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Aristotle on Unmoved Mover and its Necessity

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ARISTOTLE ON UNMOVED MOVER AND ITS NECESSITY

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ABSTRACT

In this investigation, I offer a series of answers to a set of related questions concerning Aristotle's notion of unmoved mover. To the question how many unmoved movers there are for Aristotle, I argue in chapters 1 and 2 that Aristotle recognizes a multiplicity of unmoved movers in the world, including the heavenly movers and the mortal souls. To the question how an unmoved mover causes motion, I argue in chapters 3 and 4 that, whereas a moved mover causes motion by reciprocally touching the thing moved and is moved by it in return, an unmoved mover causes motion by unilaterally touching the thing moved. To the question what kind of necessity is exhibited in the sublunary world, I argue in chapter 5 that Aristotle does believe and, because simple necessity belongs to unmoved mover as such, has conceptual reasons to believe that simple necessity is exhibited by the mortal souls in the sublunary world. I argue further that the two kinds of conditional necessity exhibited in the sublunary world are derivative from simple necessity.

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Introduction

This is an investigation into Aristotle's notion of unmoved mover. It is motivated by three questions. Question #1: What are the things that Aristotle identifies as unmoved movers? Is there only one unmoved mover for Aristotle, or are there indeed a multiplicity of them? Question #2: What is an unmoved mover, i.e. how does an unmoved mover cause motion? Question #3: What modal status does an unmoved mover exhibit, and what does this mean for Aristotle's conception of necessity in nature?

These three questions are closely connected. A different answer to the one would naturally imply different answers to the other two. According to the interpretation that I take issue with in this project, (1) there is only one real unmoved mover for Aristotle—the “prime mover” or God; (2) the “prime mover” causes motion by being a paradigm to everything else; (3) simple necessity belongs to the “prime mover” alone, so the kind of necessity exhibited by things in the sublunary world can only be conditional or hypothetical.

In the first two chapters, I take on question #1. In chapter 1, I argue, basing on the textual evidence that we have of Aristotle, mainly *Physics* 8 and *Metaphysics* Λ, that Aristotle does believe in the existence of a multiplicity of unmoved movers. There are a multiplicity of heavenly unmoved movers, and an even greater number of non-eternal, sublunary unmoved movers. In chapter 2, I argue that what Aristotle says in *De Caelo* does not amount to, as many commentators believe, an acknowledgment of the heavenly motions as self-motions and thus a departure from the general picture painted in chapter 1. In the next two chapters, I tackle question #2. In chapter 3, by answering two difficulties

I lay out at the outset, I explain how a moved mover causes motion. Importantly, I show how reciprocity works in Aristotle's theory of mover and agent, and how the notion of ὑποκείμενον is a key to understanding Aristotle's version of reciprocity. Continuing on the thread of reciprocal *versus* unilateral causation, I argue in chapter 4 that all unmoved movers, prior or posterior, heavenly or earthy, cause motion in the same manner: i.e. by *touching* what they move *unilaterally*. Hence, what I identify as the Platonist interpretation of how an unmoved mover causes motion, according to which the "prime mover" or God causes motion by being a paradigm that is desired and emulated by everything else, is wrong. For one thing, this interpretation runs the risk of representing Aristotle's "prime mover" as a self-moving agent rather than an immovable agent; for another, it makes Aristotle's "prime mover" cause motion in distance, which smacks of Newtonian mystery.

One of the important conclusions I reach in chapter 3 is that the notion of "movedness" in a moved mover should be understood as the mover's potential to be moved in the relevant respect, and that, *mutatis mutandis*, the notion of "unmovedness" in an unmoved mover should be understood as its immobility in the relevant respect. Further, I show at the end of chapter 4 the important role immobility and unmoved mover play in Aristotle's conception of simple necessity. Aristotle's conception of moved movers and that of unmoved movers are therefore in crucial aspects *modal*. This means that, on the one hand, a deeper understanding of Aristotle's conception of necessity, as we see propounded in *Metaphysics* Δ & Λ and *Posterior Analytics*, may help clarify some issues concerning his notion of unmoved mover. On the other hand, this also means that the important questions concerning Aristotle's conception of necessity and

possibility in his metaphysics, physics, and scientific methodology¹ can be re-framed and re-approached with a deeper understanding of what counts as an unmoved mover for Aristotle, and how unmoved movers cause motion. This is exactly what I do in chapter 5, where I tackle question #3 outlined in the first paragraph. I argue that simple necessity belongs not only to the “prime mover”, but more generally to all unmoved movers, therefore, given that there are indeed unmoved movers in the sublunary world as I argue in chapter 1, simple necessity does figure in the sublunary world. Further, basing on what Aristotle says in *Metaphysics* Δ 5, I argue that the two kinds of conditional necessity that people find in natural processes, hypothetical necessity and material necessity, are indeed derivative from the kind of simple necessity exhibited by the non-eternal, sublunary unmoved movers.

In this investigation, whenever I quote Aristotle in English, I use the standard translation in *The Complete Works of Aristotle* (1984) edited by Jonathan Barnes, if not otherwise indicated. I often modify the translation where I find appropriate, so I take full responsibility for the translations that I provide, and readers are encouraged to compare them with the Greek texts that I offer alongside—I indicate whose editions they are the first time when they appear.

¹ Such a question that I do not deal with in this project is how Aristotle’s own “principle of plenitude” works. See Hintikka (1973), Broadie (1982b), and White (1985).

Chapter 1 Unmoved Movers in *Physics* 8 and *Metaphysics* Λ

1.1 Introduction

My aim in this chapter is to show, through a close reading of the textual evidence, *that* Aristotle believes in a multiplicity of unmoved movers in *Physics* 8¹. I leave the question *why* Aristotle thinks this way, which is one of the central theses of my dissertation, to chapters 3 and 4. In this chapter, I mainly focus on *Physics* 8 and only briefly discuss *Metaphysics* Λ in the appendix, because the latter is closely tied to the question *why*, which question I shall deal with in chapter 4.

In arguing that Aristotle does believe in a multiplicity of unmoved movers in *Physics* 8, I'm not disputing the general consensus that *Physics* 8 *aims at* (1) establishing the eternity of motion² and (2) positing an eternal and numerically single unmoved mover and explaining its function.³ Yet there is sometimes a tendency among scholars of Aristotle to read the argument for the unmoved mover in *Physics* 8 as an infinite regress argument that starts from any motion whatsoever and ends in the single and unique unmoved mover, with all the intermediate movers being either more proximate or more

¹ I claim no originality in this general thesis, which is fundamental to my project. See Frede (2000: 1-52), Morison (2004: 76-79), and especially Menn (2012). Cf. Menn (forthcoming: IIIβ2b p. 24 ff), Merlan (1946: 1-30), and Wolfson (1958).

² N.B. I'm aware of the fact that "change" is a more appropriate English translation of κίνησις than "motion", which in English means locomotion specifically. However, since τὸ κινεῖν is conventionally translated as "the mover" and τὸ ἀκίνητον as "the unmoved", in this investigation, for the sake of consistency, I often use "motion" and motion-related expressions where "change" or change-related expressions are more appropriate in English.

³ There is some disagreement over which of the two should take the front seat. If Aristotle establishes the eternity of motion in order to posit and explain the single unmoved mover, *Physics* 8 would be theology (see e.g. Thomas Aquinas's commentary on Aristotle's *Physics* at section 965). But if the aim in analyzing the single unmoved mover is to explain the eternity of motion, *Physics* 8 would be natural philosophy (see e.g. Ross (1936: 85) and Broadie (1982a: 248-249)). I remain neutral on this point in so far as the current project is concerned.

remote *moved* movers.⁴ This tendency is coupled with the conviction that what we ordinarily regard as “self-movers”, animals, plants, etc., are in reality all moved by external stimuli. So there is one single unmoved mover which, through different sets of moved movers, is responsible for any motion in the world. My dispute is with this interpretation.

1.2 Aristotle’s Infinite Regress Arguments in *Physics* 8.5

In this section, my purpose is to show that Aristotle’s infinite regress arguments in *Physics* 8.5 are not intended to prove the existence of a unique unmoved mover that is responsible for *any* and *every* motion in the world; instead, they only prove that, for any motion, there has to be an unmoved mover, therefore it belongs to a separate question to inquire how many unmoved movers there are in the world.

This very long chapter (256a4-258b9) can be roughly divided into two parts.⁵ In the first part (256a4-257a33) Aristotle argues against the thesis that what is moved is always moved by something else that is itself moved:⁶ there has to be a first mover that is either unmoved, or if it is moved, it has to be moved by itself.⁷ In the second part

⁴ E.g. Ross (1936: 91): “there must be an all-embracing cause of movement apart from them, which accounts for the successive coming into being of the [non-eternal] unmoved movers, and gives them their power to move their bodies, and therewith other things.” Also see Ross (1936: 691). See Matthen (2001: 171). See Menn (forthcoming: IIIβ2a, 3-4) who challenges the received view.

⁵ For the question whether 256b13-27 belongs where it is found in the received text or not, see Cornford (1934: 336) and Themistius (222.23).

⁶ See 257a25-26. N.B. “always” should be read together with “something else” to imply infinite regress.

⁷ This seems to me to be the argument in the first part. Many commentators take the first part to be arguing that every first mover is a self-mover, so they have a hard time explaining how an external mover, such as the movers of the heavens which cause motion from the outside, fits into the picture. Aristotle is in fact quite careful about this, as we can see at 256a20, a33-34, and 257a25-26. See also Blyth (2015).

(256b27-258b9), Aristotle argues that, for any such self-mover, we can distinguish the one part of it which initiates motion but is unmoved in so far as it is the mover of that motion, and the other part which is moved but does not initiate motion. Therefore, in either case, whether the first mover is unmoved or self-moved, motion ends up with some mover which, in so far as it is the mover, is unmoved in that motion.

In the first part Aristotle gives three parallel proofs that it is not the case that what is moved is always moved by something else that is itself moved. In all three of these arguments, Aristotle employs the infinite regress argument. The first I shall call “the infinite regress of moved movers”, the second “the infinite regress of instruments”, and the third “the infinite regress of the kinds of motion”.

In the first proof (256a4-21), Aristotle starts from *something that is in motion* and tries to find its immediate mover.⁸ The immediate mover is either itself moved by something else or is not moved by anything else. In the case of its *not being moved by anything else*, this immediate mover will be the first mover. In the case of its being moved by something else, there must be some first mover that is *not itself moved by anything else*: for otherwise there would be a regress of infinitely many moved movers. So, if (1) everything that is moved is moved by something,⁹ and (2) the first mover is moved,¹⁰ but *not moved by anything else*, then it must be a self-mover.

In the second proof (256a21-b3), Aristotle starts from *some instrument of motion* (τὸ ὅ κινεῖ τὸ κινουῦν) and tries to find the immediate mover that uses it. Since every

⁸ Here, an “immediate mover” is that which needs nothing intermediate to move the thing moved. See 256a6-8.

⁹ This is the conclusion of *Physics* 8.4.

¹⁰ 256a20, see note 7 above.

mover moves something *with* something,¹¹ it causes motion either with itself or with some other thing.¹² Aristotle argues that for any motion, there cannot be an infinite regress of one instrument (which causes motion by being moved)¹³ being moved by another instrument. Hence for any motion, there is a final instrument that is moved by itself, or, to put in another way, there is a self-mover that uses itself as the instrument.¹⁴

The third proof consists of two parts. The common hypothesis for both parts is that what is moved is moved by something else that is itself moved.¹⁵ The difference lies in whether the attribute “being itself moved” belongs to the mover *per accidens* or *per se*.¹⁶ Since the first part of the third proof (256b3-13) does not contain an infinite regress argument (and the proof is a bit problematic in itself),¹⁷ I pass it over. In the second part (256b27-257a33), working with the alternative assumption that the mover causes motion *because* it is itself moved/in motion, Aristotle again employs an infinite regress inside of a *reductio* argument. In general, his strategy is to show that the hypothesis of the *reductio* leads to an infinite regress of further kinds of change and must therefore be false.

There are again two alternatives under this working assumption: the mover causes motion by being moved *either* (1) with the same kind of motion/change *or* (2) with a

¹¹ πᾶν γὰρ τὸ κινεῖν τί τε κινεῖ καὶ τινί (256a22-23).

¹² ἢ ... αὐτῷ κινεῖ τὸ κινεῖν ἢ ἄλλῳ (256a23).

¹³ See 256b16-20: “The instrument of motion must both move something else and be itself in motion, for it changes together with the moved, with which it is in contact and continuous, as is clear in the case of things that move other things locally, in which case the two things must up to a certain point be in contact” (trans. Hardie and Gaye in Barnes).

¹⁴ This is, of course, still based on the hypothesis that the instrument can only be moved by something which is itself moved. Nothing stops an instrument of being moved by something which is not itself moved. See 256a33-34 and note 7 above.

¹⁵ As we can tell from 257a25-26.

¹⁶ So the hypothesis for the first part is: “being moved” belongs *per accidens* to the mover, i.e. “each mover moves something while being itself moved, but not *because* it is itself moved” (256a5-6).

¹⁷ See for example Ross (1936: 89).

different kind of motion/change from the motion/change it causes.¹⁸ (1) With the example of a geometer teaching his students geometry, Aristotle argues that the first alternative leads to impossibility: it cannot be the case that the teaching and the learning of the same theorem belong to the same kind of change. (2) The second alternative, whose solution involves an infinite regress argument, is that the mover causes motion/change by itself being moved with a *different* kind of change. Thus for example, something might move another thing locally by itself undergoing a change in size (αὐξήσις): think of the steam in a steam engine. Here, we would end up with an infinite regress of the kinds of change. But, because the kinds of change according to Aristotle are finite, the series cannot go on *ad infinitum* and has to be circular: i.e. when we trace a locomotion to a change of size and the change of size to something else, and when we finally trace it back to a locomotion, the first locomotion would actually turn out to be caused, albeit remotely, by another locomotion.¹⁹ But this is absurd, because it contradicts the current alternative, which is that every motion is moved by the motion of a *different* kind. Therefore, the hypothesis of this *reductio* argument has to be false: it is not the case that what is moved should always be moved by something else that is moved—the first thing that is moved is moved either by something else that is at rest or by itself (a nice disjunctive resulting from negating the conjunctive in the hypothesis).²⁰

Aristotle goes on to show in the second part of 8.5 that, in the cases where the first mover is self-moved,²¹ we can further distinguish the one part of it which causes

¹⁸ See 256b30-31.

¹⁹ See 257a7-23.

²⁰ In Greek the conjunctive-disjunctive pair is more pronounced: οὐκ ἄρα ἀνάγκη ἀεὶ κινεῖσθαι τὸ κινούμενον ὑπ' ἄλλου, καὶ τούτου κινουμένου· στήσεται ἄρα. ὥστε ἥτοι ὑπὸ ἡρεμοῦντος κινήσεται τὸ κινούμενον πρῶτον, ἢ αὐτὸ ἑαυτὸ κινήσει (257a25-27).

²¹ See 257a32: εἴ τι κινεῖ αὐτὸ αὐτό.

motion but is not moved and the other part which is moved but does not cause motion.

Therefore, both in the cases where the first mover is unmoved and in the cases where the first mover is self-moved, we end up with some unmoved mover.

Given what I said at the outset about the general purpose of 8.5, it is clear that Aristotle is not offering a streamlined argument from something moved to a self-mover and then to an unmoved mover; rather, he is offering a two-pronged approach from something moved either (1) directly to an unmoved mover, or (2), through a self-mover, to an unmoved mover within it.²² Thus, given that the unmoved mover(s) found by the two approaches seem different (the one isn't moved at all in the motion it causes, the other is moved accidentally in the motion it causes), Aristotle's infinite regress arguments in 8.5 don't lead to one unique unmoved mover.

Now, even if we suppose that 8.5 were such a streamlined argument, the infinite regress arguments we find in it would still only prove that, for any motion, there is *a* first mover that is unmoved. It remains neutral on the question how many unmoved movers there are in the world. To argue for this unitary position, one would need to prove that the unmoved part within each and every self-mover is numerically one, or that the unmoved part is strictly speaking moved in the very motion it causes by some higher mover and therefore has to succumb to this higher mover.

²² So 256b13-27, wherever in 8.5 it belongs, focuses on (1). See also 257a25-31 and 258b4-9. Many scholars seem to have missed this point. They generally think, after the problematic passage in *Physic* 8.6, that any motion can be traced back to a self-moved mover, and within it one can always distinguish a moving part and a moved part. See e.g. Furley (1994: 4). Gill (1994:

1.3 Aristotle's Argument for a Unique Eternal Unmoved Mover in *Physics* 8.6

After tracing back every motion in the world to some unmoved mover in 8.5, Aristotle's task in 8.6 is to argue for the existence of a unique and eternal first unmoved mover. This is what scholars generally refer to as the "Prime Mover". Aristotle offers three arguments for this conclusion. In all three arguments, Aristotle starts from the conclusion reached in *Physics* 8.1 and 8.2 that there is always motion in the world.²³

In the first argument (258b16-259a13), Aristotle argues that the fact that there is *always* motion in the world cannot be caused either by one or by an infinite number of temporally contiguous non-eternal movers, therefore one needs to posit an eternal and unique mover. In the second argument (259a13-a20), Aristotle argues that the fact that there is *always* motion in the world implies that there is motion in the world *continuously*, and if continuously, then the motion has to be one in being self-identical. Then, from the eternity and the continuousness/oneness of this motion Aristotle infers the eternity and uniqueness of the mover. Finally, in the third argument (259a20-260a19), Aristotle turns to considering the causal mechanism within the movers, especially in the empirically more evident mortal self-movers. Partially as a response to ἀπορίαι #2 and #3 in 8.2, Aristotle shows that the functioning of the mortal self-movers presupposes causes that are external and therefore (1) they cannot continuously cause motion either singly or

15). For the correct reading, see recently Blyth (2015: 430-436).

²³ In *Physics* 8.1, Aristotle offers an essentially Democritean/Lucretian argument, against Anaxagoras (that there is an infinite period of total rest before motion), Empedocles (that there is some period of total rest between the cycles of love and strife), and Plato (that the cosmos and the time have a beginning), that there is always motion before some temporally finite motion and that there is always continuum of time before and after a certain point in time (the "now"). In *Physics* 8.2, Aristotle examines this conclusion against three possible counterarguments or ἀπορίαι and claims that (1) it is not necessary that *all* motions are motions toward contrary, (2) start of motion from rest is nevertheless possible, (3) and yet this in the case of the self-movers does not lead to positing motion *ex nihilo*. All three claims are re-examined in the latter half of the book (from 8.6

collectively, and (2) the way they function cannot be taken as a model of motion *ex nihilo* for the universe, which would render an eternal and unique mover useless (ἀπορία #3). Thus, in order to account for the fact that there is always motion, we need to posit an eternal and unique mover.

The second argument is especially important for my current purpose because it shows the strict correspondence between the eternity and oneness of the first unmoved mover and the eternity and continuity of the first motion.²⁴ Here, the burden of proof lies in bridging the gap between the fact that *there is always motion in the world* and the fact that *there is one eternal and continuous motion*:

The following argument also makes it evident that the first mover must be something that is one and eternal. We have shown that there must *always* be motion. That being so, motion must also be *continuous*, because what is always is continuous, whereas what is in succession is not continuous. But further, if motion is continuous, it is one.²⁵ (*Physics* 8.6 259a13-18, trans. Hardie & Gaye in Barnes)²⁶

onwards).

²⁴ Admittedly, in *Physics* 8.6 Aristotle never uses the very term πρώτη κίνησις to refer to this motion. However, he uses it in *De Motu* 700a32, *Metaphysics* Δ 1018b20, and *Physics* 8.7 260a23.

²⁵ φανερόν δὲ καὶ ἐκ τοῦδε ὅτι ἀνάγκη εἶναί τι ἓν καὶ αἰδῖον τὸ πρῶτον κινεῖν. δέδεικται γὰρ ὅτι ἀνάγκη αἰεὶ κίνησιν εἶναι. εἰ δὲ αἰεὶ, ἀνάγκη συνεχῆ εἶναι· καὶ γὰρ τὸ αἰεὶ συνεχές, τὸ δ' ἐφεξῆς οὐ συνεχές. ἀλλὰ μὴν εἴ γε συνεχές, μία. (Text: W. D. Ross, OCT, Oxford, 1950. N.B. I indicate whose Greek text I adopt the first time it appears. Readers can also find out what Greek texts I use at the end of the book, in my bibliography.)

²⁶ N.B. I indicate whose translation I adopt the first time when it appears in my main text. Readers should keep in mind that I sometimes modify the translation, so they are encouraged to compare my translation with the Greek text that I offer alongside.

It not enough that there is “always” motion in the world in the sense that such motion consists of infinitely many temporally contiguous finite motions, Aristotle argues: in order that there is “always” motion in the world, there should be motion in the world *continuously*, and because continuity implies oneness, there is necessarily one single continuous motion. Once it is shown that there is one such motion, it follows immediately that there is one such mover:

But it (i.e. the motion) is one only if the mover and the moved are each of them one, since in the event of a thing’s being moved now by one thing and now by another the whole motion will not be continuous but successive.²⁷ (*Physics* 8.6 259a18-20)

The strict correspondence between the eternity and oneness of the first unmoved mover and the eternity and continuity of the first motion explains why Aristotle further devotes a big part of the book (chapters 7 and 8) to discussing the first motion.

Importantly, I think that this strict correspondence also suggests that, conversely, the first unmoved mover is *only* responsible for the eternity and continuity of the motion it causes. Aristotle insists, for instance, at the end of *Physics* 8.6 that the first unmoved mover is *not* responsible for the non-eternity of other motions even though that non-eternity is not *per accidens*,²⁸ i.e. is in need of a causal explanation:

Why is it that instead of all things being either moved or at rest, or some things

²⁷ μία δ' ἡ ὑφ' ενός τε τοῦ κινουῦντος καὶ ενός τοῦ κινουμένου· εἰ γὰρ ἄλλο καὶ ἄλλο κινήσει, οὐ συνεχῆς ἡ ὅλη κίνησις, ἀλλ' ἐφεξῆς.

being always moved and the remainder always at rest, there are things that are sometimes in motion and sometimes not? The cause of this is now plain: it is because, while some things are moved by an unmoved mover that is eternal and are therefore always moved, other things are moved by a mover that is moved and changing, so that they too must change. But the unmoved mover, as has been said, since it remains simple and unvarying and in the same state, will cause motion that is one and simple.²⁹ (260a12-19)

This immediately leaves room for there being other causally salient movers whose causal efficacy is not reducible to that of the first unmoved mover. This is my thesis in this chapter. I substantiate this claim in the subsequent sections.

1.4 The Non-Eternal Unmoved Mover as a Kind of Unmoved Mover in *Physics* 8.6

To read 8.6 more closely, we see that Aristotle classifies unmoved movers into three kinds, one of which consists of the non-eternal unmoved movers such as individual souls located in mortal self-movers. The discussion of these non-eternal unmoved movers occurs in two passages: 258b16-259a13 and 259a20-260a19. To be sure, in neither of these two places is it Aristotle's purpose to prove that such unmoved movers exist. His interest in bringing them into the discussion is to provide arguments for the existence of the unique and eternal unmoved mover, which, as I mentioned above in section 1.3, is the

²⁸ See discussion on κατὰ συμβεβηκός in the next section.

²⁹ τί δὴ ποτε οὐ πάντα ἢ κινεῖται ἢ ἡρεμεῖ, ἢ τὰ μὲν κινεῖται αἰεὶ τὰ δ' αἰεὶ ἡρεμεῖ, ἀλλ' ἓνια ὅτε μὲν ὅτε δ' οὐ; τούτου γὰρ τὸ αἷτιον δηλὸν ἐστὶ νῦν, ὅτι τὰ μὲν ὑπὸ ἀκινήτου κινεῖται αἰδίῳ, διὸ αἰεὶ κινεῖται, τὰ δ' ὑπὸ κινουμένου καὶ μεταβάλλοντος, ὥστε καὶ αὐτὰ ἀναγκαῖον μεταβάλλειν. τὸ δ' ἀκίνητον, ὥσπερ εἴρηται, ἅτε ἀπλῶς καὶ ὡσαύτως καὶ ἐν τῷ αὐτῷ διαμένον, μίαν καὶ ἀπλῆν κινήσει κίνησιν.

main task of 8.6. Thus, in both paragraphs, the non-eternal unmoved movers serve as a *contrast* to the unique and eternal unmoved mover. As I mentioned above, it is because the non-eternal unmoved movers can neither singly nor collectively cause motion continuously (this is explained either *a priori* as in the first argument or *a posteriori* as in the third argument) that there is need for positing the unique and eternal unmoved mover.

Let us look at the two passages now to get a clearer view what these non-eternal unmoved movers are:

The following considerations will make it clear that there must necessarily be some such thing, which, while it has the capacity of moving something else, is itself unmoved and exempt from all change, both *simpliciter* and *per accidens*. *Let us suppose, if any one likes, that it is possible for some [unmoved movers] (ἐπὶ τινων ἐνδεχόμενον) at different times to be and not to be, without any process of becoming and perishing (in fact it would seem to be necessary, if a thing that has not parts at one time is and at another time is not, that any such thing should without undergoing any process of change at one time be and at another time not be). And let us further suppose it possible that some principles that are unmoved but capable of imparting motion at one time are and at another time are not.* Even so, this (i.e. to be at one time and not to be at another time) cannot be true of *all* such principles, since there must clearly be something that causes *things that move themselves* at one time to be and at another not to be. For, since nothing that has not parts can be in motion, that which moves itself must as a whole have magnitude, though nothing that we have said makes this necessarily true of every

mover. So the fact that some [self-movers] come to be and others pass away, and that this happens continuously, cannot be caused by any one of *those things that, though they are unmoved, do not always exist*: nor again those by these and these by others, for that this happens always and continuously cannot be caused either by any one of them (i.e. the non-eternal unmoved movers) singly or by the sum of them, for this fact must be eternal and of necessity, whereas the sum [of these movers] is infinite, and they do not all exist together. It is clear, then, that though *there may be countless instances of the perishing of some principles that are unmoved but impart motion*, and though many things that move themselves perish and are succeeded by others that come into being, and though one thing that is unmoved moves one thing while another moves another, nevertheless there is something that comprehends them all, and that as something apart from each one of them, and this it is that is the cause of the fact that some things are and others are not and of the continuous process of change: and this causes the motion of the other movers, while they are the causes of the motion of other things.³⁰ (*Physics* 8.6 258b13-259a7)

³⁰ ὅτι δ' ἀναγκαῖον εἶναι τι τὸ ἀκίνητον μὲν αὐτὸ πάσης ἐκτὸς μεταβολῆς, καὶ ἀπλῶς καὶ κατὰ συμβεβηκός, κινητικὸν δ' ἑτέρου, δῆλον ὧδε σκοποῦσιν. ἔστω δὴ, εἴ τις βούλεται, ἐπὶ τινῶν ἐνδεχόμενον ὥστε εἶναι ποτε καὶ μὴ εἶναι ἄνευ γενέσεως καὶ φθορᾶς (τάχα γὰρ ἀναγκαῖον, εἴ τι ἁμερὲς ὅτε μὲν ἔστιν ὅτε δὲ μὴ ἔστιν, ἄνευ τοῦ μεταβάλλειν ὅτε μὲν εἶναι ὅτε δὲ μὴ εἶναι πᾶν τὸ τοιοῦτον). καὶ τῶν ἀρχῶν τῶν ἀκινήτων μὲν κινητικῶν δ' ἐνίας ὅτε μὲν εἶναι ὅτε δὲ μὴ εἶναι, ἐνδεχέσθω καὶ τοῦτο. ἀλλ' οὐ τί γε πάσας δυνατόν· δῆλον γὰρ ὡς αἴτιον τοῖς αὐτὰ ἑαυτὰ κινουσίην ἐστὶ τι τοῦ ὅτε μὲν εἶναι ὅτε δὲ μὴ. τὸ μὲν γὰρ αὐτὸ ἑαυτὸ κινεῖν ἅπαν ἔχειν ἀνάγκη μέγεθος, εἰ μὴδὲν κινεῖται ἁμερὲς, τὸ δὲ κινεῖν οὐδεμία ἀνάγκη ἐκ τῶν εἰρημένων. τοῦ δὴ τὰ μὲν γίνεσθαι τὰ δὲ φθεῖρεσθαι, καὶ τοῦτ' εἶναι συνεχῶς, οὐδὲν αἴτιον τῶν ἀκινήτων μὲν μὴ ἀεὶ δ' ὄντων, οὐδ' αὖ τῶνδὲ μὲν ταδί [κινούντων], τούτων δ' ἕτερα. τοῦ γὰρ ἀεὶ καὶ συνεχοῦς οὔτε ἕκαστον αὐτῶν οὔτε πάντα αἴτια· τὸ μὲν γὰρ οὕτως ἔχειν αἶδιον καὶ ἐξ ἀνάγκης, τὰ δὲ πάντα ἄπειρα, καὶ οὐχ ἅμα πάντα ὄντα. δῆλον τοίνυν ὅτι, εἰ καὶ μυριάκις ἓν τῶν ἀκινήτων μὲν κινούντων δέ, καὶ πολλὰ τῶν αὐτὰ ἑαυτὰ κινούντων, φθείρεται, τὰ δ' ἐπιγίγνεται, καὶ τότε μὲν ἀκίνητον ὄν τότε κινεῖ, ἕτερον δὲ τοδί, ἀλλ' οὐδὲν ἥττον ἔστιν τι ὃ περιέχει, καὶ τοῦτο παρ' ἑκάστων, ὃ ἔστιν αἴτιον τοῦ τὰ μὲν εἶναι τὰ δὲ μὴ καὶ τῆς συνεχοῦς μεταβολῆς· καὶ τοῦτο μὲν τούτοις, ταῦτα δὲ τοῖς ἄλλοις αἴτια

In all these [self-movers], *the first mover, the cause of their self-motion, is moved by itself, though per accidens*: the body changes its place, so that also that which is in the body moves itself by leverage. Because of these reasons one can be convinced that if something belongs to *unmoved movers which also move themselves per accidens*, it cannot cause continuous motion, therefore if it is necessary for there to be motion continuously, there must be some first mover which is unmoved even *per accidens*: if, as we have said, there is to be, in things that are, some unceasing and immortal motion, and that which is is to remain itself in itself and in the same thing; for with the principle being permanent, it is necessary for the universe to be permanent, because it is continuous with relation to the principle. However, to be moved *per accidens* by oneself is not the same as to be moved *per accidens* by something else, for being moved by something else belongs also to some principles in the heaven which are locally moved with multiple motions, while the other kind belongs only to the perishable things.³¹

(*Ibid.* 259b17-259b31)

First of all, we know that Aristotle is talking about the same kind of unmoved mover in

κινήσεως.

³¹ ἐν πᾶσι δὲ τούτοις κινεῖται τὸ κινεῖν πρῶτον καὶ τὸ αἷτιον τοῦ αὐτὸ ἑαυτὸ κινεῖν ὑφ' αὐτοῦ, κατὰ συμβεβηκὸς μέντοι· μεταβάλλει γὰρ τὸν τόπον τὸ σῶμα, ὥστε καὶ τὸ ἐν τῷ σώματι ὄν καὶ τῇ μοχλείᾳ κινεῖν ἑαυτό. ἐξ ὧν ἔστιν πιστεῦσαι ὅτι εἴ τί ἐστι τῶν ἀκινήτων μὲν κινούντων δὲ καὶ αὐτὰ κατὰ συμβεβηκός, ἀδύνατον συνεχῇ κίνησιν κινεῖν. ὥστ' εἴπερ ἀνάγκη συνεχῶς εἶναι κίνησιν, εἶναι τι δεῖ τὸ πρῶτον κινεῖν ἀκίνητον καὶ κατὰ συμβεβηκός, εἰ μέλλει, καθάπερ εἵπομεν, ἔσεσθαι ἐν τοῖς οὖσιν ἄπαστός τις καὶ ἀθάνατος κίνησις, καὶ μενεῖν τὸ ὄν αὐτὸ ἐν αὐτῷ καὶ ἐν τῷ αὐτῷ· τῆς γὰρ ἀρχῆς μενούσης ἀνάγκη καὶ τὸ πᾶν μένειν συνεχές ὄν πρὸς τὴν ἀρχήν. οὐκ ἔστιν δὲ τὸ αὐτὸ τὸ κινεῖσθαι κατὰ συμβεβηκός ὑφ' αὐτοῦ καὶ ὑφ' ἑτέρου· τὸ μὲν γὰρ ὑφ' ἑτέρου ὑπάρχει καὶ τῶν ἐν τῷ οὐρανῷ ἐνίαις ἀρχαῖς, ὅσα πλείους φέρεται φοράς, θάτερον δὲ τοῖς

both passages above. This is because, in both passages, the kind of unmoved mover under discussion is the principle (ἀρχή) of motion of a given self-mover. Secondly, the two passages have different focus. In the first passage, Aristotle focuses on the non-eternity of these unmoved movers and the special way in which they come-to-be and pass away. I discuss their non-eternity in section 1.5 below. As for the special way of their coming-to-be and passing-away, because according to Aristotle they are geometrically unextended, they change from being to non-being and vice versa *instantaneously*: i.e. without coming-to-be and passing-away, which are always extended in time.³²

The second passage focuses on the curious fact that this kind of unmoved mover is moved by itself *per accidens*.³³ An unmoved mover of such a kind is unmoved in that, as the first mover of some motion, it does not cause that motion *by itself* having that motion. However, it is moved *per accidens* (κατὰ συμβεβηκός) by itself in that it *happens to be* situated in the body whose motion it causes and thereby is moved along with the body *per* (κατὰ) “what happens to it”.³⁴ It is crucial to realize here that “being situated in the body whose motion it causes” *coincides* (συμβαίνει) with “being first mover” and therefore is an accident (συμβεβηκός) of the first mover: according to Aristotle, an accident (συμβεβηκός) is “what can belong and not belong to one and the same thing, whatever it may be”,³⁵ and the first mover can be situated either in or out of the body whose motion it causes. This is of course not to say that soul or nature is not by definition,

φθαρτοῖς μόνον.

³² Otherwise there would be an infinite regress both of a smaller temporal extension and of a smaller spatial extension. Else, one would be compelled, as some Platonists indeed were, to posit a minimal part.

³³ Hence in each case there are strictly speaking two self-movers: the soul-body composite is without question a self-mover, but the soul itself also moves itself *per accidens*.

³⁴ Therefore a non-eternal unmoved mover necessarily has a body.

³⁵ *Top.* 1.5 102b6-7.

and hence *necessarily*, an internal first mover of the body it is situated in: this only means that the unmoved mover of something isn't necessarily its soul or nature. Thus, the locomotive soul of a monkey is necessarily a self-mover, but at the same time, as an unmoved mover that is not necessarily a soul, its locomotive soul is moved only *per accidens*. Nature is like a doctor who only cures himself: as *such a doctor* he necessarily cures only himself, but as *a doctor in general* he cures himself *per accidens*.

Of all three kinds of unmoved movers, two are important for the purpose of 8.6: the eternal and unique unmoved mover whose existence the chapter tries to prove, and the non-eternal unmoved movers whose causal force, whether singly or collectively, might render that of the unique first unmoved mover unnecessary. The other kind is mentioned only in passing. These are the eternal unmoved movers that are moved *per accidens* not by themselves, but by something else:

We must distinguish, however, between accidental motion of a thing by itself and such motion by something else, the former being confined to perishable things, whereas the latter belongs also to certain first principles of heavenly bodies, of all those, that is to say, that experience more than one locomotion.³⁶ (259b28-31)

As will be clear from chapter 4, such an unmoved mover is not situated in the heavenly sphere that it moves, so it is not, like the soul, moved *per accidens* by itself, but it is situated in, and therefore is moved *per accidens* along with, the heavenly sphere which immediately encircles the heavenly sphere it moves, and is thereupon moved *per*

³⁶ οὐκ ἔστιν δὲ τὸ αὐτὸ τὸ κινεῖσθαι κατὰ συμβεβηκὸς ὑφ' αὐτοῦ καὶ ὑφ' ἑτέρου· τὸ μὲν γὰρ ὑφ' ἑτέρου ὑπάρχει καὶ τῶν ἐν τῷ οὐρανῷ ἐνίαις ἀρχαῖς, ὅσα πλείους φέρεται φοράς, θάτερον δὲ τοῖς

accidens by whatever mover(s) that move the higher sphere. This kind of unmoved mover is not the focus of *Physics* 8.6, so it is mentioned here only for the sake of completeness.

To sum up, we can gather from this chapter that Aristotle's three kinds of unmoved mover are: (1) that which is unmoved *simpliciter* (i.e. unmoved *per accidens*) = the unmoved mover of the celestial sphere, (2) that which is moved *per accidens* by something else but not by itself = the unmoved movers of the lower spheres,³⁷ and (3) that which is moved both by something else and especially by itself = the non-eternal unmoved movers. As Aristotle makes clear, included in the third kind are the unmoved movers of "the things that move themselves, e.g. the class of living things and especially the animal kingdom" (259b2-3).³⁸

1.5 The Non-Eternal Unmoved Movers Continued: are animals self-movers?

1.5.1 The Difficulty (259b3-16) and its Context (259a20-b3)

There is a difficulty in understanding one particular part of the chapter. Aristotle seems to deny in 259b3-16 that animals are self-movers at all. This denial is in two ways problematic. First, it seems to contradict Aristotle's well-known doctrines that animal motion is due to the animal itself, or its soul, and that human beings are responsible for their *own* actions, i.e. the actions which are up to them to do or not to do. Second, if it is true that animals, which are the paradigm candidates for being self-movers and for positing non-eternal unmoved movers (i.e. souls) in them, turn out not to be true

φθαρτοῖς μόνον.

