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Opposites and Explanations in Heraclitus

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Introduction

Heraclitus was clearly interested in opposites.¹ He was also interested in explaining the cosmos and its constituents.² In B1 he promises to explain the nature of each thing (ἐγὼ

¹ Heraclitus was famous in antiquity for claiming that opposites were *identical*. See Aristotle who claims that Heraclitus – or at least followers of Heraclitus – transgressed the Law of Non-Contradiction by claiming that opposites are identical: *Topics*, 159b30-3; *Physics*, 185b19-25; *Metaphysics*, 1012a24ff. It should be noted that Aristotle calls this the ‘Heraclitean account’ (τὸν Ἡρακλείτου λόγον) in the *Physics* passage. Elsewhere he shows sensitivity to the fact that Heraclitus may have meant something different than what he appears to say about the identity of opposites (*Metaphysics*, 1005b17-20). Some modern scholars have also argued that Heraclitus thought that opposites were identical. See K. Popper, ‘Back to the Presocratics’, *Proceedings of the Aristotelian Society*, 59 (1958), 1-24 at 13; C. Emlyn-Jones, ‘Heraclitus and the Identity of Opposites’, *Phronesis*, 21.2 (1976), 89-114; J. Barnes, *The Presocratic Philosophers* (Routledge and Kegan Paul, 1982) at 57. The issue with this view is that none of the extant fragments *identify* opposites in such a way that transgresses the Law of Non-Contradiction. The more popular view today seems to be what is known as the Unity of Opposites – or, what I call, the standard view. See n.4. below for prominent advocates of this weaker view.

² By explanation, I mean an account of *why* something is thus and so. See B. van Fraassen, *The Scientific Image* (Oxford, 1980), ch. 5. who argues that explanations are answers to why-questions. Heraclitus never poses why-questions specifically, but his fragments are puzzling so as to induce why-questions in his reader. See also R. J. Hankinson, *Cause and Explanation in Ancient Greek Thought [Cause and Explanation]* (Oxford, 1998), 3-4 for an account of explanation particularly relevant to early Greek philosophy. Finally, see J. Moravcsik, ‘Heraclitean Concepts and Explanations’, in K. Robb (ed.), *Language and Thought in Early Greek Philosophy*, (La Salle, 1983), 134-152. Moravcsik argues that there are three levels of explanation in very early Greek thought: (1) explanation in terms of origin, (2) explanation in terms of constituency, and (3) explanation in terms of a thing and its attributes (134). According to Moravcsik, Heraclitus’ writings represent a shift from the second to the third level of

διηγέσθαι κατὰ φύσιν διαιρέων ἕκαστον) and to show how things are (φράζων ὅκως ἔχει).³ But how exactly do opposites feature in Heraclitus' explanation of the cosmos? Most scholars believe that Heraclitus espoused a so-called "unity of opposites" doctrine.⁴ According to this

explanation (135). I am in agreement with Moravcsik's general thesis, though this paper attempts to give much more detail to Heraclitus' theory and method of explanation.

³ I adopt the standard Diels-Kranz number of the fragments found in H. Diels and W. Kranz, *Die Fragmente der Vorsokratiker*, 6th edn. [*Fragments*] (Berlin, 1951). The Greek text is from D. W. Graham, *The Texts of Early Greek Philosophy: The Complete Fragments and Selected Testimonies of the Major Presocratics* [*Texts*] (Cambridge, 2010). Translations are also generally from Graham [*Texts*], but I have made significant variations throughout.

⁴ The view in its modern conception was initiated by G.S. Kirk, *Heraclitus: The Cosmic Fragments* [*Cosmic Fragments*] (Cambridge, 1954), esp. at 69. Most scholars since Kirk have followed his view or something very similar to his view. See, for example, G. Vlastos, 'On Heraclitus', *The American Journal of Philology*, 76.4 (1955), 337-368 at 367; G.E.R. Lloyd, *Polarity and Analogy* (Cambridge, 1966), at 96-102; M. Marcovich, *Heraclitus: Greek Text with a Short Commentary*, 2nd edn. [*Heraclitus*] (Sankt Augustin, 2001), 158-9; M. C. Stokes, *One and Many in Presocratic Philosophy* (Washington, D.C., 1971), at 97; A.P.D. Mourelatos, 'Heraclitus, Parmenides and the Naïve Metaphysics of Things' ['Naïve Metaphysics'], in E. N. Lee, A. P. D. Mourelatos and R. M. Rorty (eds.), *Exegesis and Argument: Studies in Greek Philosophy Presented to Gregory Vlastos*. (Assen, 1973), 16-48 at 33 and 35; C. Kahn, *The Art and Thought of Heraclitus* [*Art and Thought*] (Cambridge, 1979), at 192; E. Hussey, 'Epistemology and Meaning in Heraclitus', in M. Schofield and M. Nussbaum (eds.), *Language and Logos: Studies in Ancient Greek Philosophy Presented to G. E. L. Owen*. (Cambridge, 1982), 33-59 at 38; D. Wiggins, 'Heraclitus' Conception of Flux, Fire and Material Persistence', in M. Schofield and M. Nussbaum (eds.), *Language and Logos: Studies in Ancient Greek Philosophy Presented to G. E. L. Owen*, (Cambridge, 1982), 1-32 at 10; G.S. Kirk, J.E. Raven and M. Schofield, *The Presocratic Philosophers*, 2nd edn. (Cambridge, 1983), 188-189; T.M. Robinson, *Heraclitus: Fragments* (Toronto, 1987), at 81 and 86; M.M. Mackenzie, 'Heraclitus and the Art of Paradox', *Oxford Studies in Ancient Philosophy*, 6 (1988), 1-37 at 7-8; D. O'Brien, 'Heraclitus on the Unity of Opposites', in K. I. Boudouris (ed.) *Ionian Philosophy* (Athens, 1989), 298-303; P. Curd, 'Knowledge and Unity in Heraclitus', *The Monist*, 74.4 (1991), 531-49 at 539; R. J. Hankinson, *Cause and Explanation*, at 29; E. Papamichael-Paspalides, 'The Concept of One in Heraclitus', *Revue de Philosophie Ancienne*, 23.1 (2005), 41-54 at 42; A. Long, 'Wisdom in Heraclitus', *Oxford Studies in Ancient Philosophy*, 33 (2007), 1-17 at 1-2; J. Warren, *Presocratics* (Berkeley, 2007) at 67-70. There are three notable exceptions. For alternative views that break from the standard view see R. Dilcher, *Studies in Heraclitus* [*Studies*] (Hildersheim, 1995) at 103-116; C. Osborne, 'Heraclitus', in C.C.W. Taylor (ed.), *Routledge History of Philosophy, Vol. I: From the Beginning to Plato* (London, 1997), 80-116 at 92-96; D. Graham, 'Heraclitus' Criticism of Ionian Philosophy', *Oxford Studies in Ancient Philosophy*, 15 (1997), 1-50. Graham expanded and revised his argument in D. Graham, *Explaining the Cosmos: The Ionian Tradition of Scientific Philosophy* [*Explaining the Cosmos*]

standard view, Heraclitus claimed that opposites were somehow united *and* that opposites permeate the world to some extent. So, on this view, Heraclitus was encouraging his readers to comprehend the hidden connectedness of opposites and, perhaps, the connectedness of all things.⁵ I will argue that the standard view is incomplete. Opposites are indeed connected, and I believe Heraclitus (and his Ionian predecessors) recognized this feature of the world. However, I do not think the demonstration of this fact was his primary goal in composing the opposites fragments. The central issue with the standard view is that any clear formulation of a unity of opposites principle is too restrictive to make complete sense of Heraclitus' interesting and varied statements about opposites.⁶

In place of the standard view, I argue that Heraclitus' treatment of opposites was a reaction to the way opposites were being used by his Ionian predecessors, Anaximander and Anaximenes.⁷ Opposites, for the earlier Ionians, seem to have been explanatory principles: fundamental *explanantia*. The physical world, which includes events, stuffs and things, was

(Princeton, 2006.) I will make reference to the expanded and revised version of his argument in this paper. Osborne and Graham in particular make notable advancements in our understanding of Heraclitus' use of opposites. I discuss these views below in section I.

⁵ For example, Kirk, *Cosmic Fragments*, writes: 'The Logos is undoubtedly connected with the opposites, in fact it is the unity which underlies them and which binds together into one nexus all the components of the apparently discrete phenomenal world' (188). He also claims that 'The Logos is the formula, structure, plan, of each and all things... as such it results in the fact that 'all things are one Because they all connect up with each other *because of* this common structure' (70).

⁶ I defend this claim below in Section I. See Dilcher, *Studies*, 103-108 for another critique of the essential connection thesis. He points out that 'it is equally easy to state this idea of unity-in-opposites and to apply it to any opposition that [we] might encounter, as it is exceedingly difficult to explicate with any reasonable precision in what way these opposites actually "coincide." The formula cannot be directly elicited from any Heraclitean fragment. The relevant fragments present 'opposites' of the most diverse kind and are as varied in their formulation as they could conceivably be' (104).

⁷ Anaximander and Anaximenes were residents of the Ionian city Miletus, while Heraclitus lived in the nearby Ionian city of Ephesus.

explained by a limited set of oppositional pairs (e.g., hot and cold, condensation and rarefaction). Heraclitus' treatment of opposites, I submit, is best understood in relation to these earlier schemes of philosophical explanation. I will argue that Heraclitus was the first Ionian to treat opposites, not as explanatory principles, but as philosophical problems in need of explanation. Heraclitus' opposites are related to his philosophical explanation of the cosmos insofar as they are a) negatively, *explananda* in need of *explanantia* and b) positively, they are the clearest expression of the interdependent nature of the metaphysical structure in and of the cosmos. Heraclitus appears to have held a principle of non-well-foundedness, according to which there are no metaphysically foundational entities, and to a principle of reciprocal determination, whereby the cosmos and its parts are caught in a web of explanatory interdependence. In the end, the opposites, too, are part of this web of metaphysical interdependence and, as such, are *explananda* and (non-fundamental) *explanantia* in the cosmos.

I. Preliminaries on Explanation and Opposites

Fragment B1 is taken by most to have been the opening of Heraclitus' book. It will prove a helpful place to begin understanding what Heraclitus thought about explanation:

τοῦ δὲ λόγου τοῦδε ἐόντος αἰεὶ ἀξύνετοι γίνονται ἄνθρωποι, καὶ πρόσθεν ἢ ἀκοῦσαι, καὶ ἀκούσαντες τὸ πρῶτον· γινομένων γὰρ πάντων κατὰ τὸν λόγον τόνδε ἀπείροισιν εἰκόασι, πειρώμενοι ἐπέων καὶ ἔργων τοιούτων, ὅκοῖα ἐγὼ διηγέσθαι κατὰ φύσιν διαίρων ἕκαστον καὶ φράζων ὅκως ἔχει. τοὺς δὲ ἄλλους ἀνθρώπους λανθάνει ὅκοσα ἐγερθέντες ποιοῦσιν, ὅκωσπερ ὅκοσα εὐδοντες ἐπιλανθάνονται. (DK22B1)

Of this *logos* which holds always, humans prove to be uncomprehending, both before they hear it and after hearing it for the first time. For although all things

come to be in accordance with this *logos*, they are like the unexperienced experiencing words and deeds such as I explain when I distinguish each thing according to its nature and show how it is. Other men are unaware of what they do when they are awake just as they are forgetful of what they do when they are asleep.⁸

Perhaps the most striking feature of this fragment is Heraclitus' novel use of the Greek term *logos*.⁹ Prior to Heraclitus, the term *logos* was used to indicate a structured account of events.¹⁰ Heraclitus claims that 'all things' (πάντα) come to be in accordance with the *logos* of which he speaks. Furthermore, the *logos* holds always (ἐόντος αἰεὶ). At the very outset, Heraclitus seems to commit himself to a cosmos that has a stable structure.¹¹ Furthermore he seems optimistic that the stable structure of the cosmos renders the cosmos intelligible and explainable, even though he seems to think this is a very difficult task.

