of my alternative account of thinking in Empedocles.

5. Knowing X by X as Analogical Reasoning

Any interpretation of B109 must answer two questions: (1) what is our relation to the X (water, love, and so on) by which we know? and (2) what is the relation between this X and the X which we come to know by it? On the Aristotelian reading, the answer to (1) is: we are composed of it; the answer to (2) is: the X in us is able to establish some connexion with the external X because of their likeness. My alternative answer to (1) is: we know X, more or less, by having encountered it in experience, or having been told about it. To (2) I answer: the new X is an instance of the same principle as the familiar X. Grasping how the two cases are both *instances of the principles* is how we properly know.

While no extant text of Empedocles answers questions (1) and (2) explicitly, B17 does tell us how we should go about knowing one of the principles. As I suggested above, B17's injunction to observe love with the mind rather than with the eyes is an injunction to study love's causal role in its various instances in our experience. Felt desire and pleasure, friendly thoughts, and peaceful relations figure in B17 as familiar instances of love's workings. Less familiar instances in Empedocles' verses include well-designed animal bodies and bodily organs. In bringing them to our

That is to say, some items may be ungraspable by sense-perception only because they are too fine to be caught by the sense-organs, rather than because they involve a different activity than grasping an object.

attention Empedocles points out the non-obvious ways in which these are alike.

ταῦτὰ τρίχες καὶ φύλλα καὶ οἰωνῶν πτερὰ πυκνά
καὶ λεπίδες γίγνονται ἐπὶ στιβαροῖσι μέλεσσι. (B82, cf. B79)

The same things, hair and leaves and close-packed wings of birds
And scales, come to be on sturdy limbs.

Such verses bring out that despite differences in material composition, there are functional similarities between certain parts of humans, animals and plants. For example, hair, leaves, feathers, and scales all protect their bearers. And the protecting function, we shall see, points to the hand of love.

In B96 and B98 Empedocles identifies the ratios in which the roots or elements are mixed to form new compounds (B96 says that bone is one part earth, two parts water and four parts fire; B98 that blood is equal parts of all four roots). But B96 also makes it explicit that the ratio in the mixture is the work of Love (here Harmony). Empedocles' most famous account of design, however, credits Love with much more than ratio in the construction of the eye:

ὡς δ' ὅτε τις πρόοδον νοέων ὀπλίσασατο λύχον
χειμερινὴν διὰ νύκτα, πυρὸς σέλας αἰθομένοιο,
ἄψας παντοίων ἀνέμων λαμπτήρας ἀμοργούς,
οἷ τ' ἀνέμων μὲν πνεῦμα διασκιδνάσιν ἀέντων,
φῶς δ' ἔξω διαθρῶισκον, ὅσον ταναώτερον ἦεν,
λάμπεσκεν κατὰ βηλὸν ἀτειρέσιν ἀκτίνεσσιν·
ὡς δὲ τότε ἔν μῆνιγξιν ἐεργμένον ὠγύγιον πῦρ
λεπτήσιν <τ'> ὀθόνησι λοχάζετο κύκλοπα κούρην,
αἷ δ' ὕδατος μὲν βένθος ἀπέστεγον ἀμφιναιέντος,
πῦρ δ' ἔξω διέεσκον, ὅσον ταναώτερον ἦεν.

As when one planning a journey outfitted a lantern
A flame of fire burning through the wintry night,
Having fastened linen screens against all sorts of winds
Which scatter the air of the blowing winds
But the light flashed through, insofar as it was rarer,
And shone across the threshold with tireless beams.
So at that time did ancient fire, wrapped in membranes
And fine tissues, lie concealed in the round eye,
And these kept out the deep water flowing around
And let through the external fire, insofar as it was rarer.

Embedded in the account of the construction of the eye is an elaborate analogy with the construction of a lantern. Just as if you were making a lantern to light your way on a wintry night you would protect the flame by screens that kept the winds out but let the light pass, so too Aphrodite protects the light in the eye from the water in the eye by transparent membranes and tissues. The analogy enables us to grasp something further about Love's workings than the examples in B17: this time, it is that love's activity is creative. We are able to grasp this because we are familiar with creative activity from our ordinary experience – not only in that we come across it (as we might come across instances of earth or fire), but also insofar as we ourselves engage in creative activity. Thus we can not only reason to Love as a causal power from the evidence of complex and well-functioning effects in the world; we can also directly experience ourselves as instantiating love's causal power when we engage in creative activity. So as we have perceptual access to some instances of the four roots, we have direct – non-inferential – access to some instances of love.

The use of technological analogies – analogies from human craft – brings the workings of love into the realm of the familiar. Empedocles frequently compares Love to human craftsmen (B71, 73, 75, 84, 86, 87, 95). So, for example, Simplicius (*De Caelo* 530, 5) tells us he likens Love ordering the cosmos to a potter:

ὡς δὲ τότε χθόνα Κύπρις, ἐπεὶ τ' ἐδίηεν ἐν ὄμβρῳ,
εἶδεα ποιπνύουσα θεῶι πυρὶ δῶκε κρατύναι

And as at that time Kypris, when she moistened earth in water,
Being busy [making] shapes gave [it] to swift fire to harden. (B73)

B23 does not mention Love in particular but analogizes the creation of the cosmos of our experience to the activity of painters, who create images of all things out of just a few colours:

ὡς δ' ὅπῳταν γραφέες ἀναθήματα ποικίλλωσιν
ἀνέρες ἀμφὶ τέχνης ὑπὸ μήτιος εὖ δεδαῶτε,
οἷτ' ἐπεὶ οὖν μάρψωσι πολύχρῳα φάρμακα χερσίν,
ἀρμονίῃ μείζαντε τὰ μὲν πλέω, ἄλλα δ' ἐλάσσω,
ἐκ τῶν εἶδεα πᾶσιν ἀλίγκια πορσύνουσι,
δένδρεά τε κτίζοντε καὶ ἀνέρας ἠδὲ γυναικάς
θῆράς τ' οἰωνούς τε καὶ ὕδατοθρέμμονας ἰχθύς
καὶ τε θεοὺς δολιχαίωναυς τιμῆσι φερίστους·
οὕτω μὴ σ' ἀπάτη φρένα καινύτω ἄλλοθεν εἶναι

θνητῶν, ὅσσα γε δῆλα γεγάκασιν ἄσπετα, πηγῆν,
ἀλλὰ τορῶς ταῦτ' ἴσθι, θεοῦ πάρα μῦθον ἀκούσας.

As when painters decorate votive offerings
Men with craft, well taught by wisdom,
Who when they take in their hands many-coloured paints
Having mixed then in harmony, some more, others less,
Arrange out of these forms resembling all things
Creating trees and men and women
Beasts and birds and water-nourished fish
And far-seeing gods highest in honour:
So too do not let deception overcome your mind that there is any other
Source for mortals, however many countless ones have become manifest,
But know these precisely, having heard the account from a god.

These lines address any doubt one might have about the whole cosmos having been put together out of just four elements; Empedocles implicitly casts Love as wise and skilled, as are painters, who also have a small number of elements but are able to make the likenesses of everything in the cosmos by skillful combination. The analogy, then, suggests that the same causal power is operative in both the cases of human and divine production, and that it is the intelligent and creative power of Love.

In lines that likely precede a series of examples, Empedocles says,

εἰ δέ τί σοι περὶ τῶνδε λιπόξυλος ἔπλετο πίστις,
πῶς ὕδατος γαίης τε καὶ αἰθέρος ἡελίου τε
κιρναμένων εἶδη τε γενοίατο χροῖά τε θνητῶν
τόσσ', ὅσα νῦν γεγάσιν συναρμοσθέντ' Ἀφροδίτῃ... (B71)

But if any conviction concerning these things was lacking for you
How from water's and earth's and aether's and sun's
Combining came the forms and colours of mortal things
Insofar as they have now been fitted together by Aphrodite...

Empedocles can say how diverse phenomena are explained by his account and produce conviction in that way; he is not, however, claiming to have arrived at his account as the only possible explanation of these phenomena – indeed, he authorizes his account as divinely revealed (θεοῦ πάρα μῦθον ἀκούσας).

Aristotle complains that when Empedocles calls the sea the sweat of the earth (B55), he is merely using poetic language and not explaining anything (*Meteorology* 357a24-30). But perhaps the metaphor, based on the

fact that both sweat and the sea are salty, is not supposed to explain, but only to direct the learner (or the investigator) to look at why becoming salty would be a usual effect of water separating from earth (is it a residue of earth in the water? is earth intrinsically salty?).

So far, I have claimed that knowing X by X is a matter of coming to know some new X by virtue of seeing the similarity between it and some old X one already knew, where X is a principle or an instance of a principle, and I have paid quite a lot of attention to determining what it would be to know love by love. What about strife by strife? and earth and the other elements?

It seems likely that just as when we understand love, the cosmic principle, we see that there is more to love than the desire and pleasure involved in certain human relations, so too in the case of strife, the cosmic principle is a power that segregates, or divides compounds into their parts according to the principle 'like to like' and is instantiated not only in discord but also in the arts that involve separation (such as mining or extracting dyes or drugs from their natural sources) and perhaps in analytical or critical thinking. (Note that if this is right, then Empedocles need not accept Aristotle's conclusion that god lacks knowledge of strife because he has no strife in him; god need only have perceived strife.) Similarly, with the elements, it is not because we are composed of them that we can know them except to the extent that we experience them in our own constitution. (As a doctor, Empedocles must have been aware that there are lots of things we do not know about our own constitutions.) Rather, it is insofar as the earth, water, etc. that are contents of our experience are themselves representational contents that they enable us to recognize the same contents in new instances. And we come to have knowledge by accumulating experiences and recognizing their similarities until we can reduce them to Empedocles' four roots and Love and Strife. In this process of knowledge acquisition, it is their representational content (not their material composition) which is significant.

It may be objected here that Empedocles never says we know by likeness in so many words, and that our authority for the 'by likeness' account of knowing is also Aristotle. Why retain this if we have rejected so much?²¹

²¹ Rather than for knowing, Empedocles uses the language of likeness to explain the formation of compounds (Aphrodite likens things to one another so that they desire to be together, ἀλλήλοισι ἔστρεπται ὁμοιωθέντ' Ἀφροδίτη, B22), and to explain the location of

After all, B109 does not say that we see flesh by flesh or bones by bones, but only four roots, earth, aether, water and fire, along with love and strife by these principles. And it stands to reason that the principles that are fundamentally responsible for the way the world is would also be the tools by which we know, *for the reason that* they make the world the way it is.

One reason to retain the 'like by like' schema for knowing, however, is that although the goal is knowledge of the principles, Empedocles characterizes the path to this goal as through the recognition of likeness – not only of earth to earth and love to love, but also of sea to sweat or feathers to leaves. Like Parmenides before him and Democritus after, Empedocles shows a concern not only with his audience accepting true doctrine but also with their accepting it as a result of traveling along a particular path of inquiry, one that will confer understanding.

6. Conclusion

In a landmark study, Lloyd 1966 claims that although Empedocles used detailed analogies extensively in his reasoning and was (as in B84) 'at pains to point out and underline the similarities between the lantern and the eye, attempting to recommend and justify his theory... by appealing to the extent of the *positive analogy* between the cases he compares',²² and although the use of analogies enabled empirical evidence to be brought to bear on otherwise intractable problems,²³ nevertheless, 'there is no concrete evidence that he explicitly recognised the procedure he uses so extensively as such, as a method of investigating obscure phenomena.'²⁴ Lloyd is right that Empedocles does not (to our knowledge) try to justify his analo-

bodies in the cosmos (whole-natured forms rise up out of the earth because they are partly made up of fire, and the fire down there wants to reach its like, *θέλον πρὸς ὁμοίων ἰκέσθαι*), the heavenly fire [B62]. Moving beyond mere vocabulary, in B90 he describes sweet, bitter, sharp and hot combining with their likes, but these are sensible qualities and so if we suppose the context to be one of cognition, these lines would have to be about sense-perception. Plutarch quotes them in the context of an argument in support of a varied diet, on the grounds that the body, being composed of heterogeneous elements, draws on heterogeneous elements in the diet and transports them to the right places (*Quaestiones Conviviales* 4.663a).

²²) Lloyd 1966, p. 327.

²³) Lloyd 1966, pp. 358-59.

²⁴) Lloyd 1966, p. 337.

gies (beyond enumerating the points of similarity between two cases) or to identify their limitations, or to reflect on the nature of the conclusions warranted by analogies. And it is difficult on the basis of our evidence to say whether Empedocles recognised analogical reasoning as a method of investigation *as opposed to* a method for persuasion or teaching. He may simply have considered his cosmology true and found in analogies confirmatory and illustrative evidence for it. Nevertheless, it is clear that when Empedocles used analogies in the natural world, and between the natural and man-made worlds, to bring out the economical causal order underlying the diverse phenomena of our experience, he identified what he was doing as engaging in a distinctive kind of thinking, which he described using the formula, 'knowing X by X.'²⁵

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