³⁷ N.B. The second and the third kinds of movers are unmoved *per se*, but may be moved *per accidens* either by something else or also by themselves, whereas the first kind of unmoved mover is unmoved both *per se* and *per accidens*, i.e. unmoved *simpliciter*.

self-movers after all, my thesis that there are non-eternal unmoved movers will be in jeopardy. A lot of ink has been poured over this recently.³⁹

The context (259a20-b3) of the passage is this: after two *a priori* arguments for the existence of the unique and eternal unmoved mover from taking the eternity of motion as given,⁴⁰ Aristotle turns to an *a posteriori* argument from considering the causal mechanism (ἀρχαί 259a22) within movers, especially within the empirically more evident mortal self-movers.⁴¹ Aristotle's aim in considering these movers, as I stipulate from what he says in 259a27-29,⁴² is to show that, because the immediate principles of the things that are sometimes moved and sometimes at rest are insufficient, there is need for positing other more remote principles, i.e. things that are always unmoved and things that are always moved.⁴³

This general context, then, is what lies behind Aristotle's discussion of self-motion at *Physics* 8.6 259b3-16. More directly, however, the discussion takes the form of a response to ἀπορία #3 in *Physics* 8.2, that such non-eternal unmoved mover

³⁸ ἃ κινεῖ αὐτὰ ἑαυτά, οἷον τὸ τῶν ἐμψύχων καὶ τὸ τῶν ζώων γένος.

³⁹ See Solmsen (1971: 171-82), Nussbaum (1978), Furley (1994), Gill (1994), Sauvé Meyer (1994), and Morison (2004). Corcilius and Gregorić (2013) have a section on the general problem of self-motion. Unfortunately, they haven't discussed the relevant passages in *Physics* 8.

⁴⁰ See section 1.3 above.

⁴¹ Thus 259a27 δῆλα πᾶσι and 259b1 ὁρῶμεν δὲ καὶ φανερώς ὄντα. See also *Physics* 8.3 254a35-b1: πρὸς ἅπαντα γὰρ ταῦτα ἰκανὴ μία πίστις· ὁρῶμεν γὰρ ἓνια ὅτε μὲν κινούμενα ὅτε δ' ἡρεμοῦντα.

⁴² ἐπεὶ δὲ τὰ μὲν τοιαῦτα δῆλα πᾶσι, βουλόμεθα δὲ δεῖξαι καὶ τοῖν δυοῖν ἐκατέρου τὴν φύσιν, ὅτι ἔστιν τὰ μὲν αἰεὶ ἀκίνητα τὰ δὲ αἰεὶ κινούμενα. See also the end of *Physics* 8.3.

⁴³ Aristotle then in 259a29-b1 offers a paraphrase of the arguments in chapter 5: the principle of things moved is the self-mover, and the principle of both things moved and the self-mover is the unmoved mover. It is clear from Aristotle's account in *Physics* 8.5 that the unmoved mover mentioned here should be the internal mover. Further, it is manifest that all the living beings (τὸ τῶν ἐμψύχων γένος 259b2-3) are such self-movers. However, it is evident *a posteriori* that these self-movers and the unmoved mover (i.e. the soul) within them are both non-eternal (e.g. all animals are mortal) and intermittent in their functioning (e.g. all animals take rest), therefore the strategy in chapter 5 of tracing the motion of something to its ἀρχή doesn't necessarily lead to some eternally existing and eternally functioning unmoved mover.

causing non-eternal motion might be construed as a model of motion *ex nihilo* for the universe and render the first motion mortal.⁴⁴ I now quote the passage in full:⁴⁵

In fact, we see clearly that there are things of such a sort as to move themselves, for example the species of the animate things and that of the animals. And these [self-movers] have suggested the idea that perhaps it is possible for motion to come to be in a thing without having been in existence at all before, because we see this actually occurring in these [self-movers]: at times when they are not in motion they move themselves again, as it seems. *We must grasp the fact, therefore, that they move themselves only with one kind of motion, and that they do not move themselves with that motion in the strict sense (ταύτην οὐ κυρίως), for the cause is not from itself.*⁴⁶ (259b1-8)

Rather (ἄλλά), there are other natural motions in animals, e.g. increase, decrease, and respiration, with which each kind of them are moved when they are at rest

⁴⁴ “The fact is evident above all in the case of animate beings: for it sometimes happens that there is no motion in us and we are quite still, and that nevertheless we are then at some moment set in motion, that is to say it sometimes happens that we produce a beginning of motion in ourselves spontaneously without anything having set us in motion from without. ... Therefore, if an animal is ever in a state of absolute rest, we have a motionless thing in which motion can be produced from the thing itself, and not from without. Now if this can occur in an animal, why should not the same be true also of the universe [τὸ πᾶν]? If it can occur in a small world it could also occur in a great one: and if it can occur in the world, it could also occur in the infinite; that is, if the infinite could as a whole possibly be in motion or at rest” (*Physics* 8.2 252b17-28). Aristotle responds to this ἀπορία in two places: first at *Physics* 8.2 253a7-21 and then in our passage at *Physics* 8.6 259b3-16.

⁴⁵ N.B. I modify Hardie & Gaye’s translation quite heavily here.

⁴⁶ ὁρῶμεν δὲ καὶ φανερῶς ὄντα τοιαῦτα ἃ κινεῖ αὐτὰ ἑαυτά, οἷον τὸ τῶν ἐμψύχων καὶ τὸ τῶν ζώων γένος, ταῦτα δὲ καὶ δόξαν παρεῖχε μὴ ποτε ἐνδέχεται κίνησιν ἐγγίγνεσθαι μὴ οὔσαν ὅλως, διὰ τὸ ἐν τούτοις ὁρᾶν ἡμᾶς τοῦτο συμβαῖνον (ἀκίνητα γάρ ποτε ὄντα κινεῖται πάλιν, ὥς δοκεῖ), τοῦτο δὲ δεῖ λαβεῖν, ὅτι μίαν κίνησιν αὐτὰ κινεῖ, καὶ ὅτι ταύτην οὐ κυρίως· οὐ γὰρ ἐξ αὐτοῦ τὸ αἷτιον.

(ἡρεμοῦν) and not being moved by the motion by which they move themselves.

But the cause of this (τούτου δ' αἴτιον) [sort of motion] is what surrounds (τὸ περιέχον) and many of the things that come in (πολλὰ τῶν εἰσιόντων): thus in some cases the cause is food: when it is being digested animals sleep, and when it is being separated (διακρινομένης) [into the more corporeal and the purer sort of blood that is suitable for nourishment of the organs and other constituent parts of the body]⁴⁷ they awake and move themselves, the original starting point (viz., the food ingested) being from outside (ἔξωθεν οὔσης).⁴⁸ (259b8-14)

That is why animals are not always moved continuously by themselves: it is something else that moves them, itself being in motion and changing as it comes into relation with each several thing that moves itself.⁴⁹ (259b14-16)

The behavior of animals does not pose a threat to the eternity of motion and of the universe, explains Aristotle: animals move themselves only with one kind of motion,⁵⁰ and they do not move themselves with this kind of motion *strictly speaking* (κυρίως) because what causes the motion (τὸ αἴτιον) is not from the animal itself. Hence, they

⁴⁷ For this interpretation of what Aristotle is referring to here by διακρινομένης see section 1.5.3 below, referring to Aristotle's account of digestion, sleeping and waking up in *De Somno*. Most translators incorrectly render this by “distributing,” sc. of the nourishment from the heart into the various parts of the body.

⁴⁸ ἀλλ' ἔνδρῳ ἄλλαι κινήσεις φυσικαὶ τοῖς ζώοις, ἃς οὐ κινεῦνται δι' αὐτῶν, οἷον αὔξησις φθίσις ἀναπνοή, ἃς κινεῖται τῶν ζώων ἕκαστον ἡρεμοῦν καὶ οὐ κινούμενον τὴν ὑφ' αὐτοῦ κίνησιν. τούτου δ' αἴτιον τὸ περιέχον καὶ πολλὰ τῶν εἰσιόντων, οἷον ἐνίων ἢ τροφή· πεπτομένης μὲν γὰρ καθεύδουσιν, διακρινομένης δ' ἐγείρονται καὶ κινεῦσιν ἑαυτούς, τῆς πρώτης ἀρχῆς ἔξωθεν οὔσης.

⁴⁹ διὸ οὐκ ἀεὶ κινεῦνται συνεχῶς ὑφ' αὐτῶν· ἄλλο γὰρ τὸ κινεῦν, αὐτὸ κινούμενον καὶ μεταβάλλον πρὸς ἕκαστον τῶν κινούντων ἑαυτά.

⁵⁰ Locomotion, as we gather from the parallel passage in *Physics* 8.2.

cannot be the model for motion *ex nihilo* (κίνησιν ἐγγίγνεσθαι μὴ οὕσαν ὅλως) whose application to the universe (τὸ πᾶν) and especially to the first heaven would make its motion mortal. That this has to be the general direction of the argument no one disputes; however, there is much disagreement about how exactly this argument works, especially how the middle part (259b8-15) hangs together with the whole, which has important ramification for my overarching question whether or not Aristotle believes that animals are self-movers.

1.5.2 A New Interpretation

Two ways on how to interpret the claim that *animals do not move themselves with locomotion in the strict sense* have been suggested:

First, a simple reading is to take the middle part (259b8-14) as explanatory of the first part.⁵¹ This reading puts the “other natural motions” (ἄλλαι κινήσεις φυσικαί, 259b8) such as increase, decrease, respiration, and digestion on a par with locomotion. Thus, *just as* in the case of these other natural motions the cause of motion comes not from the animals themselves but externally, *in the same way* the cause of locomotion comes not from the animals themselves but externally. Therefore, when Aristotle claims that animals are not *strictly speaking* self-movers even in their own locomotion because the cause is not from the animal itself, he means that the cause is from the outside the animal *just as* the causes of the other natural motions are external, and indeed when he says “*the first principle* being thus originally from outside” he means by “the first principle” that of

⁵¹ This is more or less suggested by Hardie & Gaye’s translation and Ross’s paraphrase. Most importantly, they both avoid translating the ἀλλά at 259b8.

both the other motions and locomotion.⁵²

Second, a subtler way of interpretation, which acknowledges the contrast between self-locomotion and the other natural motions in the passage, has been suggested more recently. According to this interpretation, Aristotle either (a) doesn't explain the ground for the claim here altogether, or (b) only very briefly. (a) Thus, Nussbaum thinks that the reason why is "undeveloped".⁵³ To judge from her account in her commentary on the *De Motu* of how Aristotle fills in these gaps, the real reason why animals are not self-movers in the strict sense even in their locomotion, according to Nussbaum's Aristotle, lies in the fact that they are moved locally by the external objects of thought or desire (these objects are thus intentional objects), which point is only developed in *De Anima* and *De Motu*. Nussbaum's view is shared by Furley, among others.⁵⁴ (b) Morison, who follows Nussbaum's division of points,⁵⁵ thinks that the reason why according to Aristotle animals are not self-movers in the strict sense is stated here very succinctly in the clause "for the cause is not from itself" (οὐ γὰρ ἐξ αὐτοῦ τὸ αἴτιον: 259b7-8): based on

⁵² This reading is untenable because it conflicts with the parallel passage (253a7-21) in *Physics* 8.2 where Aristotle first responds to ἀπορία 3 in *Physics* 8.2. There, Aristotle contrasts locomotion, which according to him the animal itself originates (253a14), with other kinds of motion/change that occur in the animal. For brevity's sake, I do not elaborate on this point here.

⁵³ See Nussbaum (1978, 119-120) (*italics hers*): "In fact, Aristotle seems to be making two separate points [at *Physics* 8.6 259b1-16]: (1) Local motion is the only genuine self-motion; but even this is not *strictly* self-motion, since it depends on external *aition*. (2) In the case of the *other* natural motions (growth, decay, respiration, etc.), there is no reason to think any is genuine self-motion. ... (2) is the same point already made in chapter 2 [i.e. *Physics* 8.2]; it will be repeated and developed in *MA* chapter 11, ... (1) is obscure and undeveloped. What is the external *aition*? And in what sense, given that there is this external *aition*, can animals be said to be self-moving? The *Physics* provides no further answers. Its arguments have gaps that can be filled only by an adequate account of animal motion and its relationship to external goals and external necessities".

⁵⁴ See Furley (1978). I respond to this interpretation in section 1.5.4 below.

⁵⁵ For Nussbaum's division of points, see note 53 above. See Morison (2004: 72). Morison proposes a similar change of punctuation—a stop before ἀλλά at 259b8—as does Nussbaum (1978: 119). Both of them translate the ἀλλά correctly as "but", as opposed to Hardie & Gaye and Ross who simply leave it out in their translation/paraphrase.

Aristotle's account of self-movers in *Physics* 8.5, the animal is not the cause of self-motion as a composite whole, but only a part of it is, i.e., the unmoved part—its soul. So, *in the strict sense*, the animal as a body-soul composite does not move itself because one part of the composite does not cause motion. Further, the mover within a composite animal, its soul, is a self-mover not *per se* but only *per accidens*, because although it *per se* moves the moved part (the body), it is moved in that motion only *in that* and *because* it is situated within the moved part, which fact is incidental to its being a mover.⁵⁶ Thus, when Aristotle says “the cause [of the self-motion] is not *from itself*” (259b7-8), his claim is not that the cause is from *outside* of the animal, as Nussbaum, Ross, and Hardie and Gaye think, but that the cause is not from the animal *as a whole*; rather, the cause is only from *part* of it—its soul (Morison, 2004: 74).⁵⁷

I suggest a *third* way of interpreting why *animals do not move themselves with locomotion in the strict sense*. I argue that, although it is true that Aristotle does contrast the animal self-motion with the other animal motions, *nevertheless*, the temporal duration of the former is punctuated by and causally dependent on the latter whose temporal duration is in turn punctuated by and causally dependent on something external which

⁵⁶ See Morison (2004: 73-75). For the notion of self-motion *per accidens*, see section 1.4 above.

⁵⁷ The weakness of Morison's interpretation is this. The reason why “it is necessary to grasp” (259b6) the fact that animals move themselves only with self-locomotion and do not move with that motion in the strict sense is *not only* that it rules out the *per accidens* self-movers as causes of the *continual* motion of the universe: *more importantly*, if we read the text more closely (the δὲ at 259b6 picks up the ἀπορία of motion *ex nihilo* at b3-6), the fact is meant to respond to the motivating ἀπορία of the passage by ruling out the behavior of animals in their self-motion as providing any suggestion that the motion of the universe might have begun *ex nihilo*. Yet if the fact necessary for us to grasp is, as Morison would have it, that the animal soul moves itself only *per accidens*, it is difficult to see how grasping this fact is supposed to rule out finding animal self-motion a basis for suggesting that the motion of the universe began *ex nihilo*, for it is not on the face of it impossible for the animal soul to move its body *ex nihilo*, and itself *ex nihilo* by leverage. In order to respond to the motivating ἀπορία, animal self-motion has to be, in one way or other, qualified *externally*, and it is precisely this point that Morison denies (see Morison 2004: 76).

enters. Thus, animals are not self-movers in their locomotion in the strict sense because the cause of *some aspect* (namely the temporal duration) of their locomotion lies in the other natural bodily motions whose temporal duration is itself externally caused.⁵⁸ In other words, using the language of my project, animal souls are unmoved movers *per se*, but moved movers *per accidens* in other ways.

This causal reading of the relation between the two kinds of motion is confirmed by the parallel passage in *Physics* 8.2:

So nothing prevents it from being the case that ... some of these [externally caused motions in the animal] set in motion the intellect or the appetite, and this again then sets the whole animal in motion: this is what happens when animals are asleep: though there is then no perceptive motion in them, there is some motion that causes them to wake up again.⁵⁹ (253a15-20)

In what is taken by Nussbaum to be a separate point in the *Physics* 8.6 passage, Aristotle also outlines this causal relationship:

But the cause of this is what surrounds and many of the things that come in: thus in some cases the cause is food: when it is being digested animals sleep, and when it is being separated they awake and move themselves, the original starting point being from outside. That is why animals are not always moved continuously by

⁵⁸ For what it is worth, this seems to be Simplicius' reading *ad loc.* See *On Physics*, 1258, 19-31. See also note 86 below on Gill's interpretation.

⁵⁹ οὐδὲν οὖν κωλύει ... τούτων δ' ἑνίας τὴν διάνοιαν ἢ τὴν ὄρεξιν κινεῖν, ἐκείνην δὲ τὸ ὅλον ἤδη ζῶον κινεῖν, οἷον συμβαίνει περὶ τοὺς ὕπνου: αἰσθητικῆς μὲν γὰρ οὐδεμιᾶς ἐνούσης κινήσεως,

themselves.⁶⁰ (259b11-15)

According to the example given in this passage, the food which enters an animal body is the first cause and an external cause (ἡ πρώτη ἀρχὴ ἔξωθεν οὕση) of some motions (ἐνίων) in the animal body. What motions does food cause? According to Aristotle's statement here, it seems that the entrance of food into the animal body, giving rise to the nutritive activities of cooking up (πέψις) of the ingested food and separation (διάκρισις) of the product into its purer and less pure parts, causes the animal in question to go to sleep and wake up and be self-moving. Therefore food, a proximate cause of an animal's nutritive activities, is a remote cause of the animal's perceptive states and locomotive activities precisely because there is a causal relation between the externally moved motions within an animal (such as the digestion of food and the separation of blood) and its perceptive states (such as being asleep and being awake) together with its perceptive and locomotive activities (such as the actual perceiving of some *X* and the motion towards it).

That this is the case is confirmed by Aristotle's remarks on digestion and perception elsewhere, and especially in *De Somno et Vigilia* (from now on *De Somno*).

Let's take a look at *De Somno* now.

ἐνούσης μέντοι τινός, ἐγείρεται τὰ ζῷα πάλιν.

⁶⁰ τούτου δ' αἴτιον τὸ περιέχον καὶ πολλὰ τῶν εισιόντων, οἷον ἐνίων ἡ τροφή· πεττομένης μὲν γὰρ καθεύδουσιν, διακρινομένης δ' ἐγείρονται καὶ κινουῦσιν ἑαυτούς, τῆς πρώτης ἀρχῆς ἔξωθεν οὕσης, διὸ οὐκ ἀεὶ κινουῦνται συνεχῶς ὑφ' αὐτῶν.

1.5.3 *De Somno* on Digestion and Sleep⁶¹

If what is referred to by Aristotle as his *Περὶ Τροφῆς* had survived,⁶² it would be a better place to go for his theory of animal digestion. Unfortunately it didn't, and given what we do have, *De Somno* contains Aristotle's most detailed account. That said, my focus on *De Somno* is not totally contingent upon textual condition, for *De Somno* occupies a special place in Aristotle's animal psychology. On the one hand, as Aristotle spares no effort to point out in the first chapter of this treatise, sleep and waking are the *πάθη* of the perceptive soul,⁶³ therefore *De Somno* certainly belongs to a description of the perceptive part of the animal soul. On the other hand, somewhat paradoxically, he spends a major part of the treatise discussing animal nutritive activities, and especially digestion. The reason for this apparent mismatch lies in that sleep and waking are, as will emerge below, the result of the interaction between the nutritive part and the perceptive part of the soul: when the organs corresponding to the perceptive soul are acted upon (*πάσχουσι*) by the *nutritive* activities going on in the animal body, sleep or waking arises in the perceptive part. This is to say, sleep and waking are, as it were, the boundary and the causal link between the nutritive and the perceptive parts of the animal soul. This is exactly what we need in order to understand the *Physics* 8.6 passage.

N.B. I remain agnostic on the question where in Aristotle's philosophical career to

⁶¹ Morison alludes to it and McKirahan mentions the connection in his note to his translation of Simplicius' commentary, but no one, so far as I know, has discussed *De Somno* in detail in connection with *Physics* 8. For the status of the text of *De Somno*, see Everson (2007).

⁶² *De Somno* 3 456b5. Diogenes Laertius's catalogue doesn't include anything close, either. According to Bonitz in his index, Aristotle refers to the work at the following places: *Meteorology* 4.3 381b13, *De Anima* 2.4 416b31, *PA* 4.4 678a19, and *GA* 5.4 784b2.

⁶³ Or, more correctly speaking, they are the *πάθη* of the bodily organs which correspond to the perceptive part of the soul. There is some controversy whether at this point in Aristotle's philosophical life he thinks the soul is moved and affected or not. I do not engage with this problem in this project.

locate *De Somno*. It may be true, as according to Menn (2002)'s refined developmentalist account,⁶⁴ that *De Somno* (together with *Physics* 7) represents an earlier view⁶⁵ according to which the soul is still “moved *via* its body” (*De Somno* 1 454a8-10). In translating and discussing the relevant passages, I remain neutral whether e.g. “the perceptive part” is a soul part or a body part because it doesn't affect my purpose.

(a) Food and Digestion

First of all, in *De Somno* Aristotle tells us that the entrance of food into the animal body gives rise to a series of nutritive activities consisted mainly of two processes: (1) the *cooking up* (πέψις) of food into blood and wastes and (2) the *separation* (διάκρισις) of blood into finer blood and denser blood, which we saw referred to in the *Physics* 8.6 passage. According to Aristotle's theory of animal digestion, external food first enters the mouth, which breaks it down to facilitate good digestion,⁶⁶ then it travels through the esophagus into the stomach, which is the receptacle for undigested food and the first organ of digestion. From there, through a digestive process which involves first the stomach and then the liver and finally the heart, food that has been cooked and broken down in the stomach and liver is turned into blood in the heart, which is the proper ἀρχή and receptacle for blood.⁶⁷ The blood thus coming out of the heart is hot, and it has to be cooled in the brain and separated out in the heart before it can be used to sustain and replenish the organs and other organic parts of the body.

⁶⁴ Refined from those of Nuyens (1948) and Ross (1961).

⁶⁵ Which sets it apart from the later view such as we find in *De Anima*.

⁶⁶ *PA* 650a10-19.

It is manifest that, ... , when the *food enters from outside* (τῆς θύραθεν τροφῆς εἰσιούσης) the parts fitted for its reception, the evaporation (ἀναθυμίασις) enters into the veins, and there, undergoing a change, is *converted* into blood, and makes its way to their source (i.e. the heart). All this has been dealt with in *On Nourishment*.⁶⁸ (*De Somno* 3 456a32-b5, trans. Beare in Barnes)

An animal awakes when *the cooking-up of the food is completed* (πεφθῆι): when the heat, which had been forced together in large quantity within a small compass from the surrounding part, has once more prevailed, and when the more corporeal and the purer blood have been *separated* (διακριθῆι).⁶⁹ (*Ibid.* 3 458a10-12)

(b) The nutritive activities and sleep and waking

Second, it is important to notice that (1) sleep and waking are *πάθη* of the *perceptive* part of an animal, and (2) the nutritive activities of digestion and separation *act on* (ποιοῦσιν) an animal's perceptive part by causing it to be awake, i.e. perceptively active, and asleep, i.e. perceptively inactive. Thus, food, which is the external cause of the nutritive activities of an animal, is a remote cause of some aspect of the animal's perceptive activities.

⁶⁷ For the heart as the ἀρχή of veins and blood, see *PA* 3.4 666a1-b1.

⁶⁸ φανερόν δὴ ὅτι ... τῆς μὲν οὖν θύραθεν τροφῆς εἰσιούσης εἰς τοὺς δεκτικούς τόπους γίγνεται ἡ ἀναθυμίασις εἰς τὰς φλέβας, ἐκεῖ δὲ μεταβάλλουσα ἐξαιματοῦται καὶ πορεύεται ἐπὶ τὴν ἀρχήν. Εἵρηται δὲ περὶ τούτων ἐν τοῖς *Περὶ τροφῆς*. (Text: W. D. Ross, *Aristotle: Parva Naturalia*, Clarendon Press, Oxford, 1955)

⁶⁹ ἐγείρεται δ' ὅταν πεφθῇ καὶ κρατήσῃ ἡ συνεωσμένη θερμότης ἐν ὀλίγῳ πολλῇ ἐκ τοῦ

(α) Sleep and waking are perceptive πάθη

With *De Somno* being a book on the perceptive soul peculiar of animals,⁷⁰ it is of central importance to Aristotle's aim and project in *De Somno* that sleep and waking are the πάθη of the *perceptive part* (τὸ αἰσθητικὸν μόριον) of an animal:

Both these πάθη (i.e. sleeping and waking) concern perception of the primary perceptive part (περὶ αἴσθησιν τοῦ πρώτου αἰσθητικοῦ). ... Sleep is a πάθος of the perceptive part. ... We assert that sleep is in some way the changelessness of perception and, as it were, a bond of perception, while its loosening or remission constitutes the being awake.⁷¹ (*De Somno* 1 454a22-4, b9-10, and b25-7)

More specifically, the perceptive part which is affected in sleep and waking is not any random part, but the “ruling perceptive part” (τὸ κύριον αἰσθητήριον)— “that which concerns touch” (τὸ ἅπτικόν):

Now, since every αἴσθησις has something special and also something common; special, as, e.g., seeing is to the sight, hearing to the ἀκοή, and so on with the other αἴσθησις severally; while all are accompanied by a common δύναμις, in virtue of which a person perceives that he sees or hears, ...for αἴσθησις is one,

περιεστώτος, καὶ διακριθῇ τό τε σωματωδέστερον αἷμα καὶ τὸ καθαρώτερον.

⁷⁰ In *De Sensu* Aristotle studies the nature of the common sense touch, i.e. what is its function. In *De Somno* Aristotle studies the πάθη of the organ of touch, i.e. how it is acted upon. In *De Longitudine Vitae* Aristotle studies another set of πάθη of the organs beyond waking and sleep: life and death.

⁷¹ ἄμφω γάρ ἐστι τὰ πάθη ταῦτα περὶ αἴσθησιν τοῦ πρώτου αἰσθητικοῦ. ... ὁ γὰρ ὕπνος πάθος τι τοῦ αἰσθητικοῦ μορίου ἐστίν. ... τῆς δ' αἰσθήσεως τρόπον τινὰ τὴν μὲν ἀκίνησίαν καὶ οἶον δεσμὸν τὸν ὕπνον εἶναι φαμεν, τὴν δὲ λύσιν καὶ τὴν ἄνεσιν ἐγρήγορσιν.

and the ruling perceptive part (τὸ κύριον αἰσθητήριον) is one, though the definition of αἴσθησις for each genus, e.g., sound or color, is different; and since this subsists in association especially with τὸ ὀπτικόν, for this can exist apart from all the other αἰσθητήρια, but none of them can exist apart from it—a subject of which we have treated in *De Anima*; it is therefore evident that waking, together with sleep, is a πάθος of this. This explains why they belong to all animals; for touch (ἅφῃ) alone belongs to all.⁷² (*Ibid.* 2 455a12-27)

Now, being a πάθος of the part which concerns touch means that sleep and awaking are ways in which this part may be acted on or moved, therefore the cause of sleep and waking, whatever it is, is just a cause of *how* the part concerning touch, and in general *how* the perceptive part, is affected. I next inquire what the cause of sleep and waking is.

(β) The nutritive activities are causes of sleep and waking

That the nutritive activities *cause* the animal to be awake and be asleep is in fact the reason why Aristotle dwells on the nutritive activities and digestion in *De Somno*, a book which otherwise belongs to Aristotle's treatment of the perceptive soul. Many passages confirm the causal relationship between the nutritive activities and sleep and waking, which, as I have shown above, are πάθη of the perceptive part:

⁷² ἐπεὶ δ' ὑπάρχει καθ' ἐκάστην αἴσθησιν τὸ μὲν τι ἴδιον, τὸ δέ τι κοινόν, ἴδιον μὲν οἶον τῇ ὄψει τὸ ὄραν, τῇ δ' ἀκοῇ τὸ ἀκούειν, καὶ ταῖς ἄλλαις ἐκάστη κατὰ τὸν αὐτὸν τρόπον, ἔστι δέ τις καὶ κοινὴ δύναμις ἀκολουθοῦσα πάσαις, ἣ καὶ ὅτι ὄρᾳ καὶ ἀκούει αἰσθάνεται. ... ἔστι μὲν γὰρ μία αἴσθησις, καὶ τὸ κύριον αἰσθητήριον ἓν, τὸ δ' εἶναι αἰσθήσει τοῦ γένους ἐκάστου ἕτερον, οἶον ψόφου καὶ χρώματος, τοῦτο δ' ἅμα τῷ ὀπτικῷ μάλιστα ὑπάρχει (τοῦτο μὲν γὰρ χωρίζεται τῶν ἄλλων αἰσθητηρίων, τὰ δ' ἄλλα τούτου ἀχώριστα, εἴρηται δὲ περὶ αὐτῶν ἐν τοῖς Περὶ ψυχῆς θεωρήμασιν), φανερόν τοίνυν ὅτι τούτου ἐστὶ πάθος ἢ ἐγρήγορσις καὶ ὁ ὕπνος. διὸ καὶ πᾶσιν ὑπάρχει τοῖς ζώοις· καὶ γὰρ ἡ ἀφῆ μόνη πᾶσιν·

In general

The point for consideration next in order is: with what things coming to be, and from where, does *the ἀρχή of the affection, i.e., waking and sleeping* come to be? Now, since it is when it has perception that an animal must first take food and receive growth, and in all cases food in its ultimate form is, in sanguineous animals, the natural substance blood, or, in bloodless animals, that which is analogous to this; and since the veins are the place of the blood, while the origin of these is the heart. ... All this has been dealt with in *On Nourishment*, but we must here recapitulate what was there said, in order that we may consider the *ἀρχαί of the change (i.e. of waking and sleeping)*, and come to know what happens to the perceptive part to account for the occurrence of waking and sleep.⁷³ (*Ibid.* 3 456a30-b9)

Digestion and Sleep

As we observed above, sleep is not just any impotence of the perceptive faculty, but this affection is one which arises from the evaporation concerning food. The matter evaporated must be driven onwards to a certain point, then turn back and change like a tide-race. Now, in every animal the hot naturally tends to move upwards, but when it has reached the parts above, it turns back again, and moves downwards in a mass. This explains why *sleeps come from food*. ... When,

⁷³ Ἐχόμενον δὲ τῶν εἰρημένων ἐστὶν ἐπελθεῖν τίνων γιγνομένων καὶ πόθεν ἡ ἀρχὴ τοῦ πάθους γίγνεται, τοῦ τ' ἐγρηγορέναι καὶ τοῦ καθεύδειν. φανερόν δὴ ὅτι ἐπεὶ ἀναγκαῖον τῷ ζῳῷ, ὅταν αἰσθησὶν ἔχῃ, τότε πρῶτον τροφήν τε λαμβάνειν καὶ αὔξεισιν, τροφή δ' ἐστὶ πᾶσιν ἡ ἐσχάτη τοῖς μὲν ἐναίμοις ἢ τοῦ αἵματος φύσις, τοῖς δ' ἀναίμοις τὸ ἀνάλογον, τόπος δὲ τοῦ αἵματος αἱ φλέβες, τούτων δ' ἀρχὴ ἡ καρδία. ... Εἴρηται δὲ περὶ τούτων ἐν τοῖς Περὶ τροφῆς· νῦν δὲ ἀναληπτέον ὑπὲρ αὐτῶν τούτου χάριν, ὅπως τὰς ἀρχὰς τῆς κινήσεως θεωρήσωμεν, καὶ τί πάσχοντος τοῦ

therefore, this comes to a stand it weighs a person down and causes him to nod, but when it has actually sunk downwards, and by its return has repulsed the hot, sleep comes on, and the animal is presently asleep.⁷⁴ (*Ibid.* 3 456b17-28)

Hence it is plain from what has been said that sleep is a sort of concentration of the hot matter inwards and mutual replacement (ἀντιπερίστασις) due to the cause above mentioned. Hence much motion is characteristic of a drowsy man. But where it (viz. the heat in the upper and outer parts) begins to fail, he grows cool, and owing to this cooling process his eye-lids droop. Accordingly the upper and outward parts are cool, but the inward and lower, i.e. the parts at the feet and in the interior of the body, are hot.⁷⁵ (*Ibid.* 3 457a33-b6)

It is this part—the brain—which also produces sleep in those animals that have one; while in those without one, it is the analogous part. For by cooling the flow of blood from the nourishment, or on account of certain other similar causes, it weighs the region down, and makes the heat recede downwards along with the blood. Because of this greater accumulation in the lower region it produces

μορίου τοῦ αἰσθητικοῦ συμβαίνει ἡ ἐγρήγορσις καὶ ὁ ὕπνος.

⁷⁴ ἀλλὰ γάρ, ὥσπερ εἵπομεν, οὐκ ἔστιν ὁ ὕπνος ἀδυναμία πᾶσα τοῦ αἰσθητικοῦ, ἀλλ' ἐκ τῆς περὶ τὴν τροφὴν ἀναθυμιάσεως γίγνεται τὸ πάθος τοῦτο· ἀνάγκη γὰρ τὸ ἀναθυμιώμενον μέχρι τοῦ ὠθεῖσθαι, εἴτ' ἀντιστρέφειν καὶ μεταβάλλειν καθάπερ εὐριπον. τὸ δὲ θερμὸν ἐκάστου τῶν ζώων πρὸς τὸ ἄνω πέφυκε φέρεσθαι· ὅταν δ' ἐν τοῖς ἄνω τόποις γένηται, ἀθρόον πάλιν ἀντιστρέφει καὶ καταφέρεται. διὸ μάλιστα γίνονται ὕπνοι ἀπὸ τῆς τροφῆς· ἀθρόον γὰρ πολὺ τὸ τε ὑγρὸν καὶ τὸ σωματῶδες ἀναφέρεται. ἰστάμενον μὲν οὖν βαρύνει καὶ ποιεῖ νυστάζειν· ὅταν δὲ ῥέψῃ κάτω καὶ ἀντιστρέψαν ἀπώσῃ τὸ θερμὸν, τότε γίγνεται ὁ ὕπνος καὶ τὸ ζῶον καθεύδει.

⁷⁵ ὥστε φανερόν ἐκ τῶν εἰρημένων ὅτι ὁ ὕπνος ἐστὶ σύνοδος τις τοῦ θερμοῦ εἶσω καὶ ἀντιπερίστασις φυσικὴ διὰ τὴν εἰρημένην αἰτίαν· διὸ πολλὴ ἡ κίνησις τοῦ ὑπνοῦντος. ὅθεν δ' ἐκλείπει, καταπύχεται καὶ διὰ ψύξιν καταπίπτει τὰ βλέφαρα, καὶ τὰ μὲν ἄνω κατέψυκται καὶ τὰ ἔξω, τὰ δ' ἔντος καὶ τὰ κάτω θερμά, οἷον τὰ περὶ τοὺς πόδας καὶ τὰ εἶσω.

sleep.⁷⁶ (PA 2.7 653a10-17, trans. Lennox)⁷⁷

Separation of blood and waking up

A person awakes when *the cooking-up of the food is completed* (πεφθῆι): when the heat, which had been forced together in large quantity within a small compass from the surrounding part, has once more prevailed, and when the more corporeal and the purer blood have been *separated* (διακριθῆι).⁷⁸ (De Somno 3 458a10-12)

Owing to the fact that the blood after the intake (προσφορά)⁷⁹ of food comes to be especially in need of *separation*, *sleep* occurs [and it lasts] until the purer part of the blood has been separated upward, and the more turbid downward. When this has taken place animals *awake* (ἐγείρονται), being released from the heaviness of food. We have now stated the cause of sleep, viz. that it consists in the mutual replacement of thing[s] bodily which is carried back by the connatural heat in a mass upon the primary sense organ.⁸⁰ (Ibid. 3 458a21-28)

⁷⁶ ποιεῖ δὲ καὶ τὸν ὕπνον τοῖς ζώοις τοῦτο τὸ μόριον τοῖς ἔχουσιν ἐγκέφαλον, τοῖς δὲ μὴ ἔχουσι τὸ ἀνάλογον. Καταψύχον γὰρ τὴν ἀπὸ τῆς τροφῆς τοῦ αἵματος ἐπίρρυσιν, ἣ καὶ διὰ τινος ὁμοίας αἰτίας ἄλλας, βαρύνει τε τὸν τόπον (διὸ τὴν κεφαλὴν καρηβαροῦσιν οἱ ὑπνώσσοντες) καὶ κάτω ποιεῖ τὸ θερμὸν ὑποφεύγειν μετὰ τοῦ αἵματος. Διὸ πλεῖον ἀθροιζόμενον ἐπὶ τὸν κάτω τόπον ἀπεργάζεται τὸν ὕπνον. (Text: P. Louis, *Aristote. Les parties des animaux* Paris: Les Belles Lettres, 1956)

⁷⁷ Lennox (2001).

⁷⁸ ἐγείρεται δ' ὅταν πεφθῇ καὶ κρατήσῃ ἡ συνεωσμένη θερμότης ἐν ὀλίγῳ πολλὴ ἐκ τοῦ περιεστώτος, καὶ διακριθῇ τό τε σωματωδέστερον αἷμα καὶ τὸ καθαρώτερον.