⁸ This fragment is preserved for us by both Sextus Empiricus, *Against the Professors*, 7.132-133 and Hippolytus, *Refutations*, 9.9.3. Aristotle, *Rhetoric*, 1407b14-15 tells us that these are the opening words of Heraclitus' book. Both Aristotle and Sextus claim that B1 is the opening of Heraclitus' Book.

⁹ Most interpreters have supposed that the term refers to some cosmic principle. For example, see Kirk, *Cosmic Fragments*, 39. This has been challenged by some who claim that it simply refers to Heraclitus' account (i.e. his book). The most notable proponent of this view is perhaps M.L. West, *Early Greek Philosophy and the Orient [Orient]* (Oxford, 1971), 124-9. For my part, I agree with M. Johnstone, who argues for a middle position. See M. Johnstone, 'On 'Logos' in Heraclitus' ['Logos'], *Oxford Studies in Ancient Philosophy*, 47 (2014), 1-29. I deal with the philosophical significance directly in Section IV below.

¹⁰ See Johnstone, 'Logos', 13-17.

¹¹ Of course, this has been the subject of great controversy. However, I believe it is safe to say that most scholars today doubt Heraclitus held a theory of radical flux whereby everything is always changing in every respect. See Graham, *Explaining the Cosmos*, 113-122 for a summary of the debate over the last century. I take it that the standard view today regarding flux is that Heraclitus' cosmos does change but that the change is orderly, and the order is stable. In Heraclitus' own words: 'Changing it rests' (B84a). See Graham, *Explaining the Cosmos*, 129-137 for an account of flux in Heraclitus' stable world.

Let's examine some of the verbs contained in this fragment. Heraclitus claims to 'explain' (διηγέσθαι) things. (I gloss ἕκαστον as 'things' since the 'each' refers to the 'all things' (πάντα) earlier in the fragment.) διηγέσθαι has the sense of describing something in detail to someone who isn't in the know.¹² He also claims to show *how* things are (φράζων ὅπως ἔχει). φράζω has the sense of showing or telling someone a piece of information.¹³ It was often used prior to Heraclitus in the sense of showing or telling someone the way to get somewhere.¹⁴ It was also used in the sense of relaying a command from a place of authority.¹⁵ Hence the term connotes the passing on of reliable, practical information from a source of authority. Finally, Heraclitus promises to differentiate (διαίρειν) things according to their *nature* (κατὰ φύσιν). διαίρειν has the sense of division or taking things apart.¹⁶ Heraclitus' term for nature (φύσις) seems to mean something like a metaphysical character.¹⁷ The main verb of the clause is

¹² For later uses of the term see Aristophanes, *Birds*, 198 and Antiphon, *Against the Stepmother*, 13.8. See also Kirk, *Cosmic Fragments*, 41 who implies that the term for Heraclitus means 'explanation' in a strong sense of the term.

¹³ E. Cunliffe, *A Lexicon of the Homeric Dialect* (Norman, 2012) includes 'display', 'indicate', 'instruct', and 'direct' as translations of this term.

¹⁴ See, *Odyssey*, 11.2 and 14.3.

¹⁵ See *Iliad*, 10.127 and *Odyssey*, 10.549.

¹⁶ Kirk, *Cosmic Fragments*, 41 claims that this term 'means something more than merely "judging," and implies a process of analysis.' This is, of course, a precursor to the great notion of διαίρεσις in Plato and Aristotle. See Plato's *Sophist* 267ff. and Aristotle's *Prior Analytics* I.31

¹⁷ φύσις prior to Heraclitus meant something like 'visible characteristic'. See Homer, *Odyssey*, 10.302-6. Pindar, writing around the same time as Heraclitus, also used the term φύσις to reference visible characteristics. See Pindar, *4th Isthmian Ode to Melissus of Thebes*, line 50. However, Heraclitus elsewhere claims that φύσις κρύπτεσθαι φιλεῖ (B123), 'a nature tends to be hidden'. I take this to indicate Heraclitus has *metaphysical* character (i.e., something closer to an essence) in mind rather than just a loose description of visible characteristics. See A. D. P. Mourelatos, *The Route of Parmenides*. Revised and Expanded Edition (Parmenides Publishing, 2008) who states that 'The term clearly carries for [Heraclitus] a sense of real constitution or inner nature' (6). See also K. Begley, 'Heraclitus against the Naïve Paratactic of Mere Things', *Ancient Philosophy Today*, 3.1 (2021), 74-97, for an interpretation of Heraclitus according to which his interest in *phusis* is in terms of essences. For a more thorough analysis of the term '*phusis*' see my '*Phusis*, Opposites and Ontological Dependence in Heraclitus' [*Phusis*], *History of Philosophy Quarterly*, 35.3 (2018), 199-217 at 200-203.

‘explain’ (διηγεῖσθαι) and Heraclitus uses the participle ‘differentiating’ (διαιρέων) most plausibly to indicate his means of explanation. If this is right, Heraclitus is interested in explaining things according to their nature by differentiating them. These words apply to ‘all things’ (πάντα) referenced earlier in the fragment. So, it seems safe to say that Heraclitus was interested in explaining the way things are. But I do not think he was merely interested in cataloguing and describing the existents of the world. Elsewhere, in B50, he claims that ‘all things are one’ (ἐν πάντα εἶναι). Significantly, Heraclitus calls the world ‘*kosmos*’ in the sense of an ordered whole.¹⁸ All this strongly suggests that Heraclitus saw himself as explaining the structure and nature of all things (πάντα) which constitute the cosmos (κόσμος).

It is difficult to know exactly what Heraclitus took to constitute the class of ‘things’. We might think it is all ‘things’ in a robust sense whereby things are the bearers of properties. But I think this is too strong for a presocratic thinker writing before the incredibly nuanced discussions of Plato and Aristotle. Instead, I propose we treat ‘all things’ (πάντα) as referring to all the *aspects* of the cosmos: things, properties, stuffs, and events. At any rate, these are what he discusses in his fragments. All these aspects of the cosmos have a character – a nature (*phusis*) – and Heraclitus seems interested in explaining how all these aspects hang together as an orderly whole.

¹⁸ See C. Kahn, ‘Anaximander’s Fragment: The Universe Governed by Law’, in *The Pre-Socratics: A Collection of Critical Essays*, (Ed. Mourelatos), 99-117. He states: ‘Precisely considered, the *kosmos* is a concrete arrangement of all things, defined not only by a spatial disposition of parts, but also by the temporal taxis within which opposing powers have their turn in office’ (111). In B30 Heraclitus refers to the world as κόσμον τόνδε. This is the first known philosophical use of the word *kosmos* (although it is possible it was used before Heraclitus). See also G. Betegh and V. Piano, ‘Column IV of the Derveni Papyrus. A new analysis of the text and the quotation of Heraclitus’, in C. Vassallo (ed.), *Presocratics and Papyrological Tradition* (Berlin, 2019), 179–220 at 198-200).

B1 has an analytic flavor. Heraclitus promises to break down (διαιρέω) the cosmos into smaller components in order to reveal the nature of its parts (ἕκαστον). This may give us the sense that Heraclitus intends to explain the cosmos by division. However, this is only partially true. If we turn to the extant fragments, we will see that Heraclitus spends as much time synthesizing discrete parts of the cosmos as he does analyzing the cosmos into its parts. Some of the most famous fragments speak to Heraclitus' synthetic project. B50 claims that 'all things are one' (ἐν πάντα εἶναι) and B41 claims that 'thought ... steers all things through all things' (γνώμην ... ἐκυβέρνησε πάντα διὰ πάντων). I think B10 provides a clear statement of Heraclitus' balanced interest in synthesis and analysis:

συλλάψεις: ὅλα καὶ οὐχ ὅλα, συμφερόμενον διαφερόμενον, συναῖδον διαῖδον, καὶ ἐκ πάντων ἐν καὶ ἐξ ἑνὸς πάντα. (DK22B10)

Collectives: wholes and not wholes; brought together, pulled apart; sung in unison, sung in conflict; and from all things one and from one all things.¹⁹

The point, I think, is that Heraclitus saw himself explaining the way the cosmos is and why it is that way. I will have a great deal more to say about the details of Heraclitus' scheme of explanation below. For now, let it suffice that he seems to have thought that he needed to analyze the cosmos into its parts and synthesize its parts into a whole in order to explain the cosmos and its parts.

But now let's turn to the opposites so we can begin to inquire into their relation to Heraclitus' scheme of explanation. To begin it will prove useful to examine just a few opposites

¹⁹ I discuss this fragment in much more detail in section IV below.

fragments in brief.²⁰ Much more can and has been said concerning the following fragments. I will simply focus on features relevant to our question. My initial goal here is two-fold: 1) to provide a glimpse of the richness and variety of the fragments concerned with opposites and 2) to show that the standard view – that Heraclitus is merely displaying the internal connection of opposites – is unable to account for that variety and richness. If this is true, then the standard view cannot account for how the opposites feature in Heraclitus’ explanation of the cosmos. I don’t mean to suggest that the standard view is incompatible with these fragments, but just that it fails to bring out what is most interesting about opposites and indeed seems to be Heraclitus’ point in repeatedly referring to them.

First consider fragment B57:

διδάσκαλος δὲ πλείστων Ἡσίοδος τοῦτον ἐπίστανται πλεῖστα εἰδέναι, ὅστις
ἡμέρην καὶ εὐφρόνην οὐκ ἐγίνωσκεν ἔστιν γὰρ ἓν. (DK22B57)

The teacher of the multitude is Hesiod; they believe he has the greatest
knowledge - who did not comprehend day and night: for they are one.²¹

²⁰ See Marcovich, *Heraclitus*, insert ‘Table of Opposites in Heraclitus’ Doctrine on the Logos’ (between 160-161) for a useful, introductory guide to the opposing terms in Heraclitus. For each pair of opposites, Marcovich lists their ‘Reason for Unity’. But in the end, he finds 11 different reasons for the unity of various opposites. Marcovich does not attempt to explain how the 11 different reasons are related to one another. I take this as evidence that Marcovich has not given a full explanation of Heraclitus’ use of opposites.

²¹ Dilcher, *Studies*, 109 takes an even stronger stance against the standard view. He argues that the ἓν cannot refer to day and night since day and night are feminine nouns and ἓν is neuter. Dilcher thinks this is good evidence against *any* notion of unity of opposites in Heraclitus. But this might be wrong since it is possible, at least in later Greek writing, to express two feminine things as one neuter thing. Compare e.g. the use of the neuter ταῦτόν in Aristotle’s *Politics* 1255b16-17: οὐ ταῦτόν ἐστι δεσποτεία καὶ πολιτική.

I begin with this fragment because it is, perhaps, the strongest evidence for the standard view. As is well-known, Hesiod treated the divinities Day and Night as distinct entities.²² Heraclitus appears to be correcting this by claiming that they are one; that is, day and night are opposing parts of a single meteorological process. The deeper point seems to be this: what-it-is-to-be-day and what-it-is-to-be-night are connected by being conceptually interdependent – they belong to a single conceptual sequence. So, it does appear that Heraclitus recognized that opposites were connected. But it does not follow that this was a new discovery on Heraclitus' part,²³ nor does it follow that this was Heraclitus' only, or even primary, interest in opposites. The interpretive strategy of the standard view has been to take this somewhat clear expression of a principle and read it onto all the other instances of Heraclitus' opposites. But we shall see just how restrictive this move is when we examine other instances of Heraclitus' opposites in their own right.

Consider fragment B61:

θάλασσα ὕδωρ καθαρώτατον καὶ μιαρώτατον, ἰχθύσι μὲν πότιμον καὶ σωτήριον,
ἀνθρώποις δὲ ἄποτον καὶ ὀλέθριον. (DK22B61)

Sea is the purest and most polluted water: for fish drinkable and healthy, for men undrinkable and harmful.²⁴

On the surface, Heraclitus is making the true observation that sea water is both pure and polluted. This is a judgement of value: sea water is both good and bad. But Heraclitus is obviously *not* supposing that sea water is both A and not-A at the same time and in the same respect. He

²² See Mourelatos, 'Naïve Metaphysics', 33-34.

²³ I think it is implausible that Anaximenes, for example, could use rarefaction and condensation as he does without realizing that the two process are conceptually connected.

²⁴ This fragment is also preserved by Hippolytus, *Refutations*, IX.10.5. Hippolytus claims '[Heraclitus] says that the polluted and the pure are one and the same thing and that the drinkable and the undrinkable are one and the same thing'.

specifies that sea water has these properties relative to different species. For fish, it is good to drink. For humans, it is not good to drink. The deep meaning of the fragment seems to indicate something about value: opposing values are respondent dependent.²⁵ This is an interesting and important, philosophical insight concerning opposites and values. Now according to the standard view, the meaning of the fragment must merely be that these opposites, as with all opposites, are connected; so, this fragment shows that purity and pollution are connected. But this seems to miss the deep insight concerning kind-relative value; an insight that has to do with opposites but that cannot be cashed out in terms of the standard view.

Here is another fragment concerning opposites.

οὐ ξυνιαῖσιν ὄκως διαφερόμενον ἑωυτῶι ὁμολογέει. παλίντροπος ἀρμονίη ὄκωσπερ τόξου καὶ λύρης. (DK22B51)

They do not understand how disagreeing with itself it agrees with itself: back-turning structure as of a bow or a lyre.²⁶

The opposites cited in this fragment are disagreement and agreement and the claim is that something can agree with itself while disagreeing with itself. This principle is applied to a bow and a lyre as illustrative examples of the principle. It is clear to see how a bow and a lyre disagree while agreeing with themselves. Take a bow. The stave and string are at odds with one

²⁵ This thought resurfaces in a few other fragments: B9, B13, B11. For a further discussion of this insight concerning value see my ‘Heraclitus on the Nature of Goodness’, *Ancient Philosophy*, 41.1 (2021), 1-22.

²⁶ This fragment is preserved for us by Hippolytus, *Refutations*, IX.9.2. There is some disagreement over the word παλίντροπος; some scholars prefer παλίντονος (i.e. back-stretched) since the term was known in ancient times as a Homeric epithet for ‘bow’ (τόξον). Furthermore, Plutarch, who cites the fragment three times, once renders it παλίντονος. Marcovich, *Heraclitus* and Kirk, *Cosmic Fragments* support παλίντονος, while Kahn, *Art and Thought* and Graham, *Texts* support παλίντροπος. For my part, I am happy to leave the text as it has been handed down to us as παλίντροπος.

another in that they exert opposing forces on one another. However, the bow agrees with itself in that these opposing parts constitute the very nature of the bow. So, at least for some objects, the opposites present in them are constitutive of the very nature of the objects in question. But, again, the standard view must conclude that this fragment is merely saying that disagreement and agreement are connected. Again, this misses a rich philosophical insight about opposites and their role in constituting the nature of various objects.²⁷

Finally, consider the following fragments together:

τὰ ψυχρὰ θέρεται, θερμὸν ψύχεται, ὑγρὸν αὐαίνεται, καρφαλέον νοτίζεται. (DK22B126)

Cold things warm up, hot things cool off, wet things become dry, dry things become moist.²⁸

πυρὸς θάνατος ἀέρι γένεσις, καὶ ἀέρος θάνατος ὕδατι γένεσις. γῆς θάνατος ὕδωρ γενέσθαι καὶ ὕδατος θάνατος ἀέρα γενέσθαι καὶ ἀέρος πῦρ καὶ ἔμπαλιν.

(DK22B76.3-7)

The death of fire is the birth of air, and the death of air the birth of water. It is death for earth to become water, and death for water to become air, and death for air to become fire and contrariwise.²⁹

B126 contains a true observation about changing opposites: cold and hot, wet and dry are connected in terms of change. B76 contains a set of elemental transformations. I believe the two

²⁷ See my *Phusis* for more details on other fragments that seem to illustrate the same insight concerning opposing properties and their role in constituting objects. Importantly rivers (B12) seem to bear this oppositional structure.

²⁸ This fragment is preserved by John Tzetzes, *On the Iliad*, 126.

²⁹ Diels, *Fragmente*, provides three variants of this fragment together. I have provided a combination of the 2nd (Plutarch) and 3rd (Marcus Aurelius). Graham [*Texts*] places these two together but they may very well have been disparate quotations. I think it is helpful to see the two together, but I do not think my philosophical point rests on this precise composition.

fragments resonate thematically. The opposites listed in B126 happen to be what later Greeks associated with the four elements listed in B76.³⁰ The fragments, if they do go together, suggest that the elemental stuffs which constitute material reality change and in virtue of this change things become warm or cool, wet or dry.³¹ This, again, is a deep philosophical insight about reality. But, on the standard view, B126 merely indicates that cold and hot, wet and dry are connected and B76 merely indicates that death and birth are connected. While it is true that these opposites are connected, the interpretive strategy of the standard view misses the rich connection between elemental transformations and the changes between opposing properties. I don't mean to suggest that scholars who accept the standard view can't also recognize these various insights; however, the standard view does not explain how Heraclitus' concern about the unity of opposites relates to his other concerns about opposites.

There are two alternatives to the standard view that are worth considering. Catherine Osborne has argued that for Heraclitus '[i]dentity, similarity, difference, opposition' are 'all determined by the significance acquired in context'.³² She states that according to Heraclitus, 'what counts as the same and what counts as opposed is decided by a significance acquired in a social or temporal context, and is not determined absolutely by a fixed or material constitution in the entities we observe'.³³ This view goes a long way to break from the standard view. It is particularly good at explaining fragments like B61 concerning sea water. However, it does not

³⁰ This is most clearly seen in Aristotle, *On Generation and Corruption*, II.3.

³¹ See my discussion of Daniel Graham's view below (same section). See also G. Betegh, 'On the Physical Aspect of Heraclitus' Psychology' ['Physical Aspect'], *Phronesis*, 52 (2007), 3-32 who incorporates Heraclitus' soul into the physical flux of elements. On Betegh's view too, there is an association between the elements and the elemental properties, including mental properties. There may be some disagreement about the precise relations of the properties to the elements, but *that* there is a relation seems to be agreed on by most scholars.

³² Osborne, 'Heraclitus', 80.

³³ Osborne, 'Heraclitus', 94.

seem to be able to make good sense of a fragment like B51 concerning the bow and the lyre. The opposition inherent in and the resulting identity of the bow and the lyre do not seem to be context dependent, and they do, in fact, seem to have a fixed constitution: without certain material conditions, the bow and the lyre fail to be what they are. Furthermore, oppositions *qua* opposites don't seem to be determined by context: hot and cold may be relative to context but *qua* opposites they seem to be relative merely to one another. While I think Osborne captures something Heraclitean and while her interpretation does much better than the standard view in accounting for deep philosophical insight, it cannot fully account for the variety of opposites. As such, it fails to provide a satisfying solution to the relation between Heraclitus' opposites and his philosophical explanation of the cosmos.

Daniel Graham presents another alternative to the standard view:

[o]pposites are the same just in the sense that opposite *things* or *stuffs* turn into one another... They are, moreover, quantitatively equivalent in the sense described, by bearing a determinate ratio to one another. To say that opposites are the same is simply to say that they are transformationally equivalent.³⁴

Graham's interpretation of Heraclitus' use of opposites works well with fragments like B126 and B76. But Graham's thesis cannot make sense of the opposing values of seawater in B61 nor of the opposing forces of the bow and the lyre in B51. These fragments cite opposites that have nothing to do with transformation. Graham doesn't force a false thesis on Heraclitus, but, as with Osborne, the interpretation does not account for the variety of opposites.

³⁴ Graham, *Explaining the Cosmos*, 129.

Heraclitus' opposites clearly have something to do with his explanation of the cosmos. I have argued that there are multiple philosophical insights concerning opposites in the world. The insights do not seem to be reducible to the single thesis 'opposites are essentially connected'. So, we are left with two problems: How exactly do Heraclitus' opposites feature in Heraclitus' explanation of the cosmos? And what unifies Heraclitus' interest in opposites? To answer these questions, I believe it is helpful to examine how opposites were used in philosophical explanations prior to Heraclitus.

II. Opposites in Heraclitus' Predecessors

Heraclitus was preceded by two other Ionian thinkers: Anaximander and Anaximenes. Both thinkers appealed to opposites in their explanations of the cosmos. In what follows, I present a sketch of Anaximander's and Anaximenes' ideas which I take to be, for the most part, uncontroversial.

According to Anaximander, there is something called the *apeiron*, which seems to be a sort of primordial entity from which all things are generated. Aristotle claims that the *apeiron* is Anaximander's *archê* – his starting point of metaphysical explanation.³⁵ Anaximander seems to have constructed a cosmogony based on the *apeiron*:

φησὶ δὲ τὸ ἐκ τοῦ αἰδίου γόνιμον θερμοῦ τε καὶ ψυχροῦ κατὰ τὴν γένεσιν
τοῦδε τοῦ κόσμου ἀποκριθῆναι καὶ τινα ἐκ τούτου φλογὸς σφαῖραν περιφυῆναι
τῶι περὶ τὴν γῆν ἀέρι ὡς τῶι δένδρῳι φλοιόν. (DK12A10.7-10)

³⁵ By metaphysical explanation I mean an explanation for *why* things are thus and so. Note that metaphysical explanations do not preclude anything physical. See Aristotle, *Physics*, 203b6-28. Simplicius, *Physics*, 24.13-16 claims that Anaximander is the first to introduce the term *apeiron* as an *archê*. We don't know for sure if Anaximander himself used the term *archê*, but Aristotle is right to point out that the *apeiron* is a metaphysical principle in the sense that it is the metaphysical ground for everything.

[Anaximander] says that the part of the *everlasting* (i.e. the *apeiron*) which is *generative* [γόνιμον] *of hot and cold separated off* [ἀποκριθῆναι] at the coming to be of the world-order and from this [ἐκ τούτου] a sort of sphere of flame grew around the air about the earth like *bark* around a tree.³⁶

It is hard to know with certainty, but it seems that this bit of *testimonia* is evidence that there are two stages of cosmic generation. First, a ‘generative part’ (γόνιμον) of the *apeiron* separates off from the *apeiron* itself. Second, this mysterious part of the *apeiron* produces physical contrarities (hot and cold) as well as physical stuffs (fire, air, and earth).³⁷ It seems that Anaximander’s entire cosmos is explained by these physical stuffs and their opposing properties. From Theophrastus (quoted by Simplicius), we learn that from the *apeiron* things come to be, but also that it is into the *apeiron* that things perish. Consider Anaximander B1, which is embedded in a paraphrase from Simplicius:

ἐξ ὧν δὲ γένεσις ἐστι τοῖς οὖσι, καὶ τὴν φθορὰν εἰς ταῦτα γίνεσθαι κατὰ τὸ χρεῶν· διδόναι γὰρ αὐτὰ δίκην καὶ τίσιν ἀλλήλοις τῆς ἀδικίας κατὰ τὴν τοῦ χρόνου τάξιν, ποιητικωτέροις οὕτως ὀνόμασιν αὐτὰ λέγων. (DK12B1)

From what things existing objects come to be, into them too does their destruction take place, *according to necessity: for they give recompense and pay restitution to each other for their injustice according to the ordering of time*, expressing it in these rather poetic terms.³⁸

³⁶ A10 is a testimony from pseudo-Plutarch, *Miscellanies*, 2. Though it is, on the whole, clearly a testimony and not a verbatim quotation, Daniel Graham, *Texts*, thinks the words italicized are verbatim quotations.

³⁷ Simplicius, *Physics*, 150.24-25 tells us that ‘[Anaximander’s] contrarities are hot, cold, dry, moist, and the others’. It isn’t clear here what Simplicius means by ‘the others’ (τὰ ἄλλα).

³⁸ The italicized words are generally thought by scholars to be original to Anaximander.

According to the standard interpretation of Anaximander, the most basic entities are the elemental powers, which participate in a system of retaliation with one another, such that if one opposite becomes too powerful it is overtaken by another opposite. According to Aëtius, Anaximander thought that meteorological events are consequences of wind (A23). But we also learn that wind is accounted for by elemental powers in strife: ‘Anaximander says wind is a rush of air when the most fine and moist parts of it are moved or dissolved by the sun’ (A24). Presumably the sun has the power to heat and thereby dry out the moisture in the air, causing the air to move and become wind. Wind accounts for the meteorological phenomena, but the striving of opposing powers accounts for wind. If this is correct, Anaximander seems to have treated the opposites as fundamental *explanantia* with reference to the rest of the physical world.³⁹ Graham writes: ‘In Anaximander we see a closed system of explanation in which a set of items, apparently including elemental stuffs and their contrary properties, accounts for all the phenomena of experience’.⁴⁰ Since the opposites seem to pose the ultimate physical explanation of the physical stuffs and their operations, I believe it makes most sense to suppose that for Anaximander the war of opposites is the most basic principle of explanation for this world. The *apeiron* may explain why the opposites and their stuffs exist at all,⁴¹ but it is the opposites that

³⁹ C. Kahn, *Anaximander and the Origins of Greek Cosmology* [*Anaximander*] (New York, 1960) at 178 supports this view. Vlastos too seems to suggest this when he speaks of ‘the opposites which constitute this world’ in his ‘Equality and Justice in Early Greek Cosmologies’ [‘Equality and Justice’] *Classical Philology*, 42.3 (1947), 156-178 at 169. G. Freudenthal in his ‘The Theory of Opposites in an Ordered Universe: Physics and Metaphysics in Anaximander’ [‘Theory of Opposites’], *Phronesis*, 31 (1986), 197-228 at 198 claims that the statement ‘the basic constituents of Anaximander’s world are equal opposite powers’ is ‘uncontroversial’. Graham, *Explaining the Cosmos*, 42 on the other hand, argues against this pure power ontology. But Graham still promotes, as do I, the interpretation that the powers are the explanatorily basic factors in Anaximander’s thought.

⁴⁰ Graham, *Explaining the Cosmos*, 42.

⁴¹ This interpretation of the *apeiron* is supported by Vlastos, ‘Equality and Justice’, but is contested by Freudenthal ‘Theory of Opposites’.

provide the ultimate explanation for why stuffs are the way they are and behave the way they do.⁴²

I turn now to Anaximenes, who is generally thought to be one of Anaximander's rough contemporaries.⁴³ According to the *testimonia*, Anaximenes provides an explanation of the physical world by means of two opposing processes – rarefaction and condensation:

διαφέρειν δὲ μανότητι καὶ πυκνότητι κατὰ τὰς οὐσίας. καὶ ἀραιούμενον μὲν πῦρ γίνεσθαι, πυκνούμενον δὲ ἄνεμον, εἶτα νέφος, ἔτι δὲ μᾶλλον ὕδωρ, εἶτα γῆν, εἶτα λίθους, τὰ δὲ ἄλλα ἐκ τούτων. (DK13A5.4-6)

[Air] differs in essence in accordance with its rarity (μανότητι) and density (πυκνότητι). When it is thinned (ἀραιούμενον) it becomes fire, while when it is condensed it becomes wind, then cloud, when still more condensed it becomes water, then earth, then stones. Everything else comes from these.⁴⁴

Here, as with Anaximander, Anaximenes in a way treats opposites as the fundamental *explanantia* of the physical world. It is true that Aristotle claims Anaximenes' *archê* is air, but the real explanatory power seems to come from the opposing processes that account for the differences in essence of the various stuffs into which air can transform.⁴⁵ This is not to say that the opposites are of the same sort for Anaximenes and Anaximander, or that they account for the physical world in the same way. For Anaximander, it seems opposing *powers* explain the

⁴² Some may think that cosmic justice is a fundamental, explanatory principle for Anaximander. However, it seems to me that Anaximander's opposites are self-regulating as a matter of necessity. Cosmic justice simply is the self-regulating war of opposites.

⁴³ Diogenes Laertius, *Lives of the Eminent Philosophers*, 2.3 and Simplicius, *Physics*, 24.26 claim that Anaximenes was the student of Anaximander. But these later reporters loved to arrange all historical philosophers into long chains of teachers and students, often without any real evidence.

⁴⁴ This testimony is provided by Simplicius, *Physics*, 24.26-25.1.

⁴⁵ Aristotle, *Metaphysics* A, 984a5-7.

physical world, while for Anaximenes opposing *processes* explain the physical world. But it does seem that both attempted to offer an explanation of the cosmos by appealing to fundamental opposites. Put simply, for both Anaximander and Anaximenes, stuffs, things and events in the physical world are *explananda* and certain opposites serve as their *explanantia*.

Anaximander and Anaximenes seem to be concerned with explanatory *fundamentality*.⁴⁶

Their respective opposites appear to be fundamental *explanantia* for the rest of the physical world. As such, we can classify their views in line with Metaphysical Foundationalism.

According to foundationalists, the entire cosmos is explained by one or more metaphysically

⁴⁶ In the terms of modern metaphysics, we might say they are concerned with *grounding*. Grounding relations are generally thought to be ‘in virtue of’ relations, such that when *y* holds in virtue of *x*, *x* grounds *y*. If *x* grounds *y*, then *x* is more fundamental than *y* and *x* explains *y*. While these early thinkers are clearly not concerned with the finer points of grounding relations being debated today, their systems of explanation seem to follow the general pattern of grounding as expressed above. See F. Correia, and B. Schnieder (eds.), *Metaphysical Grounding: Understanding the Structure of Reality [Metaphysical Grounding]* (Cambridge University Press, 2012) for a recent anthology on ground. There is a current debate concerning the precise nature of ground; for a sample of this debate see Rosen, G. ‘Metaphysical Dependence: Grounding and Reduction’ in *Modality: Metaphysics, Logic, and Epistemology*, ed. B. Hale and A. Hoffman (Oxford, 2010), 347-383; C. S. Jenkins, ‘Is Metaphysical Grounding Irreflexive?’, *The Monist*, 94 (2011), 267-276; J. Schaffer, ‘Grounding, Transitivity, and Contrastivity’, in Correia, F. and Schneider, B. (eds.) *Metaphysical Grounding* (2012), 122-138. K. Fine, ‘Guide to Ground’ [‘Guide’], in F. Correia and B. Schneider, *Metaphysical Grounding* (2012), 37-80; K. Koslicki, ‘Varieties of Ontological Dependence’, in F. Correia and B. Schneider, *Metaphysical Grounding* (2012), 186–213; M. J. Raven, ‘Ground’, *Philosophy Compass*, 10.5 (2015), 322-333; J. Zylstra, ‘The Essence of Grounding’ [‘Essence’], *Synthese*, 196.12 (2019), 5137-5152. The notion of grounding I believe to be at work in Anaximander is endorsed by Raven, ‘Ground’. According to Raven, ‘Ground is ... supposed to serve a certain job description: it is the common factor in diverse *in virtue of* questions, the structuring relation in the project of explaining how some phenomena are “built” from more fundamental phenomena, and a key part of a venerable tradition concerned with metaphysical explanation’ (324). He also explains that ‘ground is *metaphysical* because it concerns the phenomena in the world itself, but also *explanatory* because it concerns how some phenomena hold in virtue of others’ (326). We might worry that it is anachronistic to interpret these thinkers as being concerned with grounding. However, the idea is not that they are consciously employing a concept of grounding, but merely that they seem to have had some basic notion of ontological and explanatory fundamentality, and that this notion, untheorized among these early Greek philosophers, is the same one contemporary metaphysicians interested in grounding investigate.

foundational (i.e. absolutely fundamental) entities.⁴⁷ Explanations flow in one direction from the foundational entity/entities through the varying levels of fundamental entities to the derivative entities.⁴⁸ Anaximander's metaphysical foundation (*archê*) is the *apeiron* and Anaximenes' is air insofar as these pose the existential conditions for the cosmos. These, in turn, ground the existence of the opposites and, in the words of Simplicius 'everything else comes from these'. The opposites are existentially derivative from the foundation, but the opposites are fundamental to the rest of the physical world (observable stuffs, things, and events). In a word, their respective opposites do all the explanatory work with respect to the nature of the physical world. In sum, Anaximander and Anaximenes accepted two principles concerning opposites and explanations: 1) the physical stuffs, things, and events in the world are *explananda* and certain opposites are their *explanantia*, and 2) these opposites are explanatorily fundamental in the physical world and everything else in the physical world is explained with reference to them.⁴⁹

III. Opposites as Explananda

⁴⁷ Raven, 'Ground', summarizes foundationalism: 'if explanations must begin, then so too any grounded fact must ultimately be grounded in facts which themselves are ungrounded ... [this] entails that this ordering terminates in minimal elements, like an explanatory chain beginning from unexplained explainers' (327). These unexplained explainers are foundational entities.

⁴⁸ A contemporary expression of this principle is called a Strict Partial Order: explanatory relations are irreflexive, transitive and asymmetric. See M. J. Raven, 'Is Ground a Strict Partial Order?', *American Philosophical Quarterly*, 50.2 (2013), 193-201. Anaximander's and Anaximenes' explanations do appear to follow a Strict Partial Order. According to this view chains of grounding obtain. In the grounding chain, $X \rightarrow Y \rightarrow Z$. X is foundational and non-derivative. Y and Z are derivative, but Z is more derivative than Y. Y is fundamental with respect to Z, but derivative with respect to X.

⁴⁹ This isn't to say that Anaximander and Anaximenes don't have their differences with respect to their schemes of explanation, but I do think it is safe to say that they held these principles in common. It's worth pointing out that this interpretation fits nicely with Aristotle's argument that the 'physicists' used contraries to explain change in the cosmos in *Physics*, I.4, 188a27-a31.

When we turn to Heraclitus, we see a change in how opposites are featured, but it is difficult to see clearly what that change amounts to.⁵⁰ In Anaximander and Anaximenes, the featured opposites are few and of the same order. For Heraclitus, the opposites are numerous and varied. This discrepancy suggests an implicit criticism on the part of Heraclitus, but it is difficult to see what the criticism might be.⁵¹

Many scholars have suggested that Heraclitus' B80 is an implicit criticism of Anaximander and so it is worth examining this line of thought:⁵²

εἶδεναι δὲ χρὴ τὸν πόλεμον ἔόντα ξυνόν, καὶ δίκην ἔριν, καὶ γινόμενα πάντα
κατ' ἔριν καὶ χρεών. (DK22B80)

It is necessary to know that war is common, and strife is justice, and all things come to be in accordance with strife and necessity.

While Anaximander in B1 (quoted above, section II) says that the opposites pay for their injustice, Heraclitus claims that the striving of opposites *is* justice. Some interpreters see this as evidence for the single unity of opposites thesis in Heraclitus: *opposites are essentially*

⁵⁰ Lloyd, *Polarity and Analogy*, tries to make sense of Heraclitus' new approach within the tradition of appealing to opposites: 'While Heraclitus' theory was exceptional in that he particularly emphasised the interdependence or 'unity' of opposites, it was typical in so far as he too analysed the data of experience generally into pairs of opposites' (17). However, Lloyd does not discuss exactly how and why Heraclitus analyzed the data of experience into opposites. Furthermore, it seems Heraclitus treated the pairs of opposites *as* data of experience rather than *analyzing* the data of experience by means of opposites (esp. B126: 'cold things warm up ... etc.').

⁵¹ According to Graham, *Explaining the Cosmos*, Heraclitus contributes to the development of early Ionian natural philosophy by solving the problem of primacy in what he (i.e. Graham) calls the Generating Substance Theory (GST) (see esp. chapters 4 and 5). Graham's view helps to situate Heraclitus in the development of Ionian science. However, it does not fully explain Heraclitus' use of opposites in the way he did.

⁵² See Kirk, *Cosmic Fragments*, 240; Vlastos, 'On Heraclitus', 358; Mourelatos, 'Naïve Metaphysics', 35; Kahn, *Art and Thought*, 206.

connected.⁵³ But if this is a criticism of Anaximander, surely Heraclitus' point is merely semantic and not substantial, since both Anaximander and Heraclitus seem to be claiming that a war or strife of some sort is the proper course of the cosmos.⁵⁴ Hence it does not seem that B80 really is a criticism of Anaximander after all; it even seems to be a point of agreement. To be clear, there are differences. For Anaximander this strife has a beginning (insofar as he thinks there is a beginning to the cosmos). For Heraclitus strife is eternal. Furthermore, Anaximander's retaliation of opposites is just, but not *all* strife is just on his account. For Heraclitus strife as such, seems to be just. So, what is Heraclitus' implicit criticism of the way opposites are featured in the intellectual milieu of his day?

Here is my suggestion. While Heraclitus' predecessors explained the physical world by means of a simple set of fundamental opposites, Heraclitus proliferates examples of many different pairs of opposites to make the point that we cannot so simply explain the world by reducing our *explanantia* to a pair (or limited set of pairs) of opposites.⁵⁵ Perhaps we could even read Heraclitus' numerous and varied instances of opposites as an argument of indifference against his predecessors.⁵⁶ An indifference argument uses a lack of reason to establish a definite

⁵³ Mourelatos, 'Naïve Metaphysics' at 35 argues that for Anaximander the 'opposites are essentially incompatible,' but for Heraclitus 'they are *one*, they are internally or conceptually related by being opposed determinations within a single field'. But Anaximander's opposites would also have to be 'opposed determinations within a single field', by the same logic.

⁵⁴ Kahn, *Anaximander*, at 183 writes: 'The elements feed one another by their own destruction, since what is life to one is death for its reciprocal. The first law of nature is a *lex talionis*: life for life'. There is a debate concerning whether or not for Anaximander the opposites govern themselves (Kahn, *Anaximander*, 167-8 and Vlastos, 'Equality and Justice', 156-8) or whether the opposites require the *apeiron* to govern them (Freudenthal, 'Theory of Opposites', 208).

⁵⁵ It is possible that Parmenides (presumably writing after Heraclitus, although we don't know for sure) made a similar point about the use of opposites in his predecessors. See Parmenides, DK28B8.53-61.

⁵⁶ I would like to thank Victor Caston for this suggestion. I appeal to the work of S. Makin, *Indifference Arguments* (Oxford, 1993). The main form of an indifference argument is this: 1).

conclusion. Such arguments are not foreign to Presocratic thinkers before and after Heraclitus.⁵⁷ Heraclitus' implicit criticism of Anaximenes could plausibly be construed thus: 'Why pick rarefaction-condensation as the fundamental explanatory pair of opposites when there are a number of other opposites?' Heraclitus cites numerous pairs of opposites that could rival Anaximenes' opposites as contenders for fundamental *explanantia*: wet/dry, war/peace, life/death. It stands to reason that we could just as plausibly construe a fundamental principle out of each of these as we could out of Anaximander's or Anaximenes' opposites. At the same time, it is implausible to think that all opposites could equally be fundamental. For simplicity's sake, just consider Anaximander's and Anaximenes's opposites: hot-cold, rarity-density. Both sets are equal contenders to be fundamental *explanantia*. But both can't be fundamental. Either rarity-density explains hot-cold (as Anaximenes thinks) or hot-cold explains rarity-density (as Anaximander thinks).⁵⁸ Neither, on their own, are right (according to Heraclitus); and both can't be right. And so, neither set of opposites can serve as the fundamental *explanans* of the cosmos.⁵⁹

There is no more reason for p than there is for q. 2) Either both p and q are true or neither p nor q are true. Independent argumentation is required to determine which disjunct in the initial conclusion is warranted.

⁵⁷ It is thought that Anaximander appealed to an argument of indifference when he reasoned that the earth is stable and at the centre of the universe since it has no more reason to be at one side than it does to be at the other (Anaximander, A26). See Makin, *Indifference Arguments*, 101-105 for an analysis of Anaximander's indifference argument. Democritus, writing after Heraclitus, employed indifference arguments to conclude that atoms are partless and that there exists an infinite variety of atoms. See Makin, *Indifference Arguments*, 49-84 for an extensive analysis of indifference arguments in Democritus.

⁵⁸ At least, this is true on a foundationalist framework for explanation. It need not be true on a coherentist framework.

⁵⁹ This isn't to say that they cannot be *explanantia* at all, just that they cannot be fundamental *explanantia*.

His further point, I think, is that opposites require an explanation as much as the physical world does. Indeed, we experience them as evident in the physical world (e.g. cold things warm up, etc.) and it stands to reason that we need an explanation for why they behave the way they do. Thus, we cannot merely treat them as *explanantia*, we must treat them as *explananda*. I reconstruct the argument as follows:

1. There are many sets of opposites of a varied sort that are equal contenders to be taken as fundamental *explanantia*.⁶⁰
2. We have no more reason to choose one set of opposites (e.g., hot-cold) over other equal contenders as a fundamental *explanans*.
3. Either these sets of opposites are all fundamental *explanantia* or none are.
4. It is implausible that all these sets of opposites are fundamental *explanantia*.
5. Hence, none of these sets of opposites are fundamental *explanantia*.
6. Everything is either a fundamental *explanans* or an *explanandum*.
7. Therefore, all sets of opposites are *explananda*.⁶¹

Note that being an *explanans* is compatible with being an *explanandum* – something can explain something else while requiring an explanation itself.⁶² But being a fundamental *explanans* is

⁶⁰ Note that my formulation of the argument does not rest on the claim that *all* sets of opposites for Heraclitus are equal contenders for fundamental *explanantia*. It is simply the case that at least *some* sets of opposites are equal contenders to be fundamental *explanantia*. And this is enough to secure the argument. I do not spell out which sets these are, nor need I for the argument to work.

⁶¹ One may wonder why I slide from ‘these sets’ in the premises to ‘all sets’ in the conclusion. The answer is simple: in the initial premises, we are considering sets of opposites that are plausible contenders as fundamental *explanantia*. All remaining sets (e.g., possibly up-down) are *not* fundamental *explanantia* by default. So, the move from ‘these sets’ to ‘all sets’ is warranted by this default exclusion.

⁶² For example, a water molecule both explains the properties of blood plasma and is explained by its subatomic particles. The water molecule is both an *explanans* (with respect to blood plasma) and an *explanandum* (with respect to the subatomic particles).

incompatible with being an *explanandum* – fundamental *explanantia* are unexplained explainers. Of course, Heraclitus did not formulate this argument. However, I do think it is plausible that the conclusion is Heraclitus' and that the argument captures his reasons for holding that conclusion. Two things strike me as true: (1) Anaximander and Anaximenes did choose a limited set of oppositional pairs to explain the entire cosmos. And (2) they are wrong for arbitrarily choosing one (or some) set(s) of opposites from a number of equally plausible pairs of opposites. I think Heraclitus was aware of (1) and saw the truth in (2). I submit that this reconstruction makes good sense of why Heraclitus cited so many varied pairs of opposites. It also makes good sense of why many of his pairs of opposites are presented in a puzzling fashion.

If this is right, we have a partial answer to the question: how do opposites feature in Heraclitus' explanation of the cosmos? Our initial answer is that they are not fundamental *explanantia*, they are *explananda*. I want to be clear. I do not think the negative argument exhausts Heraclitus' interest in opposites. I will have more to say about Heraclitus' positive interest in opposites below (Section VI). Before I do so, it is worth pointing out that if I'm right and Heraclitus saw the opposites as *explananda*, and if I'm right that Heraclitus is interested in explaining the cosmos, then he must have thought there was an *explanans* for the opposites. But what is the *explanans* for the opposites now conceived as *explananda*?

IV. Against a Metaphysical Foundation

When dealing with Heraclitus' predecessors, I argued that they were foundationalists of a sort. Foundationalists hold the belief that everything in the cosmos is either directly or indirectly explained by a foundational entity or a set of foundational entities. Foundational here means *absolutely* fundamental. What is regarded as foundational is something that explains others but is not itself explained by anything else. Does Heraclitus have a foundational entity or set of

foundational entities? For Heraclitus, there seem to be four potential candidates for a non-cosmogonical, foundational principle of explanation for the cosmos: fire, *logos*, God or the cosmos itself. However, I will argue that none of these candidates can satisfy the conditions necessary to be considered a foundational principle of explanation.

Fire is cited in B30 as something that might appear to be a foundational principle. Heraclitus identifies the cosmos with an ever-living fire, and many have interpreted this literally.⁶³ According to this material monist view, Heraclitus thought all things are fire as substratum and the changes in the cosmos are mere accidental changes of this basic substance. If this is true, then Heraclitus' theory of elemental change is reduced to the alterations of a more basic stuff: fire. But this view does not square well with Heraclitus' theory of radical elemental change. We saw from B76 that the elements transform into one another such that the birth of one element is the death of another element. Importantly, fire is also part of this birth-death cycle. Heraclitus says that 'the death of fire is the birth of air' (πυρὸς θάνατος ἀέρι γένεσις). If the fire of B30 is ever-living (ἀείζωον), it cannot be the same fire spoken of in B76 of which death (θάνατος) is predicated. At the very least, I think it is safe to say that elemental fire is not what everything is made of and therefore not a metaphysical foundation in that sense.

However, fire might be foundational in another sense. Consider fragment B90:

πυρός τε ἀνταμοιβή τὰ πάντα καὶ πῦρ ἀπάντων ὅκωσπερ χρυσοῦ χρήματα καὶ
χρημάτων χρυσός. (DK22B90)

⁶³ Aristotle is famous for his material monist interpretation of Heraclitus and other Presocratics. See *Metaphysics* 983b6-983b18 and 984a5-984a11. Barnes, *The Presocratic Philosophers*, 45-48 has argued more recently that Heraclitus is a material monist who supposed that all things are actually fire in altered guise. See Graham, *Explaining the Cosmos*, 122-129 (esp. at 127) for an extended argument against the material monist view. See also H. Cherniss, *Aristotle's Criticism of Presocratic Philosophy* (Baltimore, 1935), and H. Cherniss, 'The Characteristics and Effects of Presocratic Philosophy', *Journal of the History of Ideas*, 12 (1951), 319-45.

All things are an exchange for fire and fire for all things, as goods for gold and gold for goods.

Heraclitus does seem to give a privileged status to fire. For this reason, some have argued that fire has metaphysical primacy over the other elements. Charles Kahn, for example, has argued that fire is the original element out of which all the elements are born and into which all the elements die.⁶⁴ Indeed, fragment B31 seems to indicate that the elemental transformations begin with fire and are called the ‘turnings of fire’ (*puros tropai*). But, metaphysically speaking, the elements still seem to exist in a closed cycle of transformation. The essences of the other elements are no more dependent on the essence of fire than the essence of fire is dependent on the other elements. Furthermore, this again does not square well with B30 which claims that the cosmos always was, is and will be fire. For these reasons, I think it makes most sense to suppose that fire itself is not a metaphysical foundation for the cosmos; instead, it is a symbol for the cosmos as a dynamic, regulated entity.⁶⁵

Instead of fire, some might claim that the *logos* is a foundational principle of explanation for Heraclitus.⁶⁶ We saw that in fragment B1 Heraclitus claims that the *logos*, whatever it is, holds forever (τοῦ δὲ λόγου τοῦδ’ ἐόντος ἀεὶ). He also claims in B1 that all things come to be in accordance with the *logos* (γινομένων γὰρ πάντων κατὰ τὸν λόγον τόνδε). In B2, he claims that the *logos* is common (τοῦ λόγου δ’ ἐόντος ξυνοῦ) even though most humans have a private

⁶⁴ Kahn, *Art and Thought*, 132-138.

⁶⁵ In taking fire as a symbol for organized, cosmic change, I follow Graham, *Explaining the Cosmos*, who says that fire is ‘fundamental just by being symbolic of the constant change that the elements undergo’ (127). Interestingly, Kahn, *Art and Thought*, too claims at 136 that Heraclitus chose fire as his primary element for metaphoric reasons.

⁶⁶ Most recently R. McKirahan, *Philosophy Before Socrates*, 2nd edn. (Indianapolis, 2010) at 133 and P. Curd, ‘The Divine and the Thinkable: Toward an Account of the Intelligible Cosmos’ [‘Intelligible’], *Rhizomata*, 1.2 (2013), 217-24 at 236-238.

understanding of the world. In B50, Heraclitus says: ‘listening not to me but to the *logos* (τοῦ λόγου ἀκούσαντας) it is wise to agree that all things are one’. Many scholars have interpreted Heraclitus’ *logos* as a cosmic law.⁶⁷ The greatest evidence seems to come from the second occurrence in B1 in which Heraclitus claims that all things come to be in accordance with the *logos*. There is a problem with interpreting Heraclitus’ *logos* as a cosmic law: rendering the term in this manner would mean that Heraclitus’ use of the term *logos* bears no resemblance to the standard use of the term in and around the time Heraclitus was writing.⁶⁸ In response to this problem some scholars have argued that the cosmic law interpretation forces a Stoic conception of *logos* back onto Heraclitus and that it is plausible to read *logos* as simply referring to what Heraclitus is saying.⁶⁹ That’s what a *logos* was in Heraclitus’ day: something someone says (*legein*). However, this interpretation also has its problems; it seems implausible that Heraclitus *wasn’t* using the term in a special sense, especially with the second usage of *logos* in B1: it is implausible that Heraclitus thought all things came to be in accordance with his utterances. This interpretation also makes nonsense of B50: ‘listening not to me, but to the *logos*...’ It is implausible that Heraclitus wanted us to listen not to him but to what he says. So, on the one hand, a cosmic law interpretation of *logos* seems to be too strong, but the deflationary reading seems to be too weak.

Mark Johnstone has recently offered a moderate solution to this issue that to my mind provides the most plausible understanding of *logos* in Heraclitus. Johnstone examines the

⁶⁷ Graham, *Explaining the Cosmos*, 143-144; McKirahan, *Philosophy Before Socrates*, 136; Curd, ‘Intelligible’, 237.

⁶⁸ See Johnstone, ‘*Logos*’, 2. There he argues: ‘Yet the single biggest problem with this “cosmic-law” interpretation, as it might be called, is that it risks completely detaching Heraclitus’ employment of the word “*logos*” from any other attested use of it in and around his time’.

⁶⁹ Burnet, *Early Greek Philosophy*, 4th ed. (London, 1930), 133 n.1; West, *Orient*, 124-9; Barnes, *The Presocratic Philosophers*, 59.

common usage of *logos* around the time Heraclitus was active. He finds that, ‘while the term “*logos*” most commonly referred to something appearing in language, it was not merely anything that happened to be said. Rather, a *logos* was an organized presentation of things as being “thus and so”’.⁷⁰ When things are presented in a certain way, they can be understood. On these grounds, Johnstone argues that ‘Heraclitus denotes by the term “*logos*” neither his own discourse nor a cosmic law, but rather the world’s orderly and intelligible (i.e. comprehensible, understandable) presentation of its nature to us throughout our lives’.⁷¹ Thus the *logos* doesn’t belong to Heraclitus but to the cosmos itself. On this reading, the *logos* is simply the world’s presentation of its nature as orderly and intelligible, not the foundational explanatory principle of the cosmos itself. It is worth noting that if this interpretation is correct – and I think it is – the question of fundamentality gets passed on to the cosmos. Is the cosmos itself the foundation of all things? We will examine this view shortly. But first it will be helpful to examine Heraclitus’ theology.

Some have claimed that Heraclitus’ God is the foundational principle of explanation for the cosmos.⁷² We’ve already examined fragment B30 which claims that the cosmos was not created by a god. But Heraclitus does think God exists and is somehow identified with the cosmos:

ὁ θεὸς ἡμέρη εὐφρόνη, χειμῶν θέρος, πόλεμος εἰρήνη, κόρος λιμός
[τὰναντια ἅπαντα ...], ἀλλοιοῦται δὲ ὅκωσπερ <...> ὀκόταν συμμιγῆι
θυώμασιν, ὀνομάζεται καθ’ ἡδονὴν ἐκάστου. (DK22B67)

⁷⁰ Johnstone, ‘*Logos*’, 16.

⁷¹ Johnstone, ‘*Logos*’, 21.

⁷² Curd, ‘Intelligible’, suggests at 237 that the *logos* is divine and that the divine *logos* is foundational.

God is day night, winter summer, war peace, satiety hunger [all the contraries ...], and he alters just as <oil/fire?> when it is mixed with spices, is named according to the aroma of each of them.⁷³

Heraclitus here identifies God with several opposing pairs – perhaps *all* the opposites if we accept Hippolytus’ interpolation.⁷⁴ Heraclitus elsewhere refers to this divine being as ‘one’ (*hen*) and ‘wise’ (*sophon*) (B32 and B41).⁷⁵ Incidentally, Heraclitus claims that all things are *one*:

οὐκ ἔμοῦ, ἀλλὰ τοῦ λόγου ἀκούσαντας ὁμολογεῖν σοφόν ἐστὶν ἐν πάντα εἶναι.

(DK22B50)

Having listened not to me, but to the *logos*, it is wise to agree that all things are one.⁷⁶

Since Heraclitus’ God is not the creator of the cosmos (B30), is somehow immanent in the cosmos (B67) and is identified with the cosmos (B67 and B50, by way of B32 and B41), I submit it makes most sense to suppose that Heraclitus’ God simply *is* the cosmos: all things together as a whole, integrated, orderly, intelligible, and ever-living entity. I cannot defend this view fully here, but I believe it makes the most sense of Heraclitus’ divine fragments. If I’m

⁷³ There is a lacuna in this fragment. Diels, *Fragmente*, Graham, *Texts*, Marcovich, *Heraclitus*, and Kirk, *Cosmic Fragments*, fill it with “fire.” However, there is some evidence to suggest that the missing word could well be ‘oil’, since this was a common mixture with spices. See H. Frankel, ‘Heraclitus on God and the Phenomenal World’, *Transactions and Proceedings of the American Philological Association*, 69 (1938), 230-244.

⁷⁴ Hippolytus, the supplier of this fragment, adds that God is *all* the contraries.

⁷⁵ ἐν τῷ σοφόν, μόνον λέγεσθαι οὐκ ἐθέλει καὶ ἐθέλει Ζηνὸς ὄνομα (B32): ‘The wise is one, it alone wishes and does not wish to be called by the name of Zeus’. εἶναι γὰρ ἐν τῷ σοφόν, ἐπίστασθαι γνώμην, ὅτε ἐκυβέρνησε πάντα διὰ πάντων (B41): ‘Wisdom is one: knowing the thought/plan that steers all things through all’.

⁷⁶ This fragment is preserved for us by Hippolytus, *Refutations*, IX. 9.1.

right, we are again pushed to consider whether the cosmos itself is explanatorily basic (i.e. foundational).

To be explanatorily basic, the cosmos as an integrated whole must explain its parts and not the other way round. This is a question about fundamental mereology: are the parts prior to the whole or is the whole prior to the parts? The priority pluralist will argue that the parts explain the whole; the priority monist will argue that the whole explains the parts.⁷⁷ Importantly, a foundationalist must come down on one side and one side only since, according to their view, *something* must be foundational, and a foundation cannot be something that is itself explained by anything else. Does Heraclitus pick a side? Consider fragment B10:

συλλάψεις: ὅλα καὶ οὐχ ὅλα, συμφερόμενον διαφερόμενον, συναῖδον διαῖδον,
καὶ ἐκ πάντων ἓν καὶ ἐξ ἑνὸς πάντα. (DK22B10)

Collectives: wholes and not wholes; brought together, pulled apart; sung in unison, sung in conflict; both from all things one and from one all things.

This fragment is concerned with mereological priority – or so I will argue.⁷⁸ The first word (συλλάψεις) refers to things that are taken together: collective entities. Heraclitus then affirms that collective entities are both whole and not-whole. There are three ways we might interpret the meaning of the opposing pairs in the middle of the fragment: 1) we might think it is a diachronic description of the cosmos: at one time it is pulled apart (a mereological sum), at another time it is brought together (a proper whole). But this interpretation is ill-advised as we have no other evidence of such an Empedoclean cycle in Heraclitus. Furthermore, it fails to make sense of

⁷⁷ I borrow the terms “priority pluralism” and “priority monism” and their meanings from J. Schaffer, ‘Priority Monism’, *Philosophical Review*, 119.1 (2010), 31-76. See this work for a contemporary defense of Priority Monism.

⁷⁸ Graham, *Explaining the Cosmos*, 143, also recognizes the mereological nature of this fragment.

Heraclitus' use of the plural 'collectives' at the beginning of the fragment. 2) we might think that Heraclitus' is using this fragment to parse out different types of collectives: some are proper wholes, others are mereological sums. But this interpretation suffers since the point in the first half would have very little to do with the final statement about the cosmos and its parts. Finally, 3) we might think that the pairs of opposites parse out the different aspects of part-whole structures (i.e. collectives). The different aspects of such a structure are their parts (not-whole, pulled apart, sung in conflict) and the integrated whole (whole, brought together, sung in unison). I adopt this aspectual reading of part-whole structures in B10 since it fares better than the other two interpretations in that it can provide a unified interpretation of the fragment: the entire fragment is about wholes and their parts. The plural collectives at the beginning of the fragment lets us know that Heraclitus thinks there are whole-part structures within the cosmos. The final words reveal that such wholes can also be the parts of the cosmos and that the cosmos itself is a whole-part structure. Heraclitus ends the fragment with the cosmic claim that 'all things come from one and one comes from all things'. The 'one' must indicate the cosmos. The 'all things' must indicate the parts of the cosmos. If this is so, Heraclitus appears to be ambivalent with respect to mereological priority: the whole and its parts stand to one another in a relation of metaphysical interdependence. And since a Metaphysical Foundationalist cannot be ambivalent with respect to mereological priority, Heraclitus cannot be a Metaphysical Foundationalist.

But let us consider the last eight words of B10 more carefully: 'both from all things one and from one all things'. If 'one' (ἓν) designates the cosmos and 'all things' (πάντα) its parts, can we make good sense of the odd and reciprocal use of 'from' (ἐκ)? In context, the Greek term

‘from’ (ἐκ) plausibly denotes either *generation* or *composition*.⁷⁹ If Heraclitus means the former, he would be claiming that all things are generated from the cosmos, and that the cosmos is generated from all things. But reading ‘from’ (ἐκ) as generation seems to contradict B30, which claims that the world is ever-living and not created. If he intends the latter, he would be claiming that the cosmos is made out of all things, and that all things are made out of the cosmos. But reading ‘from’ (ἐκ) as composition seems to contain a logical difficulty: the cosmos cannot be composed of all things as matter if all things are composed of the cosmos as matter. Pages can be said to compose a book; but that same book cannot then be said to compose the pages. Composition is a non-reciprocal relation. A third option is possible. The ‘from’ (ἐκ) might suggest cosmogonical language. In Anaximander A10, it is claimed that ‘hot and cold separated off at the coming to be of the world-order and from this (*ek toutou*) a sort of sphere of flame grew’. The preposition ‘from’ (ἐκ), when used in a cosmogonical context, might signal a sort of cosmogonical movement from *explanans* to *explanandum*. Heraclitus’ point in B10 might then be that ‘all things’ and ‘one’ are mutually explanatory, such that neither is more fundamental than the another. In other words, ‘all things’ hold in virtue of the ‘one’, and the

⁷⁹ There are other uses of ἐκ: place (the place *from* which), or of time (thereafter, or a point in time *at* which something occurs), but this fragment does not seem concerned with time or place.

‘one’ holds in virtue of ‘all things’.⁸⁰ Neither are explanatorily basic. Both the cosmos and its parts explain one another in a reciprocal fashion.⁸¹

Let’s explore the relation between the cosmos and its parts more carefully. If Heraclitus is claiming that the whole cosmos is explained by its parts and the parts are explained by the whole cosmos, does this commit him to symmetrical explanation whereby X and Y explain one another in exactly the same manner? It need not, at least not if he assumed the following:

Part-Whole Principle: Wholes and parts stand to one another as mutually, though not exhaustively, explanatory.

Heraclitus’ point is rather intuitive. If you want to understand the cosmos, you’ll need to examine its parts. And if you want to understand the parts of the cosmos, you’ll need to examine

⁸⁰ This usage of ἐκ seems to be a plausible construal of the ‘in accordance with’ usage cited by Liddell and Scott, *A Greek-English Lexicon*, 9th ed., revised by H. Stuart Jones and R. McKenzie (Oxford, 1925-40). See entry: ἐκ III.7. In this instance, ἐκ seems to be citing the ground of information. Compare the following usages: Herodotus I.64: τὴν νῆσον Δῆλον καθήρας ἐκ τῶν λογίων: ‘he purified the island of Delos *in accordance with* the oracles’. Demosthenes, *Against Timocrates*, 28.3: ἀνελὼν τὸν ἐκ τῶν νόμων χρόνον. ‘he cancelled the time that was in accordance with the statute’. Aeschylus, *The Persians*, 397: ἔπαισαν ἄλμην βρύχιον ἐκ κελεύματος. ‘they struck [with their oars] the briny deep *in accordance with* the command’. In all these cases ἐκ seems to be citing an origin of some information. In the Herodotus passage, Peisistratus cleanses the island of Delos having been informed to do so by the oracles; Peisistratus understands x (to cleanse the island) from y (the oracle). In the Demosthenes passage, Demosthenes is describing a man who drafts a decree but alters the date; he cancels the date that was *given* or *informed* by the statute. In this situation we understand x (the correct date) from y (the decree). In the Aeschylus passage the rowers strike oar because of the command; they understood x (to row) from y (the command).

⁸¹ It is worth pointing out that B90, discussed above (same section), corroborates this conclusion. Heraclitus claims that fire is an exchange (ἀνταμοιβή) for all things and all things for fire. If I am right in thinking that fire is a metaphoric symbol for the cosmos itself (as evidenced by B30), then B90 is saying that the cosmos is exchangeable for all things and all things for the cosmos in the same way that goods and gold are exchangeable. What is the foundation for the value of goods and the value of gold? Their values are interdependent and arise from the exchange itself. The point of B90 seems to be that there is a metaphysical currency whereby all things (i.e. the parts of the cosmos) and the cosmos itself are worth the same. This point resonates with the idea that the cosmos and its parts are explanatorily interdependent.

the whole cosmos. But this isn't the whole story. In B1 Heraclitus claims to differentiate each part (διαίρεων ἕκαστον) of the cosmos in order to explain its nature. The success of explaining the nature of things by division entails the explanatory interdependence of the things being explained. Any part of the cosmos is what it is (in part) because of its surrounding parts. As such, I believe it makes good sense to think that Heraclitus adopted the following principle:

Difference Principle: Any part of a whole is different from every other part and is what it is, in part, because of the other parts of that whole.⁸²

By differentiating the parts (διαίρεων ἕκαστον) of the cosmos, we come to understand how things are explained by their surrounding entities.⁸³ For example, we recognize that land and sea (parts of the cosmos) are distinct from one another. And we can begin to understand what they are by explicating the differences between them. For starters, the one is dry, stable, and fit for humans (but not fish) and the other is wet, flowing, and fit for fish (but not humans). This differentiation reveals to us something about the metaphysical character of land and sea. At least

⁸² More evidence for the Difference Principle might be found in B53 and B80 where Heraclitus claims that 'war (Πόλεμος) is the father of all' (B53) and 'all things happen in accordance with strife (ἔρις)' (B80). Some might think that, on the basis of these fragments, war/strife is a candidate for a foundational principle of explanation. But it seems to me that claiming that 'war is the father of all' just is to say that nothing in or about the cosmos is a foundational principle of explanation. Strife itself cannot be a foundational principle of explanation for Heraclitus since it has an opposite, peace, that helps explain what strife is. Instead, by saying that war is the father of all, I take Heraclitus to be saying that things in the cosmos are always pitted against one another in an explanatorily productive manner. For more on Heraclitus' interest in differentiating see B7: εἰ πάντα τὰ ὄντα καπνὸς γένοιτο, ῥῖνες ἂν διαγνοῖεν. 'If all things became smoke, noses would distinguish them'.

⁸³ I don't mean to suggest that the Difference Principle is fully expressed in B1. Rather, the Difference Principle is a plausible and meaningful interpretation of B1, especially in light of Heraclitus' lack of a clear and stable foundation for explanation. I should also make clear that I do not think that non-identity entails explanatory dependence. Instead, it seems that the explanatory dependence of parts is understandable by recognizing the difference between the parts.

some of their intrinsic and extrinsic properties help to explain one another. As such, land and sea themselves are what they are (at least in part) because of one another. The point of the Difference Principle is this: in the absence of a metaphysical foundation, the different explanatory factors of a given whole help to explain one another.⁸⁴

By combining the Difference Principle and the Parts-Whole Principle, we can get a fuller picture of Heraclitus' scheme of explanation. If we want to understand any part of the cosmos fully, we will need to see how it is differentiated and explained by its surroundings *and* how it fits into the nested part-whole structures of the cosmos. An ultimate explanation of a Heraclitean entity will make reference to the cosmos itself. By the Part-Whole Principle, the cosmos is explained via its parts and an explanation of the parts will run back to the cosmos itself. By the Difference Principle, the cosmos is what it is, in part, by being different from its parts (its designation is singular rather than plural; it is an *integration* of parts rather than a mere *collection*

⁸⁴ One might worry that the Difference Principle over-generates. For example, a slice of pizza and the number 3 are distinct, but not obviously explanatorily dependent on one another. (Thanks to Victor Caston for this objection.) However, if we assume, as is reasonable, that Heraclitus thought explanatory chains were transitive, this worry may dissipate. A slice of pizza is indeed not directly explanatorily dependent on the number 3. But a slice of pizza is explanatorily dependent on the number 1; after all, it is a *single* slice of pizza as opposed to two slices of pizza. And the number 1 and the number 3 are explanatorily interdependent just in the sense that all numbers can be considered inter-explanatory. (This is an admittedly controversial claim. But I submit that it is a Heraclitean claim in light of the fact that he has an aversion to metaphysical foundations). A slice of pizza may therefore be explanatorily dependent on the number 3 by transitivity through the number one. Someone might object further that the number 3 is not explanatorily dependent on the slice of pizza. However, we might think that numbers as conceptual entities are dependent on worldly concreta and that a given slice of pizza is a part of the set of entities that constitute the concreta of the world. The number 3 therefore may be explanatorily dependent on a slice of pizza by transitivity through the set of worldly concreta. There seems to be a principle of proximity here. The closer parts are, the more explanatory power they hold for each other. But there is nothing preventing the difference principle from radiating out via transitivity. I don't mean to suggest Heraclitus thought precisely in this manner, but just that the Difference Principle can be a coherent principle of explanation especially if we reject explanatory foundations and allow for the transitivity of explanatory relations.

of parts). The parts of the cosmos are *explananda* for the cosmos as *explanans*. And the cosmos is an *explanandum* for the parts as *explanantia*. In this manner, Heraclitus takes the cosmos as an *explanandum* and an *explanans*. This sets Heraclitus apart in a striking fashion from his predecessors – indeed, from any presocratic thinker.

V. Metaphysical Interdependence

If, as I've argued, Heraclitus thought that neither the cosmos nor its parts are fundamental but that they stand to one another as mutually (though not strictly symmetrically) explanatory, then Heraclitus seems to have subscribed to a principle of metaphysical interdependence: explanatory relations are reciprocal rather than unidirectional (i.e. from fundamental to derivative). Such a view has been labeled Metaphysical Coherentism in contemporary metaphysics.⁸⁵ So far, we have conducted the examination of Heraclitus' views on explanation at a cosmic altitude. It will prove helpful to explore some specifics. Importantly, we must get clear on exactly *what* the explanatory relations are for Heraclitus and *how* exactly they hang together. This will require us to investigate the parts of the cosmos. But what *are* its parts for Heraclitus? This is incredibly difficult to answer. However, I have suggested above that we treat as parts the things that Heraclitus discusses in his fragments: material elements (stuffs), mid-sized objects (things), opposites (properties), meteorological phenomena (events), etc. In a word, I think it is safest to treat the *aspects* of the cosmos – the one's mentioned by Heraclitus – as its parts. For now, I will restrict my current discussion to two aspects of the cosmos discussed by Heraclitus: 1) material elements and 2) mid-sized objects. The ultimate goal, as will become clear, is to situate Heraclitus' positive interest in opposites into this discussion of explanation.

⁸⁵ N. Thompson, 'Metaphysical Interdependence', in Jago, M. (ed.) *Reality Making* (Oxford, 2016), 38-55.

Recall from section I that Heraclitus held a theory of elements and that they transform into one another. I cannot give a comprehensive account of this theory here. The following discussion is based in part on the important scholarship done by Daniel Graham.⁸⁶ Consider fragments B31 and B76:

πυρὸς τροπαὶ πρῶτον θάλασσα, θαλάσσης δὲ τὸ μὲν ἥμισυ γῆ, τὸ δὲ ἥμισυ
πρηστήρ ... <γῆ> θάλασσα διαχέεται, καὶ μετρέεται εἰς τὸν αὐτὸν λόγον, ὁκοῖος
πρόσθεν ἦν ἢ γενέσθαι γῆ. (DK22B31.2-3 and 9-11)

The turnings of fire: first sea, and of sea half is earth, half fireburst ... <Earth> is liquefied as sea and measured into the same proportion it had before it became earth.

πυρὸς θάνατος ἀέρι γένεσις, καὶ ἀέρος θάνατος ὕδατι γένεσις. γῆς θάνατος ὕδωρ
γενέσθαι καὶ ὕδατος θάνατος ἀέρα γενέσθαι καὶ ἀέρος πῦρ καὶ ἔμπαλιν.
(DK22B76.3-7)

The death of fire is the birth of air, and the death of air the birth of water. It is death for earth to become water, and death for water to become air, and death for air to become fire and contrariwise.

⁸⁶ Graham, *Explaining the Cosmos*, 122-129. I explore a slightly different view in line with Graham's in my 'Elements and Opposites in Heraclitus', *Apeiron*, 51.4 (2018), 427-452. The clearest differences between my view and Graham's view are these 1) I take Heraclitus to have a 4-element theory while Graham takes Heraclitus to have a 3-element theory. And 2) I take Heraclitus' elements to be associated closely with a single property each while Graham seems to think that they have a vague range of properties. On this last point, see also Betegh, 'Physical Aspect', 23 who claims that we should not interpret Heraclitus as thinking that the elements had a rigid set of properties.

Whether we think that Heraclitus held that there were three or four elements, he clearly thought that any element was transformable into any other.⁸⁷ First, we should note that if this is so, then no one element is foundational with respect to the rest. If we were to explain earth, we might begin by citing where earth comes from: air. In part, this is true: air serves as the partial *explanans* for earth.⁸⁸ It is only partial since the generating source of earth does not fully explain what it is to be earth. Furthermore, we would do well to treat air as an *explanandum* in turn and it quickly becomes apparent that we will end up in a circle, back to earth. Does earth explain earth? Not obviously. But a partial explanation of earth has been gained from this exercise: earth is ontologically dependent on all the other elements insofar as it depends for its *existence* on all the other elements. But all the elements are ontologically dependent on one another and so they comprise a *system* of elements: a network composed of interdependent, dynamic parts in flux.

The elements also seem to be conceptually interdependent amongst themselves. What each element *is* is distinct from what every other element is. For, what-it-is-to-be-water is different from what-it-is-to-be-fire (Difference Principle). When one attempts to explain a given element, one can do so by referencing its powers: presumably fire has the power to heat (among others) while water has the power to quench (among others). Heraclitus certainly must have

⁸⁷ There is some discussion as to whether or not Heraclitus held a three-element theory (Earth-Fire-Water) or a four-element theory (Earth-Air-Fire-Water). The debate turns somewhat on the authenticity of B76. However, recent work done on Heraclitus' notion of soul may suggest evidence beyond B76 that Heraclitus *did* think that air was an elemental stuff. See A. Laks, 'How PrePlatonic Worlds Became Ensouled', *Oxford Studies in Ancient Philosophy*, 55 (2018), 1-34 at 14-23. Laks argues that Heraclitus' soul is air and that it is breathed in from around us. If Laks' argument is successful, we probably have good reason to think air is a genuine Heraclitean element. We should note that Laks' argument rests heavily on doxographic evidence as opposed to verbatim fragments. Still, the evidence does bear on the question of the authenticity of Heraclitean elemental air.

⁸⁸ It is common for contemporary metaphysicians to make a distinction between *x* partially grounding *y* and *x* fully grounding *y*. See Fine, 'Guide', Raven, 'Ground', and Thompson, 'Metaphysical Interdependence'.

thought that the elements had powers in some way distinct from one another or they would not be distinct elements. When one attempts to explain what Heraclitean earth *is*, one must explain how earth's function *differs* from those of the other material elements. In this way, all the elements are conceptually interdependent: that is, *what* they are (their essence) is dependent, at least in part, on the whatness of all the other elements. Combining this result with the result from the previous paragraph, we can conclude that for Heraclitus the material elements are each ontologically and conceptually dependent on one another. And if that is true, they explain one another in a reciprocal fashion. But I don't mean to suggest that the elements are wholly explained by one another. According to the Part-Whole Principle, a full explanation of an element must ultimately refer to its role in the cosmos (e.g., constituting mid-sized objects). And, as we've seen, an explanation of the cosmos will push us to examine its parts once again.⁸⁹

Next let's examine what Heraclitus said about mid-sized objects. I will restrict my discussion to one fragment already mentioned in section I:

οὐ ξυνιαῖσιν ὅκως διαφερόμενον ἑωυτῶι ὁμολογέει. παλίντροπος ἀρμονίη ὅκωσπερ
τόξου καὶ λύρης. (DK22B51)

⁸⁹ We might worry that this introduction of explanatory loops may be unsatisfying as a metaphysical principle. A central worry may be this: it seems as though anything can only be partially (i.e. not fully) explained by this coherentist approach to explanation since grounding chains never terminate. See R. Bliss, 'Viciousness and Circles of Ground', *Metaphilosophy*, 45.2 (2014), 245-256 for a contemporary argument defending the plausibility of grounding loops. See also Thompson, 'Metaphysical Interdependence'. If my reader is worried about the plausibility of Heraclitus' view, they can consider a recent example cited by Zylstra, 'Essence', 5147: 'The volume of a substance is the quotient of its mass (dividend) and density (divisor). The density of a substance is the quotient of its mass (dividend) and volume (divisor). Finally, the mass of a substance is the product of its density and volume.' Zylstra concludes that volume is grounded in mass and density, density is grounded in mass and volume and mass is grounded in density and volume. This is a plausible case of a local grounding loop.

They do not understand how while differing with itself it agrees with itself:

reciprocal structure as of a bow or a lyre.

For simplicity, let's examine the bow. Heraclitus claims that the bow agrees with itself while disagreeing with itself. The stave and string are at odds with one another (i.e. they *oppose* one another), but the bow itself is what it is because of this tension. The stave and string are the parts of the bow. In a philosophically interesting way, the stave and string of a bow explain one another via the Difference Principle. To explain a bowstring, one must refer to the bow-stave. A bowstring is the part of a bow that gets attached to the bow-stave and pulls the bow-stave inward. But to explain a bow-stave, one must refer to the bowstring. A bow-stave is the part of a bow to which the bowstring is attached and pulls the bowstring outward. Importantly, both stave and string are the partial cause of the tension in one another. As such, the parts of the bow explain one another in a non-trivial way (Difference Principle). But things can only be partially explained by the Difference Principle since the Difference Principle is blind to the full being of the higher order entity of which the parts are mere parts. As such, the parts of the bow must refer to the whole bow itself for a more complete explanation via the Part-Whole Principle. When we ask what a bow *is* our explanation will require an analysis of its parts in tension, but it will also push us closer to the cosmic level: to fully understand the bow, we must understand the larger context in which it operates (i.e., hunting and war). The Part-Whole Principle will also require a push in the opposite direction: toward the material constitution of the parts and the properties of the material elements since this explains the pre-existing nature of the bowstring and bow-stave such that they can compose a bow. This, I submit, is a very clear picture of Heraclitus' theory of explanation, which I think can be summarized in two statements: 1) The parts of a thing partially explain one another (Difference Principle), and 2) wholes further explain their parts and parts

further explain wholes (Part-Whole Principle) – from the basic material constituents to the cosmos itself.

VI. Conclusion: Opposites and Explanation

We have been trying to understand the relation between Heraclitus' interest in opposites and his scheme of explanation. We are now in a better position to answer this question – indeed, the answer has already surfaced. We have just now seen that the opposites are caught in the middle of this interdependent web called the cosmos. Opposites are parts of the cosmos, not-independently existing entities (indeed, nothing is independent if my interpretation is correct), but real aspects of the cosmos that need to be explained. What, then, explains the opposites? If the conclusion of the last section is true, then a) the opposites partially explain one another (Difference Principle) and b) the opposites are further explained with reference to their role in the cosmos (Part-Whole Principle). But we also saw that the cosmos is explained by its parts so, importantly, the cosmos is partially explained by the opposites. As such, the opposites, as with all the parts of the cosmos, are both (non-fundamental) *explanantia* and *explananda* for Heraclitus.

B51 told us that things differ from one another while agreeing with one another. Differing and agreeing are opposites; they are real aspects of the world. On the first analysis, differing and agreeing as opposing terms explain one another: they are metaphysically interdependent. One cannot explain what-it-is-to-differ without explaining what-it-is-to-agree and vice versa. This is an instance where a part of the cosmos partially explains another part and vice versa (Difference Principle). Differing and agreeing are further explained by their role in the cosmos – constitution of bows and lyres, for example (Part-Whole Principle toward the whole). Differing and agreeing are also explained by the material conditions in which they are realized –

here, the flexibility of the horn (bow-stave) and the elasticity of the sinew (bowstring) (Part-Whole Principle toward the parts).⁹⁰ In the case of a bow, a harmony (agreement) of opposing parts (differing) constitutes the nature of the bow. As such, the opposites, in part, explain what the bow is. So, these opposites, being caught in the web of interdependence, both partially explain the bow and are explained, in part, by the bow. Opposites explain things like the bow (whose name is life and whose work is death), but the opposed tensions and forces must themselves be understood, both how they are connected (the standard view has that much right) and the ways in which they work together to do what they do (and explain what they produce). What I've said here about differing-agreeing can be said about all the opposites in Heraclitus; the result is not a banal thesis, but a rich, philosophical explanation of the cosmos and its constituents.

We have seen how Heraclitus' opposites factor into his explanation of the cosmos, but we might still wonder why Heraclitus was *centrally* interested in opposites. We could answer this by claiming that Heraclitus felt the need to respond to his predecessors. And I think that would be a satisfying answer. But I think the answer runs deeper. I mentioned in the introduction that Heraclitus was aware that opposites are essentially connected (though this does not exhaust his interest in opposites). The essential connection of opposites entails that opposing pairs partially explain one another. In Heraclitus, opposing terms present the clearest case of Difference Principle: what-it-is-to-be-hot must refer to what-it-is-to-be-cold and vice versa. So why was Heraclitus so interested in opposites? I submit it is because opposites are the clearest sign of metaphysical interdependence evident in the cosmos. Metaphysical interdependence happens to

⁹⁰ Homer, *Iliad*, 4.105-126, tells us that Lycaon's bow was made from the horn (κέρας) of an ibex and the string was made from ox-tendon (νεῦρα βόεια).

be Heraclitus' most basic principle of explanation for all things including the cosmos. To cite B51, the cosmos has a palintropic (i.e. reciprocal) structure (*harmoniê*), just like a bow.

For Heraclitus, the role of opposites in his explanation of the cosmos and its constituents is summarized in three statements: 1) opposites and oppositions cannot function as fundamental *explanantia*, contra his Ionian predecessors, 2) all explanatory relata are complexly interdependent just as opposing terms are simply interdependent, and 3) opposites are both *explananda* and (non-fundamental) *explanantia*. The cosmos has a reciprocal structure (*παλίντροπος ἄρμονίη*) whereby all things are caught in a web of metaphysical interdependence. We can call this view Metaphysical Coherentism. Interestingly, the cosmos itself is implicated in this reciprocal structure since it and its parts stand to one another in a relation of interdependence: all things from one and one from all things (B10). Opposites for Heraclitus are not fundamental explanatory principles as thought by his Ionian predecessors but opposition itself stands as a symbol of the metaphysical interdependence in and of the cosmos. Heraclitus rejects Metaphysical Foundationalism and embraces Metaphysical Coherentism.⁹¹

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