

The Metaphysics of Parmenides' Doxa and its Influence

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ABSTRACT: Parmenides' *Aletheia* receives the lion's share of philosophical scrutiny. His *Doxa*, focusing on the explanation of natural phenomena, by contrast, is often neglected, especially in studies focusing on metaphysics. But it is the latter that occupied most of Parmenides' poem and which had, arguably, a more profound influence on later philosophy. The *Doxa* seems to embody the Eleatic properties Parmenides attributes to the proper object of understanding, at least as far as possible in a theory designed to account for change. Apparently for the first time, it attempts to explain changeable phenomena in terms of changeless principles. The principles of the *Doxa* offered a model for subsequent philosophies of nature, and provided the basis for theories of elements from the fifth century BC until today.

KEY-WORDS: Parmenides; Presocratics; Metaphysics; Science.

RESUMEN: La *Aletheia* de Parménides ha sido estudiada al fondo por los filósofos. Su *Doxa*, al contrario, se suele desatender, especialmente en los estudios de la metafísica. Pero es ésta la que ocupa la mayoría del poema y ha ejercido la mayor influencia sobre la filosofía posterior. La *Doxa* parece ejemplificar las propiedades eleáticas que Parménides atribuye al objeto apropiado del entendimiento, al menos hasta donde sea posible en una teoría que pretende explicar el cambio. Por lo visto, intenta explicar, por primera vez, los fenómenos variables por medio de principios invariables. Los principios de la *Doxa* ofrecieron un modelo para las filosofías posteriores de la naturaleza, y proporcionaron una base para las teorías de los elementos desde el quinto siglo a.C. hasta el presente.

PALABRAS-CLAVE: Parménides; Presocráticos; Metafísica; Ciencias.

Parmenides is in many ways the pivotal figure of Presocratic philosophy. His careful analyses, supported by an extended argument, delivered with literary flourish in dactylic hexameters, changed the course of philosophy. After the *proemium* (DK 28B1), in which he tells the tale of a youth escorted to the House of Night to receive a revelation from a goddess, he provides an argument for how philosophy should be done, in the voice of the goddess. This revelation consists of two parts: the *Alētheia* (B2-B8. 49) about the only way to conduct philosophical inquiry, and the *Doxa* (B8. 50 ff.), a constructive cosmology which purports to explain the phenomena of the world. Philosophers in recent times have focused most of their energies on the former; here I shall focus on the latter. For the *Doxa* is no less influential than the *Aletheia*, and in some ways more influential, as I shall indicate. But the structure and significance of the *Doxa* is no less problematic than that of the *Aletheia*. Here I shall (I) briefly outline what I take to be the relevant points of the *Aletheia*; (II) examine the metaphysics of the *Doxa* in light of the *Aletheia*; and (III) discuss the influence the *Doxa* had on later thought.

Aletheia

The key argument of Parmenides' *Aletheia* is found in fragment 2:

Come now and I shall tell, and do you receive through hearing the tale, which are the only ways of inquiry for thinking: the one: that it is and that it is not possible not to be, is the path of Persuasion (for she attends on Truth);
the other: that it is not and that it is not right it should not be,

this I declare to you is an utterly inscrutable track,
for neither could you know what is not (for it cannot be
accomplished),nor could you declare it.¹

Here the goddess tells the youth that there are only two “ways of inquiry,” or, if you will, methods of research. One of them is the way that it is, the other the way that it is not. There has been a great deal of argument about what the ‘it’ is that is the implicit subject of the verb, and what sense of ‘is’ should be employed in understanding the argument. Since my focus is not on this particular argument, I shall try to be as vague as possible here.

Plausibly the subject of the sentence refers to the (potential) object of inquiry the inquirer is pursuing. As for senses of the verb, there are two candidates that have been argued for with the greatest plausibility. One is the existential sense: ‘is’ = ‘exists.’ What we need to inquire after is what exists; there is no understanding to be gained from seeking what does not exist (Barnes 1982, 160–161). The other most likely reading is that of a “fused” sense involving predication and identity: to say ‘*x* is’ is to say ‘*x* is (really) *F*,’ for some *F*. What Parmenides has in mind, on this reading, is a philosophical explanation like that in which Xenophanes says that Rainbow really is cloud (B32). On this account ‘it is’ is short for ‘*x* is (really) *F*’ (Mourelatos 2008, 47–73).

In the case of the existential reading, the first way, which I shall call the Way of Is, works because we can inquire about what exists; the second way, the Way of Is-Not, fails because to seek knowledge about what does not exist is futile. In the reading involving predication and identity, which I shall call the “speculative predication” reading,² to inquire into what the *F* is amounts to seeking a positive understanding of the object, whereas the Way of Is-Not fails because to account for

¹ My own translations unless otherwise noted. See Graham, 2010.

² The term and interpretation come from Mourelatos 2008, pp. 56–60.

something in terms of its being not-F is not informative.

To add one complication, some authorities would think that Parmenides has in mind a combination of the existential and the predicative readings, since to *exist* is to be *something*, and to be *something* is to *exist* (Kirk et al. 1983, 246). Indeed, there are places where Parmenides seems to go back and forth between an existential and a predicative reading. Even Aristotle in his powerful ontology seems to think that existence and essence are interdependent (*APo.* 2.1-2).

On the basis of his initial characterization of the Way of Is and the Way of Is-Not, Parmenides eliminates the second approach as unworkable. He goes on, in fr. 6, to address a further option, in which “mortals knowing nothing/ wander, two-headed.” For them in their folly, “to be and not to be are thought to be the same/ and not the same, and the path of all is backward-turning” (B6. 4-5, 8-9). In other words, ignorant mortals (the goddess is speaking) confound being and not-being, and so make a mess of everything. Evidently no one explicitly follows the Way of Is-Not: that is only a theoretical possibility (Owen 1960, 91). But human inquirers do confound being with not-being, and in doing so, commit the fallacy of seeking what-is-not. What seems to be the case here is that human theories assume that the objects of inquiry sometimes exist, sometimes do not; or they assume that objects change from having one character to lacking it and vice versa.

“Never shall this prevail, that things that are not are,” warns the goddess. “But you, withhold your thought from this way of inquiry” and “judge by reasoning the very contentious examination/ uttered by me” (B7. 1, 2, 5-6). Clearly, this putative third way, which we may call the Way of Is-and-Is-Not, is also untenable, and not just because the goddess says so, but on rational grounds. We are left, then, with one path to follow:

Only one tale is left of the way:
that it is; an on it are posted very many signs, that [1] what-is is
ungenerated and imperishable, [2] a whole of one kind, [3]
unperturbed, and [4] complete. (B8. 1-4)

The goddess has provided us with a road map. We can tell we are on the right road if we find the signs that tell us about our destination object. It has no beginning or end temporally, it is all alike, unchanged, and complete. These signs provide criteria for judging the thing or things that we are seeking for. In order for us to succeed in our quest, we must find something that exhibits all four characters expressed by the signs. In other words, what-is must satisfy fixed conditions. The characters expressed here can be seen as individually necessary and perhaps jointly sufficient conditions for arriving at our destination.

Whatever we seek for must have four special properties. Let us call them Eleatic Properties. Parmenides goes on to argue for them individually. His strategy consists of showing that things that lack these properties presuppose what-is-not. If something comes to be, for instance, then it was not at some previous time; if that thing later perishes, it will not be at some later time. If something is not all alike, it contains something that is not the same as it—something that is not. If it changes place, it moves into what is not. And so on. What is real must consist of what-is, without any concessions to what-is-not.

In the *Aletheia* Parmenides for the first time establishes a theory of what reality consists of, an ontology. As Barnes (1982, 176) observes, “The first full-blooded metaphysician was Parmenides; and the first systematic metaphysics was the Eleatic philosophy.” Parmenides identifies the target as what-is, based in part on what-can-be and in part on what-can-be-known and what-can-be-expressed. In that sense, he links ontology with epistemology and philosophy of language. By identifying what-is with that which satisfies the Eleatic Properties, he provides what-is with a permanent, indelible character: an Essence. In this sense, he invents essentialism.

Aristotle implies that all his predecessors were seeking the same thing: being (*to on*), which is substance (*ousia*) (*Metaph.* 7.1, 1028b2-7). There is some truth in that; but only from Parmenides on

were philosophers explicitly thinking about being rather than about water or air or fire or something similar. It seems that they also had some notion of a character corresponding to the different kinds of stuffs they considered. They called that character *phusis*, nature. But it was always unclear whether that nature was fixed or changeable, just as the word *phusis* can denote either a permanent nature, on the one hand; or growth and development, on the other.³ Parmenides, for his part, insists that the only kind(s) of things that can *be* is (are) what is changeless, all alike, everlasting or eternal, and complete. Whatever *is* has to be what it is through and through, without gaps, starts or stops, or shortcomings.

It may be that Parmenides wants us to understand that there is only one thing that can satisfy the conditions implied in the Eleatic Properties: What-is or Being itself. Certainly this is the dominant understanding of his successors, and it is held by many modern interpreters (e.g. Guthrie, 1965, 1-80; Furth, 1968; Kirk et al., 1983, 249). But Parmenides never argues explicitly for a strong monism.⁴ And some interpreters believe he leaves the door open for non-monistic accounts (Mourelatos, 2008; Curd, 1998; Palmer, 2009).

Yet our world, the world of our experience, is not at all like this world of constancy, perfection, and stasis. It is a world of change, flux, development, differentiation, imperfection, growth and decay. How then are we to understand it? One obvious possibility is that the world of experience is merely a world of illusion and unreality. But of course to say that is to leave us where we started before philosophy came on the scene: with no clue as to how to navigate the chaotic conditions of life. Here, Parmenides offers a cosmology of his own. The basic principles of the project are reasonably clear, but the status of the project remains obscure and controversial. It is this project that I wish to concentrate on. Can Parmenides build a bridge between his *a priori* ontology and the

³ Emp. B8.1-2 uses *phusis* as a synonym for 'birth.' On the early use of the term, see Heidel 1910; Naddaf 2005.

⁴ Barnes, 1982, 204-207, 228-230, sees Parmenides as stopping short of a strong monism, which Melissus pursues.

messy world we live in, or does he offer merely a specious construction meant to show the futility of natural philosophy, and hence of trying to understand human experience?

Doxa

At the end of his elaborate argument about the four Eleatic Properties, Parmenides announces:

Here I cease from faithful account and thought
about truth; from this point on learn mortal opinions,
hearing the deceptive order [*kosmos*] of my words. (B8. 50–52)

From this point on, the goddess will provide the youth with a cosmology and natural philosophy in the manner of prevalent Ionian theories. Line 52 seems to contain a word-play, in that the order of the goddess's words will provide a world-order, a cosmos or cosmology.

She continues with the principles of the theory:

[Mortals] made up their minds to name two forms [*morphai*],
of which it is not right to name one—that is where they have
gone astray—and they distinguished contraries in body and set
signs apart from each other: to this form the ethereal fire of
flame, being gentle, very light, everywhere the same as itself,
not the same as the other; but also to that one by itself
contrarily unintelligent night, a dense body and heavy.
I declare to you this arrangement [*diakosmos*] to be completely
likely, so that no judgment of mortals will ever surpass you.
(B8. 53–61)

The goddess here provides the basis for an account of how nature works. There are two basic “forms,” Light and Night, which have contrary properties (lines 56, 58). Light is gentle, rare, buoyant, intelligent; Night is forceful, dense, heavy, and unintelligent.

In this exposition, we get two basic kinds of reality, each with its own character, which is the polar opposite of the character of the other

kind of reality. Each one of these is alike with itself, but unlike the other (57-58). What is striking here is that we get *some* set of defining properties for each of the two forms. In each case the properties of one form are distinct from those of the other. There has never been any configuration quite like this before Parmenides. The components of reality are distinct, but fixed and stable in themselves. And they are the basic components, for “all is full at once of light and dark night,/ both equal, since neither has no share in it” (B9. 3-4). So these two forms are equal, and together they make up the constitution of the world. Insofar as the things we perceive are, for instance rare, they have a share of Light; insofar as they are dense, they have a share of Night, and so on (B8. 2). The physical objects we encounter in most cases have a multitude of qualities, some of which are derived from Light, others of which are derived from Night. They are, accordingly, mixtures of the two forms.

What is the status of the two forms relative to Parmenides' own criteria? (1) In the first place, the two forms are, to all appearances, without coming-to-be or perishing; they always exist. (2) In their own natures, they are alike through and through. What is Light has all the properties of Light, and what is Night has all the properties of Night. (3) In their own natures, Light and Night are changeless. They are, however, changeable in their relations with each other, and presumably in their distribution throughout the cosmos. Thus Light and Night are free to mix in different proportions so as to produce different substances, such as bone, flesh, or wood. This implies that they are capable of locomotion or spatial translation. (4) The two forms are complete in the sense of always being what they are. On the other hand, they are radically incomplete in the sense of constituting only one-half of the properties of the world. One is light, one is heavy; one is bright, one is dark; presumably one is hot, one is cold, and so on. Indeed each basic property one form has seems to be understandable as the negation of the corresponding property of the other form, so that if one form is *F*, the

other is not-*F*.

On this account the forms of Parmenides' cosmology exemplify some Eleatic Properties. But they fall short, for in the end they embody only a subset of all basic properties, and to that extent they are disqualified by Parmenides' criteria from being real. This seems to provide grounds for the goddess' characterization of her account as a "deceptive order of ... words" (B8. 52). She hints that mortals "have gone astray" by failing to identify a unity of the things that are (53-54). Yet her account has a positive side: "this arrangement [*diakosmos*, a word often used for cosmology] [is] completely likely/, so that no judgment of mortals will ever surpass you" (60-61). So the goddess' cosmology is the best possible cosmology, even though it is deeply flawed.

What then is the precise status of the *Doxa*? Is it the best exemplar of a class of explanations that are hopelessly wrong? Is it the best instrument for understanding a world that is in its own character unknowable? Is it a model for how natural philosophy could be pursued if the problems of the Way of Is-Not could be overcome in some way?

Let us consider what Parmenides gives us in his cosmology. He has provided in the *Aletheia* an ontology of changeless things and their changeless properties, apparently for the first time. The Way of Is leads us toward the discovery of some entity (or entities) that has (have) Eleatic Properties. To be real, the entity (or entities) must be all alike, without any temporal or spatial or qualitative differentiation (which would entail not-being). Suppose, however, there were more entities than one. Then those entities would have to have Eleatic Properties. They could be internally everlasting, alike, changeless, and complete. But if they interacted with each other, they would have to change, at least in relation to each other. The minimal number of basic entities would be two. In order to account for all the properties experienced in the world, and in particular the polar opposites that characterize the world, these entities would have to embody one or other of each basic contrariety. But then one entity would stand to the other in the relation of what-is

to what-is-not, and the theory would embody the Way of Is-and-Is-Not, which was already dismissed from consideration.

The goddess' choice of two kinds or flavors of reality seems a bit odd: Light and Night, which seem fairly insubstantial. The two forms do stand to each other in opposition. It may be that Parmenides is guided by the Hesiodic themes of the poem, which takes place at the House of Night, where in the *Theogony*, the anthropomorphic deities Day and Night take turns occupying the house while the other housemate is abroad (Hes. *Th.* 744-757; Parm. B1. 8-14). Aristotle identifies the two forms with Fire and Earth, two of the four elements that became standard subsequent to the publication of Parmenides' poem (*Metaph.* 986b31-4). Would it be possible to construct a physics in which there were more than two basic entities, for instance four elements, with each one having positive qualities that are not to be defined as the negation of some other quality? Could a new, improved version of the model be created that escaped the flaws of the original?

Elements

Up to this point, we have looked at the ontology and cosmology of Parmenides in more or less theoretical terms, with a minimum of historical background or exegesis. But his theory is part of an ongoing conversation or debate about how to understand the world. However much we might wish to understand his contribution as the timeless and unconditioned pronouncements of a goddess who embodies reason,⁵ Parmenides is a player in a historical discussion carried out among real (or real enough for our purposes) human beings ("mortals"), of whom Parmenides was one (even if he insinuates that he was initiated into the mysteries by a goddess) (Burkert 1969). Without a historical perspective we cannot hope to appreciate what Parmenides did nor did not

⁵ Owen (1960) argues for the discontinuity between Parmenides' poem and its philosophical antecedents.

accomplish with his poem.

Here I shall sketch the historical situation as I see it, recognizing that my reconstruction is controversial and open to dispute. I will, however, also reflect on traditional interpretations of the early development of philosophy. According to Aristotle, the author of the most traditional and influential interpretation, the first philosopher was Thales, and he and most of his early colleagues were Material Monists: they identified one basic stuff from which the world was composed. Thales said it was water; Anaximenes said it was air; Heraclitus said it was fire (Arist. *Metaph.* 983b6–27). This basic stuff could change its appearances depending on the situation; for instance, Anaximenes said that by being rarified or condensed, air could change into fire (more rare) or (in an increasing scale of density) wind, cloud, water, earth, and stones. Thus everything was really one but could change in quality or quantity to have different phenomenal properties at different times.

Aristotle's interpretation is problematic. He has no writings of Thales to appeal to; Anaximander never quite fits his picture, and the testimonies of his cosmology seem to show he is not a material monist; Anaximenes seems to allow coming-to-be and perishing according to the testimonies, and indeed Plato himself represents his theory as one of radical change (*Ti.* 49b–c; Graham 2003); and Heraclitus expressly rejects the foundations of the theory. Among the three basic realities he accepts: fire, water, and earth, he says that the birth of one constitutes the death of the other (B36, B76, B31). If, as seems plausible to me, Heraclitus is just making explicit what is implicit in his predecessors' theories, then all the early philosophers think that one stuff can change into another, thus recognizing radical change, that is: coming-to-be and perishing, among the basic stuffs of the world.⁶

The relationship between Heraclitus and Parmenides is controversial, but I believe that Parmenides was reacting to Heraclitus,

⁶ See Kahn 1960, pp. 154–155; Stokes 1971; Graham 1997, 2006; Palmer 2009, pp. 22–23.

whose vocabulary, assertions, and even style he imitates in his poem (Graham 2002; Guthrie 1965, 24). In any case, it is the claim that there is radical change in the world that seems to elicit the wrath of the goddess in B6-B7 and the first and most extensive argument of B8 (for the first Eleatic Property, lines 5-21). If the early philosophers believed in radical change, then to reject coming-to-be and perishing would overthrow all their theories at one blow. If, on the other hand, they were material monists, that argument would have absolutely no effect on them; they would simply agree. To be sure, the other three Eleatic properties would render material monism unable to account for changes of appearances; but in this case a material monist could complain that Parmenides' theory was inferior to material monism in rendering experience inexplicable. Parmenides' radical critique seems to presuppose a radical theory, such as Heraclitus' flux theory. It is to a theory that seems to be saying that everything is changing all of the time that one responds by insisting that nothing changes ever.⁷

If, as Heraclitus holds, fire turns to water and water to earth, and vice versa, where each is a distinct being, then, schematically, $A \leftrightarrow B \leftrightarrow C$. But then, for instance, B comes-to-be from what is not-B, and later perishes into what is not-B. This is to treat being and not-being as the same and not the same. The only way to avoid this problem is to say that there are changeless beings that interact differently to produce the phenomenon of change.

We can formalize the principles Parmenides lays down in the *Doxa* as follows:⁸

⁷ I believe that Heraclitus' own view is more nuanced, in that he claims that stability supervenes on change, e.g. in B12; but Parmenides, Plato, and Aristotle seem to take him as an extreme flux theorist. See Graham 2006, pp. 148-185.

⁸ Adapted from Graham, 2006, p. 224.

Theory of Elements

1. There is a set of substances E_1, E_2, \dots, E_n which are the basic substances.
2. The $\{E_i\}$ are permanent existences.
 - a. They are (i) without coming-to-be and perishing; (2) all alike with themselves; (3) unchanging in themselves; and (iv) complete in themselves. (Eleatic Essentialism)
 - b. The set has at least two members. (Pluralism)
 - c. The $\{E_i\}$ are *elements*. (Definition)
3. All other substances $\{S_j\}$ are a product of relation $\{R_k\}$ of $\{E_i\}$.
4. There is a set of forces $\{F_l\}$ that governs $\{R_k\}$.
5. The world (cosmos) comes to be through the orderly application of $\{F_l\}$ to $\{R_k\}$.

Parmenides' *Doxa* embodies the minimal number of elements, namely two. These elements mix with each other as an unnamed goddess or deity sends them to mingle (B12). In this scenario, the goddess is an external agency or force that brings elements together.

This pattern is repeated in some way in almost all the post-Parmenidean natural philosophies (Graham 2006, 224–249). Perhaps the most straightforward version is that of Empedocles. He identifies four elements: Earth, Water, Air, and Fire. Each one seems to be an independent and eternal existence. They are acted on by two opposing forces, which Empedocles dubs Love and Strife and personifies as deities (31B17. 16–29). He maintains that all other substances can be derived from combinations of the four elements and gives two specific “chemical” formulas or Relations of elements: 8 measures of bone consist of 2 portions Earth, 2 portions water, 0 portions Air, and 4 portions Fire (B96). Four measures of blood consist of 1 portion each of all four elements (B98). At times in a complex cosmology, Love prevails to bring elements together into compounds; at other times, Strife separates them

into their components (B26–B31, B35).

Anaxagoras develops a theory of an infinite, or at least unlimited, number of elements that mix together or separate. He does not allow for compounding, but he does say that whatever predominates in a mixture, in other words, whatever constitutes the largest quantity of that mixture, gives its character to the whole mixture (59B12). Thus with different inputs, one substance can become manifest that was latent before, while another substance that was manifest can become undetectable. In this way, anything can seem to turn into anything. For instance, by eating bread, I can help build the bones and blood in my body (B10). In reality, there was bone and blood in the bread all along; it was just not manifest before it was extracted by a metabolic change. In this way nothing really comes to be or perishes (at the elemental level), but anything can *appear* to come to be or perish (at the phenomenal level). Beings do not cease to be, but are redistributed in the world.

The atomists, Leucippus and Democritus, likewise, rely on a theory of elements. Officially they recognize only two elements: the Full and the Empty, or Void. They sometimes call these, respectively, What-Is and What-Is-Not (67A6), which appears to violate Eleatic principles. But in another way, they are the most true to Parmenides' *Doxa* of all later natural philosophers. For they take the Dense and the Rare embodied by Night and Light, respectively, and push them to their ultimate limits: what is completely dense or full, and what is complete rare or empty (Graham 2008, 345–357). In this scenario the empty becomes the locus for change, which is change of place. The Full is now divided up into an infinite number of microscopic particles of different shapes, which can move in space but change in no other way. So while there are only two elements, the Full and the Empty, there are an infinite number of instances of the Full, which rearrange themselves in space to create temporary conglomerates of atoms that constitute the middle-sized objects that can be perceived by humans, and also the cosmic bodies that constitute the world.

In all of these theories, nature consists of a set of fixed beings with Eleatic Properties, or at least the most Eleatic Properties that can be posited for such fixed beings. Each fixed being has its own essence, which constitutes it as an element. Elements then interact either to form compounds with new properties (as in Empedocles), or mixtures capable of exhibiting the properties of its most numerous components (Anaxagoras), or conglomerates with properties determined by its structure (atomists). In this way, the compounds, mixtures, or conglomerates are all functions of their component elements, and their properties of derivative stuffs are all functions of the properties of their elements. Derivative substances come and go, but the elements always exist. At the phenomenal level there is radical change, but at the elemental level there is constancy and only accidental change, amounting to some capacity for rearrangement and distribution.

In this way, the changeless and everlasting provides a foundation for the variable and ephemeral. The world described by theories of elements is not a world of perfect unity and homogeneity, but it is a world in which radical change has been ruled out, in which the components of the world have Eleatic Properties insofar as it is possible, consistent with an account of phenomenal change, and in which, to this extent, the phenomenal world is orderly in its composition.

Parmenides' poem offers an elaborate cosmology that is extensive and detailed—much more so than one would think was necessary for a dialectical exercise that aimed merely at dismissing cosmologies. But it is not just the quantity of the *Doxa* that is impressive, but its quality. Parmenides offers three major insights into the cosmos that are unparalleled in his predecessors' work. First, he observes that the moon gets its light from the sun, and he cites the evidence for the claim: the luminous part of the moon is always facing the sun. The moon, therefore, shines with a borrowed light (B14, B15). Before Parmenides there are some elaborate theories of the structure and radiation of the moon: its orbit is like a great wheel of fire enclosed within a covering of

air, shining out at one aperture which opens and closes to reveal the phases of the moon (Anaximander 12A22). The moon is like a leaf blown around the sky by a wind, presumably presenting more or less of its surface area to viewers on the earth (Anaximenes 13A14). The moon is a luminous cloud (Xenophanes 21A43). The moon consists of a dark bowl filled with fire; the phases of the moon result from the rotation of the bowl (Heraclitus 22A12). The theories are ingenious, but all of them are based on the assumption that the moon has its own source of light. Parmenides, by contrast, posits a dark, presumably spherical body that shines by reflecting the sun's light. On this model, the moon must be closer to the earth than the sun (since it disappears from view when it is in complete shadow during the new moon phase). The theory "predicts" that the moon will become fuller as it increases its angular distance from the sun (during the course of a lunar month) until it is full when it is located directly opposite the sun in the sky; then it will decrease as it approaches the sun rising in the east in the second half of the lunar month. And so, in fact, do the phases progress. On Parmenides' theory, the positions of the moon in relation to the sun and the phases of the moon are not just correlated: the former causally determine the latter.

Second, Parmenides identifies the morning star with the evening star. These are manifestations of the same body, a single planet that appears sometimes with the setting of the sun, on its left (south and east), or appears before the rising sun on its right (north and west). This fact was known to Babylonian astrologers/ astronomers at least a thousand years before Parmenides.⁹ But no Greek philosopher was aware of the connection before Parmenides. And given that Parmenides, unlike the Milesian philosophers, lived far from the borders of the eastern empires, it is improbable that he borrowed his knowledge from them. We are not told what, if any, evidence Parmenides adduced for this

⁹ See Reiner and Pingree 1975; Hunger and Pingree 1999; Graham 2013, pp. 92-95.

insight. But in retrospect, we can recognize the fact that the morning star appears in the absence of the evening star and vice versa. And we may speculate that a thoughtful observer who had followed the development of the moon's appearance from its juxtaposition with the setting sun in the west to its juxtaposition with the rising sun in the east might think about how a single body can appear and disappear and reappear in the vicinity of the sun.

Third, Parmenides for the first time, as far as we know, portrayed the earth as a spherical body. Previously, all speculative cosmologies had presented the earth as flat, either as a disk, whether thick or thin, or as an infinite plane, or a raft-like body floating on a primeval sea.¹⁰ But now Parmenides presented the earth as three-dimensional circle which allowed it to be perfectly balanced at the center of the cosmos. We do not know what empirical evidence, if any, Parmenides offered for the shape of his earth.

What we can say, in retrospect, is that Parmenides was correct in all three of his innovative conjectures. The moon gets its light from the sun; the morning star and the evening star are manifestations of a single heavenly body, the planet Venus, which is always observed in the vicinity of the sun; and the earth is (approximately) a sphere in shape. The first insight was almost immediately taken up by Anaxagoras and Empedocles, and, in an era known for competing theories of every cosmic phenomenon, suddenly natural philosophers all accepted Parmenides' account of the moon's light, while other hypotheses disappeared.¹¹ Indeed, Anaxagoras and Empedocles both saw that the theory of lunar light could be extended to account for solar and lunar eclipses.¹² Henceforth, this theory of eclipses as arising from the blocking of the sun's light came to be accepted by virtually all later

¹⁰ See Aëtius 3.10 (Diels 1879, p. 376). Ps. Plutarch has Thales with a spherical earth, but this contradicts Arist. *Cael.* 294a28-33 = A14, which has the earth floating like a raft on the sea.

¹¹ Anaxag. B18; Emp. B43, B45, B47; Graham 2013, pp. 204-226.

¹² Hippol. *Haer.* 1.8.9-10 = Anaxag. A42; Emp. B42; Graham 2013, pp. 137-159.

authorities—cited by Aristotle as a paradigm of good science (*APo.* 90a15–18)—and continued as the only viable theory throughout antiquity, into the modern period, and indeed until the present day.

Parmenides' insight about the earth's shape did not catch on immediately. Anaxagoras, Leucippus, and Democritus still had a flat earth.¹³ But within a century the theory of a spherical earth began to take over. It was Plato's conjecture in the imaginative cosmography of the *Phaedo* (109a–110d). A decade or two later Aristotle could offer two sound scientific arguments for the sphericity of the earth (*Cael.* 297b23–298a9). And in the third century BC, Eratosthenes would measure the circumference of the earth using basic astronomy and geometry, and get a reasonably accurate result (Heath, 1932, 109–112). At a time when all other cultures, including some which could boast better astronomical observations and records than the Greeks had, still believed in a flat earth, the Greeks had empirical and geometrical evidence to vindicate Parmenides' counterintuitive conjecture.

All of this suggests that, whatever Parmenides' reservations and caveats about his *Doxa*, the natural philosophy presented in it was better—not just marginally, but spectacularly better—than anything offered by his predecessors, precisely in providing a sound basis for empirical research. In retrospect we can say that three of his cosmological conjectures led to scientific discoveries that opened the doors to further understandings of the heavens and astronomical phenomena. One of the major objections to cosmological speculations of the Presocratics was that the hypotheses embodied in them could not be verified because of the remoteness of the objects and events they studied (*X. Mem.* 1.1.11–15; [Hp.] *VM* 1). But in fact, with Parmenides' cosmology, theory began to lead to confirmations; some theories were rendered obsolete, while others established themselves on the basis of predictions they made. For instance, the theory of eclipses developed by Anaxagoras

¹³ Hippol. *Haer.* 1.8.3 = Anaxag. A42; Aëtius 3.10.4–5 = Leucipp. A26, Democ. A94.

made the risky prediction that solar eclipses could happen only at the time of a new moon, and lunar eclipses could happen only at the time of a full moon (Hippol. *Haer.* 1.8.9 = 59A42). And so it is.

None of this established what the status of the *Doxa* was for Parmenides. On the one hand, the statements of the goddess seem to disqualify the cosmological theories based on elements from constituting a true account of reality. On the other hand, the goddess promises that the theory provided will be superior to all other cosmological theories—and it is, even in its empirical aspects. We must consider, too, the fact that the *Doxa* was considerably longer than the *Aletheia*, and developed with complex detail as well as penetrating insights.¹⁴ Was Parmenides just as fascinated with natural philosophy as his peers? Aristotle criticizes the Eleatics for their rigid monism, but sees Parmenides as less objectionable: “Parmenides seems in places to speak with more insight. For ... being forced to follow the observed facts [*ta phainomena*] ... he now posits two causes and two principles, calling them hot and cold, i.e. fire and earth” (*Met.* 986b27–34, tr. Ross). At least, Aristotle observes, Parmenides makes concessions to humans’ experience of the world, as other Eleatics do not.

It is a supreme irony of history that Parmenides, who has at best a problematic relationship with natural philosophy, made the greatest scientific advances of any thinker down to his own time. The development of astronomy as an empirical science owes its origin to Parmenides’ conjectures about the moon, the morning and evening star, and the shape of the earth.

Parmenides leaves another legacy of almost equal importance. This is the theory of elements, which we have discussed above. The notion that the world consists, not of changeable substances which turn into each other, not of powers or natures, but of changeless stuffs each of which has a set of fixed properties: an essence, such that these stuffs can

¹⁴ Palmer 2009, p. 160, estimates the *Doxa* may have comprised 80% of Parmenides’ poem.

combine their properties to produce temporary states of being. This theory becomes the foundation of all future natural philosophy, certainly in antiquity, and eventually in the modern period as well. Such basic stuffs are elements, which form the building-blocks of nature.¹⁵ The idea of elements goes back to Parmenides, and was promulgated especially in the four-element theory of Empedocles, Parmenides' enthusiastic follower. The ancient theory is especially influential today in the theory of chemical elements, developed in a scientific way only in the late eighteenth and early nineteenth centuries AD. Today we recognize that the elements (other than the simplest ones, hydrogen and some helium) were forged by nuclear fusion in the cores of stars, or (in the case of heavier elements) produced by fusion in the explosion of stars. In other words, the elements are not everlasting. But in everyday chemical processes, they constitute (with the exceptions of radioactive isotopes) the permanent and indestructible building-blocks of the world. The structure of the natural world and the nature of its components were prefigured by Parmenides, even if his own two elements were too few in number and not the right ones in fact.

None of this tells us exactly what Parmenides had in mind in promulgating the *Doxa*. Did he intend it to provide an optimal account of natural processes, but one which had a fatal theoretical flaw, as if to say: this is the best theory of nature than the human mind can devise; but it is untenable; hence, all human researches into nature are futile? Did he, on the other hand, intend it as a model of how best to explain how our world works, knowing that a fully adequate theory will always be out of reach, somewhat as Plato offers the theory of the *Timaeus*—as a likely but unprovable story? Did he, finally, intend it as model embodying correct principles of natural philosophy, to be improved on in light of observational evidence, recognizing that *a priori* proofs such

¹⁵ On the notion and application of elements, see studies of Diels 1899; Vollgraff 1949; Koller 1955; Lumpe 1962; Kahn 1960, pp. 119-165; Schwabe, 1980; Mourelatos, 1987; Crowley, 2005. In general, an element, *stoicheion*, is a member of an ordered series; cf. Arist. *Metaph.* 5.3. It can be applied to letters of the alphabet as well as basic substances, and the notion of letters is sometimes used as a model for physical elements: Leucipp. A9, cf. A6.

as those that are valid for ontology, will not suffice for empirical science? The last option seems to be the one that inspired the next generation of natural philosophers, even if it seems the most remote from the argument of Parmenides' goddess.

Without endorsing any of these options, we can recognize the influence of the latter two in the shape of theories to come. In Plato, we have the Two World Theory, with an Eleatic world of Forms, timeless, changeless, impassible, complete, ideal; and a Heraclitean world of nature, where every manifestation is in flux, but somehow constrained into some kind of order by the upper Eleatic world and its imposition of character, number, and geometry (Pl. *Tht.* 156a-157c; *Ti.* 49d-53b). In Aristotle, we have a two-level theory of sorts also: there is First Philosophy, dealing with the ultimate realities, providing an ontology and basic metaphysics of substance; and there is Second Philosophy, dealing with substances that change, composed of matter and form, potentiality and actuality, involving place and time, which Aristotle calls Physics or Natural Philosophy (*Metaph.* 1004a2-9; 1026a10-23; 1069a30-b2).

Again we return to the irony that Parmenides, the father of the *a priori* approach to philosophy, offered the first empirical hypotheses about the structure of the cosmos that would be vindicated by observations and would form the foundations of scientific astronomy and cosmology. In the provisional framework for studying nature that he presented in the *Doxa*, a theory of elemental substances that combine and recombine to produce variable compounds or events, he also provided a model of explanation that would inspire a kind of second sailing of Presocratic natural philosophy, would underwrite most subsequent scientific research, and would ultimately triumph in contemporary chemistry. It would also inspire atomic theory, a conscious imitation of the dualism of the *Doxa*, which would in its turn dominate much modern research into the structure of matter and emerge in the twentieth century AD (to be sure in a version modified by

quantum theory) as the correct basis of the theory of elements.

In the end the question comes down to whether Parmenides was so fixed on an *a priori* structure of being with an almost aesthetic perfection that he could not tolerate the messiness of the world of experience; or whether he could use his basic theory of what-is to account for the changeable world of experience, even if only in a provisional or tentative way. Many of his successors took his theory of elements as a model, a kind of paradigm, for explaining the world, and they used his insights into the shape and disposition of the heavenly bodies to craft the beginnings of scientific astronomy. Parmenides was a confirmed metaphysician and ontologist. At best he was only a reluctant natural philosopher and scientist. But his speculations in the latter area made him the father, or perhaps grandfather, of modern science.

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