⁷⁹ It seems to me that it is an overtranslation to render it “assimilation” (J. I. Beare in Barnes). It simply means the taking in of, say, food.

⁸⁰ διὰ δὲ τὸ γίγνεσθαι ἀδιακριτώτερον τὸ αἷμα μετὰ τὴν τῆς τροφῆς προσφορὰν ὕπνος γίγνεται, ἕως ἂν διακριθῇ τοῦ αἵματος τὸ μὲν καθαρώτερον εἰς τὰ ἄνω, τὸ δὲ θολερώτερον εἰς τὰ κάτω· ὅταν δὲ τοῦτο συμβῇ, ἐγείρονται ἀπολυθέντα τοῦ ἐκ τῆς τροφῆς βάρους. τί μὲν οὖν τὸ αἴτιον τοῦ καθεύδειν εἴρηται, ὅτι ἡ [ὑπὸ] τοῦ σωματώδους τοῦ ἀναφερομένου ὑπὸ τοῦ συμφύτου θερμοῦ ἀντιπερίστασις ἀθρόως ἐπὶ τὸ πρῶτον αἰσθητήριον.

This echoes with what Aristotle claims in *Physics* 8.6: after eating much food, my heart, the perceptive part concerning touch, is shrouded in heat and can no longer function, sweet sleep then befalls me, and my whole perceptive soul turns from being active into being inactive. I have shown that this is supported by the theory of digestion and sleep put forward in *De Somno*.

(γ) The perceptive function and the locomotive function

There is much dispute as to whether the perceptive and the locomotive souls (and their respective organs) are numerically one or two, and whether and how we can divide them.⁸¹ If the locomotive soul is indeed some aspect of the broader perceptive soul and they share the same ruling bodily part, then the *πάθη* of the perceptive bodily part would by definition be the *πάθη* of the locomotive bodily part as well, therefore, just as food is a cause of an animal's perceptive activities, it is also a cause of its locomotive activities.

However, even if the locomotive soul and the perceptive soul are numerically two in that their respective organs are divisible, the *πάθη* of the former, though not identical, would still be necessarily implied by the *πάθη* of the latter.⁸² This is because for Aristotle, the psychic functions corresponding to different kinds/parts of the animal soul are hierarchical:⁸³ when an organ corresponding to the animal nutritive soul is affected in a certain way, the organs corresponding to the perceptive soul are necessarily also similarly affected; but when an organ corresponding to the animal perceptive soul is affected in a certain way, the organs corresponding to the animal nutritive soul need not be similarly

⁸¹ See Caston (forthcoming) "Aristotle on the unity of psychology: how to divide the soul".

⁸² I.e. if the latter is acted on, then the latter is necessarily acted on as well.

⁸³ See chapter 4 for details.

affected. Thus, when an animal is asleep, i.e. perceptively inactive, it can neither perceive nor locally move.

Whichever is the case, it is far from surprising that at *Physics* 8.6 259b13 Aristotle lumps being awake and self-moving together and claims that both are affected in some way by the nutritive activities which are in turn affected in some way by the external food.

To sum up the discussion on *De Somno*, I've shown that Aristotle thinks that it is the food that enters from without (ἡ θυράθεν τροφή), together with the nutritive activities of concoction (πέψις) and separation (διάκρισις), that acts on the perceptive part of an animal, and that he thinks that waking and sleep are the result of the perceptive part being acted on. What is more, because the functioning of the locomotive soul is either contingent upon or a part of the functioning of the perceptive soul as a whole, the cause of *some* πάθη of the perceptive part is *a* cause for the locomotive part as well.⁸⁴

1.5.4 Back to *Physics* 8

It may appear paradoxical to say that what causes an animal's self-motion is not from itself, yet based on the above analysis of *De Somno*, we can see that, strictly speaking, the external cause (i.e. food) and the internal cause (the different psychic parts) do not cause the same effect: what food causes, through an animal's nutritive activities, is the start (waking up), the end (falling asleep), and the duration (being awake) of the animal's perceptive and locomotive activities. Now, an animal can only perceive some

⁸⁴ I do not deal with the interesting question whether growth and perception count as self-motion/self-change or not here. They are self-motion in the same way self-locomotion is self-motion, i.e. in certain respects. On growth and nutrition as self-change, see Menn (2002).

object *X* and move itself from place *A* to place *B* (where *X* is situated) when it is awake,⁸⁵ so food is a συνάιτιον (i.e. *sine qua non*) of the animal's perception of *X* and its locomotion to *X*. But the fact that it perceives *X* and not something else is caused by the presence of the object and the functioning of the perceptive soul; similarly, the fact that it moves itself from *A* to *B* and not in some other direction is caused by its perceiving *X* at *B*. Therefore, it is the cause of *some aspect* of an animal's self-motion that is outside itself, and the animal is a self-mover in the *others* aspects: *qua* perceptive (locomotive) soul in respect of the direction and speed of locomotion, for example.⁸⁶

Aristotle spells this important distinction out in the last sentence of the *Physics* 8.6 passage: “that is why animals are not always moved *continuously* by themselves”.⁸⁷ This is to say, as long as the animals are in temporally continuous motion, they are moved by themselves, but *that* they are in temporally continuous motion is caused by something external, namely food. This is supported by the description in *De Somno* 3 that food, with its digestion and distribution, punctuates an animal's daily activities into temporally discrete chunks. To return to the puzzling sentence in *Physics* 8.6, “animals are not self-movers *strictly speaking* (κυρίως)”, but only when they are awake, i.e. are temporally continuous movers, and *whether* they are awake *or not* is determined by “the other motions”—the nutritive activities—whose beginning and end are in turn caused by “what surrounds and enters”, i.e. food.

At this point one may easily see the deficiency of one branch of the second

⁸⁵ On sleepwalking, see *De Somno* 2 456a24-27.

⁸⁶ The idea of distinguishing the cause for the start of a motion and the cause regulating the motion once it has been started first appears in Gill (1994). Gill doesn't discuss animal locomotion, though, which is what is at stake in the *Physics* 8.6 passage.

⁸⁷ διὸ οὐκ ἀεὶ κινεῖνται συνεχῶς ὑφ' αὐτῶν.

interpretation of the *Physics* 8.6 passage, which may be called the “intentional reading”.⁸⁸ According to this reading, when Aristotle says that “animals move themselves only with one kind of motion, and with this not in the strict sense”, he means that an animal’s self-locomotion is strictly speaking caused by the intentional object, which is outside of the animal in question. Hence *in the strict sense*, it is the external object of the motion which is its first cause, but *loosely speaking*, because of the ambivalent status of intentional objects which under some description are said to be internal to the mind, animals can be said to move themselves. So to quote Nussbaum’s passage again: “local motion is the only genuine self-motion; but even this is not strictly self-motion, since it depends on an *external* aition.... Its arguments have gaps that can be filled only by an adequate account of animal motion and its relationship to *external goals* and external necessities” (1975: 119) and Furley: “an animal is correctly described as a self-mover, because when it moves, its soul moves its body, and the external cause of its motion is a cause of motion only because it is seen as such by a faculty of the soul. There must be an *external object*, however, and hence the movement of an animal does not provide an example of a totally autonomous beginning of motion” (1978: 176-7).

Now, leaving aside the question whether this interpretation is supported by *De Anima* and *De Motu* or not for the moment, in *Physics* 8 at least it has no ground.

Although the parallel passage in *Physics* 8.2 might lead one to such an interpretation,⁸⁹ Aristotle clarifies in *Physics* 8.6 that the externally caused changes and activities in the animal body (some of which in turn move the *διάνοια* or the *ὄρεξις*) are not the

⁸⁸ See section 1.5.2 above.

⁸⁹ “Many motions are produced in the body by what surrounds (ὕπὸ τοῦ περιέχοντος), and some of these set in motion the intellect (διάνοια) or the appetite (ὄρεξις), and this again then sets the whole animal in motion.”

perception of external objects, as the “intentional reading” would require, but such mundane changes and activities as increase, decrease, breathing and digestion, which are all nutritive rather than perceptive.⁹⁰ Besides, quite counter-intuitively, according to Aristotle, one cannot be woken up from sleep and become actively perceptive and locomotive by some particular perception (such as hearing a thunderclap), because in order to have some particular perception, one has to be awake, i.e. perceptively active, in the first place. To say that some particular perceptive sense could turn itself on to perceive some external object before the whole perceptive soul has been turned on would seem to defy Aristotle’s overall purpose in *Physics* 8.6, because it comes very close to claiming motion *ex nihilo*.

I’ve already distinguished between the animal self-motion *qua* self-moved and the temporal continuity and discreteness of that motion which are caused externally. More broadly, to understand Aristotle’s arguments in *Physics* 8 concerning the first unmoved mover and the non-eternal unmoved movers, it is important to distinguish between the nature of something and the temporal extension of its nature:⁹¹ in so far as something has a certain nature, it necessarily tends to fulfill *this* nature (i.e. to cause a certain kind of motion in the body to which it belongs *per se*), but because its body is susceptible to

⁹⁰ Corcilus and Gregorić’s otherwise interesting paper (2013) falls prey to the same problem.

⁹¹ One might cite *De Longitudine Vitae* 5 and say that because each living species has a natural life-span, the nature of something should incorporate how long it expects to live. This is not true. According to Aristotle’s actual account there, the length of life for each individual is due to how much and how warm the moisture inside the body is as compared to the environment, and this varies across different kinds of living beings, different species within the same kind, and different individuals within the same species but having different habitats: i.e. it is not due to the soul as an internal principle of motion after all. Cf. *GA* 4.8 777b6-8: the cause of the length of life lies in the proximity of the way the animal is mixed elementally to the way the surrounding (περιέχοντα) air is and in the other physical circumstances (συμππτώματα).

Note also that in *GC* 2.10 and *GA* 4.8, the life cycles of living things are caused remotely by the approaching and retreating sun.

external causes or *other* internal causes *than* this nature, it does not fulfill this nature *eternally* or even *continuously*. That necessity or eternity comes from τὸ περιέχον—and in the case of eternity, ultimately from the first eternal unmoved mover.⁹² This is effectively what Aristotle claims in the passage which immediately follows in *Physics* 8.6, where, unless you follow my interpretation, he seems to have *digressed* from arguing that the non-eternal movers cannot be the model of a non-eternal universe (motion *ex nihilo*) to arguing that the non-eternal movers cannot cause eternal effects (surely they cannot, but how does this work as a repudiation of motion *ex nihilo*?), with a connective relative pronoun ἐξ ὧν:

From these considerations we may confidently conclude that if a thing belongs to the class of unmoved movers that are also themselves moved accidentally, it is impossible that it should cause *continuous* motion. So the necessity that there should be motion *continuously* requires that there should be a first mover that is unmoved even accidentally, if, as we have said, there is to be in the world of things an unceasing and undying motion, and the world is to remain permanently self-contained and within the same limits: for if the first principle remains, the universe must also remain, since it is continuous with the first principle.⁹³

(*Physics* 8.6 259b20-28)

See Menn (forthcoming: IIIγ2a) for a different argument to the same conclusion.

⁹² See e.g. *De Caelo* 2.1.

⁹³ ἐξ ὧν ἔστιν πιστεῦσαι ὅτι εἴ τί ἐστι τῶν ἀκινήτων μὲν κινούντων δὲ καὶ αὐτὰ κατὰ συμβεβηκός, ἀδύνατον συνεχῇ κίνησιν κινεῖν. ὥστ' εἴπερ ἀνάγκη συνεχῶς εἶναι κίνησιν, εἶναί τι δεῖ τὸ πρῶτον κινεῖν ἀκίνητον καὶ κατὰ συμβεβηκός, εἰ μέλλει, καθάπερ εἵπομεν, ἔσεσθαι ἐν τοῖς οὖσιν ἄπαυστός τις καὶ ἀθάνατος κίνησις, καὶ μενεῖν τὸ ὄν αὐτὸ ἐν αὐτῷ καὶ ἐν τῷ αὐτῷ· τῆς

The general argumentative structure of what comes after 259b16 is this: after the claim that animal souls are not self-movers in the strict sense and don't cause motion all by themselves is explained in 259b8-16 through a discussion of the other animal motions/changes, Aristotle first classifies animal souls as *per accidens* self-movers (259b16-20) and claims, assuming that animal souls are the paradigm for *per accidens* self-movers, that no *per accidens* self-mover causes continuous motion (259b20-22). What comes after in 259a22-28, therefore, is not an explanation of 259b20-22, but a further inference from 259b20-22: since no *per accidens* self-mover (i.e. a mover which is unmoved *per se* but is moved by itself *per accidens*) causes continuous motion, the fact that there is a continuous motion demands that there be a mover that is unmoved even *per accidens*. Afterward in 259b28-31 Aristotle distinguishes between the non-eternal unmoved mover *per accidens* moved by oneself (the soul) and the eternal unmoved mover *per accidens* moved by something else (the lesser heavenly mover). His aim here is presumably on the one hand to delimit the scope of the previous discussion and make it clear that not all *per accidens* motion is non-eternal, and on the other hand to start a new discussion of why there are both eternal and non-eternal motions in the world.

Aristotle's theory of matter and contraries (the matter, the form, and its privation) testifies to this division of labor between the different causes of motion: as Aristotle repeatedly points out in both *Physics* 1 (especially in *Physics* 1.5) and *Metaphysics* Λ, matter is always *some* matter concerning *a* certain pair of opposites. See e.g.:

One might raise the question from what sort of non-being generation proceeds; for things are said not to be in three ways. If, then, one way to not be is to be

γὰρ ἀρχῆς μενούσης ἀνάγκη καὶ τὸ πᾶν μένειν συνεχές ὄν πρὸς τὴν ἀρχήν.

potentially, still, what is not is not potentially any and every thing, but different things come from different things.⁹⁴ ... The causes and the principles, then, are three, two being the pair of contraries of which one is definition and form and the other is privation, and the third being the matter.⁹⁵ (*Metaphysics* Λ 2 1069b26-34, trans. Ross in Barnes, modified)

But all things have not the same elements, but analogically they have; i.e. one might say that there are three principles—the form, the privation, and the matter. *But each of these is different for each class*; e.g. in color they are white, black, and surface. Again, there is light, darkness, and air; and out of these are produced day and night.⁹⁶ (*Ibid.* Λ 4 1070b17-21)

Further, that which is first in respect of fulfillment is the cause of all things. But in another sense there are different first causes, viz. all the contraries which are neither stated as classes nor spoken of in several ways; and further, the matters of different things are different.⁹⁷ (*Ibid.* Λ 5 1071a35-b1)

⁹⁴ I.e. One way of “not being X” is to be “not X actually but X potentially”: e.g. a white piece of paper is not actually black but potentially black, so the piece of paper is not white by being white potentially. Cf. *Physics* 1.7. Ross’ original translation (1908) gets the point, which is wrongly modified in Barnes (1984).

⁹⁵ ἀπορήσειε δ’ ἂν τις ἐκ ποίου μὴ ὄντος ἢ γένεσις· τριχῶς γὰρ τὸ μὴ ὄν. εἰ δὴ τι ἔστι δυνάμει, ἀλλ’ ὅμως οὐ τοῦ τυχόντος ἀλλ’ ἕτερον ἐξ ἑτέρου. ... τρία δὲ τὰ αἷτια καὶ τρεῖς αἱ ἀρχαί, δύο μὲν ἢ ἐναντίωσις, ἥς τὸ μὲν λόγος καὶ εἶδος τὸ δὲ στέρησις, τὸ δὲ τρίτον ἢ ὕλη. (Text: W. D. Ross, *Aristotle’s Metaphysics*, Clarendon Press, Oxford, 1924)

⁹⁶ πάντων δὲ οὕτω μὲν εἰπεῖν οὐκ ἔστιν, τῷ ἀνάλογον δέ, ὥσπερ εἰ τις εἴποι ὅτι ἀρχαὶ εἰσὶ τρεῖς, τὸ εἶδος καὶ ἡ στέρησις καὶ ἡ ὕλη. Ἀλλ’ ἕκαστον τούτων ἕτερον περὶ ἕκαστον γένος ἐστίν, οἷον ἐν χρώματι λευκὸν μέλαν ἐπιφάνεια· φῶς σκότος ἀήρ, ἐκ δὲ τούτων ἡμέρα καὶ νύξ.

⁹⁷ ἔτι τὸ πρῶτον ἐντελεχεία· ὡδὶ δὲ ἕτερα πρῶτα ὅσα τὰ ἐναντία ἃ μήτε ὡς γένη λέγεται μήτε

Because “the matters for different things are different” and “there are different first causes”, the unique and eternal first unmoved mover cannot be the form which is contrary to *any and every* privation. This to say, as a mover, the first unmoved mover is not responsible for *any and every* motion: as we shall see, the only motion which the first unmoved mover is responsible for is the eternal temporal duration of the first heaven. It follows that because the contrariety between “being in motion” and “being at rest” at 259b10 is not identical either with the contrariety we find between “being awake” and “being at rest (=being asleep)”, or the contrariety we find between “being eternal” and “being non-eternal”, there is something *other than* the first unmoved mover of the first heaven and the unmoved mover of “what surrounds” that is the unmoved mover of a certain animal’s “being in motion” and “being at rest”: this something else is the unmoved mover within the animal in question—its perceptive-locomotive soul.⁹⁸

1.6 Conclusion of the Discussion on *Physics* 8

To conclude, I have shown that the theory of motion outlined in *Physics* 8 allows for a multiplicity of movers to qualify as unmoved movers. First, the infinite regress arguments in *Physics* 8.5 only prove that, for any motion, there is a first mover that is unmoved. It remains neutral on the question how many unmoved movers there are in the world. Secondly, although the argument for a highest unmoved mover in *Physics* 8.6 connects the eternity of motion with the highest unmoved mover that is unmoved both

πολλαχῶς λέγεται· καὶ ἔτι αἱ ὕλαι.

⁹⁸ For brevity’s sake I do not deal with the interesting and important question why Aristotle claims that animals are self-movers *only* in their locomotion, i.e. why are they not self-movers in their nutritive and perceptive activities. Indeed they are (see Menn: 2002), so Aristotle is either arguing from what is commonly accepted (ἐνδοξα), or taking the perceptive and locomotive power to be what an animal soul essentially is.

per se and *per accidens*, it does not preclude the existence of the other two kinds of unmoved movers: those that are unmoved *per se*, but moved *per accidens* by others, and those that are unmoved *per se*, but moved *per accidens* both by others and by themselves. Thirdly, the passage in *Physics* 8.6 (259b3-16), where Aristotle seems to argue that animals are not self-movers and their souls not unmoved movers in the strict sense, upon further examination, doesn't conflict with Aristotle's conviction that the animal souls are *per se* unmoved movers.

Appendix:

1.7 Multiple Heavenly Unmoved Movers in *Metaphysics* Λ 8⁹⁹

To the surprise of many interpreters, *Metaphysics* Λ 8 opens with a question on the *number* of the divine unmoved substance.¹⁰⁰ In it, Aristotle identifies the divine unmoved substance which is under discussion in Λ 7 with the mover of a heavenly sphere and argues for the existence of a *multiplicity* of such movers. A previously popular position on *Metaphysics* Λ 8, represented by Jaeger (1923/1948)'s view on the issue, is this: that Λ 8, which contains an account of multiple heavenly movers, is a later (indeed the latest) insertion and with the same reason all the passages in *Physics* 8.6 that support there being multiple unmoved movers are later insertions.¹⁰¹ Jaeger is motivated, as we

⁹⁹ Menn (forthcoming IIIβ2b) offers a more detailed discussion of the same problem. I agree with it completely, and this section is here only for the completeness of my overall argument.

¹⁰⁰ See *Metaphysics* Λ 8 1073a14-15: Πότερον δὲ μίαν θετέον τὴν τοιαύτην οὐσίαν ἢ πλείους, καὶ πόσας, δεῖ μὴ λανθάνειν.

¹⁰¹ On *Metaphysics* Λ, see Jaeger (1923/1948, 345-7): "The theology of the main content of the two preceding chapters [i.e. chapters 6 and 7] breathes an entirely different spirit. The unmoved mover there discussed moves the heaven by itself, and through the medium of them, which move themselves, it moves this world of things whose motion is purely external to it. ... Chapter 8 interrupts this continuous train of thought and breaks it [i.e. *Metaphysics* Λ] into two parts. Remove it, and chapter[s] 7 and 9 fit smoothly together. After reading chapter 8, on the other

can see from his discussion quoted in the preceding note, by his belief that the general flavor of Aristotle's theology is monotheistic: Jaeger supports his claim on the ground that Λ 8 clashes with the other chapters of *Metaphysics* Λ , and most notably with Λ 7 and Λ 9, both *doctrinally*— Λ 8 suggests polytheism whereas Λ 7 and Λ 9 support monotheism—and *stylistically*.¹⁰²

Doctrinally speaking, it is far from clear that the other chapters of *Metaphysics* Λ are monotheistic. First, there are several places in *Metaphysics*, both in Λ and elsewhere, where Aristotle seems to imply that there are more than one divine substances.¹⁰³ Second, as Merlan (1946) has shown, Aristotle's *arguments* preceding Λ 8 should not be understood to be in favor of monotheism. They should rather be construed as intended to

hand, it is impossible to take up again the speculative meditation broken off with chapter 7. From soaring flights, from Platonic religious speculation, we plunge headlong down to the monotonous plain of intricate computation and specialized intelligence. ... [This chapter] loses itself entirely in subsidiary matters, and shows far more interest in ascertaining the exact number of the spheres than it does understanding of the fact that this grotesque multiplication of the prime mover, this army of 47 or 55 movents, inevitably damages the divine position of the prime mover and makes the whole theology a matter of mere celestial mechanics."

On *Physics* 8.6, see Jaeger (1948, 362-4): "These indications in this chapter of the *Physics* [i.e. *Physics* 8.6] of a plurality of unmoved guiders of the stars are obviously mere subsequent additions. Aristotle inserted them at the time when the school was beginning to discuss the extension of his theory of the unmoved mover, when there was still not much more than the bare possibility of deciding for a larger number of planetary movers. The passages in question are three. The first is 258b10. Here grammatical reasons suggest that the parenthesis 'whether one thing or a plurality' is to be regarded as an addition. ... The second passage, 259a7-13, is an equally improvised reference to the possibility of several movers. ... The third passage that owes its existence to an addition is 259b28-31, at the end of the series of proofs."

¹⁰² On the style of Λ 8 see Jaeger (1948, 344-5): "Book Λ is an outline of a lecture, not intended for the use of other persons at all. It contains only the main points, sketchily put together, sometimes merely jotted down one after the other with a recurring 'Note, next, that ...', and bare of all stylistic polish in detail. ... There is not the slightest reason to fear that in his lectures Aristotle spoke the sort of Greek that some readers, knowing none but these parts of him, reverence with respectful awe as genuine Aristotelian brevity. How he really spoke is shown by chapter 8, which in contrast to the rest of the book is fully written out. In consequence its style is so strikingly distinct from that of its context that we must seek a reason for this phenomenon."

Jaeger goes on to offer doctrinal reason why Λ 8 clashes with Λ 7 and Λ 9.

¹⁰³ See *Metaphysics* Λ 6 1071b19-22: "δεῖ ἄρα εἶναι ἀρχὴν τοιαύτην ἥς ἡ οὐσία ἐνέργεια. ἐτι τοίνυν ταύτας δεῖ τὰς οὐσίας εἶναι ἄνευ ὕλης· ἀϊδίους γὰρ δεῖ, εἴπερ γε καὶ ἄλλο τι ἀϊδιον;" *Metaphysics* Δ 5 1015b14 and E 1 1026a16. See Merlan (1946: 16) and Menn (forthcoming:

describe what *a* divine unmoved substance is and therefore as remaining neutral on the question how many such substances there are.¹⁰⁴ Indeed, as Merlan has suggested, it is very likely that Aristotle takes a multiplicity of unmoved movers as *uncontroversial* for his dialectical opponents: i.e. Speusippus' episodic numbers and geometrical figures, Xenocrates' Idea numbers are all *many in number*.¹⁰⁵ Further, according to Merlan, the Homeric quotation at the end of *Metaphysics* Λ: “οὐκ ἀγαθὸν πολυκοιρανίη· εἷς κοίρανος ἔστω” (“the rule of many is no good; let there be one ruler”) should be understood as a contention against Speusippus' episodic view of substance¹⁰⁶ and as arguing that it is wrong to assume, as Speusippus does, a number of unconnected kinds of substance: rather, all substances are essentially and causally connected to each other and there is a highest ἀρχή of all. However, saying that there is a highest god doesn't necessarily imply that the other gods are not gods: it need only imply that the gods are not unconnected, and that there exists a hierarchy among them.¹⁰⁷

The argument from style is problematic as well. Here I summarize Menn's points.

It is true that much of Λ 8 is elevated and free of hiatus with the exception of

IIIβ2b p.24).

¹⁰⁴ See Merlan (1946: 8): “It would seem to follow, furthermore, that in Aristotle's mind there was not the slightest contradiction between ch. 8 and the preceding sections of the book. What he felt he had proved in these sections was that there is a sphere [Merlan means by “a sphere” a type] (and of course, one sphere only) of ‘Unmoved Entity’. But whether or not this sphere comprises more than one unmoved entity was, as he understood it, still an entirely open question—open, of course, for his hearers rather than for the author who, being still a Platonist, probably felt sure from the very outset that the sphere of ‘unmoved entity’ comprised more than one unmoved entity.”

¹⁰⁵ See also Menn (forthcoming: IIIβ2b p. 25).

¹⁰⁶ See *Metaphysics* Λ 10 1075b37-1076a4: οἱ δὲ λέγοντες τὸν ἀριθμὸν πρῶτον τὸν μαθηματικὸν καὶ οὕτως αἰεὶ ἄλλην ἔχομένην οὐσίαν καὶ ἀρχὰς ἐκάστης ἄλλας, ἐπεισοδιώδη τὴν τοῦ παντὸς οὐσίαν ποιοῦσιν (οὐδὲν γὰρ ἢ ἑτέρα τῇ ἑτέρᾳ συμβάλλεται οὐσα ἢ μὴ οὐσα) καὶ ἀρχὰς πολλὰς· τὰ δὲ ὄντα οὐ βούλεται πολιτεύεσθαι κακῶς. “οὐκ ἀγαθὸν πολυκοιρανίη· εἷς κοίρανος ἔστω.” It is clear that Speusippus is meant.

¹⁰⁷ See chapter 4, section 4.5.

1073b32-1074a14 and 1074a31-8, however, it is hard to believe, as Jaeger would have it, that Aristotle wrote Λ 8 later, as an addition to the original Λ . A more natural conclusion is, as Blass (1875) suggests, that Aristotle wrote the hiatus-free passages in Λ 8 first, as part of an exoteric work, and later, when he was composing Λ , he excerpted these passages and placed them where he needed to discuss the number of immaterial substances. In such a scenario, the parts of Λ 8 where Aristotle does not avoid hiatus (1073b32-1074a14 and 1074a31-8) would have been added in as new material, so they agree in style with the rest of Λ . (2) Jaeger's claim that Λ 7 joins smoothly with Λ 9 is not true, so Menn (forthcoming) IIIβ2b p.28: "the last paragraph of Λ 7 (1073a3-13) talks about eternal non-sensible substance in general and its indivisibility and unchangeability, with nothing specific to νοῦς, and the jump to Λ 9's 'τὰ δὲ περὶ τὸν νοῦν ἔχει τινὰς ἀπορίας' would be wrenching. Both in argument and in style the last paragraph of Λ 7 goes with the hiatus-avoiding parts of Λ 8; but if we excise this paragraph as well, the original Λ will have contained absolutely no discussion of non-sensible substance in general (but only of νοῦς as the first ἀρχή), which seems incredible."

1.8 Unmoved Movers in *Metaphysics* Λ

It is more important to my project to show that the non-eternal unmoved movers we encounter in *Physics* 8 are also discussed, and recognized as such by Aristotle in *Metaphysics* Λ in the name of the forms of the sensible substances.

It is a general consensus that Λ is divided in two parts: the first part (cc. 1-5) in which Aristotle discusses sensible (=natural) substances, and the second part (cc. 6-10) in which Aristotle discusses non-sensible (=unmoved) substances. The last sentence of Λ 5,

together with the first sentence of Λ 6, introduces this transition:

We have stated, then, what are the principles of sensible things and how many they are, and in what sense they are the same and in what sense different.

Since there were three kinds of substance, two of them natural and one unmoved, regarding the latter we must assert that it is necessary that there should be an eternal unmoved substance. For substances are the first of existing things, and if they are all destructible, all things are destructible.¹⁰⁸ (1071b1-6)

Jaeger (1923/1948) reads more into this transition than the mere division between the sensible and the non-sensible substances. He claims that, because of the overlap between the sensible-unmoved distinction and the perishable-eternal distinction in that sensible substances are also perishable and non-sensible substances also eternal (with the *ad hoc* exclusion of the sensible eternal substances which Aristotle specifically mentions in many places), the two parts deal with perishable substances (Λ 1-5) and eternal substances (Λ 6-10) respectively. And thus, according to the introductory passage in Λ 1¹⁰⁹ to which the beginning of Λ 6 is a parallel, Λ 1-5 belong to physics and Λ 6-10 to

¹⁰⁸ τίνες μὲν οὖν αἱ ἀρχαὶ τῶν αἰσθητῶν καὶ πόσαι, καὶ πῶς αἱ αὐταὶ καὶ πῶς ἕτεραι, εἴρηται. // Ἐπεὶ δ' ἦσαν τρεῖς οὐσίαι, δύο μὲν αἱ φυσικαὶ μία δ' ἡ ἀκίνητος, περὶ ταύτης λεκτέον ὅτι ἀνάγκη εἶναι ἄϊδιόν τινα οὐσίαν ἀκίνητον. αἱ τε γὰρ οὐσίαι πρῶται τῶν ὄντων, καὶ εἰ πᾶσαι φθαρταί, πάντα φθαρτά.

¹⁰⁹ “There are three kinds of substance—one that is sensible (of which one subdivision is eternal and another is perishable; the latter is recognized by all men, and includes e.g. plants and animals), of which we must grasp the elements, whether one or many; and another that is immovable, and this certain thinkers assert to be capable of existing apart, some dividing it into two, others identifying the Forms and the objects of mathematics, and others positing, of these two, only the objects of mathematics. The former two kinds of substance are the subject of

metaphysics.¹¹⁰

Now, the claim about the overlap between the two distinctions is simply false. Even with the sensible eternal substances excluded, what Aristotle claims in the first sentence of Λ 6 is that he is going to investigate whether, within the category of the unmoved (= non-sensible) substances, *there is* an eternal unmoved substance. Therefore, as far as the sentence itself is concerned, it seems rather to imply that there are unmoved substances that are non-eternal.

Further, it is not the case that chapters 1-5 deal only with sensible substances in the sense that *only the sensible substances are under discussion*. Importantly for our purpose, individual forms, which are the topic of chapter 3 and appear also in chapters 4-5, are non-sensible. Indeed, as has been pointed out by Frede,¹¹¹ what Aristotle says at the end of chapter 5 is that the *principles* of sensible things, what they are and how many they are, have been stated, and these principles need not be themselves sensible. To complicate the matter even more, chapters 6-10 not only deal with the *principles* of unmoved things to the exclusion of the sensible things, but seem to take the principles of

physics (for they imply movement); but the third kind belongs to another science, if there is no principle common to it and to the other kinds" (1069a30-b2).

¹¹⁰ Jaeger (1948, 220-1): "The lecture [i.e. Λ] is sharply divided into two unequal portions. The first of these (cc. 1-5) discusses the doctrine of sensible reality; its analysis results in the conceptions of matter, form, potency, and act. The second (cc. 6-10) begins straight away with the speculative idea of the unmoved mover and with the assertion of a supersensible reality. Unlike the second, the first part is not an end in itself; it is there simple for the sake of the second, to which it serves as foundation... But the decisive consideration is that in Λ the notion of metaphysics is confined to the later part; the earlier is not reckoned as belonging thereto. ... The unmoved and eternal, on the other hand, is the object of metaphysics without qualification... In exactly the same way he here says simply that sensible reality is perishable, and infers that, it there exists nothing but the forms immanent in sensible things, everything in the universe is necessarily subject to the Heraclitean flux." Jaeger's note here is significant: "Sensible substances, with the exception of the heavenly bodies, are described simply as perishable in Λ 1, 1069a31, and 6, 1071b6; cp. K 2, 1060a22. The later account in Z 8, 1033b5, and H 3, 1043b15, is much more complex."

¹¹¹ See Frede (2001: 5).

the unmoved things to be also the principles of the sensible things.¹¹² This, combined with the beginning of chapter 6 which suggests that there are non-eternal unmoved substances, suggests that chapters 2-5 and chapters 6-10 have an *interlocking relationship*:

Chapters 6-10 pick up the conclusion of chapters 2-5—forms (and matter) are indeed unmoved principles of some sensible substances yet they cannot be principles as Plato claims they are because they are non-eternal—and ask, among all unmoved substances which include most conspicuously the non-eternal ones, whether there are one or indeed many such substances which are also eternal. This echoes well with what Aristotle argues in *Physics* 8.

1.9 The Case with Non-Eternal Unmoved Substances

Jaeger doesn't agree with the thesis outlined above. He thinks that the immanent forms in Λ are changeable, and that it is only later, in *Metaphysics* Z and H (which according to him are later works), that Aristotle has an account according to which “the world of appearance has been thoroughly penetrated with the idea that it too partakes of the unchangeable because of the forms that hold sway in it”.¹¹³ I think he confuses “non-eternal” with “changeable”.

According to Aristotle's theory both in Λ and elsewhere, an immanent form is both unchangeable and non-eternal. (1) First, an immanent form is *unchangeable*. Aristotle claims that immanent forms do not undergo coming-to-be or, in general, change at the beginning of Λ 3:

¹¹² See e.g. *Metaphysics* Λ 8.

Note, next, that neither the matter nor the *form* comes to be (γίγνεται)—and I mean the last matter and form. For everything that changes is something and is changed by something and into something. That by which it is changed is the immediate mover; that which is changed, the matter; that into which it is changed, the form. The process, then, will go on to infinity, if not only the bronze comes to be round but also the round or the bronze comes to be; therefore there must be a stop.¹¹⁴ (*Metaphysics* Λ 3 1069b35-1070a4)

So, according to Aristotle, only composites come to be (e.g. a round bronze), whereas the non-composites that make up a composite do not (e.g. the round and the bronze). And because the last matter and form are by definition that into which a composite substance is ultimately divided, neither of them comes to be (γίγνεται). The same argument, in a more developed form, is made at Z 8 1033a23-b19, from which I now quote the conclusion:

It is obvious, then, from what has been said, that that which is spoken of as form or substance does not come to be (οὐ γίγνεται), but the concrete thing which gets its name from this comes to be (γίγνεται), and that in everything which is generated matter is present.¹¹⁵ (*Metaphysics* Z 8 1033b16-19)

¹¹³ See Jaeger (1948: 221 n. 1).

¹¹⁴ Μετὰ ταῦτα ὅτι οὐ γίγνεται οὔτε ἡ ὕλη οὔτε τὸ εἶδος, λέγω δὲ τὰ ἔσχατα. πᾶν γὰρ μεταβάλλει τὶ καὶ ὑπὸ τινος καὶ εἰς τι· ὑφ' οὗ μὲν, τοῦ πρώτου κινουῦντος· ὃ δέ, ἡ ὕλη· εἰς ὃ δέ, τὸ εἶδος. εἰς ἄπειρον οὖν εἴσιν, εἰ μὴ μόνον ὁ χαλκὸς γίγνεται στρογγύλος ἀλλὰ καὶ τὸ στρογγύλον ἢ ὁ χαλκός· ἀνάγκη δὴ στήναι.

¹¹⁵ φανερόν δὲ ἐκ τῶν εἰρημένων ὅτι τὸ μὲν ὡς εἶδος ἢ οὐσία λεγόμενον οὐ γίγνεται, ἡ δὲ σύνολος ἢ κατὰ ταύτην λεγομένη γίγνεται, καὶ ὅτι ἐν παντὶ τῷ γεννωμένῳ (γινομένῳ Alc: γενομένῳ Ab) ὕλη ἔνεστι.

(2) Second, an immanent form is *non-eternal*. A passage in *Metaphysics* H 3 suggests this as a possibility:

And man is not animal plus biped, but there must be something besides these, if these are matter, —something which is neither an element nor from element (οὔτε στοιχεῖον οὔτ' ἐκ στοιχείου), but is the substance; but this people eliminate, and state the matter. If, then, this is *the cause of the thing's being*, and if the cause of its being is its substance, they will not be stating the substance itself. *This (ταύτην) [substance], then, must either be eternal or it must be destructible without being in the process of being destroyed, and must have come to be without being in process of coming-to-be.* It has been proved and explained elsewhere that no one makes or begets the form, but it is this individual that is made, and the composite of form and matter comes to be. *Whether the substances of destructible things can exist apart, is not yet at all clear;* except that obviously this is impossible in some cases—in the case of things which cannot exist apart from the individual instantiations, e.g. house or utensil. Perhaps, indeed, neither these things themselves, nor any of the other things which are not formed by nature, are substances at all; for one might say that the nature in natural objects is the only substance to be found in destructible things.¹¹⁶ (*Metaphysics* H 3 1043b10-23)

¹¹⁶ οὐδὲ δὴ ὁ ἄνθρωπος ἐστὶ τὸ ζῷον καὶ δίπουν, ἀλλὰ τι δεῖ εἶναι ὁ παρὰ ταῦτά ἐστιν, εἰ ταῦθ' ὕλη, οὔτε δὲ στοιχεῖον οὔτ' ἐκ στοιχείου, ἀλλ' ἡ οὐσία· ὁ ἐξαιρουντες τὴν ὕλην λέγουσιν. εἰ οὖν τοῦτ' αἷτιον τοῦ εἶναι, καὶ οὐσία τοῦτο, αὐτὴν ἂν τὴν οὐσίαν οὐ λέγοιεν. ἀνάγκη δὴ ταύτην ἢ αἰδῖον εἶναι ἢ φθαρτὴν ἄνευ τοῦ φθείρεσθαι καὶ γεγονέναι ἄνευ τοῦ γίνεσθαι. δέδεικται δὲ καὶ δεδήλωται ἐν ἄλλοις ὅτι τὸ εἶδος οὐθεὶς ποιεῖ οὐδὲ γεννᾷ, ἀλλὰ ποιεῖται τόδε, γίγνεται δὲ τὸ ἐκ τούτων. εἰ δ' εἰσὶ τῶν φθαρτῶν αἱ οὐσῖαι χωρισταί, οὐδὲν πω δῆλον· πλὴν ὅτι γ' ἐνίων οὐκ ἐνδέχεται δῆλον, ὅσα μὴ οἷόν τε παρὰ τὰ τινὰ εἶναι, οἷον οἰκίαν ἢ σκεῦος. ἴσως μὲν οὖν οὐδ' οὐσῖαι εἰσὶν οὔτ' αὐτὰ ταῦτα οὔτε τι τῶν ἄλλων ὅσα μὴ φύσει συνέστηκεν· τὴν γὰρ φύσιν μόνην

It is clear from the context that by ταύτην (at 1043b14) Aristotle means the substance that is the form or the actuality of something which is its cause of being (αἴτιον τοῦ εἶναι) (e.g. the form and the actuality of a human being—the soul—is the non-material cause of his or her living activities), and which is distinct from either the definitional element of the thing¹¹⁷ or the composite which is composed of these elements (ἐκ στοιχείου/ων). Such a substance, claims Aristotle, is either eternal if it can exist apart, or, if it cannot exist apart, destructible (φθαρτή) without a continuous process of being destroyed (φθείρεσθαι). Aristotle goes on to show, in the latter half of the passage quoted, that in the case of artificial things, there is either no substance over and above the particular instantiations (παρὰ τὰ τινά) that exists apart and eternally, or no substance at all presumably because artificial things don't have an internal cause of being (αἴτιον τοῦ εἶναι) in the same way natural things do (a saw, for instance, can only be an active saw when someone is using it). Further, Aristotle shows elsewhere, as part of his anti-Platonic argument against the appeal to a highest Form,¹¹⁸ that even in the case of natural things, there is no numerically single universal substance—a universal nature of, say, human being—that exists eternally apart from the particulars as their causes of being (αἴτιον τοῦ εἶναι).¹¹⁹ So,

ἂν τις θεῖη τὴν ἐν τοῖς φθαρτοῖς οὐσίαν.

For brevity's sake, I do not discuss the many textual problems within this passage, which do not affect my conclusion.

¹¹⁷ In the case of “man”, such elements are “animal” and “biped”. Now, differentiae such as “biped” are indeed said to be the form or actuality of something (H 2 1043a18-19). However, differentiae conceived in this way are distinct from what are conceived as elements (στοιχείον) of definition which are described as matter in the passage quoted above (1043b11). See Menn (forthcoming: IIε p. 11).

¹¹⁸ See Menn (forthcoming) on *Metaphysics* Z 4-9.

¹¹⁹ See *Metaphysics* Z 8 1033b19 ff.: “Is there, then, a sphere apart from the individual spheres or a house apart from the bricks? Rather we may say that no ‘this’ would ever have been coming to be, if this had been so, but that the ‘form’ means the ‘such’, and is not a ‘this’—a definite thing; but the artist makes, or the father begets, a ‘such’ out of a ‘this’; and when it has been begotten, it is a ‘this such’. And the whole ‘this’, Callias or Socrates, is analogous to ‘this brazen sphere’, but

the cause of being for destructible things is not a numerically single and separate universal Form, but rather individual and immanent forms that are one in species, but many in number.¹²⁰ A passage at the beginning of *Metaphysics* Z 15 confirms this:

Since substance is of two kinds, the concrete thing (τὸ σύνολον) and the formula (ὁ λόγος)—I mean that one kind of substance is the formula taken with the matter, while another kind is the formula in general—, substances in the former sense are capable of destruction (for they are capable also of generation), *but there is no destruction of the formula in the sense that it is ever in course of being destroyed* (for there is no generation of it either: the being of house is not generated, but only the being of this house), *but without generation and destruction formulae are and are not* (ἀλλ’ ἄνευ γενέσεως καὶ φθορᾶς εἰσὶ καὶ οὐκ εἰσίν); for it has been shown that no one begets nor makes these.¹²¹ (1039b20-27)

man and animal to ‘brazen sphere’ in general. Obviously, then, the cause which consists of the Forms (taken in the sense in which some maintain the existence of the Forms, i.e. if they are something apart from the individuals) is useless, at least with regard to comings-to-be and to substances; and the Forms need not, for this reason at least, be self-subsistent substances. In some cases indeed it is even obvious that the begetter is of the same kind as the begotten (not, however, the same nor one in number, but in form), i.e. in the case of natural products (for man begets man), unless something happens contrary to nature, e.g. the production of a mule by a horse. (And even these cases are similar; for that which would be found to be common to horse and ass, the genus next above them, has not received a name, but it would doubtless be both in fact something like a mule.) Obviously, therefore, it is quite unnecessary to set up a Form as a paradigm (for we should have looked for Forms in these cases if in any; for these are substances if anything is so); the begetter is adequate to the making of the product and to the causing of the form in the matter. And when we have the whole, such and such a form in this flesh and in these bones, this is Callias or Socrates; and they are different in virtue of their matter (for that is different), but the same in form; for their form is indivisible.”

¹²⁰ See Ross (1924, ii: 188) on *Metaphysics* Z 8 1033b5-6.

¹²¹ Ἐπεὶ δ’ ἡ οὐσία ἑτέρα, τό τε σύνολον καὶ ὁ λόγος (λέγω δ’ ὅτι ἡ μὲν οὕτως ἐστὶν οὐσία, σὺν τῇ ὕλῃ συνειλημμένος ὁ λόγος, ἡ δ’ ὁ λόγος ὅλως), ὅσαι μὲν οὖν οὕτω λέγονται, τούτων μὲν ἔστι φθορά (καὶ γὰρ γένεσις), τοῦ δὲ λόγου οὐκ ἔστιν οὕτως ὥστε φθεῖρεσθαι (οὐδὲ γὰρ γένεσις, οὐ γὰρ γίγνεται τὸ οἰκία εἶναι ἀλλὰ τὸ τῆδε τῇ οἰκίᾳ), ἀλλ’ ἄνευ γενέσεως καὶ φθορᾶς εἰσὶ καὶ οὐκ εἰσίν· δέδεικται γὰρ ὅτι οὐδεὶς ταῦτα γεννᾷ οὐδὲ ποιεῖ.

Similarly at the beginning of E 3:

That there are principles and causes which are generable and destructible (γενητὰ καὶ φθαρτὰ) without ever being in course of being generated or destroyed (ἄνευ τοῦ γίγνεσθαι καὶ φθείρεσθαι), is obvious.¹²² (1027a29-30)

Now, given that these individual forms are on the one hand non-eternal and on the other hand do not come to be or pass away in a continuous process, how do they change their status between being and not-being?¹²³ Aristotle seems to think that they do so *instantaneously*. This is confirmed by what he says in *Physics* 8.6 about non-eternal unmoved movers, and a parallel passage in *Metaphysics* B 5 concerning the geometrical boundaries:

Let us suppose, if you will, that in the case of certain things it is possible for them at different times to be and not to be, without coming-to-be and passing-away (ἄνευ γενέσεως καὶ φθορᾶς): in fact, it would seem to be necessary, if *a thing that has no parts* at one time is and at another time is not, that any such thing should without undergoing any process of change (ἄνευ τοῦ μεταβάλλειν) at one time be and at another time not be (ὅτε μὲν εἶναι ὅτε δὲ μὴ εἶναι). And let us further suppose it possible that some principles that are unmoved but capable of imparting motion at one time are and at another time are not (ὅτε μὲν εἶναι ὅτε δὲ

¹²² Ὅτι δ' εἰσὶν ἀρχαὶ καὶ αἷτια γενητὰ καὶ φθαρτὰ ἄνευ τοῦ γίγνεσθαι καὶ φθείρεσθαι, φανερόν.

¹²³ I thank Stephen Menn for mentioning this problem to me in conversation some time ago.

μὴ εἶναι).¹²⁴ (*Physics* 8.6 258b16-22)

In addition to what has been said, their (i.e. those who think that geometrical boundaries are more substance more than the bodies they are boundaries of) theories concerning *generation and destruction* turn out bizarre. For if substance, not having existed before, now exists, or having existed before, afterward does not exist, this change is thought to be accompanied by a process of becoming or perishing; but points and lines and surfaces cannot be in process either of becoming or of perishing, when they at one time exist and at another do not (ὅτῃ μὲν οὐσας ὅτῃ δὲ οὐκ οὐσας). For when bodies come into contact or are divided, their boundaries *instantaneously* (ἅμα) become one in the one case when they touch, and two in the other—when they are divided; so that when they have been put together one boundary does not exist but has perished, and when they have been divided the boundaries exist which before did not exist (for it cannot be said that the point, which is indivisible, was divided into two). And if the boundaries come into being and cease to be, from what do they come into being?¹²⁵

(*Metaphysics* B 5 1002a28-b5)

¹²⁴ ἔστω δὴ, εἴ τις βούλεται, ἐπὶ τινων ἐνδεχόμενον ὥστε εἶναί ποτε καὶ μὴ εἶναι ἄνευ γενέσεως καὶ φθορᾶς (τάχα γὰρ ἀναγκαῖον, εἴ τι ἄμερὲς ὅτῃ μὲν ἔστιν ὅτῃ δὲ μὴ ἔστιν, ἄνευ τοῦ μεταβάλλειν ὅτῃ μὲν εἶναι ὅτῃ δὲ μὴ εἶναι πᾶν τὸ τοιοῦτον). καὶ τῶν ἀρχῶν τῶν ἀκινήτων μὲν κινήτικῶν δ' ἑνίας ὅτῃ μὲν εἶναι ὅτῃ δὲ μὴ εἶναι, ἐνδεχέσθω καὶ τοῦτο.

¹²⁵ πρὸς γὰρ τοῖς εἰρημένοις καὶ τὰ περὶ τὴν γένεσιν καὶ τὴν φθορὰν συμβαίνει ἄλογα. δοκεῖ μὲν γὰρ ἡ οὐσία, ἐὰν μὴ οὐσα πρότερον νῦν ἢ ἢ πρότερον οὐσα ὕστερον μὴ ἢ, μετὰ τοῦ γίγνεσθαι καὶ φθεῖρεσθαι ταῦτα πάσχειν· τὰς δὲ στιγμὰς καὶ τὰς γραμμὰς καὶ τὰς ἐπιφανείας οὐκ ἐνδέχεται οὔτε γίγνεσθαι οὔτε φθεῖρεσθαι, ὅτῃ μὲν οὐσας ὅτῃ δὲ οὐκ οὐσας. ὅταν γὰρ ἅπτηται ἢ διαιρῆται τὰ σώματα, ἅμα ὅτῃ μὲν μία ἀπτομένων ὅτῃ δὲ δύο διαιρουμένων γίνονται· ὥστ' οὔτε συγκειμένων ἔστιν ἄλλ' ἔφθαρται, διηρημένων τε εἰσὶν αἱ πρότερον οὐκ οὐσαι (οὐ γὰρ δὴ ἢ γ'

Admittedly, in neither passage is Aristotle making a positive statement concerning how the non-eternal forms change their status of being, however, if we read the two passages together with the preceding three passages from *Metaphysics* Z 15 and H 3, and *Metaphysics* E 3, where Aristotle suggests that the non-eternal formulae (i.e. forms) indeed “are and are not without the process of being generated or destroyed” (1039b25-26), it is beyond doubt that it is Aristotle’s view that the non-eternal forms change their status of being *instantaneously*, without the process of coming-to-be and passing-away. The beginning passage of *Metaphysics* H 5 confirms this connection between geometrical boundaries and immanent forms:

Since some things are and are not, without coming to be and ceasing to be (ἄνευ γενέσεως καὶ φθορᾶς ἔστι καὶ οὐκ ἔστιν), *e.g. points*, if they can be said to be, and *forms* in general (for it is not ‘white’ comes to be, but the wood comes to be white, if everything that comes to be comes from something and comes to be something), not all contraries can come from one another, but it is in different senses that a pale man comes from a dark man, and pale comes from dark. Nor has everything matter, but only those things which come to be and change into one another.

Those things which, without ever being in course of changing, are or are not, have no matter.¹²⁶ (1044b21-29)

ἀδιαίρετος στιγμή διηρέθη εἰς δύο), εἴ τε γίνονται καὶ φθείρονται, ἐκ τίνος γίνονται;
¹²⁶ Ἐπεὶ δ’ ἓν ἄνευ γενέσεως καὶ φθορᾶς ἔστι καὶ οὐκ ἔστιν, οἷον αἱ στιγμαί, εἴπερ εἰσὶ, καὶ ὅλως τὰ εἶδη (οὐ γὰρ τὸ λευκὸν γίγνεται ἀλλὰ τὸ ξύλον λευκόν, εἰ ἐκ τίνος καὶ τὸ πᾶν τὸ γιγνόμενον γίγνεται), οὐ πάντα ἂν τάναντία γίγνοιτο ἐξ ἀλλήλων, ἀλλ’ ἐτέρως λευκὸς ἄνθρωπος ἐκ μέλανος ἀνθρώπου καὶ λευκὸν ἐκ μέλανος· οὐδὲ παντὸς ὕλη ἔστιν ἀλλ’ ὅσων γένεσις ἔστι καὶ μεταβολή εἰς ἄλληλα· ὅσα δ’ ἄνευ τοῦ μεταβάλλειν ἔστιν ἢ μή, οὐκ ἔστι τούτων ὕλη.

It is important, both for my project and for a correct understanding of Aristotle's theory of forms, that the non-eternal individual forms are the *causes* and the *principles* of the generation of composite beings (see e.g. *Metaphysics* Λ 2 1069b26-34). So the attempt, by Shields for example, to interpret the immanent forms as "supervenient entities" parasitic upon composite substances gets Aristotle's theory topsy-turvy.¹²⁷ In order for some matter which was not-X to become X, both the matter and the X (and the not-X) have to pre-exist in some way or other, so it is not true that X comes to be *per accidens* as a supervenient entity in the process in which some matter becomes X, as Shields argues. In the example which Shields takes as a problem for the "instantaneous" interpretation of the generation of immanent forms,¹²⁸ there is indeed a continuous process in which a piece of bronze as matter is shaped towards being the form Hermes as Shields maintains, however, this continuous process is efficiently caused by the sculptor's sculpturing art (i.e. the form Hermes in his soul) as an efficient cause, and finally caused by the form Hermes of the individual sculpture made, and neither of these forms itself comes to be in this very process—the one pre-exists the process, while the other concludes the process.

¹²⁷ See Shields (1990: 381-382).

1.10 Conclusion of the Discussion on *Metaphysics* Λ

To conclude, the theory of unmoved substances outlined in *Metaphysics* Λ allows for a multiplicity of substances to qualify as unmoved substances, and these include the non-eternal individual forms.

¹²⁸ See Shields (1990: 382).

Chapter 2 Heavenly Motion and its Movers in *De Caelo*

2.1 Introduction

The most influential interpretation on Aristotle's theory of heavenly motion in *De Caelo* is that of von Arnim and Guthrie. According to them, the revolving heavenly spheres, whose revolutions regulate the motions of everything else in the universe, have the principles of their motion entirely within themselves. Aether,¹ the body out of which these spheres and the stars within them are made, moves in circle by nature, so that the heavenly spheres exhibit circular motion by the nature of their material and are internally moved or self-moved.² Understood as such, Aristotle's theory of heavenly motion in *De Caelo* is fundamentally different from the theory on the same subject we find in the later books of *Physics*, *Metaphysics* Λ, and *De Motu Animalium*, in which Aristotle apparently thinks that a given heavenly sphere is always moved by some mover external to it.³

¹ Or, according to Aristotle, the "first body" (τὸ πρῶτον τῶν σωμάτων, τὸ πρῶτον σῶμα, ἡ πρώτη οὐσία τῶν σωμάτων). See *De Caelo* 1.2 269b4, 1.3 270b2-3, b11, b21. "Aether" is not properly speaking an Aristotelian term. It is a popular Ionic term to which Aristotle sometimes applies his questionable etymology. See *De Caelo* 1.3 270b22, *Meteorologica* 1.3 339b25, and *De Mundo*** 1 392a8.

² See Guthrie (1933: 163-164) and von Arnim (1931: 16-17). Gill (1994: 32) distinguishes between "natural movers" such as the aether and the four elements, which have only a *passive* inner principle of motion, and "self-movers" such as the animals, which have an *active* inner principle of motion. So, according to Gill, the heavenly spheres are not self-moved like the animals but are naturally moved. Leggatt (1995: 31-37) is less clear about his position: although he rightly acknowledges that aether is *not* the highest divinity in *De Caelo*, he still thinks (p. 35) that *aether* is a material self-mover and only assigns teleological roles to the highest divinity.

³ N.B. In this chapter, I'm only dealing with Aristotle's theory of heavenly movers in *De Caelo*. In so far as *De Caelo* is concerned, the above interpretation, which can be dated to Alexander of Aphrodisias (see Wolfson, 1973: 29-32), is still the dominant one. The alternative interpretation, which seems to be Simplicius' view (see Wolfson, 1973: 32-34), according to which the heavenly spheres are moved by their internal souls, has not been widely accepted. Ross (1936: 98) and Falcon (2005: 73-77) are the exceptions in this regard. So Blyth (2013: 428) is slightly misleading when he cites Gill and Guthrie as supporting the latter interpretation. See more in note 72 below.

However, in so far as the interpretation of *Metaphysics* Λ is concerned, it is still sometimes

This interpretation was concurrent with and part of the trend of Aristotle scholarship known as the “developmental theory” (*die Entstehungsgeschichte*). According to its pioneer Jaeger, Aristotle’s intellectual development can be defined by his earliest “Platonist” period when he was a firm believer of Forms⁴ and his latest period when he was a devout empiricist.⁵ Aristotle’s surviving works can thus be chronologically arranged by their doctrinal relationship to either position, and if we find some inconsistencies across the Aristotelian corpus, or even within a single work, it is often not because we have understood him incorrectly or he tolerated such inconsistencies himself. These inconsistencies are there because the texts in which we find them were composed by Aristotle in different periods of his intellectual development, so to try to synchronize and harmonize them would be futile. Lying in the background of this trend is, of course, the 19th century historicist thesis that any natural or social organism, in so far as it is a living organism, necessarily involves a continuous development, so treating it as having a static nature is to do it an injustice.⁶

As Nuyens (1948) “out-Jaegered” Jaeger in applying the developmental hypothesis to Aristotle’s psychology, von Arnim (1931) and Guthrie (1933)⁷ did the same to Aristotle’s theory of the first mover. According to them, Aristotle (1) started his

argued that, in order for a heavenly sphere to desire its external unmoved mover, it needs to have an appetitive soul. I respond to this interpretation of *Metaphysics* Λ in chapter 4. Despite the fact that the second interpretation is not widely accepted, I still offer an interpretation in the latter half of the chapter against it.

⁴ Jaeger (1948: 52).

⁵ Jaeger (1948: 366).

⁶ The thesis is best represented by the philosophy of Hegel, who was influenced by the works of Goethe, Herder, and Rousseau.

⁷ Guthrie later (1939: n. xxxii) partly recants his earlier view: “As will appear later, however, I consider my earlier assertion of a materialistic stage in Aristotle’s thought (*Class. Quart.* 1933, p. 169) to have been too positive in expression.” However, he still holds that “it remains true that according to the description of the motion of the *aither* in i. 2, soul is an unnecessary addition”

career believing in the doctrines of Plato's *Laws*, according to which every motion can be causally traced to the motion of a self-mover,⁸ and this self-mover Plato defines as "the soul".⁹ Therefore, as it concerns the heavenly bodies, they are moved by the self-moving souls within them.¹⁰ Later on, according to von Arnim and Guthrie, Aristotle (2) moved on to the theory in *De Caelo* in which he abandons the idea that the heavenly spheres are moved by souls¹¹ and instead attributes their motion to their material—aether. *Just as fire moves upward and water downward by nature without needing a soul as their mover, aether moves in a circle by nature and its motion is therefore a self-motion.*¹² Finally comes the third stage, when in later books of *Physics* and *Metaphysics* Aristotle (3) arrives at the principle "no movement is without an external mover, and the primary mover of all must be unmoved," which according to Arnim conflicts with the

(1939: xxxv-xxxvi).

⁸ *Laws* 10.892a-899b.

⁹ *Laws* 10.896a-b:

Athenian: "So what's the definition of the thing that we call the soul? Surely we can do nothing but use our formula a moment ago: 'motion capable of moving itself.'

Clinias: "Do you mean that the entity which we all call 'soul' is precisely that which is defined by the expression 'self-generating motion'?"

Athenian: "I do. And if this is true, are we still dissatisfied? Haven't we got ourselves a satisfactory proof that soul is identical with the original source of the generation and motion of all past, present and future things and their contraries? After all, it has been shown to be the cause of all change and motion in everything." (trans. Saunders in Cooper ed., *Plato: Complete Works*, Hackett 1997)

¹⁰ *De Philosophia* is what Von Arnim and Guthrie have in mind for this stage of Aristotle's thought. See von Arnim (1932: 7) and Guthrie (1933: 168-9).

¹¹ There are at least two references to the universe and heavenly bodies as "ensouled (ἐμψυχος)" in *De Caelo*, at 285a29 and 292a18-21. Von Arnim takes these as discordant remnants from the early theory of *De Philosophia*: (1931: 18) "So müssen wir schliessen, dass Aristoteles in *de caelo*, wenn er den οὐρανός ἐμψυχος nennt, etwas zu viel von dessen früherer Natur in das neue Werk übernommen hat."

¹² Guthrie (1933: 169) cites *De Caelo* 2.1 284a18ff as evidence for this stage of Aristotle's thought. See also Jaeger (1948: 153): "The derivation of circular motion from the material nature of the ether reveals the intention to explain all phenomena of movement whatever by the natural laws of matter."

commitment to the concept of nature as an internal mover.¹³ So the mature Aristotle abandons the previous conceptions of the internal causation of heavenly motions and embraces the model of external causation.

This view of the *De Caelo*, with some modifications, is still the dominant interpretation today.¹⁴ For the purposes of this chapter, I remain neutral on the general methodological questions involved in Jaeger's developmental hypothesis. Although I'm not sure how much importance one should place upon someone's intellectual development in understanding his or her thought, I have no doubt that *some* of Aristotle's ideas changed through time and it must have some bearing on the texts that we now have. What I challenge in this chapter is the *particular* view on the development of Aristotle's theory on the heavenly motion which I outlined in the last paragraph. I argue that *nothing* Aristotle says in *De Caelo* commits himself to positing the heavens as self-moved—either as a self-moved body or as a body moved by a self-moving soul (respectively the second and the first stage *chez* von Arnim)—, therefore there is no contradiction between *De Caelo* and Aristotle's more “mature” works such as *Physics* and *Metaphysics* in which he posits an incorporeal external unmoved mover for the entire universe and many such movers for the many heavenly spheres. My argument comprises two prongs. The first prong is more dialectic. Against von Arnim and Guthrie's thesis that the universe is self-moved *qua* an aetherial body, I dispute their textual evidence. I echo Cherniss (1944) in this regard. I examine in particular a famous passage in *DC* 1.9 which has been dismissed by both past and recent scholars as no evidence for positing

¹³ See von Arnim (1931: 10-13)

¹⁴ See e.g. Judson (1994: 157-161), Matthen (2001: 171-199), and Thein (2013: 63-84). See also Kosman (1994: 138): “in the *De Caelo*, the circular motion of the outermost sphere is natural to the aetherial body of which that sphere is composed; it is therefore as self-explanatory as the

external movers.¹⁵ Second, against the thesis that the heavens in *De Caelo* is self-moved *qua* a soul-body composite because it is said to be “ensouled” (ἐμψυχος at *DC* 2.2 285a29), I tentatively reconstruct a theory of πνεῦμα which I argue could reconcile one thing’s “being ἐμψυχος” with the ultimately external causation of its motion. I rely on other Aristotelian texts, especially *De Motu Animalium* and *De Generatione Animalium* for my reconstruction.¹⁶

2.2 The Evidence for the View that Heaven is a Bodily Self-mover

(1) *De Caelo* 1.9 279a17-b3

The most important piece of evidence von Arnim and Guthrie put forward for their view comes in *De Caelo* 1.9 279a17-b3. This is also the most controversial one in the history of Aristotelian scholarship on *De Caelo*.¹⁷

To support his claim that Aristotle takes the self-moving “aether-sphere” to be the god and the highest principle of the universe, von Arnim cites the following lines:¹⁸

So, too, in its discussions concerning the divine, popular philosophy often propounds the view that *whatever is divine, whatever is primary and supreme*, is necessarily unchangeable (ἀμετάβλητον). Such a fact confirms what we have said.

downward motion of earth or the upward motion of fire.”

¹⁵ See Baghdassarian 2011 and Thein 2013 for two recent attempts at the issue.

¹⁶ Blyth (2013: 427-465) offers a similar interpretation, both of how *pneuma* works in this regard, and of the external causation of heavenly motion in general. His treatment is broader in scope than mine: he also discusses relevant passages in *Physics* 8 and *De Motu Animalium*. Despite some minor differences, especially on his reading of the secondary scholarship, I agree wholeheartedly with the two major points of his paper identified above.

¹⁷ See Leggatt (1995: 204-206).

¹⁸ See von Arnim (1931: 15): “Aber dass die Äthersphäre selbst hier der Gott und die an Dignität höchststehende Wesenheit des Kosmos ist, zeigt klar der Schluß des neunten Kapitels p.

For there is nothing else more powerful than it to move it—since that would be more divine—and it has no defect and lacks none of its proper excellences. Its unceasing motion, then, is also reasonable (καὶ ἄπαυστον δὴ κίνησιν κινεῖται εὐλόγως), since everything ceases to be moved when it comes to its proper place, but *the body whose path is the circle* (τοῦ δὲ κύκλῳ σώματος) has one and the same place for starting-point and goal.¹⁹ (279a30-b3, trans. Stocks in Barnes)

Isolated from its context, the passage appears to say that (1) the primary and supreme divinity is the round body that is moved with an unceasing motion and that (2) there is nothing else stronger than the round body that could move it. Therefore, as one can infer, the highest and divine being is a self-moving body.²⁰ Crucially, this reading is inescapable if the subject of κινεῖται at 279b1 is the “primary and supreme divinity” mentioned at 279a32-33 and if it is to be identified with the round body. This appears to be also Alexander’s reading of the passage.²¹ However, it is worth quoting the lines which immediately precede it:

And outside the heaven, as we have shown, body neither exists nor can come to exist. It is clear then that there is neither place nor void nor time outside the

279, 30 [sic].”

¹⁹ Καὶ γάρ, καθάπερ ἐν τοῖς ἐγκυκλίοις φιλοσοφήμασι περὶ τὰ θεῖα, πολλάκις προφαίνεται τοῖς λόγοις ὅτι τὸ θεῖον ἀμετάβλητον ἀναγκαῖον εἶναι πᾶν τὸ πρῶτον καὶ ἀκρότατον· ὃ οὕτως ἔχον μαρτυρεῖ τοῖς εἰρημένοις. Οὔτε γὰρ ἄλλο κρεῖττον ἐστὶν ὃ τι κινήσει (ἐκεῖνο γὰρ ἂν εἴη θεϊότερον) οὔτ’ ἔχει φαῦλον οὐδέν, οὔτ’ ἐνδεὲς τῶν αὐτοῦ καλῶν οὐδενός ἐστιν. Καὶ ἄπαυστον δὴ κίνησιν κινεῖται εὐλόγως· πάντα γὰρ παύεται κινούμενα ὅταν ἔλθῃ εἰς τὸν οἰκεῖον τόπον, τοῦ δὲ κύκλῳ σώματος ὁ αὐτὸς τόπος ὅθεν ἤρξατο καὶ εἰς ὃν τελευτᾷ. (Text: P. Moraux, *Aristote. Du ciel* Paris: Les Belles Lettres, 1965)

²⁰ Von Arnim (1931: 97); Guthrie (1933: 168); Ross (1936: 97).

²¹ See in Simplicius *On De Caelo*, p. 287 (Heiberg).

heaven. Hence whatever is there (τάκεϊ), is of such a nature as not to occupy any place, nor does time age it; nor is there any change (μεταβολή) in any of the things which lie beyond the outermost motion (ὑπὲρ τὴν ἐξωτάτω ... φοράν); they continue through their entire duration (τὸν ἅπαντα αἰῶνα) unaltered and unaffected, living the best and most self-sufficient of lives. As a matter of fact, this word ‘duration’ (αἰών) possessed a divine significance for the ancients; for the end (τέλος) which defines the period of life of any creature, outside of which no natural development can fall, has been called its duration. By the same definition the end (τέλος) of the whole heaven and the end which defines all time and infinity, is ‘duration’—a name based upon the fact that it is always—an immortal and divine duration. From it derive the being and life which other things, some more articulately but others feebly, enjoy.²² (279a16-30)

In this passage, “the things there” (τάκεϊ), i.e. outside the heaven, are said to be (1) not in place and (2) not aged by time. Assuming that they are the same as the things that lie beyond the outermost motion (τὰ ὑπὲρ τὴν ἐξωτάτω τεταγμένα φοράν), they (3) do not involve any change (μεταβολή) and (4) lead a life (ζωή) that is unaltered and unaffected through their entire life-expanse (αἰών). Aristotle then taps into his questionable

²² Ἐξω δὲ τοῦ οὐρανοῦ δέδεικται ὅτι οὔτ’ ἔστιν οὔτ’ ἐνδέχεται γενέσθαι σῶμα. Φανερόν ἄρα ὅτι οὔτε τόπος οὔτε κενὸν οὔτε χρόνος ἐστὶν ἔξω [sc. τοῦ οὐρανοῦ]. Διόπερ οὔτ’ ἐν τόπῳ τάκεϊ πέφυκεν, οὔτε χρόνος αὐτὰ ποιεῖ γηράσκειν, οὔδ’ ἐστὶν οὐδενὸς οὐδεμίας μεταβολῆς τῶν ὑπὲρ τὴν ἐξωτάτω τεταγμένων φοράν, ἀλλ’ ἀναλλοίωτα καὶ ἀπαθῆ τὴν ἀρίστην ἔχοντα ζωὴν καὶ τὴν αὐταρκεστάτην διατελεῖ τὸν ἅπαντα αἰῶνα. (Καὶ γὰρ τοῦτο τοῦνομα θεῖως ἔφθεγκται παρὰ τῶν ἀρχαίων. Τὸ γὰρ τέλος τὸ περιέχον τὸν τῆς ἐκάστου ζωῆς χρόνον, οὗ μὴθὲν ἔξω κατὰ φύσιν, αἰὼν ἐκάστου κέκληται. Κατὰ τὸν αὐτὸν δὲ λόγον καὶ τὸ τοῦ παντὸς οὐρανοῦ τέλος καὶ τὸ τὸν πάντα χρόνον καὶ τὴν ἀπειρίαν περιέχον τέλος αἰὼν ἐστὶν, ἀπὸ τοῦ αἰεὶ εἶναι τὴν ἐπωνυμίαν εἰληφώς, ἀθάνατος καὶ θεῖος). Ὅθεν [i.e. τοῦ τέλους τοῦ παντὸς οὐρανοῦ] καὶ τοῖς ἄλλοις ἐξήρηται, τοῖς μὲν ἀκριβέστερον τοῖς δ’ ἀμαυρῶς, τὸ εἶναί τε καὶ ζῆν.

etymological resources and plays on the word αἰών. “The things there” (5) appear also to relate to the end (τέλος) which delimits (περιέχει) the heaven as a physical and temporal whole. They lead an eternal life because they are the τέλος of the whole heaven, which has been proved elsewhere to be eternal.²³ Further, (6) other things are said to be dependent on this end in their being and life, some more accurately, others feebly.

It is clear that “the things there” are not bodily: Aristotle has already proved that there is no body outside the heaven,²⁴ and “the things there” are beyond (ὕπὲρ at a20) the outermost motion and outside (ἐξω/ἐξωθεν at a16 and a18) the heaven,²⁵ therefore they are incorporeal.²⁶ However, their *being incorporeal* is not necessarily in conflict with their *being the τέλος* of the heaven. This is because the limit of a three-dimensional physical sphere, its τόπος,²⁷ is not bodily,²⁸ nor is the limit of eternity any body. Therefore, “the things there”, while being incorporeal, can at the same time be the τέλος

²³ *Physics* 8.6.

²⁴ See *De Caelo* 1.9 278b21-279a11.

²⁵ Leggatt (1995: 34) underlines this fact when he argues that *aether* is not the highest divinity for Aristotle in *De Caelo*: “In three different contexts Aristotle refers to certain entities which, though not explicitly identified with god, clearly stand above the ‘first body’ in superiority. Following his discussion of other worlds in I, 9, Aristotle suddenly mentions the ‘things there’ (279a18), located beyond or above the heavens.”

²⁶ Alexander claims that “the things there” are the sphere of the fixed stars. Admittedly it is possible to understand the sphere of the fixed stars as outside of the heaven if “the heaven” here is to be understood as τὸ ὅλον [σῶμα] τὸ ὑπὸ τῆς ἐσχάτης περιεχόμενον περιφορᾶς (278b21-2). However, this also forces Alexander to understand the “outermost motion” as the motions of the planetary spheres, which in no account should be ἐξωτάτω.

²⁷ Or τόπος-equivalent, to be more precise. Aristotle thinks that, strictly speaking, the universe doesn’t have a τόπος, because there is nothing bodily outside it that contains it (τὸ πᾶν is literally “everything there is”), and the τόπος of x is by definition the motionless boundary of what contains x, as we can see in the next note. With this being said, I use “τόπος” rather than the cumbersome “τόπος-equivalent” for brevity’s sake.

²⁸ Cf. *Physics* 4.4 212a20-21 “Hence the τόπος of a thing is the innermost unmoved boundary (πέρας ἀκίνητον) of what delimits (περιέχει) it.”

Note that the τόπος of an object is not the outer surface of the object, but the inner surface of the container touching the outer surface of the object.

of the heaven.²⁹

Now, reading the first passage in the light of the second to which it is connected with the connective καὶ γάρ (a30),³⁰ we can see how the narrative runs. “What we have said” at 279a33 refers to the claim that the things there, on which other things depend for their being and lives (a28-30), are without change (a19-21).³¹ The verbal echo between μεταβολή (a19-20) and ἀμετάβλητον (a32) and that between ἀρίστην ... αὐταρκεστάτην (a21-22) and τὸ πρῶτον καὶ ἀκρότατον (a32-33) strengthen this impression. Thus, the primary and supreme divine being in the first passage is to be identified with the *incorporeal* τὰκεῖ in the second passage. If this is the case, this divine being cannot be the circular body that is the “aether-sphere”, but can only be the incorporeal limit of this bodily sphere.

As for the voice of κινεῖται at 279b1, then, we can take it as the lesser of the two evils. We can either insist, with Simplicius, that Aristotle wrote κινεῖ and is thus saying “and it is reasonable that they cause unceasing motion”,³² or understand the word as

²⁹ Aristotle claims in *De Motu* 3 669a20-22 that the poles of the universe are *not* its unmoved mover partly because things that have no magnitude but are merely termini or points have no power. This is used by Coope (forthcoming) and Morison (forthcoming) as a piece of evidence against boundaries as the candidate for the heavenly unmoved mover. However, Aristotle does place the mover of the universe at its κύκλος and claims that it is without magnitude in *Physics* 8.10 (see note 35 below). One way out of this difficulty is to say that Aristotle in *De Motu* 3 is targetting a particular view of his contemporaries who make things that are not *part of* but *in* the heavens—the poles (just as a point in a line is not part of the line but in the line)—the unmoved movers of the heavens, so Aristotle’s remark does not apply to the τόπος-equivalent of the heavens, which is neither *part of* nor *in* the heavens. Another way out is to say that the unmoved mover only acts *at* the periphery as “the thing desired”, and be agnostic as to whether it is the τόπος or not. This is very close to Coope and Morison’s own solution. See more in chapter 4, section 4.3.1.

³⁰ “And in fact” or “and also”. See Denniston (1954: 108-110).

³¹ Note the disagreement on this point.

³² See Simplicius 291 24-28: εἰ μέντοι οὕτως ἔχοι ἡ γραφή, ὥς ἐν τισιν ἡῦρον ἀντιγράφοις, καὶ ἄπαιστον δὴ κίνησιν κινεῖ εὐλόγως, ἀλλ’ οὐχὶ κινεῖται, ὥς Ἀλεξάνδρῳ δοκεῖ, καὶ τοῦτο καὶ τὰ πρὸ αὐτοῦ πάντα δυνατόν ἀβιάστως ἐπὶ τὰ νοητὰ καὶ ἀκίνητα αἷτια καὶ ἔξω τοῦ κόσμου λεγόμενα ὥς ὑπερκόσμια ἀνάγειν.

impersonal and thus “and it is reasonable that there is unceasing motion”,³³ or hypothesize a parenthesis in between.³⁴

Interpreting “the things there” as the heavenly τόπος is of course not a novel idea. After all, in the days before the invention of the developmental approach and its application to Aristotle, scholars were used to illustrating one Aristotelian text with the help of another. Toward the very end of *Physics* 8 Aristotle places the mover of the universe at its κύκλος,³⁵ and this has been interpreted either as the celestial equator (Eudemos)³⁶ or the entire circumference of the celestial sphere (Alexander).³⁷ “ἐκεῖ ἄρα τὸ κινεῖν”, says Aristotle at *Physics* 267b9, and the verbal echo with “τάκεῖ” at *De Caelo* 279a18 suggests combining the evidence from *Physics* 8.10 and *De Caelo* 1.9³⁸. So, although he endorses a different solution, Alexander mentions the possibility that τάκεῖ in

³³ See Willy Theiler (1957: 129) and his reference there to Schwyzer.

³⁴ See Cherniss (1944: 588). He thinks that 279a18-35 is a long parenthesis and that 279b1-3 follows upon 279a17-18. This proposal might be a little bit *ad hoc*.

³⁵ *Physics* 8.10 267b6-9: ἀνάγκη δὴ ἢ ἐν μέσῳ ἢ ἐν κύκλῳ εἶναι· αὐτὰ γὰρ αἱ ἀρχαί. ἀλλὰ τάχιστα κινεῖται τὰ ἐγγύτατα τοῦ κινεῖντος. τοιαύτη δ' ἢ τοῦ κύκλου κίνησις· ἐκεῖ ἄρα τὸ κινεῖν. See Leggatt (1995: 204).

³⁶ See Simplicius 1354, 9-12: ὁ δὲ Εὐδημος ἐν τῷ μεγίστῳ κύκλῳ φησὶν εἶναι τῷ διὰ τῶν πόλων· οὗτος γὰρ τάχιστα κινεῖται, τὸ δὲ κινεῖν δοκεῖ ἄρχεσθαι, ὅθεν τάχιστα ἂν κινήσῃ καὶ ῥᾶστα.

³⁷ See *ibid.* 1354, 16-22: [Ἀλέξανδρος] λύων δὲ τὴν ἀπορίαν λέγει, ὅτι εἰ μὲν ἐν μορίῳ τινὶ εἴη τῆς περιφερείας τῆς ἐξωτάτω, κινεῖτο ἂν κατὰ συμβεβηκὸς τῷ κατὰ μόρια τὴν κίνησιν εἶναι τῆς σφαίρας· εἰ δὲ ἐν πάσῃ τῇ περιφερείᾳ (οὕτω γὰρ ἔσται ἐν τῷ τάχιστα κινουμένῳ), οὐκέτι ἂν κινεῖτο κατὰ συμβεβηκὸς τῷ πάσαν τὴν περιφέρειαν μὴ κινεῖσθαι μηδὲ ἀλλάσσειν τὸν τόπον, ἀλλ' ἐν τῷ αὐτῷ μένειν αἰεὶ.

Strictly speaking it should be the inner surface touching the outer circumference of the celestial sphere. See *ibid.* 1355, 11-15: οὐ χρὴ οὖν δεδοικέναι, μὴ κατὰ συμβεβηκὸς κινήσωμεν τὸ πρῶτως κινεῖν ἐν τῷ ἀπλανεῖ λέγοντες αὐτὸ οὐρανῷ· οὐ γὰρ ἐστὶν ἐν τῷ οὐρανῷ κυρίως ἐκεῖνο, ἀλλ' ὁ οὐρανὸς ἐν αὐτῷ, εἴπερ τὸ ἐν τινὶ περιέχεται ὑπὸ τοῦ ἐν ᾧ ἐστὶ· περιέχει δὲ ἐκεῖνο τὸν ὅλον κόσμον τῇ ἀπείρῳ ἐαυτοῦ δυνάμει.

³⁸ For what it is worth, *De Caelo* 1 immediately follows *Physics* 8 in the Bekker edition and in the commentary tradition, so it would have been very natural to combine the evidence. See Simplicius *In De Caelo* 6, 28-31: Τὸ προοίμιον τὸν τε σκοπὸν τῆς πραγματείας διδάσκει καὶ τὴν τάξιν αὐτῆς, ὅτι πρὸς τὴν Φυσικὴν ἀκρόασιν συνεχής· ἐπειδὴ γὰρ ἐκείνη περὶ τῶν φυσικῶν ἀρχῶν ἦν, ἔδει μετ' ἐκείνην περὶ τῶν ἀπὸ τῶν ἀρχῶν λέγειν, ταῦτα δ' ἐστὶ τὰ σώματα προσεχῶς.

De Caelo 1.9 be the incorporeal external first mover of the universe.³⁹ Some commentators after Alexander, as reported by Simplicius,⁴⁰ together with Simplicius himself, go along with this interpretation. Of course it is not clear whether Simplicius understands τὰ κεῖ in *De Caelo* 1.9 as the τόπος of the universe or not; however, it is clear that he does understand them as the incorporeal intelligibles (νοητά) and the external unmoved principles or causes which move the heavenly spheres.⁴¹ We are also not surprised to learn from the doxographical tradition, with the help of Willy Theiler's 1957 contribution, that many people in antiquity indeed think that the highest divinity for Aristotle is the πέρας of the heaven, and this is only an inference away from being the τόπος of the universe.⁴² Philo of Alexandria himself holds a similar position, doubtlessly influenced by Aristotle.⁴³

³⁹ Simplicius *In De Caelo* 287, 19-23: Ὁ Ἀλέξανδρος τὰ ἐνταῦθα λεγόμενα ἤτοι περὶ τοῦ πρώτου κινούντος λέγεσθαι φησιν, ὅπερ ἔξω δοκεῖ εἶναι παντὸς τοῦ σώματος τῷ ἐν μηδενὶ εἶναι, οὐκ ἐν τόπῳ· ἀσώματον γάρ· ἢ περὶ τῆς τῶν ἀπλανῶν σφαίρας· καὶ μᾶλλον περὶ ταύτης ἀκούει (“takes in the latter sense” see LSJ s.v. ἀκούω iv) πάντα ἕως τοῦ τοῦ δὲ κύκλῳ σώματος ὁ αὐτὸς τόπος, ὅθεν ἤρξατο καὶ εἰς ὃν τελευτᾷ.

⁴⁰ *Ibid.* 290, 1-4: Ταῦτα, ὅπερ εἶπον, πάντα ἀπ’ ἀρχῆς τῆς ῥήσεως μέχρι τέλους ἐπὶ τοῦ κυκλοφορητικοῦ σώματος ἀκούειν μᾶλλον ἀξιοῖ ὁ Ἀλέξανδρος, οἱ δὲ νεώτεροι τῶν ἐξηγητῶν πάντα ὡς ἐπὶ τῶν ἀκινήτων αἰτίων τῶν τὰ οὐράνια κινούντων εἰρημένα παραινοῦσιν ἀκούειν.

⁴¹ See *ibid.* 291, 3-4 and 27.

⁴² See Sextus Empiricus *adv. Math.* 10.33: ὅσον δὲ ἐπὶ τοῖς οὕτω λεγομένοις ὑπὸ τῶν Περιπατητικῶν, κινδυνεύει ὁ πρῶτος θεὸς τόπος εἶναι πάντων. **κατὰ γὰρ Ἀριστοτέλην ὁ πρῶτος θεὸς ἦν τὸ πέρας τοῦ οὐρανοῦ**. ἤτοι οὖν ὁ θεὸς ἕτερόν τι ἐστὶ παρὰ τὸ οὐράνιον πέρας, ἢ αὐτὸ ἐκεῖνο ὁ θεὸς ἐστίν. καὶ εἰ μὲν ἕτερόν ἐστι παρὰ τὸ οὐράνιον πέρας, ἔσται τι ἕτερον ἐκτὸς τοῦ οὐρανοῦ, καὶ τὸ τούτου πέρας τόπος γενήσεται οὐρανοῦ, καὶ ταύτῃ δώσουσιν οἱ περὶ τὸν Ἀριστοτέλην ἐν τόπῳ περιέχεσθαι τὸν οὐρανόν· ὅπερ οὐχ ὑπομενοῦσιν, ἀνθεστῶτες ἐκατέρῳ τούτων, τῷ τε εἶναι τι ἐκτὸς τοῦ οὐρανοῦ καὶ τῷ τὸν οὐρανὸν ἐν τόπῳ περιέχεσθαι. εἰ δὲ ταῦτόν ἐστι τῷ οὐρανῷ πέρας, ὁ θεός, ἐπεὶ τὸ τοῦ οὐρανοῦ πέρας τόπος ἐστὶ πάντων τῶν ἐντὸς οὐρανοῦ, ἔσται κατὰ τὸν Ἀριστοτέλην ὁ θεὸς πάντων τόπος, ὃ καὶ αὐτὸ τῶν ἀπεμφαινόντων, quoted in Theiler (1957: 129). See also Sextus Empiricus *hyp.* 3.218 Ἀριστοτέλης μὲν ἀσώματον εἶπεν εἶναι τὸν θεὸν καὶ πέρας τοῦ οὐρανοῦ. Στωικοὶ δὲ πνεῦμα διῆκον καὶ διὰ τῶν εἰδεχθῶν, Ἐπίκουρος δὲ ἀνθρωπόμορφον, Ξενοφάνης δὲ σφαῖραν ἀπαθῆ, quoted in Theiler (1957: 127).

⁴³ *De Somniis* 1.63: κατὰ δὲ τρίτον σημαινόμενον αὐτὸς ὁ θεὸς καλεῖται τόπος τῷ περιέχειν μὲν τὰ ὅλα, περιέχεσθαι δὲ πρὸς μηδενὸς ἀπλῶς, καὶ τῷ καταφυγῇ τῶν συμπάντων αὐτὸν εἶναι, καὶ ἐπειδήπερ αὐτός ἐστι χώρα ἑαυτοῦ, κειρωρηκῶς ἑαυτὸν καὶ ἐμπερόμενος μόνῳ ἑαυτῷ.

De Fuga et Inventione 75: τὸ δὲ δώσω σοι τόπον, οὗ φεύγεται ὁ φονεύσας (Exod. 21, 13)

Apart from the received early dating of *De Caelo*, there is another reason why recent scholars are reluctant to combine the evidence from *De Caelo* and *Physics* regarding “the things there”. They point out that in *De Caelo* 1.9 the “things there” are not assigned any role in causing motion.⁴⁴ This is not true. “The things there” are said to be the causes of being and life for other things (279a28-30),⁴⁵ and being and life for Aristotle essentially imply all kinds of κίνησις: qualitative and quantitative change, locomotion, becoming and perishing. Better still, if we adopt, as my interpretation suggests, Simplicius’ variant reading “κινεῖ”, then Aristotle would have mentioned a specific role for “the things there” as movers. After all, Simplicius does say that he “found the reading in some copies”.⁴⁶ Even if we grant that it is true that Aristotle doesn’t specifically mention the role of mover in *De Caelo*, still, this argument from silence seems not strong enough for the conclusion that Aristotle thinks, at the moment when he composes *De Caelo*, that the things there— the divine external τέλος of the

ἀκουσίως, πάνυ καλῶς εἰρησθαί μοι δοκεῖ· τόπον γὰρ καλεῖ νῦν οὐ χώραν ἐκπεπληρωμένην ὑπὸ σώματος, ἀλλὰ δι’ ὑπονοειῶν αὐτὸν τὸν θεόν, ἐπειδὴ περιέχων οὐ περιέχεται καὶ ὅτι καταφυγὴ τῶν ὅλων ἐστί.

Legum Allegoriarum 1.44: θεοῦ γὰρ οὐδὲ ὁ σύμπας κόσμος ἄξιον ἂν εἶη χωρίον καὶ ἐνδιαίτημα, ἐπεὶ αὐτὸς ἑαυτοῦ τόπος καὶ αὐτὸς ἑαυτοῦ πλήρης καὶ ἰκανὸς αὐτὸς ἑαυτῷ ὁ θεός, τὰ μὲν ἄλλα ἐπιδεᾶ καὶ ἔρημα καὶ κενὰ ὄντα πληρῶν καὶ περιέχων, αὐτὸς δὲ ὑπ’ οὐδενὸς ἄλλου περιεχόμενος, ἅτε εἷς καὶ τὸ πᾶν αὐτὸς ὢν.

All above are quoted in Theiler (1957: 129).

⁴⁴ See Baghdassarian (2011: 199): “*Il n’est sans doute pas anodin, non plus, que la fin de DC I, 9 ne prête jamais aucune fonction motrice précise aux “êtres de là-bas”. Il est vrai qu’ils sont ici présentés comme des causes de l’être et de la vie des autres réalités. Cela, toutefois, n’a rien de propre à la doctrine du Premier Moteur. ... Car il y a vraisemblablement une différence non négligeable entre le fait de dire d’un être qu’il est un principe et celui de déterminer avec précision les fonctions principielles qu’il convient de lui attribuer,*” and Thein (2013: 73): “to this second solution, which was also mentioned by Alexander, I find one embarrassment. The problem is not simply the grammatical passage from (several or many) ‘things there’ to the unique Prime Mover. Rather, it is the complete absence of any mention of the Prime Mover in the following lines, not to talk about the rest of the treatise where perhaps one single passage in Book II could be evoked as a support for such a reading.”

⁴⁵ On the causal connotation of the word ἐξήρτηται, see Bonitz *Index* ad loc.

⁴⁶ Simplicius *In de Caelo* 291, 25: ὡς ἐν τισιν ἡῶρον ἀντιγράφοις.

heaven— are *not* movers. The omission may simply be due to the topic of *De Caelo*, which focuses on the material aspect of the universe.⁴⁷ *De Caelo* 1.9 itself, for instance, focuses on the unity of the universe (“Are there many worlds or is there only one world, the world in which we live?”). In fact, Aristotle mentions “the things there” at the end of 1.9 only to show that they are not bodily and therefore their being external to the bodily universe doesn’t contradict the claim that the single universe contains all the bodies that there are and therefore doesn’t lead to a theory of multiple worlds.

(2) *De Caelo* 2.1 284a18-b5

The second passage von Arnim cites is another very important one.⁴⁸ It has been taken by von Arnim and Guthrie⁴⁹ to argue that the heavenly mover in *De Caelo* is not a Platonic world-soul which by its own motion moves its body, but that the body itself—the aether—moves in a circle by its own natural tendency as aether. Ross and Guthrie think that it also excludes the possibility of an external mover.⁵⁰

Hence we must not believe the old tale which says that the world needs some Atlas to keep it safe—a tale composed, it would seem, by men who, like later thinkers, conceived of all the upper bodies as earthy and endowed with weight,

⁴⁷ Cf. Manuwald (1989: 115): “Ebensowenig darf es Verdacht erregen, wenn Aristoteles in *De Caelo* immer nur mehr oder weniger beiläufig vom Unbewegten Bewegen spricht. Da die Frage des Ursprungs der Bewegung in dieser Schrift nicht thematisch ist, wird man auch gar nichts anderes erwarten.”

⁴⁸ See von Arnim (1931: 17).

⁴⁹ See Guthrie (1933: 169).

⁵⁰ See Ross (1936: 97): “Another passage tells the same tale—ii. 1. 284a18-23, 27-35, where not only is there no thought of a transcendent mover, but the eternal movement of the heavens is said to be incompatible even with necessitation by a soul, since the required effort would be unworthy of the moving soul,” and Guthrie (1939: xxi): “The passage ii. 1. 284a18ff. is scarcely compatible

and therefore supported it in their fabulous way upon animate necessity (ἀνάγκη ἔμψυχον). We must no more believe that than follow Empedocles when he says that the world, by being whirled around, received a movement quick enough to overpower its own downward tendency, and thus has been kept from destruction all this time. Nor, again, is it conceivable that it should persist eternally by the necessitation of a soul (ὑπὸ ψυχῆς ἀναγκαζούσης). For a soul could not live in such conditions painlessly or happily, since the movement involves constraint, being imposed on the first body, whose natural motion is different, and imposed continuously. It must therefore be uneasy and devoid of all rational satisfaction; for it could not even, like the soul of mortal animals, take recreation in the bodily relaxation of sleep. An Ixion's lot must needs possess it, without end or respite. If then, as we said, the view already stated of the first motion is a possible one, it is not only more appropriate so to conceive of its eternity, but also on this hypothesis alone are we able to advance a theory consistent with popular divinations of the divine nature. But of this enough for the present.⁵¹ (*De Caelo* 2.1 284a18-b5)

with the presence of a transcendent mover in the background.”

⁵¹ Διόπερ οὔτε κατὰ τὸν τῶν παλαιῶν μῦθον ὑποληπτέον ἔχειν, οἱ φασιν Ἄτλαντός τινος αὐτῷ προσδεῖσθαι τὴν σωτηρίαν· ἐοίκασι γὰρ καὶ τοῦτον οἱ συστήσαντες τὸν λόγον τὴν αὐτὴν ἔχειν ὑπόληψιν τοῖς ὕστερον· ὥς γὰρ περὶ βάρος ἔχόντων καὶ γενητῶν ἀπάντων τῶν ἄνω σωμάτων ὑπέστησαν αὐτῷ μυθικῶς ἀνάγκην ἔμψυχον. Οὔτε δὲ τοῦτον τὸν τρόπον ὑποληπτέον, οὔτε διὰ τὴν δίνησιν θάπτοντος τυγχάνοντα φορᾶς τῆς οἰκείας ροπῆς ἔτι σώζεσθαι τοσοῦτον χρόνον, καθάπερ Ἐμπεδοκλῆς φησιν. Ἀλλὰ μὴν οὐδ’ ὑπὸ ψυχῆς εὐλογον ἀναγκαζούσης μένειν αἶδιον· οὐδὲ γὰρ τῆς ψυχῆς οἶόν τ’ εἶναι τὴν τοιαύτην ζωὴν ἄλυπον καὶ μακαρίαν· ἀνάγκη γὰρ καὶ τὴν κίνησιν μετὰ βίας οὔσαν, εἴπερ κινεῖ φέρεσθαι πεφυκότος τοῦ πρώτου σώματος ἄλλως καὶ κινεῖ συνεχῶς, ἄσכולον εἶναι καὶ πάσης ἀπηλλαγμένην ραστώνης ἔμφρονος, εἴ γε μηδ’ ὥσπερ τῇ ψυχῇ τῇ τῶν θνητῶν ζώων ἐστὶν ἀνάπαυσις ἢ περὶ τὸν ὕπνον γινομένη τοῦ σώματος ἄνεσις, ἀλλ’ ἀναγκαῖον Ἰξίωνός τινος μοῖραν κατέχειν αὐτὴν αἶδιον καὶ ἄτρυτον. Εἰ δὲ, καθάπερ εἵπομεν, ἐνδέχεται τὸν εἰρημένον ἔχειν τρόπον περὶ τῆς πρώτης φορᾶς, οὐ μόνον αὐτοῦ περὶ τῆς αἰδιότητος οὕτως ὑπολαβεῖν ἐμμελέστερον, ἀλλὰ καὶ τῇ μαντείᾳ τῇ περὶ τὸν θεὸν μόνως ἂν ἔχοιμεν οὕτως ὁμολογουμένως ἀποφαίνεσθαι συμφώνους λόγους. Ἀλλὰ τῶν μὲν τοιούτων λόγων

This carefully composed passage⁵² argues against (1) the “Atlas conception” of the mover of the world as the axis between the celestial poles (Atlas is like the shaft of an umbrella),⁵³ (2) the Empedoclean conception of the overpowering mover, and (3) the necessitating soul as the mover of the world. These three theories are all examples involving a “by force (βίαιον)” mover.⁵⁴ Now according to Aristotle’s theory of force (βία) and toil (πόνος), the kind of motion in which something can be said to be moved by force and to involve toil is rectilinear motion—the motion between contrary states.⁵⁵ It may be true that, according to Aristotle’s psychology, the motion that is caused by the soul is *always* rectilinear and it *always* involves both toil for the mover and force against the moved,⁵⁶ so what Aristotle argues against here is not just a *particular* conception of how the world soul might cause motion, but the *general* thesis that the universe is moved by any soul. However, it does not follow that the universe cannot be moved by an external unmoved mover: of course, since the motion of the heaven is eternal and τέλειον, it does not have one πέρας in the beginning and another at the end like the non-eternal rectilinear motions do, but it simply doesn’t follow that this motion does not have an

ἄλις ἔστω τὸ νῦν.

⁵² Jaeger (1946: 306) thinks that this passage, together with the previous passage, shows a more fluid style which is characteristic of Aristotle’s dialogues. He seems to think that they are taken “more or less verbatim” from *De Philosophia* (p. 302-3). However, Simplicius’s comment at 289,3 that “he talks of this in *De Philosophia*” does not prove Jaeger’s point, as Jaeger claims. In general, Jaeger’s appeal to style is vague and lack of statistic support. It is important to note that Jaeger uses the stylistic trait as a *terminus post quem* to show that *De Caelo* must be later than *De Philosophia*, not that the two passages contain a theory that is in conflict with the rest of the work.

⁵³ Cf. *De Motu Animalium* 3. See Coope (forthcoming) and Morison (forthcoming) for analysis of the *De Motu* passage.

⁵⁴ The mover asserts “animate necessity” (284a23) or “necessitates” (284a27) in the sense of necessity which is force (βία) (see *Metaphysics* Δ5 1015a27).

⁵⁵ See *De Caelo* 2.1 284a5-10 and *Metaphysics* Θ8 1050b5-29. See detailed analysis in chapter 3.

⁵⁶ See many places. See Guthrie (1939: xxxvi, n. α).

external τέλος which causes motion in a completely different way. In fact unilateral touch, with which an unmoved external mover causes motion, seems to cause motion in the very way required.⁵⁷ So, although it may exclude a world-soul, this passage does not decide between a material self-mover (aether) and one or more unmoved external movers which do not cause motion by force.

(3) *De Caelo* 3.2 300b16-25

Again, to support his claim that there is a continuation of the conception that the universe is self-moved in *De Caelo* 3, von Arnim quotes the following sentence:⁵⁸ “for the prime mover must cause motion in virtue of its own natural movement...”⁵⁹ As Guthrie already notes,⁶⁰ if we read the whole passage, Aristotle should only be understood as paraphrasing and inferring from Plato’s theory in *Timaeus*:

The same difficulty is involved even if it is supposed, as we read in the *Timaeus*, that before the ordered world was made the elements moved without order. Their movement must have been due either to constraint or to their nature. And if their movement was natural, a moment's consideration shows that there was already an ordered world. *For the prime mover must cause motion in virtue of its own natural movement*, and the other bodies, moving without constraint, as they came to rest in their proper places, would fall into the order in which they now stand,

⁵⁷ See chapter 4 on *GC* 1.6.

⁵⁸ Von Arnim (1931: 21-22). The unfair nature of von Arnim’s use of quotations might be due to the scholarly practice of the day, in which scholars relied on *Zettel*, which don’t allow too much room for context.

⁵⁹ *De Caelo* 3.2 b21-22: τό τε γὰρ πρῶτον κινεῖν ἀνάγκη κινεῖν ἑαυτὸ κινούμενον κατὰ φύσιν.

⁶⁰ See Guthrie (1939: xxi-xxii) and Cherniss (1944: 388 n.307).

the heavy bodies moving towards the center and the light bodies away from it.

But that is the order of their distribution in our world. (*De Caelo* 3.2 300b16-25)⁶¹

The fact that neither Alexander nor Simplicius uses this explanation—that this sentence is a non-committal inference from *Timaeus*—to acquit Aristotle of the commitment to a self-mover, cited by Guthrie as a piece of evidence, cannot carry much weight, if any at all.⁶²

(4) *De Caelo* 2.3 286a8-12

Everything which has a function exists for its function. The activity of god is immortality, i.e. eternal life. Therefore the movement that belongs to god (τῷ θεῷ κίνησιν) must be eternal. But such (τοιούτος) is the heaven, viz. a divine body, and for that reason to it is given the circular body whose nature it is to move always in a circle.⁶³

Guthrie (1939: xxii) first mentions this passage as a piece of evidence for excluding the external mover because he thinks that it is clear from this passage that by “god” Aristotle

⁶¹ Τὸ αὐτὸ δὲ τοῦτο συμβαίνειν ἀναγκαῖον κἂν εἰ καθάπερ ἐν τῷ Τιμαίῳ γέγραπται, πρὶν γενέσθαι τὸν κόσμον ἐκινεῖτο τὰ στοιχεῖα ἀτάκτως. Ἀνάγκη γὰρ ἢ βίαιον εἶναι τὴν κίνησιν ἢ κατὰ φύσιν. Εἰ δὲ κατὰ φύσιν ἐκινεῖτο, ἀνάγκη κόσμον εἶναι, ἐάν τις βούληται θεωρεῖν ἐπιστήσας· τό τε γὰρ πρῶτον κινεῖν ἀνάγκη κινεῖν ἑαυτὸ κινούμενον κατὰ φύσιν, καὶ τὰ κινούμενα μὴ βία, ἐν τοῖς οἰκείοις ἡρεμοῦντα τόποις, ποιεῖν ἥνπερ ἔχουσι νῦν τάξιν, τὰ μὲν βάρος ἔχοντα ἐπὶ τὸ μέσον, τὰ δὲ κουφότητα ἔχοντα ἀπὸ τοῦ μέσου· ταύτην δ' ὁ κόσμος ἔχει τὴν διάταξιν.

⁶² See Guthrie (1939: xxii).

⁶³ Ἐκαστόν ἐστιν, ὃν ἐστὶν ἔργον, ἕνεκα τοῦ ἔργου. Θεοῦ δ' ἐνέργεια ἀθανασία· τοῦτο δ' ἐστὶ ζωὴ αἰδίου. ὥστ' ἀνάγκη τῷ θεῷ κίνησιν αἰδίου ὑπάρχειν. Ἐπεὶ δ' ὁ οὐρανὸς τοιούτος (σῶμα γάρ

means the divine body (σῶμα θεῖον), heaven. Cherniss (1944: 586-7) offers a great analysis on this passage.⁶⁴ To summarize his points: the reading of θεῶ at 286a10 is controversial. J, a 10th century manuscript, offers θεῖον, so that Aristotle would be saying that “the movement that belongs to the divine must be eternal”. This is strengthened by the fact that τοιοῦτος at 286a11 can only mean that the heaven is divine (θεῖον), not that it is the highest god. Therefore Aristotle is assigning immortal ἐνέργεια to the highest god and eternal κίνησις to the divine body, in accordance with his observation in *De Caelo* 2.12 292a18-b25 which responds to and clarifies the current passage. So this passage, too, is no good witness for excluding the external divine mover.

Basing their view on their analysis of the above passages, von Arnim and Guthrie blame the following passages, in which self-motion of the universe is denied, on an interpolation by Aristotle himself.⁶⁵

(5) *De Caelo* 2.6 288a27-b6

Further, since everything that is moved is moved by something, the cause of the irregularity of movement must lie either in the mover or in the moved or both. For if the mover moved not always with the same force, or if the moved were altered and did not remain the same, or if both were to change, the result might well be an irregular movement in the moved. But none of these possibilities can be conceived as actual in the case of the heavens. As to that which is moved, we

τι θεῖον), διὰ τοῦτο ἔχει τὸ ἐγκύκλιον σῶμα, ὃ φύσει κινεῖται κύκλῳ ἀεί.

⁶⁴ See also Leggatt (1995: 227).

⁶⁵ See von Arnim (1931: 20): “*Wir müssen vielmehr schließen, dass der ‘unbewegte Beweger’ in der Schrift de caelo ursprünglich überhaupt nicht vorkam, sondern erst nachträglich hinzugefügt*

have shown that it is primary and simple and ungenerated and indestructible and generally unchanging; and the mover has an even better right to these attributes. It is the primary that moves the primary, the simple the simple, the indestructible and ungenerated that which is indestructible and ungenerated. Since then that which is moved, being a body, is nevertheless unchanging, how should the mover, which is *incorporeal*, be changed (ἐπεὶ οὖν τὸ κινούμενον οὐ μεταβάλλει σῶμα ὄν, οὐδ' ἂν τὸ κινοῦν μεταβάλλοι ἀσώματον ὄν)?⁶⁶

This is clear evidence that Aristotle thinks that the mover of the universe is incorporeal.

(6) *De Caelo* 4.3 311a9-12

Both that which acts from the beginning and that which removes the hindrance or deflects cause motion, as was explained previously, where we tried to show how none of these things moves itself.⁶⁷

This is again a clear indication that nothing bodily that is in motion is self-moved, and

wurde." See also *ibid.* 22-24 "VI. Späterer Zusatz im vierten Buche de caelo".

⁶⁶ Ἔτι δ' ἐπεὶ πᾶν τὸ κινούμενον ὑπὸ τινος κινεῖται, ἀνάγκη τὴν ἀνωμαλίαν γίνεσθαι τῆς κινήσεως ἢ διὰ τὸ κινοῦν ἢ διὰ τὸ κινούμενον ἢ δι' ἄμφω· εἴτε γὰρ τὸ κινοῦν μὴ τῇ αὐτῇ δυνάμει κινῶι, εἴτε τὸ κινούμενον ἀλλοιοῖτο καὶ μὴ διαμένει τὸ αὐτό, εἴτε ἄμφω μεταβάλλοι, οὐθὲν κωλύει ἀνωμάλως κινεῖσθαι τὸ κινούμενον. Οὐθὲν δὲ τούτων δυνατόν περὶ τὸν οὐρανὸν γενέσθαι· τὸ μὲν γὰρ κινούμενον δέδεικται ὅτι πρῶτον καὶ ἀπλοῦν καὶ ἀγέννητον καὶ ἀφθαρτον καὶ ὅλως ἀμετάβλητον, τὸ δὲ κινοῦν πολὺ μᾶλλον εὐλογον εἶναι τοιοῦτον· τὸ γὰρ πρῶτον τοῦ πρώτου καὶ τὸ ἀπλοῦν τοῦ ἀπλοῦ καὶ τὸ ἀφθαρτον καὶ ἀγέννητον τοῦ ἀφθάρτου καὶ ἀγενήτου κινητικόν. Ἐπεὶ οὖν τὸ κινούμενον οὐ μεταβάλλει σῶμα ὄν, οὐδ' ἂν τὸ κινοῦν μεταβάλλοι ἀσώματον ὄν.

⁶⁷ κινεῖ δὲ τό τε ἐξ ἀρχῆς ποιῆσαν καὶ τὸ ὑποσπάσαν ἢ ὅθεν ἀπεπήδησεν, καθάπερ εἴρηται ἐν τοῖς πρώτοις λόγοις, ἐν οἷς διωρίζομεν ὅτι οὐθὲν τούτων αὐτὸ ἐαυτὸ κινεῖ.

“ἐν τοῖς πρώτοις λόγοις” clearly refers to *Physics* 8.4. Given that the first four passages, upon further inspection, do not exclude an external incorporeal mover of the universe, we have no reason to attribute these two passages where Aristotle clearly endorses an external mover to later redaction.

To summarize, the belief that in *De Caelo* Aristotle endorses the aetherial heavenly body, *qua* body, to be the highest mover of the universe has shaky textual basis. There is rather evidence for thinking that Aristotle believes in one or many external incorporeal movers in *De Caelo*, and if one combines the evidence from *Physics* 8.10 with what we read in *De Caelo*, the movers of the universe seem to be the τόπος of the universe or to be *at* the τόπος of the universe.⁶⁸

2.3 The Problem of the “Ensouled” Heaven

In section 2.2, I have shown that the aetherial first body, *qua* body, cannot be the highest mover of the universe for Aristotle. Yet there is another difficulty for positing external causation in *De Caelo*: two passages from *De Caelo* seem to suggest that Aristotle thinks that the heavens and the stars, which are materially homogeneous to the heavens, are moved by souls. Now, whether we are talking about a Platonic self-moving soul or an Aristotelian “*per se*-unmoved” soul, a soul is an *incorporeal* principle of

⁶⁸ One might think that the reason why the immobility of the first mover of the universe is due to the fact that it is not geometrically extended at all, so its motion is a geometric impossibility. Thus, the first mover is not just incorporeal (ἄσώματος), it is also neither a surface nor a line. This would threaten the whole thesis that the mover of a heavenly sphere is its τόπος. I think that this view is problematic on the following ground. The unmoved mover of a lower heaven, according to Aristotle, is moved *per accidens*. Its *per se* immobility, which is the same in kind as that of the first mover, is obviously not due to any geometric necessity, for otherwise it would not be *per accidens* moved. Therefore the immobility of an unmoved heavenly mover is not based on any geometric ground; rather, it is due to the conceptual framework Aristotle operates under (as he outlines in *Physics* 8). I thank Ben Morison for eliciting this clarification.

motion, so it is a different sort of mover from the aetherial first body *qua* body. But because it is still an *internal* cause of motion,⁶⁹ it may come in conflict with any sort of external causation.

At *De Caelo* 2.2 285a27-30, trying to establish an order of directions for the heavens, he says:

Since we have already determined that powers of this kind (i.e. growth, perception, and locomotion) belong to things which have a principle of movement, and that heaven is ensouled (ἔμψυχος) and has a principle of movement, clearly heaven must also exhibit above and below, right and left.⁷⁰

Again, at 2.12 292a18-21, Aristotle makes the following claim:

We think of the stars as mere bodies, and as units that are serial but entirely inanimate (ἀψύχαι); but we should rather conceive of them as participating in action and life (μετεχόντων πράξεως καὶ ζωῆς).⁷¹

There are different scholarly interpretations, both of these two passages specifically, and in general of the question whether Aristotle believed in a world-soul in *De Caelo*.⁷² The

⁶⁹ A soul is the principle of motion of the natural body in which it is situated *per se*.

⁷⁰ Ἡμῖν δ' ἐπεὶ διώρισται πρότερον ὅτι ἐν τοῖς ἔχουσιν ἀρχὴν κινήσεως αἱ τοιαῦται δυνάμεις ἐνυπάρχουσιν, ὁ δ' οὐρανὸς ἔμψυχος καὶ ἔχει κινήσεως ἀρχὴν, δῆλον ὅτι ἔχει καὶ τὸ ἄνω καὶ τὸ κάτω καὶ τὸ δεξιὸν καὶ τὸ ἀριστερόν.

⁷¹ Ἀλλ' ἡμεῖς ὡς περὶ σωμάτων αὐτῶν μόνον, καὶ μονάδων τάξιν μὲν ἔχόντων, ἀψύχων δὲ πᾶμπαν, διανοοῦμεθα· δεῖ δ' ὡς μετεχόντων ὑπολαμβάνειν πράξεως καὶ ζωῆς.

⁷² For von Arnim, the apparent inconsistency between the heaven's being moved internally by its soul, as it is claimed here, and by its material aether can be attributed to Aristotle's intellectual

position I take is similar to that of Ross and Gill. I argue that there is a way in which external causation can be reconciled with heaven being ensouled, and this involves assigning different yet related causal roles to the external mover and the externally moved heavenly body. Gill (1994) calls the role of the heavenly first body “passive” and compares aether to the four elements which possess the inner passive principle of motion. While this is a correct observation, it is too broad and thus philosophically uninteresting, and the comparison with the four elements also invites further problems, including the question why the four elements should not also be called “ensouled”. So our task, it seems, is to find a more explicit role for the first body.

development from a Platonic earlier period to a more materialistic later one (Von Arnim, 1931: 17-18). Guthrie (1939), although reluctant to call the “middle period” in which *De Caelo* was written a materialistic one, views “the souls of the heavenly bodies, considered as the source of their motion”, as being “left temporarily in an ambiguous and unsatisfactory position” in *De Caelo*. See Guthrie (1939: xxxvi). Ross (1936), while arguing that “the doctrine of a transcendent [i.e. external] mover is in no way inconsistent with the doctrine that the movement of the heavenly bodies is the realization of their own nature,” agrees with Von Arnim and Guthrie that “there is there no thought of a transcendent mover” in *De Caelo*. See Ross (1936: 97). However, he thinks that “Aristotle when he wrote the *De Caelo* explained the movements of the heavenly bodies by the action of immanent souls or powers of initiating movement [as opposed to by a transcendent mover]” (see Ross 1936: 98), so while he has a hard time explaining the *De Caelo* 2.1 passage which denies ἀνάγκη ἐμψυχός, he takes the two passages (*De Caelo* 2.2 and *De Caelo* 2.12) as unproblematic. Gill (1994), essentially relying on the observation made by Ross, argues that the heavenly spheres, like the four elements, “possess an inner passive source, which accounts for their rotation, but the governing [i.e. active] principle lies outside the sphere that it directs.” See Gill (1994: 32). However, the explanation she offers as to why the heaven is called “ensouled” and the heavenly bodies “partaking action and life” seems *ad hoc*. See Gill (1994: 30 n.44): “For the claim in II. 2 that the heaven is alive and has an inner source of motion, Aristotle concludes that it has various parts (upper and lower, right and left). This inference suggests that οὐρανός here refers to the cosmos as a whole rather than to the outermost sphere. If so, this passage does not bear on our question about the spheres. The passage in II. 12 is not about the spheres either, but about the heavenly bodies. The claim that they partake of action and life does not conflict with the proposal that the spheres have only passive souls [sic].” See also Leggatt

2.3.1 Heaven “is Ensouled” and “has Principle of Movement”

First of all, for Aristotle, although a soul is an internal principle of bodily motion, calling some body “ensouled”⁷³ doesn’t necessarily mean that the soul is *in* that body. This is because, while there is only one soul for a living being, its body can be composed of different bodily parts and all of these parts are called “ensouled” with reference to this single soul, which is in the body as a whole, but not necessarily located in each and every part. Take the human hand as an example. Although Aristotle does think that the human hand as such is ensouled,⁷⁴ he doesn’t think the hand contains within itself any soul.⁷⁵ Indeed, the soul in whose name the human hand or finger is said to be “ensouled” is not the form of the hand or finger, but the form of the human being in general which is his soul.⁷⁶ Thus, a hand that is cut off from the rest of the human body cannot be an ensouled hand precisely because when cut off, it is not subordinate as an instrument to the human soul,⁷⁷ whereas a plastic tendon which is surgically connected to the rest of the human body and fulfills its function is an ensouled and *organic* tendon.⁷⁸ Therefore, the *only* “ensouled” body whose soul is its very form should be the whole body of the

(1995: 248-9), who translates the $\acute{\omega}\varsigma$ at 292a20 as “as tough”, thus making Aristotle’s suggestion that the stars participate in action and life “tentative” (p. 249).

⁷³ Only bodies can be called “ensouled”.

⁷⁴ *Metaphysics* Z11 1036b22-32.

⁷⁵ See *De Motu* 9.

⁷⁶ See *Metaphysics* Z 10 1034b28-32 “And further if the parts are prior to the whole, and the acute angle is a part of the right angle and the finger a part of the animal, the acute angle will be prior to the right angle and the finger to the man. But the latter are thought to be prior; for in formula the parts are explained by reference to them, and in respect also of the power of existing apart from each other the wholes are prior to the parts;” see also Z 10 1035b9-11: “The circle and the semicircle also are in a like relation; for the semicircle is defined by the circle; and so is the finger [defined] by the whole body, for a finger is ‘such and such a part of a man’.”

⁷⁷ *GA* 1.18 722b18-22: “Now that this is impossible is plain, for neither would the separate parts be able to survive without having any soul or life, nor if they were living things, so to say, could several of them combine so as to become one animal again.”

⁷⁸ This is only roughly speaking, because the soul not only “uses” its organs but also “repairs”

living being. Even the heart, which according to Aristotle primarily contains the psychic principle,⁷⁹ is not “ensouled” in the sense that it contains its own proper form. It is in this sense that the soul is said to be the internal principle of motion, and it is said to be situated at the center of this bodily magnitude.⁸⁰ Further, because the form of the living body is situated only in one part of the body, all the other parts within the living body are ensouled by a form which is external to them. So, calling the heavens “ensouled” doesn’t necessarily imply that the unmoved principle of motion is within the heaven.

Secondly, “having a principle of motion (ἀρχὴ κινήσεως)” in the context of *De Caelo* 2.2 may only mean “having directional principles of motion” rather than “having the unique first principle of motion, i.e. the soul”. When we read carefully the entire chapter of *De Caelo* 2.2 and its related chapter *De Incessu Animalium* 4 which deals with the directions in living beings,⁸¹ we find that in neither chapter does ἀρχὴ κινήσεως refer to the unique *unmoved* principle of motion such as the soul. Rather, paired with its opposite πέρας κινήσεως, ἀρχὴ κινήσεως refers to the bodily half where a motion starts. Thus, for living beings at least, “above” and “below” are the ἀρχή and the πέρας of nutritive supply and growth,⁸² whereas “right” and “left” are the ἀρχή and the πέρας of locomotion.⁸³

them with new material.

⁷⁹ *Metaphysics* Z 10 1035b25-27.

⁸⁰ See *MA* 9 702b16-17: “Therefore, the original seat of the moving soul must be in that which lies in the middle, for of both extremes the middle is the limiting point.”

⁸¹ See *De Caelo* 2.2 284b14 for the reference to *De Incessu Animalium* 4. See Leggatt (1995: 224).

⁸² *De Incessu Animalium* 4 705a32-b2: “the ‘above’ is that from which flows in each kind the supply of nutriment and the process of growth; the ‘below’ is that to which the process flows and in which it ends. One is an ἀρχή, the other a πέρας, and the ἀρχή is the above”.

⁸³ See *De Incessu Animalium* 4 705b13-21: “All animals which partake not only in sense, but are able of themselves to make a change of place, have a further distinction of left and right besides those already enumerated; like the former these are distinctions of function and not of position.

Now if we are to apply to the heaven such a distinction of parts, we must expect, as we have said, to find in it also the distinction which in animals is found first of them all. The distinctions are three, namely, above and below, front and its opposite, right and left—all these three oppositions we expect to find in the perfect body—and each may be called an ἀρχή. *Above is the ἀρχή of length, right of breadth, front of depth.* Or again we may connect them with the various movements, *taking ἀρχή to mean that part, in a thing capable of movement, from which movement first begins.* Growth starts from above, locomotion from the right, sense-perception from in front (for front is simply the part to which the senses are directed). *Hence we must not look for above and below, right and left, front and back, in every kind of body, but only in those which, being animate, have an ἀρχή of movement within themselves.* For in no inanimate thing do we observe a part from which movement originates.⁸⁴ (*De Caelo* 2.2 284b18-34)

We know that these three ἀρχαί are not the unmoved psychic ἀρχή in the case of animals

The right is that from which change of position naturally begins, the opposite which naturally depend upon this is the left.”

See *De Caelo* 2.2 284b27-30: “Growth starts from above, locomotion from the right, sensemovement from in front (for front is simply the part to which the senses are directed).”

⁸⁴ Εἰ δὲ δεῖ καὶ τοῦ οὐρανῶ προσάπτειν τι τῶν τοιούτων, καὶ τὸ πρῶτον, καθάπερ εἵπομεν, ἐν τοῖς ζώοις ὑπάρχον εὐλογον ὑπάρχειν ἐν αὐτῷ· τριῶν γὰρ ὄντων ἕκαστον οἷον ἀρχή τις ἐστίν. Λέγω δὲ τὰ τρία τὸ ἄνω καὶ τὸ κάτω, καὶ τὸ πρόσθιον καὶ τὸ ἀντικείμενον, καὶ τὸ δεξιὸν καὶ τὸ ἀριστερόν· ταύτας γὰρ τὰς διαστάσεις εὐλογον ὑπάρχειν τοῖς σώμασι τοῖς τελείοις πάσας. Ἔστι δὲ τὸ μὲν ἄνω τοῦ μήκους ἀρχή, τὸ δὲ δεξιὸν τοῦ πλάτους, τὸ δ' ἐμπροσθεν τοῦ βάθους. Ἔτι δ' ἄλλως κατὰ τὰς κινήσεις· ἀρχὰς γὰρ ταύτας λέγω ὅθεν ἄρχονται πρῶτον αἱ κινήσεις τοῖς ἔχουσιν. Ἔστι δὲ ἀπὸ μὲν τοῦ ἄνω ἡ αὐξήσις, ἀπὸ δὲ τῶν δεξιῶν ἡ κατὰ τόπον, ἀπὸ δὲ τῶν ἐμπροσθεν ἡ κατὰ τὴν αἴσθησιν· ἐμπροσθεν γὰρ λέγω ἐφ' ὃ αἱ αἰσθήσεις. Διὸ καὶ οὐκ ἐν ἅπαντι σώματι τὸ ἄνω καὶ κάτω καὶ τὸ δεξιὸν καὶ ἀριστερόν καὶ τὸ ἐμπροσθεν καὶ ὀπίσθεν ζητητέον, ἀλλ' ὅσα ἔχει κινήσεως ἀρχὴν ἐν αὐτοῖς ἐμψυχα ὄντα· τῶν γὰρ ἀψύχων ἐν οὐθενὶ ὁρῶμεν ὅθεν ἡ ἀρχὴ τῆς κινήσεως.

from *De Incessu Animalium* 6⁸⁵. There, Aristotle specifies a higher ἀρχή of the three ἀρχαί:

The above discussion has made it clear that the ἀρχή of movement (i.e. locomotion) is in the parts on the right. Now every continuous whole, one part of which is moved while the other remains at rest must, in order to be able to move as a whole while one part stands still, have in the place where both parts have opposed movements some common part which connects the moving parts with one another. Further in this part the ἀρχή of motion and similarly of the absence of motion of each of the parts must lie.⁸⁶ (706b16-23, trans. Farquharson in Barnes)

The common center is the ἀρχή from which the animal's movements of right and left, and similarly of superior and inferior, start. (707a12-14)⁸⁷

It remains a question whether this central ἀρχή is the soul or not.⁸⁸ However, it is clear that in both *De Caelo* 2.2 and *De Incessu* 4, Aristotle means by “ἀρχή of motion” the different directional moved ἀρχαί rather than the unique unmoved ἀρχή, so in claiming

⁸⁵ It is also obvious from *De Motu* that the south pole, which according to *De Caelo* 2.2 is the “above” principle, cannot be the unmoved principle of the heaven.

⁸⁶ Ὅτι μὲν οὖν ἐκ τῶν δεξιῶν ἢ τῆς κινήσεως ἐστὶν ἀρχή, φανερόν ἐκ τῶν εἰρημένων. ἐπεὶ δ' ἀνάγκη παντὸς συνεχοῦς, οὗ τὸ μὲν κινεῖται τὸ δ' ἡρεμεῖ, ὅλου δυναμένου κινεῖσθαι ἐστῶτος θατέρου, ἢ ἄμφω κινεῖται τὰς ἐναντίας κινήσεις, εἶναι τὸ κοινόν, καθ' ὃ συνεχῇ ταῦτ' ἐστὶν ἀλλήλοις, κἀνταῦθ' ὑπάρχειν τὴν ἀρχὴν τῆς ἐκατέρου τῶν μερῶν κινήσεως, ὁμοίως δὲ καὶ τῆς στάσεως. (Text: W. Jaeger, *Aristotelis de animalium motione et de animalium incessu; Ps.-Aristotelis de spiritu libellus* Leipzig: Teubner, 1913)

⁸⁷ αὗτη δ' ἐστὶν ἀφ' ἧς ἀρχῆς κοινῆς τῶν ἐν τῷ ζῳῳ ἢ τε τοῦ δεξιοῦ καὶ ἀριστεροῦ κινήσεις ἐστὶν, ὁμοίως δὲ καὶ ἡ τοῦ ἄνω καὶ κάτω.

that “the heaven has an ἀρχή of motion and therefore exhibits directions”, Aristotle doesn’t need to be referring to the unique unmoved ἀρχή of the heaven, let alone its position.

If the *De Caelo* 2.2 claim is not committal, what, then, is the relation between a heavenly sphere and its unique mover? I suggest we look at two pairs of Aristotelian analogy. As a side note, analogy is a more important tool for Aristotle’s philosophical project than people usually realize. For Aristotle, because definition means division into items that are more primary, the most primary philosophical items are impossible to define. So the univocal (συνωνύμως) predication of these most primary items upon different things cannot be demonstrated through a definition, and one way to demonstrate it is through analogy.⁸⁹ To give a pair of examples: on the one hand, “animal” is

⁸⁸ See at the end of *De Incessu*.

⁸⁹ Aristotle clearly thinks that this kind of predication is not homonymy. See e.g. *Nic. Ethics* 1.6 1096b25-29: οὐκ ἔστιν ἄρα τὸ ἀγαθὸν κοινόν τι κατὰ μίαν ιδέαν. ἀλλὰ πῶς δὴ λέγεται; οὐ γὰρ ἔοικε τοῖς γε ἀπὸ τύχης ὁμωνύμοις. ἀλλ’ ἄρα γε τῷ ἅπ’ ἐνὸς εἶναι ἢ πρὸς ἓν ἅπαντα συντελεῖν, ἢ μᾶλλον κατ’ ἀναλογίαν; ὥς γὰρ ἐν σώματι ὄντις, ἐν ψυχῇ νοῦς, καὶ ἄλλο δὴ ἐν ἄλλῳ. “The good, therefore, is not something common answering to one idea, but then in what way are things called good? They do not seem to be like the things that are homonymous by chance. Are goods one, then, by being derived from one [good] or by all looking towards one [good], or are they rather one by analogy?”

This passage also usefully distinguishes these κατ’ ἀναλογίαν predicates from the πρὸς ἓν predicates (the so-called “*pros hen* homonyms” or “focal sense”, see Owen (1960), Irwin (1981), and Shields (1999)). The latter, strictly speaking, has little to do with Aristotelian analogy, although Thomas Aquinas and later scholastics call the former *analogia proportionalitatis* and the latter *analogia attributionis*. The best example of πρὸς ἓν predicates is that of “healthy” in *Metaphysics* Γ 2 1003a34-b1: “everything which is healthy is related to health, one thing in the sense that it preserves health, another in the sense that it produces it, another in the sense that it is the symptom of health, another because it is capable of it.” This is clearly different from the κατ’ ἀναλογίαν predicates.

Recent literature tends to refer to the latter kind of predicates as “*pros hen* homonyms” (see e.g. Studtmann 2014: “according to Aristotle, some words do not express a genus but instead are what he calls *pros hen* homonyms — that is, homonyms related to one thing (*pros hen*), variously called cases of ‘focal meaning’ or ‘focal connection’ or ‘core-dependent homonymy’ in the literature on this topic (1003a35 ff.).”) and to claim that this is following Aristotle’s own terminology. But to be fair, although Aristotle does call this kind of predication “*pros hen*”, he never calls it “homonymy” (equivocacy). In fact, a quick search on TLG shows that Aristotle

univocally predicated of Socrates and Bucephalus because both are called “animal” under the same definition: “a living being with the faculty of locomotion”;⁹⁰ on the other hand, “good” (τὸ ἀγαθὸν) cannot be defined, therefore its non-equivocal predication upon sight and νοῦς has to be demonstrated through analogy—sight and νοῦς are *one by analogy* because sight is to the eye as νοῦς is to the soul, and we predicate “good” upon all things that are one by the same analogy. Unmoved mover and first moved mover, I suggest, are such primary things whose predication upon different situations—the psychic unmoved mover, the cosmic unmoved mover, and the mechanic unmoved mover—needs to be understood *analogically*.⁹¹

carefully distinguishes between *pros hen* predicates and homonymous as well as synonymous *kath' hen* predicates. See e.g. *Eud. Ethics* 7.2 1236b23-26 (Cf. *Nic. Ethics* 1096b27): λείπεται τοίνυν οὕτως, ὅτι ἔστι μὲν ὡς μόνη <ή> πρώτη φιλία, ἔστι δὲ ὡς πᾶσαι, οὔτε ὡς ὁμώνυμοι καὶ ὡς ἔτυχον ἔχουσιν πρὸς ἑαυτάς, οὔτε καθ' ἓν εἶδος, ἀλλὰ μᾶλλον πρὸς ἓν. *Metaphysics* Γ 2 1003a33-35 (cf. *Metaphysics* 1030b3): Τὸ δὲ ὃν λέγεται μὲν πολλαχῶς, ἀλλὰ πρὸς ἓν καὶ μίαν τινὰ φύσιν καὶ οὐχ ὁμώνυμῶς ἀλλ' ὥσπερ καὶ τὸ ὑγιεινὸν ἅπαν πρὸς ὑγίειαν.

See Frede (2000: 20-21). See also Ward (2008: 2-3).

⁹⁰ In using the language of predication, I don't imply that predicates are only or primarily linguistic terms. Thus in predicating “animal” of Socrates, I'm not just saying that the linguistic term “animal” can refer to the individual named “Socrates”, I'm predicating the real thing animal, what it takes to be an animal, of the real human being Socrates.

⁹¹ For the connection between Aristotle's method of analogy and the unmoved mover as a divine principle, see his student Theophrastus in *Metaphysics* 4b11-5a2: τίς δ' οὖν αὕτη καὶ τίνες, εἰ πλείους, πειρατέον ἐμφαίνειν ἀμῶς γέ πως εἶτε κατ' ἀναλογίαν εἶτε κατ' ἄλλην ὁμοίωσιν. ἀνάγκη δ' ἴσως δυνάμει τινὶ καὶ ὑπεροχῇ τῶν ἄλλων λαμβάνειν, ὥσπερ ἂν εἰ τὸν θεόν· θεία γὰρ ἡ πάντων ἀρχή, δι' ἣς ἅπαντα καὶ ἔστιν καὶ διαμένει. τάχα μὲν οὖν ῥάδιον τὸ οὕτως ἀποδοῦναι, χαλεπὸν δὲ σαφεστέρως ἢ πειστικωτέρως. Τοιαύτης δ' οὔσης τῆς ἀρχῆς, ἐπεὶ περ συνάπτει τοῖς αἰσθητοῖς, ἡ δὲ φύσις ὡς ἀπλῶς εἰπεῖν ἐν κινήσει καὶ τοῦτ' αὐτῆς τὸ ἴδιον, δῆλον ὡς αἰτίαν θετέον ταύτην τῆς κινήσεως· ἐπεὶ δ' ἀκίνητος καθ' αὐτήν, φανερόν ὡς οὐκ ἂν εἴη τῷ κινεῖσθαι τοῖς τῆς φύσεως αἰτία, ἀλλὰ λοιπὸν ἄλλη τινὶ δυνάμει κρείττονι καὶ προτέρῃ.

“What this (i.e. the ἀρχή) is, or what they are, if they are more than one, we must try to indicate somehow or other, whether by analogy or by some other similarity. ... It is perhaps easy to provide an explanation in this manner, but difficult in a clearer and more convincing manner. Such being the first principle, then, since it is connected with the sensibles, and nature is, to put it simply, in motion (which is its property), it is clear that it should be posited as the cause of movement. But since it is unmoved per se, it is obvious that it could not be by being moved that it serves as cause to the things of nature, and the only alternative is that it should be by some other power superior and prior to this.” (Trans. Ross).

2.3.2 The Analogy between the First Body and *Pneuma*

We know from at least one place in Aristotle's corpus that the first body (*aether*), i.e. the element of the heavenly bodies, is related to another mysterious psychic matter, *pneuma*.⁹²

Now it is true that the power (δύναμις) of all kinds of soul seems to have a connexion (ἔοικε κεκοινωνηκέναι) with a body (σῶμα) different from and more divine than the so-called elements; but as one soul differs from another in honor and dishonor, so differs also the nature of the corresponding body. All have in their *semen* that which makes it productive; I mean what is called *heat*. This is not fire nor any such power, but the *pneuma* and the nature in *pneuma*, which is *analogous to the element of the stars*.⁹³ (*De Generatione Animalium* 2.3 736b29-737a1, trans. Platt in Barnes)

This single appearance in Aristotle is strengthened by a bunch of reports from Cicero and Iamblicus which *identify* the matter of the heavenly bodies with the matter of mind or soul:

⁹² N.B. Some scholars translate πνεῦμα as “air”. To avoid confusion with the elemental ἀήρ (one of the four simple bodies) and to keep consistency, I use the latinized form *pneuma* throughout.

On the subject of *pneuma* in Aristotle, Jaeger's 1913 paper in *Hermes* remains influential. Peck (1942: 586-9) has some comments on the analogy between *pneuma* and *aether*. Recently, Abraham Bos has published a series of articles and a monograph on the issue. See also Blyth (2015).

⁹³ Πάσης μὲν οὖν ψυχῆς δύναμις ἑτέρου σώματος ἔοικε κεκοινωνηκέναι καὶ θειοτέρου τῶν καλουμένων στοιχείων· ὥς δὲ διαφέρουσι τιμιότητι αἱ ψυχαὶ καὶ ἀτιμία ἀλλήλων οὕτω καὶ ἡ τοιαύτη διαφέρει φύσις. πάντων μὲν γὰρ ἐν τῷ σπέρματι ἐνυπάρχει ὅπερ ποιεῖ γόνιμα εἶναι τὰ σπέρματα, τὸ καλούμενον θερμόν. τοῦτο δ' οὐ πῦρ οὐδὲ τοιαύτη δύναμις ἐστὶν ἀλλὰ τὸ ἐμπεριλαμβανόμενον ἐν τῷ σπέρματι καὶ ἐν τῷ ἀφρώδει πνεῦμα καὶ ἡ ἐν τῷ πνεύματι φύσις, ἀνάλογον οὖσα τῷ τῶν ἄστρον στοιχείῳ. (Text: H.J. Drossaart Lulofs, OCT, Oxford, 1965)

The fifth kind, *from which are made stars and minds*, Aristotle thought to be something distinct, and unlike the four I have mentioned above.⁹⁴ (Cicero *Academica* 1.7.26)

Aristotle, who far exceed all others—Plato I always except—both in intellect and in industry, after taking account of the four well-known kinds of first principles from which all things were derived, considers that *there is a fifth kind of thing, from which comes mind; ...*; he adds *a fifth kind, which lacks a name, and so he calls the mind itself by a new name, ἐνδελέχεια (sic), as being a sort of continuous and endless movement.*⁹⁵ (Cicero *Tusc. Disput.* 1.10.22)

Some of the Aristotelians lay it down that *the soul is a body made of aether*.

Others define it as a perfection in accordance with the essential nature of the divine body, which [perfection] Aristotle calls ἐντελέχεια, as does Theophrastus in some works.⁹⁶ (Iamblichus, in Stobaeus, 1.49.32.109-112)

So, the element of the heavenly bodies, i.e. the first body, if it is not to be identified with

⁹⁴ *Quintum genus, e quo essent astra mentesque, singulare eorumque quattuor quae supra dixi dissimile Aristoteles quoddam esse rebatur.*

⁹⁵ *Aristoteles, longe omnibus Platonem semper excipio praestans et ingenio et diligentia, cum quattuor nota illa genera principiorum esset complexus, e quibus omnia orerentur, quintam quandam naturam censet esse, e qua sit mens; ... ; quintum genus adhibet vacans nomine et sic ipsum animum endelecheian appellat novo nomine quasi quandam continuatam motionem et perennem.*

⁹⁶ Τινὲς μὲν τῶν Ἀριστοτελικῶν αἰθέριον σῶμα τὴν ψυχὴν τίθενται· ἕτεροι δὲ τελειότητα αὐτὴν ἀφορίζονται κατ' οὐσίαν τοῦ θείου σώματος, ἣν ἐντελέχειαν καλεῖ Ἀριστοτέλης, ὥσπερ δὴ ἐν ἐνίοις Θεόφραστος. (Text: O. Hense and C. Wachsmuth, *Ioannis Stobaei anthologium*, 5 vols.

pneuma (as Cicero apparently thinks that Aristotle thought so), is at least according to Aristotle's own account analogous to *pneuma*. Now, in Aristotle's own terms, saying "A is *analogous* to B" amounts to saying "A and B are *one by analogy* (ἐν κατ' ἀναλογίαν)", and "one by analogy" by definition involves four terms.⁹⁷ This means that the first body is to something X as *pneuma* is to something Y (i.e. X: the first body = Y: *pneuma*). The GA passage focuses on the relation between each individual soul and its bodily *pneuma*, so it is reasonable to suppose that *pneuma* is analogous to the first body with respect to this relation. This means that Y is the individual soul that a *pneuma*, as a body, relates to (X: the first body :: soul: *pneuma*). Now the question is: what is the relation between *pneuma* and its corresponding soul? And what is the X that we can infer from the analogy between the first body and *pneuma*?

2.3.3 The Analogy between *Pneuma* and the Mobile Point of a Joint

To answer these two questions, one should bear in mind that Aristotle in *De Motu Animalium* introduces another important analogy between *pneuma*⁹⁸ and the mobile point of a joint, precisely in order to illustrate the relation between *pneuma* and its principle—the soul:

It is clear that all animals have connate *pneuma* and derive their strength from this. (How the connate *pneuma* is maintained we have explained elsewhere.) *This seems to bear a relation to the psychic principle that is similar to that which the*

Berlin: Weidmann, 1-2:1884)

⁹⁷ See *Metaphysics* Δ 6 1016b34-35. "Those things that are related as a third thing is to a fourth are one by analogy."

⁹⁸ Here Aristotle calls it "connate *pneuma*", in order to distinguish it from "inhaled *pneuma*". It

*point of the joints, the one which imparts movement and is moved, has to the unmoved. ... And it is obviously well disposed by nature to impart movement and supply strength. Now the functions of movement are pushing and pulling, so the tool of movement has to be capable of expanding and contracting, and this is just the nature of pneuma. For it contracts and expands without being forced, and is able to pull and push for the same cause, and it has weight by comparison with the fiery and lightness by comparison with its opposite. Whatever is going to impart motion without undergoing alteration must be of this kind.*⁹⁹ (*De Motu Animalium* 10 703a9-25, trans. Nussbaum)

Here, we have all the four terms of an analogy. Connate *pneuma* (σύμφυτον πνεῦμα) is to the psychic principle (ἡ ἀρχὴ ἡ ψυχικὴ)¹⁰⁰ as the mobile point in a joint is to the unmoved point (τὸ ἐν ταῖς καμπαῖς σημεῖον, τὸ κινοῦν καὶ κινούμενον, πρὸς τὸ ἀκίνητον). Earlier in the treatise, Aristotle explains the relation between the mobile and the unmoved points of a joint:

is safe to identify the connate *pneuma* here with the *pneuma* compared to the first body in *GA*.
⁹⁹ πάντα δὲ φαίνεται τὰ ζῷα καὶ ἔχοντα πνεῦμα σύμφυτον καὶ ἰσχύοντα τούτῳ. τίς μὲν οὖν ἡ σωτηρία τοῦ συμφύτου πνεύματος, εἴρηται ἐν ἄλλοις· τοῦτο δὲ πρὸς τὴν ἀρχὴν τὴν ψυχικὴν ὅμοιος ἔχειν ὥσπερ τὸ ἐν ταῖς καμπαῖς σημεῖον, τὸ κινοῦν καὶ κινούμενον, πρὸς τὸ ἀκίνητον. ἐπεὶ δ' ἡ ἀρχὴ τοῖς μὲν ἐν τῇ καρδίᾳ τοῖς δ' ἐν τῷ ἀνάλογον, διὰ τοῦτο καὶ τὸ πνεῦμα τὸ σύμφυτον ἐνταῦθα φαίνεται ὄν. πότερον μὲν οὖν ταυτόν ἐστι τὸ πνεῦμα ἀεὶ ἢ γίνεται ἀεὶ ἕτερον, ἔστω ἄλλος λόγος (ὁ αὐτὸς γὰρ ἐστι καὶ περὶ τῶν ἄλλων μορίων)· φαίνεται δ' εὐφυῶς ἔχον πρὸς τὸ κινητικὸν εἶναι καὶ παρέχειν ἰσχύον. τὰ δ' ἔργα τῆς κινήσεως ὥσιν καὶ ἔλξις, ὥστε δεῖ τὸ ὄργανον αὐξάνεσθαι τε δύνασθαι καὶ συστέλλεσθαι. τοιαύτη δ' ἐστὶν ἡ τοῦ πνεύματος φύσις· καὶ γὰρ ἀβίαστος συστέλλομένη, καὶ βιαστικὴ καὶ ὠστικὴ διὰ τὴν αὐτὴν αἰτίαν, καὶ ἔχει καὶ βάρος πρὸς τὰ πυρώδη καὶ κουφότητα πρὸς τὰ ἐναντία. δεῖ δὲ τὸ μέλλον κινεῖν μὴ ἀλλοιῶσαι τοιοῦτον εἶναι. (Text: M. C. Nussbaum, *Aristotle's de Motu Animalium*, Princeton University Press, 1978)

¹⁰⁰ The “psychic principle” is just the soul. See earlier at *MA* 9 703a1-3. By calling the soul “psychic principle”, Aristotle highlights its analogy with the principle of the joint.

[The animals] use their joints like a center, and the whole section containing the joint becomes both one and two, both straight and bent, changing potentially and actually by reason of the joint. And when the part is bending and being moved, *one of the points in the joints is moved and the other remains at rest*, just as if on a diameter AD should remain fixed and B be moved, so as to give AC. But in the geometrical example the center appears to be indivisible in every respect ...; whereas in the case of joints the centers become, both potentially and actually, now one, now divide.¹⁰¹ (*Ibid.* 1 698a18-b1)

That which first moves the animal must be in some origin. We have said that a joint is the origin for one part and the end of the other; hence nature uses it sometimes as one, sometimes as two. For whenever movement starts from there, *one of the endpoints must remain at rest, and the other be moved*—for we have said already that the mover must support itself against something at rest. ... *Which is what we mean by saying that it is potentially one point, but becomes actually two. So if the forearm were the animal, somewhere in this joint would be the movement-imparting principle of the soul.*¹⁰² (*Ibid.* 8 702a21-32)

¹⁰¹ ὥσπερ γὰρ κέντρῳ χρῶνται ταῖς καμπαῖς, καὶ γίνεται τὸ ὅλον μέρος, ἐν ᾧ ἡ καμπή, καὶ ἐν καὶ δύο, καὶ εὐθὺ καὶ κεκαμμένον, μεταβάλλον δυνάμει καὶ ἐνεργείᾳ διὰ τὴν καμπήν. καμπτομένου δὲ καὶ κινουμένου τὸ μὲν κινεῖται σημεῖον τὸ δὲ μένει τῶν ἐν ταῖς καμπαῖς, ὥσπερ ἂν εἰ τῆς διαμέτρου ἢ μὲν Α καὶ ἢ Δ μένοι, ἢ δὲ Β κινούτο, καὶ γίνοιτο ἢ ΑΓ. ἀλλ' ἐνταῦθα μὲν δοκεῖ πάντα τρόπον ἀδιαίρετον εἶναι τὸ κέντρον ..., τὰ δ' ἐν ταῖς καμπαῖς δυνάμει καὶ ἐνεργείᾳ γίνεται ὅτε μὲν ἐν ὅτε δὲ διαιρετά.

¹⁰² τὸ δὲ κινοῦν πρῶτον τὸ ζῶον ἀνάγκη εἶναι ἐν τινι ἀρχῇ. ἢ δὲ καμπὴ ὅτι μὲν ἐστὶ ἀρχὴ τοῦ δὲ τελευτῆ, εἴρηται. διὸ καὶ ἐστὶ μὲν ὡς ἐνί, ἐστὶ δ' ὡς δυσὶ χρήται ἡ φύσις αὐτῇ. ὅταν γὰρ κινῆται ἐντεῦθεν, ἀνάγκη τὸ μὲν ἡρεμεῖν τῶν σημείων τῶν ἐσχάτων, τὸ δὲ κινεῖσθαι. ὅτι γὰρ πρὸς ἡρεμοῦν δεῖ ἀπερείδεσθαι τὸ κινοῦν, εἴρηται πρότερον. ... ὁ δὲ φάμεν δυνάμει μὲν ἐν εἶναι σημεῖον, ἐνεργείᾳ δὲ γίνεσθαι δύο· ὥστ' εἰ τὸ ζῶον ἦν ὁ βραχίον, ἐνταῦθ' ἂν ποῦ ἦν ἡ ἀρχὴ τῆς ψυχῆς ἢ κινούσα.

So the two points are at the same place in a joint. When there is no motion starting from the joint, the two points are actually one and potentially two. When motion starts from the joint, the two points become actually two, with the one unmoved but imparting motion, the other being moved and by its motion moves the limb continuous with it. Further, according to *De Incessu Animalium* 3, the two parts in a joint must “lean against each other as the pressing to the pressed” (705a14-15), i.e. in contact.¹⁰³ Now the two parts should be on the one hand the ball which is continuous with the lower limb and on the other hand the socket which is continuous with whatever that is more to the center. The point of contact should be the point at which the ball touches the socket, and it is either potentially one and actually two when in motion, or actually one and potentially two when at rest.¹⁰⁴ Note that in the second passage quoted above (*MA* 8 702a21-32), the other side of the *pneuma*-joint analogy is more clearly shown: “if the forearm were the animal, somewhere in this joint would be the movement-imparting principle of the soul”. So, just as *pneuma* is compared to the mobile point of the joint, the psychic unmoved mover is compared to the unmoved point of the joint.

The most salient feature in this analogy between the psychic function and the function of the joint is that both pairs involve an unmoved mover on the one hand, and a moved mover on the other.¹⁰⁵ Thus the psychic principle and the unmoved point of a

¹⁰³ ἔχει γάρ τινα ἀντέρεισιν πρὸς ἄλληλα τὰ μόρια ἐν ταῖς καμπαῖς, καὶ ὅλως τὸ πιέζον πρὸς τὸ πιεζόμενον.

¹⁰⁴ Cf. *PA* 2.9 654a35-b2 and especially *De Anima* 3.10 433b21-27: “To state the matter summarily at present, that which is the instrument in the production of movement is to be found where a beginning and an end coincide as e.g. in a joint (γυγλυμός); for there the convex and the concave sides are respectively an end and a beginning (that is why while the one remains at rest, the other is moved): they are separate in definition but not separable spatially. For everything is moved by pushing and pulling. Hence just as in the case of a wheel, so here there must be a point which remains at rest, and from that point the movement must originate” (trans. Smith in Barnes)

¹⁰⁵ See especially *De Motu* 10 703a9-25, quoted above.

joint are both “movement imparting” while themselves being unmoved. *Pneuma* and the ball containing the mobile point are both moved movers in that, as “the instrument of motion”, they both cause motion in other things “by pushing and pulling”.¹⁰⁶ It seems that they are “moved” in two aspects: (1) their own motion is caused by an unmoved mover, and (2) they cause motion in other things via reciprocal physical contact¹⁰⁷ and therefore need to have strength (ἰσχύς) and power (δύναμις).

The most salient feature in this analogy for my purpose is the spatial relationship between the unmoved mover and the first moved mover in both pairs. Now, in the case of the joint, the unmoved point of the joint is said to be the center of the limb which it moves, and *qua* center, always at rest.¹⁰⁸ It *touches* the ball at the mobile point, as I outline above. The case with *pneuma* and the soul is less straightforward.

2.3.4 The Case with *Pneuma*, Soul-heat, and the Soul-principle

It may seem, from Aristotle’s scattered remarks in *GA* and elsewhere, that the unmoved psychic principle is located in connate *pneuma*, and this is especially the case when one identifies the “soul-heat” or “internal heat”,¹⁰⁹ which is called a principle of motion (κίνητικόν) and is said to be in *pneuma*, with the unmoved principle:¹¹⁰

¹⁰⁶ Cf. *De Motu Animalium* 10 703a9-25 and *De Anima* 3.10 433b21-27, both cited above.

¹⁰⁷ Unlike an unmoved mover which touches the moved unilaterally. See chapter 3 on *GC* 1.6.

¹⁰⁸ See *MA* 1 698a18-21, cited above, and also 698b1-4: “In any case, the origin relative to which the motion takes place, *qua* origin, is always at rest when the part below it is moved, as, for example, when the forearm is moved the elbow remains at rest, but when the whole limb is moved, the shoulder.”

¹⁰⁹ Τὸ ψυχικὸν θερμόν at *GA* 3.4 755a20 and θερμότης ψυχική at *GA* 2.1 732a19, and τὸ φυσικόν, σύμφυτον, οἰκεῖον θερμόν elsewhere.

(a) *De Generatione Animalium* 2.1 732a13-20

The sexes are divided in nearly all of these that can move about, for the reasons already stated, and some of them, as said before, emit *semen* in copulation, others do not. The reason for this is that the higher animals are more independent in their nature, so that they have greater size, and *this cannot exist without soul-heat* (τοῦτο δ' οὐκ ἄνευ θερμότητος ψυχικῆς); for the greater body requires more force to move it, and *heat is a moving force* (τὸ δὲ θερμὸν κινητικόν).¹¹¹

(b) *De Generatione Animalium* 2.3 736b29-7a1

Now it is true that the power of all kinds of soul seems to have a connexion (ἔοικε κεκοινωνηκέναι) with a body (σῶμα) different from and more divine than the so-called elements; but as one soul differs from another in honor and dishonor, so differs also the nature of the corresponding body. *All have in their semen that which makes it productive; I mean what is called heat.* This is not fire nor any such power, but the *pneuma* and the nature in *pneuma*, which is analogous to the element of the stars. Hence, whereas fire generates no animal and we do not find any living thing forming in either solids or liquids under the influence of fire, the *heat of the sun and that of animals* does generate them. Not only is this true of the heat that works through the semen, but whatever residue of the animal nature

¹¹⁰ For such a view, see Freudenthal (1995).

¹¹¹ τούτων δὲ σχεδὸν ἐν πᾶσι τοῖς πορευτικοῖς κεχώριται τὸ θῆλυ καὶ τὸ ἄρρεν διὰ τὰς εἰρημένας αἰτίας· καὶ τούτων τὰ μέν, ὥσπερ ἐλέχθη, προῖεται σπέρμα, τὰ δ' οὐ προῖεται ἐν τῷ συνδυασμῷ. Τούτου δ' αἴτιον ὅτι τὰ τιμιώτερα καὶ αὐταρκέστερα τὴν φύσιν ἐστίν, ὥστε μεγέθους μετευληφέναι. τοῦτο δ' οὐκ ἄνευ θερμότητος ψυχικῆς· ἀνάγκη γὰρ τὸ μείζον ὑπὸ πλείονος κινεῖσθαι δυνάμεως, τὸ δὲ θερμὸν κινητικόν.

there may be, this also has still a living principle (ζωτικὴ ἀρχή) in it. From such consideration it is clear that the heat in animals neither is fire nor derives its origin from fire.¹¹²

In these two passages, Aristotle deals with sexual generation and the embryo. From both passages and their context, we can see that Aristotle does believe firstly that there is a part in the embryo, apparently the *pneuma* coming from the semen of the male parent, which is characterized by soul-heat and is ἔμψυχον from the beginning,¹¹³ secondly that this part counts as the maker (τὸ ὑφ' οὗ) of the bodily parts,¹¹⁴ and thirdly that it is the moving faculty (κινητικόν). Nevertheless, it is important to notice that, although he thinks that the soul-heat is a principle of motion and becoming, it is not *the* unmoved soul-principle in actuality. This is because the soul-heat is conceived of as an innate power of motion which has been put into the embryo by the unmoved soul-principle of the male parent, and this innate power acts upon the material principle provided by the female parent by *warming up the material while itself being cooled down*, and when this power is consumed, the embryo comes to be a cub with all the bodily parts and organs

¹¹² Πάσης μὲν οὖν ψυχῆς δύναμις ἐτέρου σώματος ἔοικε κεκοινωνηκέναι καὶ θειοτέρου τῶν καλουμένων στοιχείων· ὥς δὲ διαφέρουσι τιμιότητι αἱ ψυχαὶ καὶ ἀτιμία ἀλλήλων οὕτω καὶ ἡ τοιαύτη διαφέρει φύσις. πάντων μὲν γὰρ ἐν τῷ σπέρματι ἐνυπάρχει ὅπερ ποιεῖ γόνιμα εἶναι τὰ σπέρματα, τὸ καλούμενον θερμόν. τοῦτο δ' οὐ πῦρ οὐδὲ τοιαύτη δύναμις ἐστὶν ἀλλὰ τὸ ἐμπεριλαμβανόμενον ἐν τῷ σπέρματι καὶ ἐν τῷ ἀφρώδει πνεῦμα καὶ ἡ ἐν τῷ πνεύματι φύσις, ἀνάλογον οὕσα τῷ τῶν ἄστρον στοιχείῳ. διὸ πῦρ μὲν οὐθέν γεννᾷ ζῶον, οὐδὲ φαίνεται συνιστάμενον ἐν πυρουμένοις οὐτ' ἐν ὑγροῖς οὐτ' ἐν ξηροῖς οὐθέν· ἡ δὲ τοῦ ἡλίου θερμότης καὶ ἡ τῶν ζῶων οὐ μόνον ἡ διὰ τοῦ σπέρματος, ἀλλὰ καὶ τὴν περίττωμα τύχη τῆς φύσεως ὃν ἕτερον, ὅμως ἔχει καὶ τοῦτο ζωτικὴν ἀρχήν. ὅτι μὲν οὖν ἡ ἐν τοῖς ζῴοις θερμότης οὐτε πῦρ οὐτε ἀπὸ πυρὸς ἔχει τὴν ἀρχὴν ἐκ τῶν τοιούτων ἐστὶ φανερόν.

¹¹³ GA 2.1 734a14-16: εἰ δὲ δὴ μὴ ἔστι τῆς ψυχῆς μηθὲν ὃ μὴ τοῦ σώματος ἐστὶν ἐν τινι μορίῳ, καὶ ἔμψυχον ἂν τι εἴη μόριον εὐθύς.

¹¹⁴ GA 2.1 733b31-a1: ζητεῖται δὲ νῦν οὐκ ἐξ οὗ ἀλλ' ὑφ' οὗ γίγνεται τὰ μόρια· ἥτοι γὰρ τῶν ἔξωθεν τι ποιεῖ ἢ ἐνυπάρχον τι ἐν τῇ γονῇ καὶ σπέρματι, καὶ τοῦτ' ἐστὶν ἢ μέρος τι ψυχῆς ἢ ψυχῆ,

formed.¹¹⁵ Because the soul-heat is acted upon and ceases to be itself when the different parts are formed, it is not an unmoved mover,¹¹⁶ and the semen and the embryo has soul in potentiality not in the sense that they, as semen and embryo, can one day have soul in actuality, but in the sense that they can develop into the body of a cub or that of a mature animal which has soul in actuality.¹¹⁷ The unmoved soul-principle is, on the one hand, that of the male parent as the first cause of motion, and on the other hand the soul-principle of the fully developed kid as the final cause of motion.

(c) *De Generatione Animalium* 3.11 762a18-32

Animals and plants (i.e. those that come into being spontaneously) *come into being* in earth and in liquid because there is water in earth, and *pneuma* in water, and *in all pneuma is soul-heat* (ἐν δὲ τούτῳ παντὶ θερμότητα ψυχικὴν), so that in a sense *all things are full of soul* (τρόπον τινὰ πάντα ψυχῆς εἶναι πλήρη).

Therefore living things form quickly whenever this *pneuma* and soul-heat are enclosed in anything. When they are so enclosed, the corporeal liquids being

ἢ ἔχον ἂν εἴη ψυχὴν.

¹¹⁵ See GA 2.1 734b13-24: “As, then, in these automatic puppets the external force moves the parts in a certain sense (not by touching any part at the moment, but by having touched previously), in like manner also that from which the semen comes, or in other words the which made the semen sets up the movement in the embryo and makes the parts of it by having first touched something though not continuing to touch it. In a way it is the innate motion that does this, as the act of building builds the house. ... But how is each part formed? We must answer this by starting in the first instance from the principle that, in all products of nature or art, a thing is made by something actually existing out of that which is potentially such as the finished product. Now the semen is of such a nature, and has in it movement and such principle, that when the motion is ceasing each of the parts comes into being and becomes ensouled.”

¹¹⁶ See Chapter 4 on GC 1.6 for details.

¹¹⁷ See Code (1987) on soul as the efficient cause in Aristotle. Cf. GA 2.1 734b34-36: “What makes them [the parts] is the movement set up by the male parent, who is in actuality what that

heated, there arises as it were a frothy bubble. Whether what is forming is to be more or less honorable in kind depends on the embracing of the soul-principle; this again depends on the medium in which the generation takes place and the material which is included. ... and the body which contains the life being included within it.¹¹⁸

(d) *De Generatione Animalium* 3.11 762b4-18

But here what must be said to correspond to this, and whence comes or what is the moving principle which corresponds to the male? We must understand that even in animals which generate it is from the incoming nourishment that *the heat* in the animal makes the residue, the beginning of the conception, by separation and concoction. ... And the portion of the *soul-principle* which is either included along with it or separated off in *pneuma* (τὸ ἐναπολαμβανόμενον ἢ ἀποκρινόμενον ἐν τῷ πνεύματι τῆς ψυχικῆς ἀρχῆς) makes an embryo and *puts motion into it*.¹¹⁹

out of which the offspring is made is in potentiality;" and GA 2.1 735a8-9: "It is plain therefore what semen has is soul in potentiality."

¹¹⁸ Γίνονται δ' ἐν γῇ καὶ ἐν ὑγρῷ τὰ ζῷα καὶ τὰ φυτὰ διὰ τὸ ἐν γῇ μὲν ὕδωρ ὑπάρχειν ἐν δ' ὕδατι πνεῦμα, ἐν δὲ τούτῳ παντὶ θερμότητα ψυχικὴν, ὥστε τρόπον τινὰ πάντα ψυχῆς εἶναι πλήρη· διὸ συνίσταται ταχέως ὅποταν ἐμπεριληφθῇ. ἐμπεριλαμβάνεται δὲ καὶ γίνεταί θερμαινομένων τῶν σωματικῶν ὑγρῶν οἷον ἀφρώδης πομφόλυξ. αἱ μὲν οὖν διαφοραὶ τοῦ τιμιώτερον εἶναι τὸ γένος καὶ ἀτιμότερον τὸ συνιστάμενον ἐν τῇ περιλήψει τῆς ἀρχῆς τῆς ψυχικῆς ἐστίν. τούτου δὲ καὶ οἱ τόποι αἵτιοι καὶ τὸ σῶμα τὸ περιλαμβανόμενον. ἐν δὲ τῇ θαλάττῃ πολὺ τὸ γεῶδες ἔνεστιν· διόπερ ἐκ τῆς τοιαύτης συστάσεως ἢ τῶν ὀστρακοδέρμων γίνεταί φύσις, κύκλω μὲν τοῦ γεώδους σκληρυνομένου καὶ πηγνυμένου τὴν αὐτὴν πῆξιν τοῖς ὅστοις καὶ τοῖς κέρασι (πυρὶ γὰρ ἄτηκτα ταῦτ' ἐστίν), ἐντὸς δὲ περιλαμβανομένου τοῦ τὴν ζωὴν ἔχοντος σώματος.

¹¹⁹ ἐνταῦθα δὲ τί δεῖ λέγειν τὸ τοιοῦτον, καὶ πόθεν καὶ τίς ἡ κινουσα ἀρχὴ ἢ κατὰ τὸ ἄρρεν; δεῖ δὴ λαβεῖν ὅτι καὶ ἐν τοῖς ζῷοις τοῖς γεννώσιν ἐκ τῆς εἰσιούσης τροφῆς ἢ ἐν τῷ ζῷῳ θερμότης ἀποκρίνουσα καὶ συμπέττουσα ποιεῖ τὸ περίττωμα, τὴν ἀρχὴν τοῦ κυήματος. ὁμοίως δὲ καὶ ἐν

In these latter two passages, Aristotle deals with a-sexual, spontaneous generation. Now, spontaneous generation by definition is not caused by the soul of the male parent, therefore, the soul-heat or the soul-principle (that is in the elemental or organic materials and makes them into animals and plants) cannot be the unmoved soul-principle: it is the effect or the change¹²⁰ that is caused accidentally, but which might have been caused by nature.¹²¹ We can see this in a famous passage from *Metaphysics* Z 7:

The active principle then and the starting-point for the process of becoming healthy is, if it happens by art, the form in the soul, and *if spontaneously*, it is that, whatever it is, which starts the making, for the man who makes by art, as in healing the starting-point is perhaps the production of warmth (and this the physician produces by rubbing). *Warmth in the body, then, is either a part of health* or is followed (either directly or through several intermediate steps) by something similar which is part of health; and *this, that which produces the part of health*, is the limiting-point (τὸ ἔσχατον).¹²² (1032b21-29)

τοῖς φυτοῖς, πλὴν ἐν μὲν τούτοις καὶ ἔν τισι τῶν ζώων οὐθὲν προσδεῖται τῆς τοῦ ἄρρενος ἀρχῆς (ἔχει γὰρ ἐν αὐτοῖς μεμιγμένην), τὸ δὲ τῶν πλείστων ζώων περίττωμα προσδεῖται. τροφή δ' ἐστὶ τοῖς μὲν ὕδωρ καὶ γῆ, τοῖς δὲ τὰ ἐκ τούτων, ὥσθ' ὅπερ ἢ ἐν τοῖς ζώοις θερμότης ἐκ τῆς τροφῆς ἀπεργάζεται, τοῦθ' ἢ τῆς ὥρας ἐν τῷ περιέχοντι θερμότης ἐκ θαλάττης καὶ γῆς συγκρίνει πέττουσα καὶ συνίστησιν. τὸ δ' ἐναπολαμβάνομενον ἢ ἀποκρινόμενον ἐν τῷ πνεύματι τῆς ψυχικῆς ἀρχῆς κύημα ποιεῖ καὶ κίνησιν ἐντίθησιν.

¹²⁰ See the *GA* 2.1 passage in note 115 above.

¹²¹ See *Physics* 2.6 198a5-7: "Spontaneity and chance are causes of effects which though they might result from intelligence or nature, have in fact been caused by something accidentally."

¹²² τὸ δὴ ποιοῦν καὶ ὅθεν ἄρχεται ἡ κίνησις τοῦ ὑγιαίνειν, ἂν μὲν ἀπὸ τέχνης, τὸ εἶδος ἐστὶ τὸ ἐν τῇ ψυχῇ, ἐὰν δ' ἀπὸ ταυτομάτου, ἀπὸ τούτου ὅ ποτε τοῦ ποιεῖν ἄρχει τῷ ποιοῦντι ἀπὸ τέχνης, ὥσπερ καὶ ἐν τῷ ἰατρεῦειν ἴσως ἀπὸ τοῦ θερμαίνειν ἢ ἀρχή (τοῦτο δὲ ποιεῖ τῇ τρίψει)· ἢ θερμότης τοίνυν ἢ ἐν τῷ σώματι ἢ μέρος τῆς ὑγείας ἢ ἔπεται τι αὐτῇ τοιοῦτον ὅ ἐστι μέρος τῆς ὑγείας, ἢ διὰ πλειόνων· τοῦτο δ' ἔσχατόν ἐστι, τὸ ποιοῦν τὸ μέρος τῆς ὑγείας,

What Aristotle is saying in this passage, is that warmth in the body is the first moved mover that is conducive to health. In the case of a healing process guided by medical art, the starting-point is the art in the soul of the doctor, whereas in the case of a spontaneous recovery, the starting-point is *whatever* starts the making, i.e. whatever causes warmth in the body, be it a jalapeño or a sunbath. So the soul-heat or the soul-principle mentioned in the last two passages is the intermediate mover, like the warmth, which is caused by some accidental starting-point. They are conducive to the forming of an unmoved soul-principle at the end (like health), yet they themselves are not unmoved soul-principle in actuality.

All the above analysis helps to illustrate one point: it is true that *pneuma* is said to be ensouled, however, as far as the generative context is concerned, “being ensouled” does not mean that *pneuma* contains within itself the unmoved soul-principle. It contains the soul-heat which is soul *in potentiality* only. It is clear that in the generative context *pneuma* functions as the first instrument, either of the soul of the male parent or of spontaneity, in the process of animal generation. The same applies to the process of nutrition which relies on the soul-heat in *pneuma* to digest and concoct food into blood and other nutriments.¹²³ In the locomotive context, as I show above, *pneuma* functions as the first instrument of the soul as well. In perceptive contexts, *pneuma* functions as the vehicle which carries sense-stimuli from the sense-organs to the soul located at the center of the heart.¹²⁴

¹²³ Aristotle thinks that the nutritive soul is responsible for both nutrition and reproduction.

¹²⁴ See GA 2.6 743b35-44a5: “The reason [for the late development of the eyes] is this. The sense-organ of the eyes is set upon certain passages, as are the other sense-organs. Whereas those of touch and taste are simply the body itself or some part of the body of animals, those of smell

In all the different layers of soul-functioning, *pneuma* works as the first instrument of the unmoved soul-principle. Given that the unmoved soul-principle is said to be located at the center of the living body as a whole and in the heart in particular,¹²⁵ whereas *pneuma* is mobile: it fills the heart but also travels with blood and fills other sense-organs, it is impossible that the *pneuma* in a particular part of the body is ensouled because it contains within itself the numerically single unmoved principle which has to remain at the center of the whole animal body: rather, as I have shown, the *pneuma* in different parts of the body is ensouled because it contains in it soul-heat, and this soul-heat is caused by the unmoved soul-principle through touch¹²⁶ at the center of the animal body.¹²⁷ The parts of the animal body which “change in accordance by expanding and contracting”—which is the locomotive function of *pneuma*¹²⁸—are said by Aristotle to “be neighboring (ἐχόμενα) the τόπος which is περί the psychic principle”.¹²⁹ We may add that one of the indications that the soul-principle at the center of the body *unilaterally* acts on *pneuma*, i.e. *without itself being acted upon in response*, is that it has no

and hearing are passages connecting with the external air and full themselves of connate *pneuma*; these passages end at the small blood-vessels about the brain which run thither from the heart.” Cf. *PA* 2.16 659b18: “And how the power of smelling depends, like their motion, upon the connate *pneuma* of their bodies, which in all of them is implanted by nature and not introduced from without.”

¹²⁵ See *De Motu* 9.

¹²⁶ On touch, see my chapter 4. Also see *GA* 2.1 734a3-4: “one thing cannot set up a motion without touching it;” and b14-17: “in like manner also that from which the semen comes, or in other words that which made the semen, sets up the movement in the embryo and makes the parts of it by having first touched something though not continuing to touch it.”

¹²⁷ See Corcilius and Gregorić (2013).

¹²⁸ Cf. *De Motu* 10 703a21-24, cited above.

¹²⁹ *De Motu* 9 702b20-25: “and it is reasonable that this (i.e. that the psychic principle is in the middle) should be so: for we say that the faculty of sense-perception too, is there. So that when, because of sense-perception, the τόπος by the principle is altered and changes, the neighboring parts change in accordance, expanding and contracting, so that by these means animal motion necessarily comes about.”

three-dimensional magnitude.¹³⁰

2.3.5 *Pneuma*, Joint, and the First Body

Returning to the analogy between *pneuma* and the joint, I conclude that in terms of spatial relationship, the analogy between *pneuma* and the mobile point (the ball) still holds. Just as the ball of a joint is external to and touched by the unmoved point in the socket, *pneuma* is external to and touched by the unmoved soul-principle. Both the unmoved soul-principle and the unmoved point are located at the center whereas *pneuma* and the mobile ball and the limb connected to it are located on the periphery.

Assuming that Aristotelian analogies are transitive,¹³¹ the analogy between the first body and *pneuma* and that between *pneuma* and joint are easily combined by the shared elements. So we have a triple analogy, as follows — X: the first body :: soul: *pneuma* :: unmoved point: ball. Based on our knowledge of the relation between the psychic principle and *pneuma*, we can work out what X is and how X relates to the heavenly first body. First, X is the unmoved, movement imparting principle of the first body. X moves the first body by touching it from the outside and X is thus not located *in* the heavenly sphere of the first body which is above the sublunary sphere of the four elements. It might be located either at the center of the universe or at the circumference

¹³⁰ See MA 9 703a1-3: “There must be some one thing that moves them [the left and the right parts of the middle section of the animal body] both, and this is the soul, which is distinct from a magnitude of this kind, though it is in it.”

¹³¹ This depends, of course, on whether for Aristotle there is only one relation between two things, so Caesar and Brutus cannot be at the same time friend-friend and father-son, for otherwise because Pullo is to Vorenus as Caesar is to Brutus as a friend to a friend, and I am to my son as Caesar is to Brutus as the father to the son, given transitivity, I’ll have to be my son’s friend and Pullo Vorenus’ father. Or perhaps for Aristotle things are in reality conceptually grasped, therefore there can only be one relation between two related things. In any case, the two pairs of analogy are too closely in parallel to allow for such a situation.

of the universe. And according to the theory of *Physics* 8.10, it is located at the circumference.¹³² This agrees well with my interpretation of *De Caelo*, according to which the unmoved mover of a heavenly sphere is external to the heavenly sphere it moves.

Second, the first body is a moved mover and an “instrument of motion” and it causes movement in other things by “pushing and pulling”. This feature is to be understood within Aristotle’s theory of concentric heavenly motions. The “other things” that a given spherical body, as a moved mover, moves are the concentric spherical bodies that lie within the spherical body in question.¹³³ It moves these subordinate spherical bodies by “pushing and pulling” their own unmoved movers with a motion that is incidental to the motions which their unmoved movers cause.¹³⁴ Thus the unmoved mover of any subordinate sphere is said to be unmoved *per se*, but moved *per accidens*.¹³⁵

¹³² *Physics* 8.10 267b6-9: “So [the unmoved mover of the universe] must occupy either the center or the circumference, since these are the principles. But the things nearest the mover are those whose motion is quickest, and in this case it is the motion of the circumference that is the quickest: therefore the mover occupies the circumference.”

¹³³ See *De Caelo* 2.12 293a4-11: “And there is a second reason why the other motions have each only one body, in that each of them except the last, i.e. that which contains the one star, is really moving many bodies. For this last sphere moves with many others, to which it is fixed, each sphere being actually a body; so that its movement will be a joint product. Each sphere, in fact, has its particular natural motion, to which the general movement is, as it were, added. But the force of any limited body is only adequate to moving a limited body.”

¹³⁴ See *Physics* 7.2. Pushing and pulling are by no means restricted to sublunary motions, as Corcilius and Gregorić (2013: 69) assert.

2.3.6 Why is Heaven Ensouled?

Now we are back to where we started. The reason why heaven is called “ensouled” is that it is related to an unmoved principle of motion in a similar way in which *pneuma* is related to its own unmoved principle. In neither case is the unmoved principle located directly in the first instrument of motion, therefore the fact that the unmoved principle is external to and at the circumference of the heavenly sphere is not contradictory with the sphere’s being “ensouled”. And if we are serious about the etymology and prefer to call the unmoved principle of heaven its “soul”, we would be following Simplicius’s interpretation of *De Caelo* 2.2 who regarded the world-soul as external to the body of which it is the soul.¹³⁶

¹³⁵ See my chapter 1 for the details.

¹³⁶ See Simplicius *In Aristotelis De Caelo Commentaria* 387, 13-17 (trans. Mueller 2004, p. 33): “Consequently, if someone asks how nature moves the heaven and how soul does so, one should not say, as Alexander did, that nature and soul are the same in that case. For how can they be the same if nature is a passive power of being moved which is present in a substratum which is moved, but soul is what causes motion from outside?” See Mueller’s note *ad loc.* p. 135: “For Simplicius, as for Neoplatonists generally, the World Soul is not ‘in’ the world; see, for example, Wallis (1995), pp. 51-3.”

2.4 Conclusion

In this chapter, I've shown that the received interpretation of Aristotle's theory of heavenly motion in *De Caelo* is problematic on the textual level. I argue that the first cause of heavenly motion is neither the heavenly sphere *qua* body, nor an unmoved soul which is directly located in it. I've shown that a unitarian reading of Aristotle's theory of heavenly motion is textually easier and doctrinally more sound than the developmental reading von Arnim and Guthrie held. In addition, crucially to my project, I show how the method of analogical reasoning is central to our understanding of how unmoved movers, across the board, cause motion. In the next two chapters, I inquire into the question of reciprocal and unilateral causation respectively.

Chapter 3 How to be a Passive-Aggressive Agent: Aristotle on Moved Movers

3.1 Introduction

The idea of an “unmoved mover” is indeed a counter-intuitive one: it seems that, in order to bring about some change in something else, whatever causes the change (the mover) must be itself active in some way or other, and that this “being itself active” may count as a change in the mover. For example, to carry this log from here to there, I must myself go from here to there; in order to go from here to there, my heart needs to pump blood into my bodily organs to move my limbs; to guide my heart’s pumping, my soul needs to be excited or attracted by some prospect: e.g. the acquisition of a pile of Green Notes. Indeed, most thinkers around Aristotle’s time, with the exception of Aristotle and his students Theophrastus and Eudemos, believed that all movers need to be themselves in motion to bring about motion in something else.¹ Aristotle’s notion of an “unmoved mover” is therefore a relatively new idea which reacts against the *communis opinio* of his day—that all movers are moved or in motion,² and we see this most clearly in his argumentation in *Physics* 8.5, which I analyzed in chapter 1.

Now, as we can see from the arguments in *Physics* 8.5, Aristotle’s positing an unmoved mover doesn’t mean that there are no moved movers—i.e. movers that are themselves moved with some relevant motion—in his universe. His main reason for positing an unmoved mover is that the idea of a *first* mover that is moved is absurd: what

¹ See Menn (2012: 431 and n. 18). Anaxagoras’ νοῦς maybe an exception, see e.g. *Physics* 8.5 256b24-27. However, Anaxagoras does think that νοῦς is bodily, though the finest of bodies, and that it starts the revolution of the universe with its own rotation (περιχωρεῖν) (see *DK* B12).

² Aristotle thinks that what is in motion is always moved by something else, yet this is not necessarily the case for his contemporaries.

is moved *per se* is always moved by something else, so it cannot be the *first* mover. So, it is only the first member of a given series of movers that needs to be unmoved, while the rest in the series are moved movers: there are indeed a great number of moved movers in Aristotle's universe, a great deal more than the unmoved movers.

3.2 The Notion of Moved Mover:³ Two Difficulties

(1) Difficulty #1

The very notion of *moved mover* involves a certain difficulty. (a) On the one hand, the notion of *moved mover* requires that a moved mover cause motion in something else *by itself undergoing some causally relevant motion*—that is to say, by *hosting* some causally relevant motion *in* itself. A “moved mover” (τὸ κινεῖν κινούμενον) is not just a mover that undergoes any random motion: the motion that the mover undergoes has to have some causal relation with the motion it causes. A “moved mover” is a mover that causes some motion K in something *by itself undergoing a causally relevant motion R*. To give an Aristotelian example, when someone moves a pebble on the ground using a stick, the stick is a moved mover in that it causes the stone to be moved locally *by itself undergoing some locomotion*, and the same applies to the hand that causes the stick to be moved.⁴ The stick might be changing its temperature at the same time, but since this change is, for the sake of argument, irrelevant to its causing motion in the pebble, the stick is not a moved mover in the sense that its temperature changes.

³ See *Physics* 3.1 201a21-25: ὥστε καὶ τὸ κινεῖν φυσικῶς κινητόν· πᾶν γὰρ τὸ τοιοῦτον κινεῖ κινούμενον καὶ αὐτό.

See also *De Anima* 3.10 433b13-: ἐπεὶ δ' ἔστι τρία, ἐν μὲν τὸ κινεῖν, δεύτερον δ' ὃ κινεῖ, ἔτι τρίτον τὸ κινούμενον, τὸ δὲ κινεῖν διττόν, τὸ μὲν ἀκίνητον, τὸ δὲ κινεῖν καὶ κινούμενον, ἔστι δὴ τὸ μὲν ἀκίνητον τὸ πρακτὸν ἀγαθόν, τὸ δὲ κινεῖν καὶ κινούμενον τὸ ὀρεκτικόν.

See also *Metaphysics* Λ 7 1072a24: ἐπεὶ δὲ τὸ κινούμενον καὶ κινεῖν [καὶ] μέσον... .

(b) On the other hand, a moved mover is, *ipso facto*, a mover that causes motion, so it has to satisfy Aristotle's general definitions of τὸ κινεῖν and κίνησις in *Physics* 3.1-3⁵. As I show right below, Aristotle's definition of κίνησις in *Physics* 3.1-3 as "an actuality⁶ of what is potential as potential" requires that the actuality of the mover, in so far as it causes motion, be located *in* the thing moved and *not in* the mover itself. Aristotle specifically denies the possibility of there being two actualities in a single causal event, the one in the mover, the other in the thing moved, therefore a moved mover *qua* mover does not itself *host* any actuality or motion. This means that the motion that is hosted *in* a moved mover is not its actuality in so far as it is a mover.⁷ Now we have a dilemma in (a) and (b).

Let me explain with a summary of *Physics* 3.1-3 why, for Aristotle, a mover *qua* mover can't host any actuality or motion. Aristotle defines κίνησις as "the actuality (ἐντελέχεια) of what is potential as potential" (ἡ τοῦ δυνατοῦ, ἢ δυνατόν, ἐντελέχεια φανερόν ὅτι κίνησις ἐστίν) in *Physics* 3.1 201b4-5⁸. After defending the soundness (καλῶς εἴρηται 201b16) of his definition in chapter 2, Aristotle is confronted with a

⁴ See *Physics* 8.5 256a6-9.

⁵ Aristotle nowhere suggests that such definitions apply only to the unmoved movers.

⁶ See note 8 below.

⁷ For example, the actuality of medicine as something that causes health is the change that takes place in the patient's body, namely the body's getting healthy, and it is not same as the changes that the medicine itself as a bodily material undergoes, relevant though they are to causing health.

⁸ There is much debate on how to interpret this definition. For a recent summary of this debate plus bibliography, see Coope (2009: 277-291). For my purpose in this chapter, I take it that (1) whether we understand ἐντελέχεια to mean "actualization" or "actuality", the whole package "ἐντελέχεια of what is potential as potential" describes κίνησις as a *process* of actualization of some potential, so, although I use "actuality" throughout for the sake of consistency, I don't mean to suggest that "actualization of what is potential of potential" isn't a correct understanding of this definition, and (2) the "potential" is a potential for some state, not a potential for some change (*pace* Heinaman).

puzzle (ἔχει δ'ἀπορίαν 202a21) in chapter 3: the definition might be ambiguous.⁹ Given that there is always an agent and a patient for any qualitative change, or, in general, always a mover and something moved for any motion, which of the two—the mover or the thing moved—is “the potential thing” (τὸ δυνατόν) to which the actuality (ἐντελέχεια) *belongs* (note the genitive in “ἡ τοῦ δυνατοῦ [ἐντελέχεια]”), and which of the two is this actuality *in*? Now, a natural answer to this question seems to be: “both.” This means that the mover, on the one hand, has the potential to cause motion and an actuality occurs *in* the mover when this active potential is being actualized, whereas the thing moved, on the other hand, has the potential to be moved and another actuality occurs *in* the moved when this passive potential is being actualized. Thus, a causal event occurs when a mover actualizes *qua* having the potential to cause motion *and* the thing moved actualizes *qua* having the potential to be moved; there are then always *two* actualities involved in a single causal event. We can appreciate the naturalness of this answer with the case of teaching and learning. It is indeed natural to think that, in order for a teacher to teach, she needs to actualize her teaching art, which is potential when she is not using it, and that this actuality is located in the teacher and is a *different* one from the actuality on the student’s part.¹⁰ So a successful teaching consists of two actualities happening at the same time in two different subjects: the teacher actualizes her teaching potential and

⁹ See *Physics* 3.3 202a21-36. I think 202a21 should be the start of chapter 3, and 202a13-21 is either interpolated from *Metaphysics* 1066a26-34, or extrapolated from 202a36. Ross didn’t mention the issue in his commentary.

¹⁰ See e.g. Gill (1991: 210): “The agent’s action is an activity, which takes place in the agent, and that activity causes a change, which takes place in the patient. Aristotle argues in *Physics* III. 3 that the change in the patient is also a change of (but not in) the agent and uses this argument to show that the change in the patient is a sustained progression toward a goal. It is the agent’s activity, however—a motion distinct from the change in the patient—that explains the change.” Gill appears to be assigning two κινήσεις to an agent here, the one being its activity which is in it, the other being the change in the patient which is also *of* the agent.

teaching (δίδαξις, which is an ἐντελέχεια) is in the teacher, whereas the student actualizes his learning potential and learning (μάθησις, which is a *different* ἐντελέχεια from δίδαξις) is in the student.¹¹

Aristotle's solution to the puzzle in *Physics* 3.3 is rather different. Since my purpose is not to analyze his arguments but to use his conclusion, I offer a paraphrase of the arguments here.¹² In short, Aristotle argues that (1) one κίνησις consists of one actuality only, of *both* the mover *and* the thing moved, and that (2) this actuality takes place in the thing moved alone.¹³ (1) It is impossible for there to be two actualities. For if there were one actuality in the mover and another actuality in the moved, either every mover would be moved, or though having motion, it would not be moved. Both are impossible. The first is impossible because of infinite regress (Aristotle's standard argument against making all movers moved). The second is impossible because the definition of "having motion" is just "being moved". If both actualities were in the moved, then, first, the actuality of the mover would not be in the mover (which is why people suppose that there are two actualities in the first place), and second, a thing will have two motions in the same respect at the same time. So both actualities cannot be in the moved. (2) Given that there is only one actuality, it makes sense that it is *in* the thing that undergoes the motion. So the actuality of the mover and the actuality of the moved,

¹¹ Similarly, the first mover of the universe contemplates and this contemplation is a different actuality from the actuality with which it causes the universe to move.

¹² For an excellent analysis see Coope (2005).

¹³ See *Physics* 3.3 202a13-20: "the solution of the difficulty is plain: motion is in the moved. It is the fulfilment of this potentiality, and by the action of that which has the power of causing motion; and the actuality of that which has the power of causing motion is not other than the actuality of the movable, for it must be the fulfilment of both. A thing is capable of causing motion because it can do this, it is a mover because it actually does it. But it is on the movable that it is capable of acting. Hence there is a single actuality of both alike, just as one to two and two to one are the same interval, and the steep ascent and the steep descent are one-for these are one and the same.

although they differ in definition or account, are *one in number* in the sense in which the road from Thebes to Athens and the road from Athens to Thebes are one in number but two in definition or account.¹⁴

What this means is that a motion-based model¹⁵ in which some motion X in some thing A causes some motion Y in something B is wrong as an interpretation of Aristotle's theory of causation. As Coope points out in her excellent article, "in modern discussion of causation, a cause and its effects are usually assumed to be two distinct *events* and debates focus on the question of what relation must hold between these two *events* if one is to be the cause of the other. Against this background, Aristotle's claim that the action of the agent is the same as the change undergone by the patient can seem very odd indeed.¹⁶" In other words, for Aristotle, motion by itself doesn't cause another motion, rather, motion is caused by some mover onto something moved. What is interesting is that this applies to Aristotle's theory of causation in general and is not just restricted to his theory of how uncaused causes—unaffected agents or unmoved movers in general—cause change.¹⁷ Thus, the actuality of a moved mover is the same as the motion undergone by the thing moved, and not the same as the motion undergone by the mover itself.

What, then, is the relation between the motion undergone by a moved mover and

although they can be described in different ways. So it is with the mover and the moved."

¹⁴ See *Physics* 3.3 202b13-15.

¹⁵ I should maybe talk about "motion/change" rather than "motion" here and below, however, I stick to "motion" for the sake of brevity and consistency with other related terms.

¹⁶ See Coope (2005: 215-6, italics mine). For the tendency to view motion itself as a cause, see e.g. Kosman (1994: 147): "it is in this sense that the primary motion itself may be termed unmoved—ἀκίνητον"; (*ibid.*: 150): "At one level, the Prime Mover is the ceaseless encircling motion of the outer most heavenly sphere"; (*ibid.*: 151): "As self-moving, it [i.e. the Prime Mover] is the principle of the motion of all lesser animate self-movers."

¹⁷ In fact, an unmoved mover trivially is unmoved, so its actualization has to be in the thing

the motion it causes? If the motion-based model¹⁸ is wrong, in what sense do we claim that a moved mover causes motion *by itself* undergoing motion?

(2) Difficulty #2

There is another difficulty concerning Aristotle's notion of *moved mover*. It seems difficult to pinpoint the causally relevant motion undergoing which a moved mover functions as a moved mover. Aristotle offers two answers that seem mutually exclusive, in *Physics* 8 and *De Anima* 3, and in *GC* 1 and *Physics* 3 respectively.

On the one hand, a moved mover is described by Aristotle as an “instrument” (τὸ ὄργανον = τὸ κινεῖν) or a “medium” (τὸ μέσον) of motion.¹⁹ Since an instrument is always used by some agent on some patient, and a medium is always what lies between the first and the last one in the series, what Aristotle has in mind is a chain consisted of three members with the moved mover in the middle: (A) the unmoved mover, (B) the moved mover (collectively speaking if there are more than one), and (C) the thing moved: A moves B, and B, moved by A, moves C.

There must be three things—the moved, the mover, and *the instrument of motion* (τὸ ὄργανον κινεῖν). Now the moved must be in motion, but it need not move anything else: *the instrument of motion must both move something else and be itself in motion* (καὶ κινεῖν καὶ κινεῖσθαι) (*for it changes together with the moved, with which it is in contact and continuous, as is clear in the case of things that move other things locally, in which case the two things must up to a certain point be in*

moved.

¹⁸ I.e. Some motion *x* in A causes some motion *y* in B.

contact): and the mover—that is to say, that which causes motion in such a manner that it is not merely the instrument of motion—must be unmoved.²⁰

(*Physics* 8.5 256b13-21)

Also in *De Anima*:

All motion involves three factors, that mover, *the instrument of motion* (ὃ κινεῖ), and that which is moved. The mover is of two kinds: it is either something which itself is unmoved or that which moves and is moved. Here that which moves without itself being moved is the practical good, *that which moves and is moved* is the faculty of appetite (for that which is influenced by appetite so far as it is actually so influenced is set in motion, and appetite in the sense of actual appetite is a kind of motion), while that which is in motion is the animal. *The instrument which appetite employs to produce movement* (ὃ δὲ κινεῖ ὄργανον ἢ ὄρεξις) is no longer psychical but bodily: hence the examination of it falls within the province of the functions common to body and soul.²¹ (*De Anima* 3.10 433b13-21, trans. Smith in Barnes)

¹⁹ See e.g. in *Metaphysics* Λ 7 1072a24.

²⁰ τρία γὰρ ἀνάγκη εἶναι, τό τε κινούμενον καὶ τὸ κινῶν καὶ τὸ ὃ κινεῖ. τὸ μὲν οὖν κινούμενον ἀνάγκη κινεῖσθαι, κινεῖν δ' οὐκ ἀνάγκη· τὸ δ' ὃ κινεῖ, καὶ κινεῖν καὶ κινεῖσθαι (συμμεταβάλλει γὰρ τοῦτο ἅμα καὶ κατὰ τὸ αὐτὸ τῷ κινουμένῳ ὄν· δηλὸν δ' ἐπὶ τῶν κατὰ τόπον κινούντων· ἅπτεσθαι γὰρ ἀλλήλων ἀνάγκη μέχρι τινός)· τὸ δὲ κινῶν οὕτως ὥστ' εἶναι μὴ ὃ κινεῖ, ἀκίνητον.

²¹ ἐπεὶ δ' ἔστι τρία, ἐν μὲν τὸ κινῶν, δεύτερον δ' ὃ κινεῖ, ἔτι τρίτον τὸ κινούμενον, τὸ δὲ κινῶν διττόν, τὸ μὲν ἀκίνητον, τὸ δὲ κινῶν καὶ κινούμενον, ἔστι δὴ τὸ μὲν ἀκίνητον τὸ πρακτὸν ἀγαθόν, τὸ δὲ κινῶν καὶ κινούμενον τὸ ὀρεκτικόν (κινεῖται γὰρ τὸ κινούμενον ἢ ὀρέγεται, καὶ ἢ ὄρεξις κίνησις τίς ἐστιν, ἢ ἐνεργεία), τὸ δὲ κινούμενον τὸ ζῶον· ὃ δὲ κινεῖ ὄργανον ἢ ὄρεξις, ἥδη τοῦτο σωματικόν ἐστιν—διὸ ἐν τοῖς κοινοῖς σώματος καὶ ψυχῆς ἔργοις θεωρητέον περὶ αὐτοῦ. (Text: W. D. Ross, OCT, Oxford, 1956)

As can be seen, as the middle member in a series of things involved in motion, a moved mover is (1) “moved” in the sense that it is moved by something prior to it in the causal chain, be it another moved mover or the unmoved first mover; it is (2) “mover” in the sense that it causes motion in something posterior to it in the causal chain. Admittedly, in the second, *De Anima* passage Aristotle employs a slightly different terminology,²² however, it is clear that the animal bodily organs, as instruments,²³ are moved by the appetite and cause motion in some further thing, whereas the appetite, as a moved mover, is moved by the practical good which is again causally prior.²⁴ Let’s call this the “chain model” of moved mover. In such a model, the causally relevant motion a moved mover undergoes as such is caused by the causally prior mover.

In *De Generatione et Corruptione* (hence *GC*) 1, on the other hand, Aristotle offers an apparently different, “reciprocal model” of moved mover:

Now, in motion, there is nothing to prevent the first mover being unmoved (indeed, as regards some first movers this is actually necessary) although *the last mover always causes motion by being itself moved*: and, in action, there is nothing to prevent the first agent being unaffected, while the last agent only acts by suffering action itself. For if things have not the same matter, the agent acts without being affected: thus the art of healing produces health without itself being acted upon in any way by that which is being healed. *But the food, in acting, is itself in some way acted upon* <by that which is being healed>: for, in acting, it is

²² See chapter 4 for a relevant analysis of this passage.

²³ Our word “organ” comes from the Aristotelian understanding of bodily organs as instruments, i.e. ὄργανα, of the soul.

²⁴ Similarly, see *De Anima* 2.7 419a13-15 on how air acts as an intermediary between a colored

simultaneously heated or cooled or otherwise affected. Now the art of healing corresponds to an origin, *while the food corresponds to the last and contiguous mover*.²⁵ (GC 1.7 324a30-b4, trans. Joachim)

Similarly, Aristotle seems to have the reciprocal model in mind in the first two chapters of *Physics* 3:

The same thing can be both potential and fulfilled, not indeed at the same time or *not in the same respect, but e.g. potentially hot and actually cold*. Hence such things will act and be acted on *by one another* (ὕπ’ ἀλλήλων) in many ways: *each of them will be capable at the same time of acting and of being acted upon*. Hence, too, *what causes motion as a natural agent can be moved: when a thing of this kind causes motion, it is itself also moved*. This, indeed, has led some people to suppose *that every mover is moved*. But this question depends on another set of arguments, and the truth will be made clear later.²⁶ (*Physics* 3.1 201a19-27)

object and the eye.

²⁵ Τὸ μὲν οὖν πρῶτον κινεῖν οὐδὲν κωλύει ἐν μὲν κινήσει ἀκίνητον εἶναι· ἐπ’ ἐνίων δὲ καὶ ἀναγκαῖον· τὸ δ’ ἔσχατον ἀεὶ κινεῖν κινούμενον. Ἐπὶ δὲ ποιήσεως τὸ μὲν πρῶτον ἀπαθές, τὸ δ’ ἔσχατον καὶ αὐτὸ πάσχον· ὅσα γὰρ μὴ ἔχει τὴν αὐτὴν ὕλην, ποιεῖ ἀπαθῆ ὄντα, οἷον ἡ ἱατρικὴ· αὐτὴ γὰρ ποιοῦσα ὑγίειαν οὐδὲν πάσχει ὑπὸ τοῦ ὑγιαζομένου. Τὸ δὲ σιτίον ποιοῦν καὶ αὐτὸ πάσχει τι· ἡ γὰρ θερμαίνεται ἢ ψύχεται ἢ ἄλλο τι πάσχει ἅμα ποιοῦν. Ἔστι δὲ ἡ μὲν ἱατρικὴ ὥς ἀρχή, τὸ δὲ σιτίον τὸ ἔσχατον καὶ ἀπτόμενον. (Text: H. H. Joachim, *Aristotle on Coming-to-be and Passing-away*, Clarendon Press, Oxford, 1922)

²⁶ ἐπεὶ δ’ ἐνια ταῦτα καὶ δυνάμει καὶ ἐντελεχείᾳ ἐστίν, οὐχ ἅμα δὲ ἢ οὐ κατὰ τὸ αὐτό, ἀλλ’ οἷον θερμὸν μὲν ἐντελεχείᾳ ψυχρὸν δὲ δυνάμει, πολλὰ ἤδη ποιήσει καὶ πείσεται ὑπ’ ἀλλήλων· ἅπαν γὰρ ἔσται ἅμα ποιητικὸν καὶ παθητικόν. ὥστε καὶ τὸ κινεῖν φυσικῶς κινήτόν· πᾶν γὰρ τὸ τοιοῦτον κινεῖ κινούμενον καὶ αὐτό. δοκεῖ μὲν οὖν τισιν ἅπαν κινεῖσθαι τὸ κινεῖν, οὐ μὴν ἀλλὰ

The mover too is moved, as has been said—every mover, that is, which is capable of motion, and whose immobility is rest—when a thing is subject to motion its immobility is rest. For to act on the movable as such is just to move it. *But this [the mover] does by contact, so that at the same time it is also acted on.* Hence we can define motion as the fulfillment of the movable qua movable, the cause being contact with what can move so that the mover is also acted on. The mover or agent will always be the vehicle of a form, either a ‘this’ or ‘such’, which, when it acts, will be the source and cause of the change, e.g. the full-formed man begets man from what is potentially man.²⁷ (*Physics* 3.2 202a3-12)

We shall revisit these passages below. For the moment, the crucial fact to notice is that here, in the reciprocal model, a moved mover is said to be moved *reciprocally by what it moves*.²⁸ Moreover, the fact that a moved mover is moved by what it moves is not just a *byproduct* of its being moved by some causally prior mover. It seems that it is precisely

περὶ τούτου μὲν ἐξ ἄλλων ἔσται δῆλον ὅπως ἔχει.

²⁷ κινεῖται δὲ καὶ τὸ κινεῶν ὥσπερ εἴρηται πᾶν, τὸ δυνάμει ὄν κινήτῳ, καὶ οὗ ἡ ἀκίνησία ἡρεμία ἐστίν (ὅ γὰρ ἡ κίνησις ὑπάρχει, τούτου ἡ ἀκίνησία ἡρεμία). τὸ γὰρ πρὸς τοῦτο ἐνεργεῖν, ἢ τοιοῦτον, αὐτὸ τὸ κινεῖν ἐστὶ· τοῦτο δὲ ποιεῖ θίξει, ὥστε ἅμα καὶ πάσχει· διὸ ἡ κίνησις ἐντελέχεια τοῦ κινήτου, ἢ κινήτου, συμβαίνει δὲ τοῦτο θίξει τοῦ κινήτου, ὥσθ’ ἅμα καὶ πάσχει. εἶδος δὲ αἰεὶ οἴσεται τι τὸ κινεῶν, ἥτοι τόδε ἢ τοιόνδε ἢ τοσόνδε, ὃ ἔσται ἀρχὴ καὶ αἰτίον τῆς κινήσεως, ὅταν κινή, οἷον ὁ ἐντελεχία ἄνθρωπος ποιεῖ ἐκ τοῦ δυνάμει ὄντος ἀνθρώπου ἄνθρωπον.

²⁸ Gill (1991:197-198) argues that in the second paragraph, the change that the movable mover suffers is not caused by what it moves. This is most definitely wrong if one reads the second paragraph in the light of the first paragraph and *GC* 1.6. She appears to think that the motion that according to Aristotle has to be in the moved counts in some way as a passion of the mover, so that the mover “simultaneously suffers, not by the moved, but in relation to it or, as Aristotle puts it in *Physics* 3.2, by the contact” (p. 198). She later identifies this passion with the change of the mover from, say, “is building” to “has built” which corresponds to the change from the building in progress and the finished building (p. 206). She wants to distinguish this kind of mover which is an agent for an end from the end itself which is for her an unmoved mover. However, the crucial problem for Gill is still that the action of the mover is in the thing moved, so the the building action’s attaining its goal is no other than the change from the building in progress to the finished building.

by being moved by what it moves that a moved mover causes motion in what it moves. Take the example of food/medicine in the first passage: it is precisely by being heated reciprocally by the body in the process of digestion that the medicine cools the body down to a temperature that is healthy.²⁹ It seems, therefore, following our definition of moved mover in section 3.2, that a certain medicine is a moved mover in that it is moved reciprocally by the body it treats, and not in that it is administered and hence moved by the doctor with his medical art, which is causally prior. So, according to the second, reciprocal model, the motion that a moved mover undergoes as such is caused by what the moved mover moves.

The two models appear to clash. A “chain modelist” thinks that a moved mover is a “moved mover” in the sense that it is moved *by a causally prior mover* and then causes motion by *assimilating* its object to its own motion, whereas a “reciprocal modelist” thinks that a moved mover is “moved” in the sense that it, in moving its object, is moved by its object in return.³⁰ Therefore, if we take the motion that a moved mover undergoes as such to be caused by one mover alone, it has to be caused *either* by the causally prior mover *or* by the causally posterior object. Indeed, it has been thought that the chain model alone applies to locomotion, while the reciprocal model applies to qualitative and quantitative change.³¹

²⁹ This healthy bodily temperature is “either health or part of health or is followed by a part of health or health itself” (*Metaphysics Z* 9 1034a27-28).

For the medical background of the day, see Hippocrates *On the sacred disease*.

³⁰ See Wildberg (2004: 236) for a succinct presentation of the problem. Wildberg sees this as a clash between *Physics* and *GC*, but, as I have shown, the reciprocal model appears in the *Physics* as well. See also my discussion in section 3.5.2 below.

³¹ See e.g. Abel B. Franco “Avempace, Projectile Motion, and Impetus Theory” in *Journal of the History of Ideas*, Vol. 64, No. 4 (Oct., 2003), pp. 543: “Aristotle only accepted a ‘reciprocal action’—i.e., an action exerted by the object moved on its mover following the action of the latter on the former—in cases of alteration but not in those in which a moving force causes a local

In what comes below, I respond to both these difficulties. First, I show with evidence from *Physics* 7.2 and *Physics* 8.10 that, in the case of locomotion and especially that of projectile motion, both models are at work, so they are not necessarily in conflict. Second, more importantly, I argue that, according to Aristotle’s relevant theories, “moved mover” should be understood as “*movable* mover” in the sense that its “movedness” is tied not to an actual motion but to a spectrum of *possible* motions which might run contrary to one another. This, I think, answers (1) the question why a moved mover is moved both by the causally prior and by the causally posterior movers, and (2) the question why the motion in a moved mover is not its actuality *qua* mover—difficulties #1 and #2 respectively. I clarify what I mean in the following two sections.

3.3 The Case of the Locally Moved Mover

3.3.1 Carrying, Pushing, and Pulling in *Physics* 7.2

First, let us look at locomotion. It is claimed that only the chain model, and not the reciprocal model, applies to locomotion.³² However, it is important to realize that a dynamically caused locomotion³³ never excludes but always implies reciprocal causation, so that e.g. a stick in pushing a pebble forward is itself also hindered in its forward

motion.”

See also Manuwald (1989: 15 n. 31): “Die vom Arzt verordnete heilende Speise liegt als solche fertig vor und wird vom zu heilenden Organismus, auf den sie einwirkt, ihrerseits affiziert. Sie wirkt nicht dadurch, dass sie die Qualitäten, welche sie im Organismus hervorruft, gleichzeitig selbst erhält. Dagegen wird in einer örtlichen Bewegungskette C von B dadurch bewegt, dass dieses seinerseits in gleicher Weise von A bewegt wird.”

This misconception is partly due to Aristotle’s misleading expression in GC 1.6 323a23-25, which seems to restrict reciprocal causation to qualitative change: “the definition of reciprocal touch (πρὸς ἀλλήλα δὲ) holds between two things, one able to cause motion and the other able to be moved in such a way that both action and passion belong to them.” See Zabarella *ad loc.* See also Natali (2004: 213): “only in alteration is there reciprocal contact.”

³² See the preceding note.

motion by it. The evidence comes from *Physics* 7.

Aristotle's labor in *Physics* 7.2 is precisely to prove that a mover is always *together* (ἄμα)—in touch—³⁴with that which is moved by it, and that this applies to *all* three kinds of motion or change: local, qualitative, and quantitative. He proves the case inductively by discussing all three kinds of motion. In his discussion of locomotion in the first and the main part of the chapter, Aristotle's strategy is to show that (1) all kinds of locomotion are reducible to pulling and pushing, and (2) pulling and pushing can only happen between things that are in physical touch.

First, Aristotle reduces the four kinds of externally caused locomotion (φορά)—pulling (ἔλξις), pushing (ῥωσις), carrying (ὄχησις), and twirling (δίνησις)—to pulling and pushing:

The motion of things that are moved by something else must proceed in one of four ways: for there are four kinds of locomotion caused by something other than that which is in motion, viz. pulling, pushing, carrying, and twirling. ... All other kinds of locomotion must be similarly reduced (ἀνάγειν), for they all fall under one or other of our four heads. And again, of these four, carrying and twirling are [reduced] to pulling and pushing. For carrying always follows one of the other three methods, for that which is carried is in motion accidentally, because it is in or upon something that is in motion, and *that which carries it is in doing so being either pulled or pushed or twirled; thus carrying belongs to all the other three*

³³ As opposed to, say, the eternal locomotion of the heavenly spheres.

³⁴ In other words, “there is nothing between moved and mover” (*Physics* 7.2 244a5-6). For this interpretation of “together”, see Ross (1936: 627): “it is evident that Aristotle's meaning [at *Physics* 5.2 226b22] is that two things are ἄμα if they are in one place which contains nothing but

kinds of motion in common. And twirling is a compound of pulling and pushing, for that which is twirling a thing must be pulling one part of the thing and pushing another part, since it impels one part away from itself and another part towards itself.³⁵ (*Physics* 7.2 243a15-244a3)

It might seem strange, at first sight, that what appear to us to be dynamic actions—pulling and pushing—are classified as kinds of locomotion, which we tend to view as a state or a quality. Yet just as the words for pulling and pushing (ἔλξις and ὥσις) nominalize the activities of pulling and pushing (ἔλκειν and ὠθεῖν), the word for generic locomotion (φορά) nominalizes the generic activity of bearing (φέρειν), therefore locomotion is always seen by Aristotle as a *dynamic* process: carrying, pushing, pulling, and twirling are all kinds of locomotion that are caused by some mover that carries, pushes, pulls, or twirls. Indeed, since Aristotle operates in a world of plenum where friction (i.e. external hindrance) is always assumed, things that are in any kind of motion will not keep in motion unless there is some mover that keeps it so. This means that, for Aristotle, motion is not a static quality or state that can be passed on: rather, motion is change from one state to another by either internal or external power.³⁶ So when A

the two, i.e. where there is nothing between them.”

³⁵ ὅσα δ' ὑπ' ἄλλου κινεῖται, τετραχῶς ἀνάγκη γίνεσθαι· τέτταρα γὰρ εἶδη τῆς ὑπ' ἄλλου φορᾶς, ἔλξις, ὥσις, ὄχησις, δίνησις. ... δεῖ δὲ καὶ τὰς ἄλλας τὰς κατὰ τόπον ἀνάγειν· ἅπασαι γὰρ πίπτουσιν εἰς τέσσαρας ταύτας. Τούτων δὲ πάλιν ἡ ὄχησις καὶ ἡ δίνησις εἰς ἔλξιν καὶ ὥσιν. ἡ μὲν γὰρ ὄχησις κατὰ τούτων τινὰ τῶν τριῶν τρόπων ἐστίν (τὸ μὲν γὰρ ὀχούμενον κινεῖται κατὰ συμβεβηκός, ὅτι ἐν κινουμένῳ ἐστὶν ἢ ἐπὶ κινουμένου τινός, τὸ δ' ὀχοῦν ὀχεῖ ἢ ἐλκόμενον ἢ ὠθούμενον ἢ δινούμενον, ὥστε κοινὴ ἐστὶν ἀπασῶν τῶν τριῶν ἡ ὄχησις)· ἡ δὲ δίνησις σύγκειται ἐξ ἑλξεῶς τε καὶ ὥσεως· ἀνάγκη γὰρ τὸ δινούμενόν τὸ μὲν ἔλκειν τὸ δ' ὠθεῖν· τὸ μὲν γὰρ ἀφ' αὐτοῦ τὸ δὲ πρὸς αὐτὸ ἄγει.

³⁶ See most clearly at *Physics* 5.1 224b13-15: “Here, however, a difficulty may be raised. Affections, it may be said, are motions, and whiteness is an affection: thus there may be change to a motion. To this we may reply that it is not whiteness but whitening that is a motion.”

causes B to move with some motion M, B is not *of* a quality or *in* a state that is M; rather, it is *changing* from state X to state Y, which change is called M for short.

Next, Aristotle shows why pushing and pulling by definition imply touch:

If, therefore, it can be shown that what is pushing and what is pulling are together with (ἅμα) what is being pushed and what is being pulled, it will be evident that in all locomotion there is nothing intermediate between moved and mover. But the former fact is clear even from the *definitions* of pushing and pulling, for pushing is motion to something else from oneself or from something else, and pulling is motion from something else to oneself or to something else, when the motion of that which is pulling is quicker than the motion that would separate from one another the two things that are continuous: for it is this that causes one thing to be pulled on along with the other. ... *Now it is impossible to move anything either from oneself to something else (i.e. to push) or something else to oneself (i.e. to pull) without being in touch with it (μὴ ἀπτόμενον)*: it is evident, therefore, that in all locomotion there is nothing intermediate between moved and mover.³⁷

(*Ibid.* 7.2 244a4-b1)

See also Lindberg (2009: 297-8) for a short history of the interpretation of Aristotle's theory of motion in the medieval period. It looks as if Averroes and Albert Magnus got it right against Avicenna and Buridan. The latter pair developed something close to the impetus theory.

³⁷ ὥστ' εἰ τὸ ὠθοῦν καὶ τὸ ἔλκον ἅμα τῷ ὠθούμενῳ καὶ τῷ ἐλκομένῳ, φανερόν ὅτι τοῦ κατὰ τόπον κινουμένου καὶ κινουόντος οὐδέν ἐστι μεταξύ. ἀλλὰ μὴν τοῦτο δηλὸν καὶ ἐκ τῶν ὀρισμῶν· ὅσας μὲν γὰρ ἐστὶν ἡ ἀφ' αὐτοῦ ἢ ἀπ' ἄλλου πρὸς ἄλλο κίνησις, ἕλξις δὲ ἡ ἀπ' ἄλλου πρὸς αὐτὸ ἢ πρὸς ἄλλο, ὅταν θάπτων ἡ κίνησις ἢ [τοῦ ἔλκοντος] τῆς χωρίζουσιν ἀπ' ἀλλήλων τὰ συνεχῆ· οὕτω γὰρ συνεφέκεται θάτερον. (τάχα δὲ δόξειεν ἂν εἶναί τις ἕλξις καὶ ἄλλως· τὸ γὰρ ζύλον ἔλκει τὸ πῦρ οὐχ οὕτως. τὸ δ' οὐθὲν διαφέρει κινουμένου τοῦ ἔλκοντος ἢ μένοντος ἔλκειν· ὅτε μὲν γὰρ ἔλκει οὗ ἔστιν, ὅτε δὲ οὗ ἦν.) ἀδύνατον δὲ ἡ ἀφ' αὐτοῦ πρὸς ἄλλο ἢ ἀπ' ἄλλου πρὸς αὐτὸ κινεῖν μὴ ἀπτόμενον, ὥστε φανερόν ὅτι τοῦ κατὰ τόπον κινουμένου καὶ κινουόντος οὐδέν ἐστι μεταξύ.

So, for any kind of locomotion, there needs to be both a mover and something that is moved, and the mover and the thing moved are in touch. Now, although it is crucial for Aristotle's theory of an unmoved mover that touch can be unilateral,³⁸ touch is for the most part reciprocal: when A touches B, B reciprocally touches A³⁹. In this more common scenario, given that A causes motion in B by touching B and to touch properly is just to cause motion,⁴⁰ it follows that B reciprocally causes motion in A. This is indeed what Aristotle says in the first passage quoted in this section, for in explaining why carrying belongs to either pushing, pulling, or twirling, he claims "that which carries, in doing so, is being either pulled or pushed or twirled (sc. by the thing carried)" (τὸ δ' ὁχοῦν ὁχεῖ ἢ ἐλκόμενον ἢ ὠθούμενον ἢ δινούμενον: 243b20-244a1). That is to say, because the reciprocal motion the mover undergoes is of one of the three kinds, the motion the mover causes, i.e. the carrying or pulling of the moved, is reducible to one of the three kinds. I'll offer a tentative answer below *why* a moved local mover always undergoes reciprocal motion while causing motion. For the moment, it is important to see from the evidence I offer above *that* Aristotle does believe that a moved local mover, while it is unquestionably moved by a mover that is causally prior, always *reciprocally touches* the thing it moves and hence is always *reciprocally moved* in some way.

3.3.2 Projectile Motion in *Physics* 8.10

The reason why some people may object to including reciprocal causation in locomotion is this: in what we would call perfectly inelastic collision (e.g. Aristotle's

³⁸ See discussion below on GC 1.6.

³⁹ See GC 1.6 323a25-27. The passage is to be analyzed below.

⁴⁰ See GC 1.6 322b32-3 and chapter 4, section 4.2.

example of a stick moving a pebble in *Physics* 8.5), we see that there is one single motion—i.e. the motion forward—that is shared by both the moved mover and the thing moved, and given that for Aristotle it is motion, not the potential for motion, that signifies causation,⁴¹ it seems that there is only one-way causation in this kind of locomotion because there is only one-way motion. However, one single motion or change may be the combined outcome of different causal events, so the fact that there is only one-way motion doesn't guarantee that there is no reciprocal causation.⁴² It may well be the case that the apparently simple motion of the stick has a complex causal history. A famous discussion in *Physics* 8.10 reveals this, upon some reflection.

In *Physics* 8.10, just before he finally locates the first unmoved mover of the universe on its periphery, Aristotle digresses to discussing the problem of projectile motion:⁴³

But first it will be well to discuss a difficulty that arises in connection with locomotion. If everything that is in motion with the exception of things that move themselves is moved by something else, how is it that some things, e.g. things thrown, continue to be in motion when their mover is no longer in contact with them? If we say that the mover in such cases moves something else at the same time, that the thrower e.g. also moves the air, and that this in being moved is also

⁴¹ Just like it is action, not the potential for action, that signifies happiness.

⁴² Note that in *Physics* 5.4 227b20-228a19, Aristotle mentions the three criteria for some motion to be one *simpliciter*: the “what”, the “in which”, and the “when”. Aristotle thinks that a motion is one *simpliciter* if and only if (1) the thing moved (the “what”) is numerically one; (2) the thing in which (the species of motion) the motion happens is numerically one; (3) the time in which the motion happens is numerically one, i.e. continuous. So, according to Aristotle, there is no restriction as to how many movers a particular motion may have, i.e. a motion can be one *simpliciter* even if there are two or more movers causing this motion.

a mover, then it would be no more possible for this second thing than for the original thing to be in motion when the original mover is not in contact with it or moving it: all the things moved would have to be in motion *simultaneously* and also to have ceased *simultaneously* to be in motion when the original mover ceases to move them, even if, like the magnet, it makes that which it has moved capable of being a mover.⁴⁴ (*Physics* 8.10 266b27-267a2)

Roughly, the problem Aristotle confronts is this: without the conceptual framework of inertia or impetus, it is extremely difficult to explain the continuation of projectile motion: why should something thrown continue to be in forward motion after it has left the hand?⁴⁵ There are two obstacles to overcome, the one easier, the other harder. (1) The easier problem is that Aristotle's dynamics doesn't allow causation at a distance: for Aristotle, the mover has to physically touch the thing moved in order to cause motion in the moved. But how can the projectile remain in forward motion when the hand no longer touches it physically? Aristotle's answer to this easier problem is that there is some mediating thing, be it air, water, or aether, that *permeates* the space between the hand and the projectile. This mediating thing, taken as a unit, is in physical contact with the hand at one end and with the projectile at the other end. Taken partially, each part of this medium is in physical contact with the parts that are next to it, and it acts as a moved mover that is

⁴³ See Sorabji (1988: 227-248) for a historical study of the problem of projectile motion.

⁴⁴ Περί δὲ τῶν φερομένων ἔχει καλῶς διαπορῆσαι τινα ἀπορίαν πρῶτον. εἰ γὰρ πᾶν τὸ κινούμενον κινεῖται ὑπὸ τινός, ὅσα μὴ αὐτὰ ἑαυτὰ κινεῖ, πῶς κινεῖται ἓνια συνεχῶς μὴ ἀπτομένου τοῦ κινήσαντος, οἷον τὰ ῥιπτούμενα; εἰ δ' ἅμα κινεῖ καὶ ἄλλο τι ὁ κινήσας, οἷον τὸν ἀέρα, ὃς κινούμενος κινεῖ, ὁμοίως ἀδύνατον τοῦ πρώτου μὴ ἀπτομένου μηδὲ κινούντος κινεῖσθαι, ἀλλ' ἅμα πάντα <καὶ> κινεῖσθαι καὶ πεπαῦσθαι ὅταν τὸ πρῶτον κινεῖν παύσῃται, καὶ εἰ ποιεῖ, ὥσπερ ἡ λίθος, οἷον τε κινεῖν ὃ ἐκίνησεν.

⁴⁵ There is no problem for it to undergo downward motion. It is the upward and forward motions,

moved by the part that is closer to the hand and in turn moves the part that is closer to the projectile. So there is no causation at a distance *even when* the projectile has left the hand.

(2) The harder problem has to do with the *temporal gap*: even if we grant that the medium is a continuous chain of moved movers, why should the projectile remain in forward motion after the hand is *at rest* and no longer moves the air? It is counter-intuitive to suggest that the hand is still doing some work to the air when the projectile has left the hand because we know from experience that it isn't. To overcome this obstacle, Aristotle takes a step further:

Therefore, we must say that the first mover gives the power of being a mover either to air or to water or to something else of the kind, naturally adapted for causing and undergoing motion; but this thing does not cease *simultaneously* to cause motion and to undergo motion: it ceases to be moved at the moment when its mover ceases to move it, but it still remains a mover, and so it causes something else consecutive with it to be moved, and of this again the same may be said. The motion begins to cease when the motive force produced in one member of the consecutive series is at each stage less than that possessed by the preceding member, and it finally ceases when one member no longer causes the next member to be a mover but only causes it to be in motion. The motion of these last two—of the one as mover and of the other as moved—must cease simultaneously, and with this the whole motion ceases.⁴⁶ (*Ibid.* 267a2-12)

i.e. unnatural motions, that are problematic.

⁴⁶ ἀνάγκη δὴ τοῦτο μὲν λέγειν, ὅτι τὸ πρῶτον κινήσαν ποιῇ οἷόν τε κινεῖν ἢ τὸν ἀέρα [τοιούτων] ἢ τὸ ὕδωρ ἢ τι ἄλλο τοιούτων ὃ πέφυκε κινεῖν καὶ κινεῖσθαι· ἀλλ' οὐχ ἅμα παύεται κινῶν καὶ κινούμενον, ἀλλὰ κινούμενον μὲν ἅμα ὅταν ὁ κινῶν παύσῃται κινῶν, κινῶν δὲ ἔτι ἐστίν. διὸ καὶ

As we can see from the passage, Aristotle's strategy is to underline the temporal gap between the two causal events concerning a given moved mover: the moved mover "does not cease *simultaneously* to cause motion and to undergo motion" (ἀλλ' οὐχ ἅμα παύεται κινεῖν καὶ κινούμενον).⁴⁷ This to say, there is always a temporal gap between the point in time at which a moved mover stops being moved by a causally prior mover, be it the hand or the piece of air that is consecutively behind it, and the point in time at which it stops causing motion in the projectile and the piece of air that is consecutively in front of it. One might be led by Aristotle's claim that the moved mover "ceases to be moved at the moment when its mover ceases to move it, but it still remains a mover" to think that, when its mover ceases to move the moved mover, it is unmoved *simpliciter*, i.e. not only unmoved by the causally prior mover, but also unmoved *reciprocally* by what it moves. Yet it is quite clear that, by saying that the moved mover "ceases to be moved when its mover ceases to move it", Aristotle means only to exclude the part of the motion that is caused by its causally prior mover,⁴⁸ and not the part of the motion that is reciprocally

κινεῖ τι ἄλλο ἐχόμενον· καὶ ἐπὶ τούτου ὁ αὐτὸς λόγος. παύεται δέ, ὅταν αἰεὶ ἐλάττων ἢ δύναμις τοῦ κινεῖν ἐγγίγνηται τῷ ἐχομένῳ. τέλος δὲ παύεται, ὅταν μηκέτι ποιῇ τὸ πρότερον κινεῖν, ἀλλὰ κινούμενον μόνον. Ταῦτα δ' ἀνάγκη ἅμα παύεσθαι, τὸ μὲν κινεῖν τὸ δὲ κινούμενον, καὶ τὴν ὅλην κίνησιν.

⁴⁷ Contra *Physics* 7.1 242a57-62: "Then since *ex hypothesi* the mover while causing motion is also itself in motion, and the motion of the moved and the motion of the mover must proceed simultaneously (for the mover is causing motion and the moved is being moved simultaneously) it is evident that the respective motions of A, B, G, and each of the other moved movers are simultaneous." In this *Physics* 7 passage, Aristotle apparently thinks that a prior mover's moving the moved mover is contemporaneous with the moved mover's moving the thing moved, which differs from what he claims in *Physics* 8.10. Wardy (1990: 100-106, esp. 105), who correctly notices the connection between the two passages in *Physics* 7.1 and 8.10, seems to have missed the point of the *Physics* 7.1 argument, for he thinks that it is because "cause and effect are simultaneous" that "the motions of mover and moved must be simultaneous" (pp. 100 and 105). A's moving B is of course simultaneous with B's being moved by A, but this doesn't prove that A's moving B is simultaneous with B's moving C. Aristotle's hypothesis in *Physics* 7.1 is rather that, B being a moved mover, A's moving B is simultaneous with B's moving C.

⁴⁸ Here cf. *Physics* 7.1 242a57-62, quoted in the preceding note. There, the motion the moved mover undergoes is apparently taken to be the one caused by the causally prior mover.

caused by the thing moved—otherwise, if the moved mover remains reciprocally unmoved when it causes motion, it would have to cause motion perpetually, which is contrary to fact.⁴⁹

For Aristotle, on the one hand, this temporal lag between the two events explains why a projectile remains in forward motion for some time after it has left the hand: the total time in which the projectile travels forward is the sum of all those little temporal lags. For my purpose, on the other hand, the case of projectile motion helps distinguish two causal events which in other kinds of locomotion may happen simultaneously.⁵⁰ Thus, it is evident that for Aristotle, conceptually speaking, there are two causal events when a moved mover causes motion, the first consisting of its being moved by some causally prior mover, the second consisting of its causing motion in something else. In either event there is a mover and something else that is moved by it. And given that the mover and what is moved by it are always in physical touch, the moved mover, in so far as it causes motion in something else, is also moved reciprocally. It is true that the two events may happen simultaneously, thus the effects (πάθη) caused by both the causally prior mover and the causally posterior thing acting on the mediating moved mover may cancel each other or merge into a motion that is one *simpliciter*.⁵¹ (Think about the stick that moves the pebble forward: its own forward motion is the combined outcome of its being acted upon both by the hand and by the pebble). However, the fact that there is only one motion in the case of the projectile doesn't imply that the moved mover in question, i.e. air, is acted on or moved by one thing alone.

⁴⁹ See *Metaphysics* Θ8 1050b24-28, quoted and discussed below.

⁵⁰ In the above case of the hand using a stick to move a stone, from Aristotle's point of view, the two events happen simultaneously.

⁵¹ See note 42 above.

3.4 “Moved Mover” as “Movable Mover”

In the preceding section, I showed that even in locomotion, the kind of motion that is the least likely to involve reciprocal causation, a moved mover is moved both by a causally prior mover and by what it moves, so that the two models—the chain model and the reciprocal model—do not amount to an either-or for Aristotle. In this section, I further argue that Aristotle’s conception of *moved mover* (τὸ κινῶν κινούμενον) should really be understood as that of “movable mover” (τὸ κινῶν ... κινητόν)⁵², and that this explains why the two models *need not* be in conflict. Moreover, towards the end of this section, I argue that understanding Aristotle’s “moved mover” as “movable mover” also makes it clear that the motion that a moved mover undergoes as such is its actuality *qua* moved and *not* its actuality *qua* mover. What I mean will appear clearer as we go along.

Now, by saying that “movable mover” is a better conception than “moved mover”, I’m not denying that a moved mover as such has to undergo actual motion. What I’m denying, though, is that a moved mover as such is *only* moved with one particular species of actual motion and not its contrary.⁵³ In what follows, I show how the conception of a “movable mover” explains why a moved mover is necessarily moved in both ways.

In the first two chapters of *Physics* 3, Aristotle describes how a “natural mover” (τὸ κινῶν φυσικῶς) causes motion:

The same thing can be both potential and actual, not indeed at the same time or not in the same respect, but e.g. potentially hot and actually cold. Hence such

⁵² See *Physics* 3.1 201a21-25: ὥστε καὶ τὸ κινῶν φυσικῶς κινητόν· πᾶν γὰρ τὸ τοιοῦτον κινεῖ κινούμενον καὶ αὐτό.

⁵³ Such a moved mover would be, say, an electric heater whose temperature keeps mounting rather than staying stable or dropping down. For what counts as a species of motion see *Physics*

things will act and be acted on by one another (ὕπ’ ἀλλήλων) in many ways: *each of them will be capable at the same time of acting and of being acted upon*. Hence, too, *what causes motion as a natural mover is movable: when a thing of this kind causes motion, it is itself also moved*. This, indeed, has led some people to suppose *that every mover is moved*. But this question depends on another set of arguments, and the truth will be made clear later.⁵⁴ (*Physics* 3.1 201a19-27)

The mover too is moved, as has been said—every mover, that is, which is capable of motion, and whose immobility is rest—when a thing is subject to motion its immobility is rest. For to act on the movable as such is just to move it. *But this [the mover] does by contact, so that at the same time it is also acted on*. Hence we can define motion as the fulfillment of the movable qua movable, the cause being contact with what can move so that the mover is also acted on. The mover or agent will always transmit a form, either a ‘this’ or ‘such’, which, when it acts, will be the source and cause of the change, e.g. the full-formed man begets man from what is potentially man.⁵⁵ (*Physics* 3.2 202a3-12)

5.4. For what motions are contrary to each other see *Physics* 5.5.

⁵⁴ ἐπεὶ δ’ ἔνια ταῦτά καὶ δυνάμει καὶ ἐντελεχείᾳ ἐστίν, οὐχ ἅμα δὲ ἢ οὐ κατὰ τὸ αὐτό, ἀλλ’ οἷον θερμὸν μὲν ἐντελεχείᾳ ψυχρὸν δὲ δυνάμει, πολλὰ ἤδη ποιήσει καὶ πείσεται ὑπ’ ἀλλήλων· ἅπαν γὰρ ἔσται ἅμα ποιητικὸν καὶ παθητικόν. ὥστε καὶ τὸ κινεῖν φυσικῶς κινήτόν· πᾶν γὰρ τὸ τοιοῦτον κινεῖ κινούμενον καὶ αὐτό. δοκεῖ μὲν οὖν τισιν ἅπαν κινεῖσθαι τὸ κινεῖν, οὐ μὴν ἀλλὰ περὶ τούτου μὲν ἐξ ἄλλων ἔσται δῆλον ὅπως ἔχει.

⁵⁵ κινεῖται δὲ καὶ τὸ κινεῖν ὥσπερ εἴρηται πᾶν, τὸ δυνάμει ὄν κινήτόν, καὶ οὗ ἡ ἀκίνησία ἡρεμία ἐστίν (ὅ γὰρ ἡ κίνησις ὑπάρχει, τούτου ἡ ἀκίνησία ἡρεμία). τὸ γὰρ πρὸς τοