

The Definition of Matter in *Physics* I

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1. Introduction

In *Physics* I and II Aristotle puts matter at the foundation of natural science, identifying it as a principle and cause needed to have scientific knowledge (190b17-25; 192a3-14), and closely connecting it to a thing's nature (194a12-14). He makes use of this foundation across most of his scientific corpus, frequently using matter in his explanations.¹ Scholars generally agree that *Physics* I is crucial for understanding how Aristotle conceives of matter and why he thinks we need it to understand the natural world, since this is where he explains why matter is a principle. Despite this consensus, there is very little agreement about how he conceives of matter in *Physics* I. According to the traditional line of interpretation, he introduces matter because he thinks that there must be something that persists through change.² This interpretation has been challenged over the last sixty years,³ although there is not an agreed upon alternative for why we need matter, if not to persist. In this paper, I provide a new way to understand Aristotle's account of matter in *Physics* I. I argue that we can use the organizational structure of *Physics* I.5-9 to determine matter's fundamental feature: to be what undergoes change. By "undergo change" I mean to change, not in the active sense of changing something else, but rather in the passive sense of being what is acted on and so what changes into something new.⁴ The interpretation I offer is compatible with thinking that matter persists through change or that it does not. However, I argue that Aristotle does not introduce matter because he thinks something must persist through change and he does not view persistence as the fundamental feature of matter. Instead, he introduces matter because he thinks for any given change there must be something properly suited to undergo that change; this is matter's fundamental feature.

In *Physics* I Aristotle clarifies matter's fundamental role by distinguishing it from the lack, where by "lack" he means the lack of the result of the change. He distinguishes matter from lack by distinguishing two ways one thing can come to be from another: either x can

¹ [List of which works mention and which works do not.]

² Recent defenders of the traditional interpretation include Code 1976, Bostock 1982, and Gill 1989.

³ E.g. King 1956, Charlton 1970, Jones 1974, and Kelsey 2008.

⁴ I use the phrase "undergo change" because words like "change" are systematically ambiguous between active and passive senses.

come to be from y by virtue of itself (*καθ' αὐτό*), or x can come to be from y by virtue of concurrence (*κατὰ συμβεβηκός*).⁵ If x comes to be from y by virtue of itself, x comes to be from y because it is y.⁶ By contrast, if x comes to be from y by virtue of concurrence, x comes to be from y because of some other description that applies to y. Aristotle claims that things come to be from matter by virtue of itself, whereas they come to be from the lack by virtue of concurrence. I argue that this is the fundamental feature of matter in *Physics* I, that things come to be from it by virtue of itself, and I argue that when Aristotle says this, he is saying that matter undergoes change by virtue of itself. Aristotle thinks matter must be a principle of natural science because in order to study the natural world you must appreciate that in every change there is something that undergoes change by virtue of itself. One of Aristotle's major insights is to see that in order to understand change, it is not sufficient merely to identify the agent; the patient also makes a crucial contribution to why and how a thing is changed. Whether a flame is put under paper or under iron has a major effect on the change that results. A natural scientist needs to understand the proper patients of natural changes.

In addition to explaining matter's role in change, Aristotle also emphasizes in *Physics* I the rather obscure idea that matter has an important claim on being a substance (*οὐσία*). Aristotle thinks that in order for anything to be a scientific principle, it must have a claim to being substance, even if it is not what most strictly speaking substance. However, while Aristotle thinks that the principles must have a claim on being substances, I argue that they are not meant to only explain substances or substantial change; Aristotle's aim in *Physics* I is to explain all change and he thinks the principles of any change must be substances.

Aristotle provides his basic account of matter in I.7. Many interpretive difficulties arise from how we should understand the main point of this chapter. In this paper I use the two chapters that precede I.7 and the two that follow to put constraints on how to understand the main point of I.7. At the end of I.6 Aristotle mentions a puzzle about

⁵ I use the translations "by virtue of itself" and "by virtue of concurrence," because these preserve the fact that the same preposition (*κατὰ*) is used in each phrase.

⁶ To be clear, I take "by virtue of itself" and "by virtue of concurrence" here to be adverbial phrases that describe how one thing comes to be from another. I take this to be parallel to a claim like "a builder builds by virtue of herself." The "by virtue of herself" modifies "builds." It says that *builds* applies to a builder because of she is a builder, not because of some other feature of her. Similarly, in saying "a tree comes to be from matter because of itself," one is saying that a tree comes to be from matter because it is matter, not because of some other feature of it. Just as we learn something crucial about builders by learning what they do by virtue of themselves, so we learn something crucial about matter by learning what it does by virtue of itself.

whether the principles are two or three (191a23-24) and then he declares five times in I.7 that he has determined the number of principles, thereby solving this puzzle (190b29-30, 190b33-191a1, 191a3-4, 191a12-15, 190a20-21). Similarly, at the beginning of I.8 and at the beginning of I.9 he refers back to an unspecified central feature of his account that Parmenideans (I.8, 191a24-25) and the Platonists (I.9, 191b35-36) failed to appreciate. I argue that the key to resolving the two-versus-three puzzle and the key thing Aristotle thinks the Platonists and Parmenideans missed is Aristotle's distinction between what a thing comes to be from by virtue of itself versus what it comes to be from by virtue of concurrence. In what follows I approach the relevant stretch of *Physics* I in reverse order: starting at *Physics* I.9 and working back to I.5 and I.6. This approach is useful since Aristotle is explicit about some key points near the end of Book I, which he treats more obscurely near the beginning.

2. The project of *Physics* I

Before going through the chapters in reverse order, we need an overview of *Physics* I and a basic understanding of Aristotle's project in it. In *Physics* I.1 and the first half of I.2 he introduces the project of determining the elements and principles (*τὰ στοιχεῖα καὶ αἱ ἀρχαὶ*) needed to understand the natural world. The second half of I.2 and all of I.3 discuss Parmenidean views, which Aristotle says are outside the proper scope of the project (184b25-185a1, 185a17-20). I.4 discusses the views of natural philosophers (*οἱ φυσικοί*), with a focus on Anaxagoras, whose views he rejects. I.5 through I.7 develop his account of the principles of nature, ending his positive account that the principles are form, matter, and, in some extended sense, lack. In I.7 he says that every coming-to-be begins with something that is one in number, but two in account (190a13-17, 190b10-13). As we will see, one account is given by the lack or opposite, the other by the matter. I.8 and I.9 apply Aristotle's central insight from I.7 to diagnosing where his predecessors went wrong.

Aristotle says in I.1 that he is searching for the principles that must be grasped in order to have any knowledge of nature (184a14-16). According to I.1, the natural course is to proceed from what is clearer and more knowable to us to what is clearer and more knowable by nature (184a16-18). At first he does not seem to do this, since he begins I.2 with a discussion of his predecessors. However, after arguing that Parmenides and Melissus do not properly engage in the study of nature, he lays down as a basic assumption, clear from a

survey of cases (*ἐπαγωγή*), that natural things, all or some of them, change (184a12-14). This, I suggest, is what is clearer and more knowable to us and what the principles allow us to explain. All of the genuine natural philosophers, according to Aristotle, accept that some or all things change, but they offer different accounts of what the principles and elements are that explain change. Aristotle is engaged in this same project, but he argues that the sort of principle and element needed is quite different from what the Presocratic natural philosophers offer.⁷ He argues that they have not grasped what is more knowable by nature.

3. The proper role of Matter and Lack in *Physics* I.9

In *Physics* I.9, I.8, and I.7 Aristotle sheds light, in different ways, on the proper role of matter and lack; that is to say, what each does by virtue of itself (*καθ' αὐτό*), or when speaking most properly (*μάλιστα λέγομεν κυρίως*, 191b6-7). Understanding these proper roles in I.9 and I.8 sheds light on Aristotle's account in I.7, making clear how important these roles are for his account there.

At the beginning of *Physics* I.9 Aristotle suggests that the Platonists did not properly understand matter, and provides an account of what they missed:

Others, indeed, have touched upon it [sc. the nature of coming to be, passing away, and change generally, c.f. 191b32-34], but not sufficiently. First, they agree that a thing comes to be simply from what is not, and that so far Parmenides spoke correctly. And then it appears to them that if it is one in number, then it is only one in possibility. But this differs greatly. For we say that matter and lack are different, and that the matter is what is not by virtue of concurrence, whereas the lack is what is not by virtue of itself, and the one, the matter, is near to substance (*οὐσία*) and a substance in a way, while the other is not a substance at all... They got as far as seeing that there must be an underlying nature, but they made it one. (191b35-192a11; translations from Charlton, modified)

Ἡμμένοι μὲν οὖν καὶ ἕτεροί τινές εἰσιν αὐτῆς, ἀλλ' οὐχ ἰκανῶς. πρῶτον μὲν γὰρ ὁμολογοῦσιν ἀπλῶς γίγνεσθαι τι ἐκ μὴ ὄντος, ἣ Παρμενίδην ὀρθῶς λέγειν· εἶτα

⁷ Bostock 1982, thinks that Aristotle's shift to a different sort of principle shows Aristotle to be a failure to produce the sort of principle the Presocratics were looking for, whereas I take it to be an intentional shift to a very different sort of principle.

φαίνεται αὐτοῖς, εἴπερ ἐστὶν ἀριθμῶ μία, καὶ δυνάμει μία μόνον εἶναι. τοῦτο δὲ διαφέρει πλείστον. ἡμεῖς μὲν γὰρ ὕλην καὶ στέρησιν ἕτερόν φαμεν εἶναι, καὶ τούτων τὸ μὲν οὐκ ὄν εἶναι κατὰ συμβεβηκός⁸ τὴν ὕλην, τὴν δὲ στέρησιν καθ' αὐτήν, καὶ τὴν μὲν ἐγγὺς καὶ οὐσίαν πως, τὴν ὕλην, τὴν δὲ οὐδαμῶς... μέχρι μὲν γὰρ δεῦρο προήλθον, ὅτι δεῖ τινὰ ὑποκεῖσθαι φύσιν, ταύτην μέντοι μίαν ποιῶσιν·

These people in *Physics* I.9 are Plato and Platonists; in *Physics* I.4 Aristotle identified Plato as the one who makes “the great and the small” a principle (187a17-20).⁹ Aristotle says that they touched upon the nature of coming to be, passing away, and all change, but not sufficiently. What follows fills out what they got right and what they missed. They touched upon the need for an underlying nature. But, what they said was not sufficient because they made it one. Aristotle distinguishes matter and lack whereas they make the mistake of thinking that since these are one in number, they are the same in being.

For our purposes the key is that Aristotle says the Platonists central mistake is failing to distinguish matter from lack, whereas Aristotle distinguishes them in terms of what holds of each by virtue of concurrence or by virtue of itself. It is crucial to Aristotle’s view that while matter and lack are one in number, they have different accounts and so different things hold of each of them properly speaking. Matter is what is not, but only because it also happens to be a lack. The lack is what is not by virtue of itself. This is what it is to be the lack. By contrast, it is only by virtue of concurrence that matter is something that is not. Matter is near to a substance and a substance in a way. The lack, despite being one in number with the matter, is not a substance at all. Near the end of the paper (section 9) I will return to this idea that matter is near to a substance.

In sections 5 through 7, below, I use *Physics* I.6 and I.7 to explain matter’s role in change and distinguish it from the lack. In what follows the *Physics* I.9 passage quoted above, Aristotle uses Platonic language to describe matter’s role and distinguish it from the lack (192a11-25). He says that matter is like a mother and that given that there is something good

⁸ Removing the comma here, after *συμβεβηκός*, at the suggestion of John Wynne. Bekker and Ross both print commas. This is not important for my overall reading of the passage.

⁹ Aristotle also uses the term matter in this I.4 passage, which tells against the idea that he is literally introducing the term “matter” in *Physics* I.7, as opposed to helping us understand what matter is and why it is needed to understand the natural world. Note that ὕλη is used once by Plato to indicate something roughly matter-like (*Philebus* 54c).

and desired, the opposite – a term that he uses interchangeably here with “the lack”¹⁰ – is not what does the yearning (*ἐφίεσθαι*); rather, it is the matter that yearns (192a20-22). It is better, Aristotle says, to think that matter desires the good and by virtue of concurrence is not good; by contrast, the Platonists think there is just a single nature that is not good and yearns for the good (192a19-20). Again, they combine the matter with the lack, failing to distinguish what holds of each by virtue of itself.¹¹

4. The Proper role of the Lack in Physics I.8

Physics I.9 explicitly mentions matter and lack and distinguishes them in terms of what holds of each by virtue of itself or by virtue of concurrence. As we will see, *Physics* I.8 does not mention matter, however, it does make a crucial point about the lack. Aristotle begins I.8 by saying:

We must say after these things that the puzzle (*ἀπορία*) of earlier thinkers is only resolved in this way. (*Physics* I.8, 191a23-24)

“Ὅτι δὲ μοναχῶς οὕτω λύεται καὶ ἡ τῶν ἀρχαίων ἀπορία, λέγωμεν μετὰ ταῦτα.

The “this way” (*οὕτω*) refers back to something indeterminate in the previous chapter. Aristotle evidently thinks that the theory he has presented in *Physics* I.7, or a crucial feature of that theory, is the central thing needed to resolve the Parmenidean dilemma of *Physics* I.8. But he never explicitly identifies how his I.7 account resolves the dilemma in *Physics* I.8.

While this is a controversial chapter, according to recent interpretations the key to resolving the Parmenidean dilemma is the distinction between what something comes to be from by virtue of itself versus what it comes to be from by virtue of concurrence.¹² This is found clearly in the text, immediately after he introduces the Parmenidean dilemma:

¹⁰ In I.9 he calls it a lack at 192a5. He explicitly treats them as interchangeable earlier, e.g., at 190b27 and 191a14. For a discussion of this, see section 7 below.

¹¹ Interestingly, there is only one mention, at the end of *Physics* I.9, of matter being connected to being potential (192a27). There is also a one-line mention of potential at the end of *Physics* I.8 that quite indirectly connects matter to potentiality. While Aristotle does not in general explain matter in terms of potentiality in *Physics* I, I take his explanation to be compatible with such an explanation.

¹² See Kelsey 2006 and Anagnostopoulos 2013. I argue for this at greater length in Ebrey 2007, ch. 2.

We, on the other hand, say that it is in one way no different, that something should come to be from what is or what is not, or that what is or is not should act [ποιεῖν] on something or be acted on, or come to be any particular thing, than that a doctor should act on something or be acted on, or that something should be or come to be from a doctor. As a result, since this is said in two ways, clearly this is also the case when we say that something is from what is, and that what is acts or is acted on. A doctor builds a house, not as a doctor, but as a builder, and comes to be pale, not as a doctor, but as dark. But he doctors and comes to be ignorant of medicine as a doctor. Since we most properly say that a doctor acts or is acted on, or that something comes to be from a doctor, if it is as a doctor that he is acted upon, or acts or comes to be, it is clear that “comes to be from what is not” means doing so as something which is not. **They gave up through not drawing this distinction,** and because of this mistake passed to the greater one of supposing that nothing comes to be or is among the other things, thus doing away with coming to be altogether. We also ourselves say that nothing comes to be simply from what is not; but that things do come to be in a way from what is not, sc. by virtue of concurrence. This is because a thing can come to be from the lack, which by virtue of itself is not and is not internal.¹³ This, however, makes people stare, and it is thought impossible that something come to be from what is not. (191a34-b17, emphasis mine)

ἡμεῖς δὲ λέγομεν ὅτι τὸ ἐξ ὄντος ἢ μὴ ὄντος γίνεσθαι, ἢ τὸ μὴ ὄν ἢ τὸ ὄν ποιεῖν τι ἢ πάσχειν ἢ ὅτι οὖν τὸδε γίνεσθαι, ἔνα μὲν τρόπον οὐθὲν διαφέρει ἢ τὸ τὸν ἰατρὸν ποιεῖν τι ἢ πάσχειν ἢ ἐξ ἰατροῦ εἶναι τι ἢ γίνεσθαι, ὥστ' ἐπειδὴ τοῦτο διχῶς λέγεται, δῆλον ὅτι καὶ τὸ ἐξ ὄντος καὶ τὸ ὄν ἢ ποιεῖν ἢ πάσχειν. Οἰκοδομεῖ μὲν οὖν ὁ ἰατρὸς οὐχ ἢ ἰατρὸς ἀλλ' ἢ οἰκοδόμος, καὶ λευκὸς γίγνεται οὐχ ἢ ἰατρὸς ἀλλ' ἢ μέλας· ἰατρεύει δὲ καὶ ἀνίατρος γίγνεται ἢ ἰατρός. ἐπεὶ δὲ μάλιστα λέγομεν κυρίως τὸν ἰατρὸν ποιεῖν τι ἢ πάσχειν ἢ γίνεσθαι ἐξ ἰατροῦ, ἐὰν ἢ ἰατρὸς ταῦτα πάσχη ἢ ποιῇ ἢ γίγηται, δῆλον ὅτι καὶ τὸ ἐκ μὴ ὄντος γίνεσθαι τοῦτο σημαίνει, τὸ ἢ μὴ ὄν. ὅπερ ἐκεῖνοι μὲν οὐ διελόντες ἀπέστησαν, καὶ διὰ ταύτην τὴν ἄγνοϊαν τοσοῦτον προσηγνόησαν, ὥστε μηθὲν οἶεσθαι

¹³ For a discussion of Aristotle's use of ἐνπάρχειν, including his use with matter see Ebrey 2007, ch. 3. For an alternative account, see Anagnostopoulos 2013.

γίγνεσθαι μηδ' εἶναι τῶν ἄλλων, ἀλλ' ἀνελεῖν πᾶσαν τὴν γένεσιν· ἡμεῖς δὲ καὶ αὐτοὶ φαμεν γίγνεσθαι μὲν μηθὲν ἀπλῶς ἐκ μὴ ὄντος, πὼς μέντοι γίγνεσθαι ἐκ μὴ ὄντος, οἷον κατὰ συμβεβηκός (ἐκ γὰρ τῆς στέρησεως, ὃ ἐστὶ καθ' αὐτὸ μὴ ὄν, οὐκ ἐνυπάρχοντος γίγνεται τι· θαυμάζεται δὲ τοῦτο καὶ ἀδύνατον οὔτω δοκεῖ γίγνεσθαι τι, ἐκ μὴ ὄντος).

The passage is structured to show that the same distinction applies to how doctors act and to what a thing comes-to-be from. Just as doctors can act as doctors or not as doctors, so one thing can come to be from another as that other thing or not as that other thing.

Aristotle claims that these earlier thinkers did not draw this distinction. In particular, they did not distinguish between coming to be from what is not as what is not and coming to be from what is not by virtue of concurrence. And similarly, they did not distinguish coming to be from what is as something that is and doing so by virtue of concurrence. Drawing these distinctions allows Aristotle, near the end of the quotation, to accept that things come to be both from what is and what is not. He explicitly does not allow things to come to be from what is not as what is not; they only do so by virtue of concurrence. In the second to last sentence, Aristotle identifies “what is not” as the lack, as one would expect given that in I.9 he says that the lack, by virtue of itself, is what is not.

Thus, Aristotle thinks the key to resolving the Parmenidean dilemma is to see that things come to be from the lack by virtue of concurrence, not by virtue of itself. In both I.8 and I.9 Aristotle draws the key distinction between what the lack does by virtue of itself and what it does by virtue of concurrence. Aristotle says in I.9 that the lack is what is not by virtue of itself, unlike matter, which is only what is not by virtue of concurrence. In I.8, Aristotle emphasizes that things can come-to-be from lack, but only by virtue of concurrence. He does not need to mention matter in I.8 to resolve the Parmenidean dilemma, but, as we will see, in I.7 he says that things come to be from matter by virtue of itself.¹⁴

¹⁴ At the end of *Physics* I.8 Aristotle mentions in passing the distinction between active and potential. This is the only time it is mentioned in *Physics* I. Elsewhere in his corpus, Aristotle closely connects matter with potentiality (e.g., REF). Since the goal of this paper is to understand *Physics* I on its own terms, I will not use this terminology to provide an account of matter, although I take my account to be compatible with one that emphasizes potentiality.

5. *Physics* I.7 and the two versus three *aporia*

Aristotle provides his basic account of matter in I.7. He connects this to his discussion in I.5 and I.6 through a puzzle (*ἀπορία*) that he first mentions at the end of *Physics* I.6:

That the elements, then, are neither one in number, nor more than two or three, is plain; but whether they are two or three, as I have said, is a great puzzle. (*Physics* I.6, 189b27-29)

ὅτι μὲν οὖν οὔτε ἐν τὸ στοιχείον οὔτε πλείω δυῶν ἢ τριῶν, φανερόν· τούτων δὲ πότερον, καθάπερ εἶπομεν, ἀπορίαν ἔχει πολλήν.

This puzzle poses an interpretive difficulty since he has never clearly said that this is a puzzle, let alone a great one. In fact, the basic argument in I.6 seems to be that in addition to two principles/elements we need a third one. There does not seem to be a puzzle here at all: simply make the principles three. And yet, as mentioned in the introduction, in the second half of I.7 he declares five different times that he has determined whether the principles are two or three. He treats resolving this, and thereby determining the principles of nature, as the major accomplishment of I.7. I will argue that his basic resolution is to distinguish between matter and lack, thereby providing the account of matter I described in the introduction, according to which matter's proper role is to undergo change.

In the first half of I.7 there is no mention of principles nor of the two versus three puzzle. Interpreters that emphasize persistence typically focus on this part of the chapter, since Aristotle says there that the underlying thing remains.¹⁵ Given the project of *Physics* I and what we have seen in I.8 and I.9 (not to mention what we will see in I.5 and I.6), it is reasonable to look for Aristotle's account of matter in the second half of the chapter, since that is where he reintroduces the question of what the principles are (190b17-20), uses the term "matter" (190b25), distinguishes between matter and lack using the by virtue of itself/by virtue of concurrence distinction (190b24-27), and reintroduces the two versus three puzzle (190b29-30 – these passages are quoted and discussed below). On my reading, as on Kelsey's, the first half of I.7 is designed to motivate the claim that the underlying thing

¹⁵ [Add Refs. Code, etc.]

is one in number but has two accounts (190a13-17, 190b10-13). This is the central claim needed to resolve the two versus three puzzle and determine what the principles are. This claim is a prerequisite for his account of the principles to be correct, but it is not strictly part of what the principles are.¹⁶ Thus, in this paper I will focus on the account he puts forward in the second half of I.7:

The underlying thing¹⁷, however, though one in number, is two in form. On the one hand the man, the gold and in general the matter are countable, for this is more of a this-something (τόδε τι) and it is not by virtue of concurrence that the thing which comes to be comes to be from this. On the other hand the lack or opposition is concurrent. And the form is one: for example, the arrangement, or the knowledge of music, or some other thing said of something in this way. Hence on the one hand we must say that the principles are two, and on the other that they are three; (190b23-30)¹⁸

ἔστι δὲ τὸ μὲν ὑποκείμενον ἀριθμῶ μὲν ἓν, εἶδει δὲ δύο (ὁ μὲν γὰρ ἄνθρωπος καὶ ὁ χρυσὸς καὶ ὄλως ἢ ὕλη ἀριθμητὴ· τόδε γὰρ τι μᾶλλον, καὶ οὐ κατὰ συμβεβηκὸς ἐξ αὐτοῦ γίνεταί τὸ γιγνόμενον· ἢ δὲ στέρησις καὶ ἢ ἐναντίωσις συμβεβηκός). ἐν δὲ τὸ εἶδος, οἶον ἢ τάξις ἢ ἡ μουσικὴ ἢ τῶν ἄλλων τι τῶν οὕτω κατηγορουμένων. διὸ ἔστι μὲν ὡς δύο λεκτέον εἶναι τὰς ἀρχάς, ἔστι δ' ὡς τρεῖς·

This passage in I.7 is where Aristotle states for the first time his basic idea that matter and lack have different accounts. Things come to be from matter not by virtue of concurrence, whereas the lack is merely concurrent with the matter. It is only after Aristotle makes this claim that he introduces his solution to the two versus three puzzle: that on the one hand the principles are two and on the other hand three (190b29-30). When Aristotle says at the beginning of I.8 that “this is the only way to resolve the earlier thinkers difficulty” he is

¹⁶ See also Kelsey 2008. I also argue for this extensively in Ebrey 2007, ch. 2.

¹⁷The relation between the underlying thing and the matter is tricky. Sometimes Aristotle says that “underlying thing” along with “the lack” make up what comes to be the thing that comes to be (e.g., 320b10). This use of the term “underlying thing” is, I suggest, the same as the use of the term “matter” in the current passage. We can think of this use of “underlying thing” as *the underlying thing as such*. In the present passage Aristotle uses the term “underlying thing” in a different way. In this second use, the lack is one aspect of the underlying thing. Clearly this must be a different way of using the term “underlying thing” since it is not contrasted with lack, rather it subsumes the lack. This second use of “the underlying thing” does not refer to the underlying thing as such, but simply to that thing which is underlying.

¹⁸ Compare similar passages: *Physics* I 9 (192a32), *Metaphysics* Zeta 7 (1032a16) and Lambda 1-2 (1069b3-9).

referring to this idea that things only come to be from the lack or opposite by virtue of concurrence. Things come to be from something else properly speaking (namely, matter, although this is not relevant for explaining where these Parmenideans went wrong).¹⁹ Similarly, the nature of coming-to-be that Aristotle says in I.9 that Plato touched upon was the need for an underlying thing that undergoes change; what Plato said was not sufficient because he did not distinguish the matter from the lack, which things come to be from merely by virtue of concurrence.

To understand what originally motivates this distinction in I.7 and to understand why Aristotle thinks we need matter as a principle, we need to turn further back in the text, to *Physics* I.5 and I.6 in order to understand the two versus three puzzle that Aristotle is trying to solve in I.7.²⁰ Before laying out the somewhat complicated details, let me provide an overview of my account. In *Physics* I.5 Aristotle provides two arguments for making opposites principles. In *Physics* I.6 he provides three arguments for introducing something in addition to the opposites. But, upon careful examination, these arguments in I.6 systematically undermine the arguments in I.5 for the opposites being principles. Thus, the two versus three puzzle is this: our reasons to think the opposites should be principles are in tension with our reasons to think we need something other than opposites. We do not know whether to make the principles two or three because we are not clear on the opposites' claim to being principles and how this relates to the need for a further principle.

6. The key pair of arguments and their resolution

This section and section 8 each have the same structure: I examine one argument in I.5, and then examine the argument(s) in I.6 that seem to undermine it, and finally consider Aristotle's resolution of the resulting tension in I.7. In this section I address the main pair of arguments that lead to the two versus three puzzle. Resolving this tension ultimately leads Aristotle in I.7 to clarify the proper role of matter, thereby explaining how it makes change intelligible.

¹⁹ Wieland 1960-61 claims that the principles Aristotle is looking for simply provide one with a "repertoire of points of view" (p. 135), that for Aristotle "there is no such things as 'matter' or 'form'" (p. 136) and that "this is why no characteristics belong to matter as such, other than those which can be extracted from the fact that it is matter for something." By contrast, I think these passages clearly indicate that for Aristotle there is definitely something matter does as such – it is what things come to be from, as such.

²⁰ The account I offer of the puzzle is close, in many ways, to the one presented by Sean Kelsey 2008, although, as we will see, I disagree with him about some of the larger morals to be drawn from it.

Let us begin with the key argument in I.5, which is undermined by an argument in I.6. I will argue that Aristotle ultimately rejects the conclusion of this argument in I.5:

[1] Our first point must be that of all the things that are none whatsoever is by nature such as to do [ποιεῖν] or suffer any chance thing by any chance thing, nor does anything come to be from just anything, unless someone takes a case that is by virtue of concurrence. [2] For how could pale come to be from knowing music, unless knowing music concurs on the not pale or the dark? [3] Instead, pale comes to be from not pale – that is, not from anything [that is not pale], but from dark or something between the two; and knowing music comes to be from not knowing music, except not from anything [that is not knowing music], but from ignorant of music, or if there is something among them that is in between. (188a31-188b3)

ληπτέον δὴ πρῶτον ὅτι πάντων τῶν ὄντων οὐθὲν οὔτε ποιεῖν πέφυκεν οὔτε πάσχειν τὸ τυχὸν ὑπὸ τοῦ τυχόντος, οὐδὲ γίγνεται ὅτιοῦν ἐξ ὄτουοῦν, ἂν μὴ τις λαμβάνη κατὰ συμβεβηκός· πῶς γὰρ ἂν γένοιτο λευκὸν ἐκ μουσικοῦ, πλὴν εἰ μὴ συμβεβηκὸς εἴη τῶ μὴ λευκῶ ἢ τῶ μέλανι τὸ μουσικόν; ἀλλὰ λευκὸν μὲν γίγνεται ἐξ οὐ λευκοῦ, καὶ τούτου οὐκ ἐκ παντὸς ἀλλ' ἐκ μέλανος ἢ τῶν μεταξὺ, καὶ μουσικὸν οὐκ ἐκ μουσικοῦ, πλὴν οὐκ ἐκ παντὸς ἀλλ' ἐξ ἀμούσου ἢ εἴ τι αὐτῶν ἐστι μεταξὺ.

Note the progression of thought. First Aristotle says that things do not come to be from some chance thing. This leaves open what non-chance thing they come to be from. Then, in the next sentence, he makes clear that an opposite (or something in between, along the same continuum) is necessary for a change to take place: pale cannot come to be from knowing music unless what knows music is also dark (or something in between pale and dark). Finally, in the third sentence, he says that things come to be from their opposites not merely by virtue of concurrence. It is clear that this is what Aristotle means since he has just said, in the second sentence, that things do not come to be from just anything, except by virtue of concurrence; in the third sentence, he says that instead of coming from just anything they

come from their opposites. For the “instead” (ἀλλά)²¹ to make sense, he must be contrasting this case with the earlier one: they come from the opposite not by virtue of concurrence. I will argue that Aristotle ultimately accepts the claims in the first two sentences: that things do not come to be from some chance thing and that the opposite is necessary for the change to take place.

But, in order to resolve the two versus three puzzle, he abandons the claim in the third sentence: that things come to be from their opposites not by virtue of concurrence. With the benefit of foresight we can see that Aristotle must ultimately change his view here, since (as we have seen) he says in I.7 that things come to be from the matter not by virtue of concurrence whereas the opposite and lack is concurrent (190b23-30). And, as we have seen, in I.8 he says that things do not simply come to be from the lack, rather they only do so by virtue of concurrence, and in I.9 he says that the lack and opposite is concurrent. (There is a slight shift here, which we will come back to, where in I.5 he only uses the term “opposite” whereas in I.7 through I.9 he typically uses the term “lack.” But he does not completely shift his vocabulary; in I.7 and I.9 he also refers to this lack as an opposite and says that it is concurrent (190b27 and 191a14, 192a17).)

The reason he ultimately abandons this claim in the third sentence is found, I propose, in the following passage in I.6, in Aristotle’s first argument for introducing a third principle:

But if they [the principles] are limited, there is an argument for not making them only two. For someone might be puzzled how density could naturally make [ποιεῖν] rarity into something or rarity naturally make density into something. And similarly whatever the opposition: for love does not gather up strife and make something from it, nor does strife <gather up love and make something> from this, but both <gather up> some other third thing <and make something from it>. (189a22-26)²²

²¹ I translate “instead” rather than the more standard “but” following Charlton. See LSJ REF for this translation. “But” suggests an opposed thought, whereas what we get is an alternative, which Greek ἀλλά can cover.

²² The text is very elliptical here, and the reading I give is different from others. In the first sentence Charlton leaves out the “something” [τις] in the text and reads “make” [ποιεῖν] as “act on”, thus translating “For it is hard to see how density could be by nature such as to act on rarity or vice versa, and similarly whatever the opposition” (p. 13). He then reads *poiein* the next time it comes up not as “act on” but this time as “make,” thus, “love does not gather up strife and *make* something out of it, nor does strife act thus with love.” The final clause is very elliptical. Charlton returns to his old “act on” locution, giving “both must act on a third thing

ἐπεὶ δὲ πεπερασμένοι, τὸ μὴ ποιεῖν δύο μόνον ἔχει τινὰ λόγον· ἀπορήσειε γὰρ ἂν τις πῶς ἢ ἡ πυκνότης τὴν μανότητα ποιεῖν τι πέφυκεν ἢ αὕτη τὴν πυκνότητα. ὁμοίως δὲ καὶ ἄλλη ὅποια οὖν ἐναντιότης· οὐ γὰρ ἡ φιλία τὸ νείκος συνάγει καὶ ποιεῖ τι ἐξ αὐτοῦ, οὐδὲ τὸ νείκος ἐξ ἐκείνης, ἀλλ' ἄμφω ἕτερόν τι τρίτον.

Love and strife and rarity and density and, in fact, all opposites are not the sort of things that are acted upon; rather, it is something else, other than opposites, that is acted upon. It is this third thing that becomes something else, not the opposite. There is, I propose, a direct conflict between this argument in I.6 and the last one we saw, in I.5. This is obscured by the fact that he uses different terminology in the two chapters: in I.5 he uses the language of what something “comes-to-be from,” whereas in I.6 he uses the language of what is “acted on.” I will argue that these pick out the same thing. If so, then in the I.5 argument Aristotle says that things must come from their opposite but then here in I.6 he is saying that they cannot come from their opposite and so there must be some third thing that things properly come to be from. Note that Aristotle begins this argument in I.6 by saying that this is “puzzling” (*ἀπορήσειε*). He uses the same “puzzling” language in the next I.6 argument. This, I propose, is the back-reference that Aristotle is expecting us to understand when he says at the end of I.6 that it is a great puzzle whether the principles are two or three.²³ If we suppose, with I.5, that things come to be from their opposites, then, Aristotle is saying here, they would be what is acted upon, which is puzzling.

That these two arguments are supposed to be in tension is confirmed by what Aristotle says in I.7, in the direct continuation of our last passage from I.7:

[Hence, on the one hand we must say that the principles are two, and on the other that they are three]; and on the one hand they are opposites, for example, if someone should say that the principles are the knowing music and the ignorant of music, or

distinct from them.” If we want to use the verb *poiein*, I think a better translation would also bring in the “something,” so giving, “both [make] some other third thing [into something].” However, this requires Aristotle giving a non-parallel elliptical construction (because he has just used the accusative with *poiein* for the object that results from making and this uses the accusative as the object you start with). Thus I use the verb that takes a single accusative and seems to capture Aristotle’s meaning: to gather up [*sunagein*].

²³ In fact, at the end of I.6 he literally says that it “holds much puzzle,” treating *aporia* as a sort of mass noun. The multiple puzzles mentioned earlier in the chapter can all be part of this mass of puzzlement.

the hot and the cold, or the united and the disunited – but on the other hand not, for opposites cannot be acted upon by one another. This too is resolved because the underlying thing is something else; for this is not an opposite. So in a way the principles are not more numerous than the opposites but are, you might say, two in number; but they are not two in every way, because of the other being which belongs to them, but three. (For the being of a man is other than the being ignorant of music, and the being of shapeless other than the being of bronze.) (190b29-191a3)

[διὸ ἔστι μὲν ὡς δύο λεκτέον εἶναι τὰς ἀρχάς, ἔστι δ' ὡς τρεῖς·] καὶ ἔστι μὲν ὡς τὰναντία, οἷον εἴ τις λέγει τὸ μουσικὸν καὶ τὸ ἄμουσον ἢ τὸ θερμὸν καὶ τὸ ψυχρὸν ἢ τὸ ἡρμοσμένον καὶ τὸ ἀνάρμοστον, ἔστι δ' ὡς οὐ· ὑπ' ἀλλήλων γὰρ πάσχειν τὰναντία ἀδύνατον. λύεται δὲ καὶ τοῦτο διὰ τὸ ἄλλο εἶναι τὸ ὑποκείμενον· τοῦτο γὰρ οὐκ ἐναντίον. ὥστε οὔτε πλείους τῶν ἐναντίων αἱ ἀρχαὶ τρόπον τινά, ἀλλὰ δύο ὡς εἰπεῖν τῶ ἀριθμῶ, οὔτ' αὖ παντελῶς δύο διὰ τὸ ἕτερον ὑπάρχειν τὸ εἶναι αὐτοῖς, ἀλλὰ τρεῖς· ἕτερον γὰρ τὸ ἀνθρώπων καὶ τὸ ἀμούσων εἶναι, καὶ τὸ ἀσχηματίστῳ καὶ χαλκῶ.

Here Aristotle puts the I.5 and the I.6 arguments alongside each other, indicating that they are the main source of the two versus three puzzle. He uses examples from I.5 of “knowing music and the ignorant of music” (e.g., 188b1-3), “the hot and the cold” (188b33), and “the united and the disunited,” (188b12-13) to refer to his argument in I.5 for the principles being opposites and uses the central idea from the I.6 argument – that opposites cannot be acted upon – to refer to his argument that the principles are not opposites. Aristotle says that the puzzle is resolved because the underlying thing is something else that is not an opposite. In order for this to not be a non sequitur, “the underlying thing” must refer to what is affected: since what is affected is different (in account) from the opposite, it can undergo the change. Aristotle has just said, in the passage that directly leads into this one, that things come to be from the matter not by virtue of concurrence, whereas the lack or opposite is concurrent. Thus, over the course of three sentences (starting in the previous I.7 passage), Aristotle describes the same role in three different ways: being what something comes-to-be from, and being what is acted on, and being an underlying thing.

While Aristotle's change in terminology may be confusing, it does help us understand matter's role by providing us with several descriptions of it. Matter is what is made into other things; it is what is acted on; things are made from it; when something comes-to-be, it is the underlying thing. When Aristotle first mentions matter, above, he says "the man, the gold, and in general the matter." In the first half of *Physics* I.7 Aristotle notes that in fact (in Greek, as in English), typically one would say that "a man comes to be musical" rather than "musical comes to be from a man" (190a21-31).²⁴ Thus, this provides us with another way to think of matter's role: it is what comes to be something else. Or, as I put it in the introduction, it is what undergoes a change.²⁵

7. Matter's proper role

We have seen that the way Aristotle distinguishes matter from lack resolves the basic tension in the two versus three puzzle, resolves the Parmenidean dilemma in I.8, and explains what Plato missed in I.9. There are a number of points to make about the resulting picture of matter. The most significant thing we learn about matter in the first book of the

²⁴ I do not take this to be more than a reflection by Aristotle of how Greek is used, picked out by his use of "is said" (*λέγεται*). One good reason to do so is that, as we have seen, Aristotle goes on to say that things come to be from "the man, the gold and in general the matter" not by virtue of concurrence (190b24-27). Thus, while we may not *say* that things come to be from the man, they in fact do so.

²⁵ Sean Kelsey (2008) is the only other scholar who identifies the puzzle as arising from a conflict between the arguments in I.5 and I.6 and so he is my closest ally in how to read the *aporia*. His reading of these arguments and why they are in conflict is very similar to my own. But he thinks the resolution is importantly different than I do. On his account, things come to be, *per se*, from both an opposite and from the matter. He defends this idea from a passage in *Generation and Corruption* (323b25-29) where Aristotle says that opposites drive one and another from each other's nature. On his reading, the opposite at the beginning of the change is what, *per se*, is destroyed in a change, whereas matter is what, *per se*, is made into the result. I am not convinced that the *Generation and Corruption* passage means that things come-to-be from their opposite *per se*.

But, setting aside the correct reading of *Generation and Corruption*, I do not think this is Aristotle's idea in *Physics* I. There is nothing in I.5 or elsewhere in *Physics* I where Aristotle discusses any sort of "destructive" aspect to change, making it hard to believe that this was supposed to be one of the main features of change that Aristotle wants us to learn. Instead, as we have seen, in three chapters in a row we are told that the opposite or lack is concurrent; the only thing it is, by virtue of itself, is what is not. Things come to be from something else *per se*, identified as matter in I.7 and I.9. Perhaps the clearest evidence comes at the end of our I.8 passage, where Aristotle says, "We too say that nothing comes to be simply from what is not; but that things do come to be in a way from what is not, sc. by virtue of concurrence" (191b13-15). He then immediately refers to "what is not" as the "lack." As mentioned earlier, he uses "lack" and "opposite" interchangeably in these last three chapters. So he is saying that nothing comes to be simply from the opposite, but it does do so in a way, namely, by virtue of concurrence. He never says in these chapters that things come to be from the lack or opposite in any way other than by virtue of concurrence. As we have seen, the reasons Aristotle mentions in I.5 for thinking that things come to be from opposites *per se* is that the opposite is necessary and things do not come to be from any chance thing. But this only gives us reason to think that opposites are *necessary* for any change and there must be some specific thing that things come to be from properly speaking; it does not give us reason for thinking that the opposite must be what it comes from properly speaking. On my account, the lack is necessary and something else, matter, has the *per se* role.

Physics is that there is something that matter does as matter: it undergoes change. Matter may incidentally do something else; it may have a number of other features. But it also has proper features, which it has as matter. To call someone a builder tells us what activities she engages in strictly speaking; similarly, with matter. Some lumber may sit in the corner of a building. But, it is not matter insofar as it is sitting there. It is matter insofar as it is the sort of thing to be built into something else, insofar as it is the sort of thing to undergo some sort of change. The lumber is, by virtue of a concurrence, a non-house; it lacks being a house. But it is matter insofar as it is the sort of thing to become a house.

This is matter's central defining feature in *Physics* I, the one thing he says that it does by virtue of itself. But this still leaves the question: why does he think it is one of the two (or three) basic principles needed for any understanding of the natural world? He does not make this space, time, body, or anything else that might seem to us like more obvious candidates. As mentioned earlier, Aristotle says in *Physics* I.2 that in order to study the natural world we must assume that there is change. And he thinks that in order to develop a science of something, one must assume that it is intelligible. This means that if a thing is undergoing change, there must be something about it that explains why it is able to do so. If we are doing natural science, we have to suppose that there is something about the things that change that makes them suitable for changing, something that makes the change intelligible. This is why Aristotle thinks that if we are studying natural science, we must set it down as a principle that there is something that is properly able to undergo that change, something that does so not by virtue of concurrence. This is what he identifies as matter.

There is no reason to think, given what Aristotle says in *Physics* I, that matter is connected with taking up space, a feature of matter that seems quite natural to us, especially with our use of the word "material."²⁶ Aristotle has a term for body (*σῶμα*) and he uses it in different contexts from where he uses the term "matter." There is also no indication in *Physics* I that matter is connected with individuation, that is, with explaining why two members of the same species are different from one another – a feature that, for example, is quite central to both Aquinas' account in *Being and Essence*, and of Anscombe and Geach's account of Aristotle.²⁷ There is also no indication that matter is connected with things that have a lower level of complexity or that it is physically smaller – a way of thinking of matter

²⁶ Anscombe 1953 describes matter as stuff, Graham 1984 as what is picked out by mass terms.

²⁷ Aquinas *On Being and Essence*, ch. 2 and (when within the same species) Anscombe and Geach 1961.

that is quite common in much Aristotle scholarship today.²⁸ It is true that what a thing comes-to-be from is typically less well organized – it is lumber rather than a house, menstrual fluid (on Aristotle’s theory) rather than a baby – but it is not the fact that something is a stuff or that it is physically smaller that makes it matter, but rather its suitability for becoming something else.

Note also that Aristotle does not introduce matter through a puzzle about generation *ex nihilo*.²⁹ Matter is motivated through the need to distinguish between matter and the lack in order to explain what something comes to be from. It is not until I.8, after matter is used to resolve the two-versus-three puzzle in I.7, that Aristotle mentions a puzzle about coming-to-be from what is not. Aristotle’s solution involves the claim that things can come-to-be from what is not, however not *as* what is not. This “what is not” is not nothing; instead, it is something that is picked out insofar as it lacks some relevant characteristic. What Aristotle is at pains to deny is not generation *ex nihilo* but generation from what is not insofar as it is not.³⁰

Note that persistence is not directly part of Aristotle’s resolution of the two versus three puzzle, nor is it what he indicates the Parmenideans and Platonists missed.³¹ He never says that matter persists by virtue of itself. This is not to say that for Aristotle matter does not persist. In the first half of I.7 Aristotle says that the underlying thing remains through coming-to-be (e.g., 190a18-21), as part of motivating his claim that in every change there is something that is one in number, two in account. This underlying thing turns out to be matter. Thus, I take it that he accepts that matter remains in *Physics* I. But he never treats it as a defining feature of matter and he does not say it is why we need matter. The point is that Aristotle does not argue that matter is a principle because he thinks that there must be something that persists in a change. He thinks matter is a principle because there needs to be something that properly speaking does the changing, not in the active sense of changing something else, but in the passive sense of what is acted upon. This is clear from the problem in I.6 and his resolution in I.7.

²⁸ Charlton 1970 argues that matter is what constitutes things. The assumption that matter is smaller or operates at a lower level is found in Cooper 1987, Lennox 2001, Leunissen 2010, and Henry 2008.

²⁹ For example, Gill 1989 (pp. 6-7) claims that Aristotle introduces matter as the continuant so as to avoid a Parmenidean problem involving sheer replacement. Alan Code 1995 (pp. 415-417) claims that matter must persist in order to solve a Parmenidean sheer replacement problem.

³⁰ So Kelsey 2008 and Anagnostopoulos 2013.

³¹ Bostock 1982, Code 1976 and Gill 1989 are examples of defenders of the view that matter must persist.

One might think that in order for something to undergo a change, to be the patient for a change, it must persist through the change. One reason this may seem likely is that Aristotle seems to think that the efficient cause must persist through a change.³² But that is not what makes something an efficient cause; rather, persisting is, at best, a by-product of the efficient cause doing its work. Similarly, if matter must persist in order to undergo change, then this is just a byproduct of its being the proper patient.

Perhaps Aristotle's considered view, outside *Physics* I, is that matter does persist. But if so, then at the end of the change there is something that is suitable for undergoing the change. This runs into problems. What is suitable for becoming bread, what becomes bread by virtue of itself, is dough. But there is no dough at the end of baking a loaf of bread. The matter for bread does not seem to persist. Moreover, things like dough are the sorts of things that Aristotle describes as matter: lumber for a house, menstrual fluid (on his theory) of a baby, blood (on his theory) of bones. In many of these cases we do not have the thing suitable for undergoing the change at the end of the change: there is no menstrual fluid in the baby from which you could create a new baby. If I am right, this does not cause a problem for his overall theory. He can drop the claim that matter remains without losing anything crucial in his account.

Thus, this account provides an important way to resolve the sort of problem that, for example, is the central motivation of Gill's book, *Aristotle on Substance*:

The dilemma is, How can the requirement for unity of the continuant *over* time be reconciled with the requirement for unity of the whole generated composite *at* a time? I will call the requirement for continuity through change a demand for "horizontal" unity, and the requirement for definable unity a demand for "vertical" unity. If matter persists through the generation, career, and destruction of a composite, thus providing horizontal unity, then the matter has a nature distinct from that of the form whose temporary presence gives the composite its particular identity. But if so, then the composite lacks vertical unity: its nature is determined in two ways, by its form and by its matter, each of which is conceptually prior to it. Yet

³² [REF]

if composites are primary substances, they must be conceptually primary entities, and so must be vertical unities.³³ (Gill, p. 6)

If Aristotle is not deeply committed to matter persisting, then we can resolve Gill's dilemma by simply accepting vertical unity. Matter need not persist and need not be conceptually prior to the composite entity. This fits with what Aristotle says in his scientific works. He identifies the menstrual fluid as the matter for animal reproduction. It need not be conceptually prior to the mature organism, nor need it persist, in order to be what these substances come to be from.

Could it be that some things are suitable to undergo change precisely because they persist through the change? If so, these things would be matter because they persist. But it is not clear why persistence would make something suitable to change: many things persist through any given change but are clearly not involved in that change. When someone becomes pale, her being musical is irrelevant to this, even if it persists through the change. In fact, things that necessarily persist through the change, such as her being risible, clearly are not what undergo the change. Merely persisting does not qualify one to undergo a change. The mere act of persisting plays no fundamental role in a change; at most, it is a prerequisite for a change to take place.

It would be reasonable to assume, from what Aristotle says in *Physics* I, that just as there are different types of efficient cause for different changes, so there are different types of matter. However, in *Physics* I Aristotle is not focused on these differences, but rather on the general need for matter. The question of what types of matter there are is specific to each science. This is why Aristotle discusses the different types of matter – for example, blood and menstrual fluid – as they come up in the specific sciences.

8. The formal requirements for being a principle

In section 6 we considered a conflict between an argument in I.5 and one in I.6, a conflict about what things properly come to be from. In addition to this conflict about what things come to be from, there is another tension between arguments in I.5 and I.6, which I argue is another part of the two versus three puzzle. This tension is about whether opposites

³³ Gill, p. 6. To be clear, Gill's project is primarily to understand part of Aristotle's *Metaphysics*. My project is to understand *Physics* I, which I take to be aimed at providing the foundations for natural science, not first philosophy.

are even the right sort of thing to be a principle of natural science. To resolve this tension Aristotle needs to clarify the ontological status of opposites and of matter. In this section I again consider an argument in I.5, then (this time) two arguments in I.6 that seem to undermine this argument, and finally passages in I.7 and I.9 that point to a resolution. Here is the I.5 argument:

Clearly, then, all in some way make the principles opposites. And that is reasonable. For the principles must be neither from one another nor from anything else, and everything else must come from them. These features belong to the primary opposites: because they are primary they are not from anything else, and because they are opposites they are not from one another. (188a26-30)

ὅτι μὲν οὖν τὰναντία πως πάντες ποιοῦσι τὰς ἀρχάς, δῆλον. καὶ τοῦτο εὐλόγως· δεῖ γὰρ τὰς ἀρχὰς μήτε ἐξ ἀλλήλων εἶναι μήτε ἐξ ἄλλων, καὶ ἐκ τούτων πάντα· τοῖς δὲ ἐναντίοις τοῖς πρώτοις ὑπάρχει ταῦτα, διὰ μὲν τὸ πρῶτα εἶναι μὴ ἐξ ἄλλων, διὰ δὲ τὸ ἐναντία μὴ ἐξ ἀλλήλων.

By “primary opposites” Aristotle means a pair of opposites that are not explained by other, prior opposites. His argument is fairly straightforward: a principle must not be from anything else and so primary opposites can be principles because they are not from anything else, including one another. This argument draws on the general idea that principles (*ἀρχάς*) should be the most prior things, since they are at the beginning. If a principle were from something else, that other thing would be prior to it.

In I.6 Aristotle argues that, to the contrary, opposites must have something prior to them and, at least in some cases, they must be from something else:

In addition to these things, someone might also be puzzled [*ἀπορήσειεν*] if someone should not posit another nature for the opposites. [First argument:] For we never see opposites being the substance (*οὐσία*) of the things that are, and yet a principle must not be something said of some underlying thing. For, there will be a principle of a principle; for the underlying thing is a principle, and seems prior to that which is said of it. [Second argument:] Again, we don’t say that one substance is the opposite of

another. How, then, can a substance be from non-substances? And how can that which is not a substance be prior to that which is? (189a27-34)

πρὸς δὲ τούτοις ἔτι κἄν τόδε τις ἀπορήσειεν, εἰ μή τις ἑτέραν ὑποθήσει τοῖς ἐναντίοις φύσιν· οὐθενὸς γὰρ ὀρώμεν τῶν ὄντων οὐσίαν τάναντία, τὴν δ' ἀρχὴν οὐ καθ' ὑποκειμένου δεῖ λέγεσθαι τινος. ἔσται γὰρ ἀρχὴ τῆς ἀρχῆς· τὸ γὰρ ὑποκείμενον ἀρχή, καὶ πρότερον δοκεῖ τοῦ κατηγορουμένου εἶναι. ἔτι οὐκ εἶναι φάμεν οὐσίαν ἐναντίαν οὐσία· πῶς οὖν ἐκ μὴ οὐσιῶν οὐσία ἂν εἴη; ἢ πῶς ἂν πρότερον μὴ οὐσία οὐσίας εἴη;

Aristotle raises two related arguments against opposites being principles. Again, he starts by saying that this is puzzling, which is probably what he is referring to at the end of the chapter when he says that it is very puzzling whether the principles are two or three. Note that in this argument he does not say that he is arguing for a third principle; instead, he provides two different arguments for thinking that opposites cannot be principles but rather we need something else. The problems both arise because opposites cannot be substances. The first problem is that opposites are not the sort of thing that can be principles, since they have something prior to them. They have something prior to them because they are not substances, and so must depend on some substance. Note that this problem arises whether or not we are explaining a substance: the principles of explanation must be substances, whatever they are explaining. Whereas the first problem is that these purported principles have something prior to them, the second problem is that these purported principles cannot explain all that they are supposed to explain. This second problem (picked out by the “again” (*eti*)) is that opposites cannot explain substances, in particular. Opposites are posterior to substances and one thing cannot come from another thing posterior to it; hence, substances cannot come from opposites. This, in turn, means that opposites cannot be the principles that explain substances.

As we saw, in I.7 immediately before Aristotle says for the first time that he has resolved the two versus three dilemma, he makes two claims about matter: (1) that it is more of a this-something (*τόδε τι*) and (2) it is not by virtue of concurrence that the thing which comes to be comes to be from it. This first claim about matter is what resolves this part of the two-versus-three puzzle, i.e., the tension about whether opposites are principles.

Matter's being more³⁴ of a this something indicates that it has an important claim to being a substance, since being a “this something” is the primary characteristic of substance (Categories 5 REF). Aristotle returns to this idea twice in I.7. When explaining the nature of the underlying thing he says that as bronze stands to a statue, so the underlying nature stands to a substance, to a this something, to what is (191a8-12). This suggests that it is not a substance, rather intimately related to one, which fits with what we saw in the I.9 passage, where he says that matter is near to substance and a substance in a way, whereas the lack is not a substance at all (192a3-6). Instead of being a substance, the lack is concurrent with matter; they are one in number, two in account. Although Aristotle seems to think in *Physics* I that matter is close to substance, at the end of I.7 he also says that “whether the form or the underlying thing has the better claim to be called the substance is still obscure” (191a19-20). His view seems to be that matter and form are each at least close enough to substance to count for purposes of being a principle of natural science. He never raises a concern that matter might not count as a principle because it is merely close to substance and merely a substance in a way.³⁵

Note that Aristotle does not simply resolve the tension between these arguments by rejecting his claim in I.5 that opposites are principles and accepting his arguments in I.6 that they are not. Instead, in I.7 the lack is identified as an opposite (190b27-32) and what it is opposed to is the form. The form is a principle and has a strong claim to being substance, despite being opposed to something, the lack. As mentioned earlier, there is a subtle shift from the talk of opposites in I.5 to talk of lack in I.7, I.8, and I.9. The lack is called an opposite in I.7 and I.9, but it is a mere contradictory, the absence of some feature (specified by the form). The term “opposite” (*enantion*) can refer to such a contradictory, but it can also refer to a more robust sort of opposite, which we can call a contrary: cold rather than non-hot. In Aristotle's account in I.7, what is needed in every change is a contradictory and matter, rather than a robust contrary and matter. This is important because Aristotle thinks that substance has no robust contrary, only a contradictory. If every change were between contraries, then there could be no change into a substance. Aristotle weakens one of the

³⁴ It is unclear whether this is an absolute use of *μᾶλλον* or (as seems a bit less likely, given the order of the text) he means more than the lack/opposite.

³⁵ Kelsey 2008 reconstructs this tension about principles very similarly to how I do. However he thinks (204) that in I.7 Aristotle merely sidesteps this tension between I.5 and I.6 by making one of the principles merely a lack, whereas I am arguing that Aristotle positively resolves this puzzle about principles by distinguishing matter from lack and arguing that matter has an important claim on being a substance.

opposites to a mere contradictory (the lack), while strengthening the other so that it has a strong claim to being a genuine substance (the form). Since it has this strong claim to being a substance, it can have nothing prior to it and hence it is able to be a principle. Thus, in contrast to the argument in I.6, Aristotle ultimately accepts that a sort of opposite can be a substance, because the form has a claim to being a substance, and it is an opposite since it is opposed to the lack.

9. Hylomorphism in *Physics* I

The idea that matter and form each have a claim to being a substance, and each is a principle and element, is connected to Aristotle's hylomorphism: his view that substances are composed of matter and form. Kelsey has recently argued that Aristotle's hylomorphism is meant to explain substantial change.³⁶ I would like to suggest an alternative here. The hylomorphism in *Physics* I connects matter and form to substance, but the matter and form explain *all* of the changes a substance undergoes, both substantial and non-substantial.

Matter and form are identified as principles and elements in *Physics* I and, as we have seen, they must each lay some basic claim to being a substance in order to meet the formal requirements for being a principle. According to the first argument in I.6 (189a27-REF), regardless of what the opposites might explain, there is a problem with opposites being principles because there would be something prior to them, namely the underlying thing. In this argument, what is being explained need not itself be some sort of substance. Nothing can have an opposite as its principle, because opposites are not substances and principles must be substances. For the second argument in I.6 (189a-34), by contrast, Aristotle focuses on the difficulty opposites have in explaining substances, in particular. In this argument, it is necessary that substances be among the things that the principles explain, but not necessarily the only thing they explain.

Throughout *Physics* I, Aristotle repeatedly uses his account to explain all change.³⁷ When he gives his resolution of the two-versus three puzzle he is quite clear that matter and form are not limited to substantial changes: "On the one hand there is the man, the gold, and in general the matter...as for the form, it is one: it is the arrangement, or the knowledge

³⁶ This is emphasized in Kelsey 2008 and 2012; Kelsey 2006 also interprets I.6 in terms of substantial change.

³⁷ Examples include not only the production of a house or statue, but also clearly non-substantial changes, such as becoming musical (1.5, 188b9-20). See also 1.7, 190a32-b16, where Aristotle distinguishes between substantial and non-substantial change and makes it clear that his account applies to both.

of music, or some other thing said of something in the same way” (190b24-29). These examples of matter and form include cases that are not of substantial change: the man mentioned is naturally understood as the one who becomes knowledgeable of music. Aristotle’s account works to explain all change and his examples involve all sorts of change.

The main passage that seems to suggest that Aristotle is focused on substantial change comes when he returns to his search for principles, in the second half of I.7:

Plainly then if there are causes and principles of things which are due to nature, from which they primarily are and have come to be, not by virtue of concurrence but each as we say by virtue of substance (*κατὰ τὴν οὐσίαν*), everything comes to be from the underlying thing and the shape. (190b17-20)

φανερὸν οὖν ὡς, εἴπερ εἰσὶν αἰτίαι καὶ ἀρχαὶ τῶν φύσει ὄντων, ἐξ ὧν πρώτων εἰσὶ καὶ γεγόνασι μὴ κατὰ συμβεβηκὸς ἀλλ’ ἕκαστον ὃ λέγεται κατὰ τὴν οὐσίαν, ὅτι γίγνεται πᾶν ἕκ τε τοῦ ὑποκειμένου καὶ τῆς μορφῆς·

Kelsey reads this as saying that the principles explain the being and coming to be of substance, in particular.³⁸ It is not clear that this is the right way to read the sentence. Aristotle sometimes uses “by virtue of substance” to mean the same thing as “by virtue of itself.”³⁹ If that is what he means here, then he is making his standard contrast between “by virtue of concurrence” and “by virtue of itself” and he is simply saying that if there are

³⁸ Kelsey 2008, esp. 204-206.

³⁹ This is a tricky sentence. At issue is how to take the clause “not by virtue of concurrence but each as we say by virtue of substance (*κατὰ τὴν οὐσίαν*).” What is this modifying and what does it mean? Kelsey takes it to modify the predicate of “are and come-to-be” i.e., the product of the change. The problem with this is that “by virtue of concurrence” modifies verbs, not nouns or predicates. If x comes-to-be from y by virtue of concurrence, this is not a fact about x or y in particular, but about how the two of them relate to one another. Pale can come-to-be not by virtue of concurrence. This is true even though pale is not a substance, but rather an affection. Given, then, that “by virtue of substance” is the alternative to “by virtue of concurrence” and given that “by virtue of concurrence” applies to the verbs “is” and “comes to be,” clearly “by virtue of substance” applies to these verbs as well. Aristotle is saying that the things due to nature are and come to be from these principles and they do so by virtue of substance. What substance is this and what does this mean? Aristotle uses this phrase, “by virtue of substance,” in 15 places across the corpus. In at least three of these cases, it means in accordance with a thing’s proper being, even if this thing is not proper substance [REFs]. Thus we cannot tell from his use of the phrase that what is coming-to-be is a substance. In those cases, it seems that the phrase means the same thing as “by virtue of itself,” which is what we would expect, since he uses the phrase interchangeably here with “not by virtue of concurrence.” Thus, I think this sentence says that we are properly identifying the principles and elements of the things due to nature, not identifying them (or the things due to nature) using some irrelevant feature of them.

principles that explain the things that are by nature, not by virtue of concurrence, then these principles are form and matter. By “things that are by nature” (τῶν φύσει ὄντων) he need not mean specifically substances. Elsewhere, for example *Physics* II.1, “things that are by nature” refers to other features of the natural world, such as fire’s moving up (REF). But let us suppose that Kelsey’s reading is correct and Aristotle is saying that form and matter explain the being and coming-to-be of substances, in particular. This still leaves open that form and matter could also explain these substances’ other changes. In fact, I take this to be a result of Aristotle’s definition of nature in *Physics* II.1: a thing’s nature determines all of its characteristic changes. The idea is that, for example, when a robin comes to be, a type of animal comes to be that undergoes the various changes characteristic of robins.

Aristotle’s description of the earlier natural philosophers, beginning in *Physics* I.2, should lead us to expect his principles to explain all changes. When the natural philosophers made the principles of change the primary constituents of things (184b22-25), they did not use these principles only to explain the things’ constitution; they used their principles to explain all the changes a thing undergoes. For example, Empedocles makes fire, earth, air, and water the constituents of things and these explain all changes. After Aristotle argues in I.6 that we need a third principle for love and strife to act on, he says “and some people enlist even more principles to constitute the nature of things” (ἐνιοὶ δὲ καὶ πλείω λαμβάνουσιν ἐξ ὧν κατασκευάζουσι τὴν τῶν ὄντων φύσιν). Aristotle thinks that for Empedocles there is no substantial change. Nonetheless, Empedocles has principles that are meant to explain how change works. And these principles, which explain non-substantial change, constitute the nature of things. Similarly, on Aristotle’s own view, the principles that explain all natural change, substantial or non-substantial, constitute the substance of things. In fact, I think that Aristotle develops this idea further in *Physics* II.1 when he considers things’ natures, although that is beyond the scope of this paper.

Conclusion

We can now see how a key insight structures *Physics* I. The insight is to see that in order for change to be intelligible, there must be something that undergoes change by virtue of itself. Aristotle thinks there must be matter because this is what he defines as the thing that undergoes change by virtue of itself. Aristotle introduces the search for principles of natural science in *Physics* I.1-2. In I.2 he lays down as clear the assumption that some or all

things change. *Physics* I.5 and I.6 set up a tension over whether opposites can be the principles that explain change. Aristotle resolves this tension by distinguishing matter from the lack in terms of each's claim on being a substance and in terms of whether things come to be from each by virtue of itself. This distinction between matter and lack is the fundamental step needed to resolve the two-versus-three puzzle, thereby determining the principles that explain change. These principles are what are better known by nature. Once Aristotle draws this distinction, he uses it to diagnose the fundamental mistake of the Parmenideans (I.8) and of the Platonists (I.9).

We are now in a good position to ask how, exactly, Aristotle's account in *Physics* I relates to what he says in his other natural works. I have argued elsewhere that this account in *Physics* I fits well with the way that Aristotle describes matter in the *Parts of Animals*.⁴⁰ In that work he typically identifies matter as blood, which he thinks of as concocted specifically to become the other parts of the body. Similarly, in *Generation of Animals* he identifies the menstrual fluid as matter; he thinks this is what becomes the newborn animal. But does this account fit with how Aristotle thinks of matter in the *De Anima*? There, he identifies the body as the matter of an organism and the soul as its form (REFs). This refers to a developed substance's matter, which seems to be distinct from the matter it came to be from. What should we make of this idea that a living substance has some privileged thing that is its matter, not the menstrual fluid or seed they came from but their body? I would argue that an organism's body is what undergoes its proper changes, as specified by its form. But this is beyond the scope of this paper. I think the account of matter we find in *Physics* I can be extended far into Aristotle's corpus of natural philosophy. But to the extent that it cannot, it is interesting to see why his account is different. My goal here has simply been to lay out the distinction that he thinks is the central insight in *Physics* I, the one needed to properly understand his conception of matter there.⁴¹

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⁴⁰ I argue that it fits with the *Parts of Animals* in Ebrey 2015.

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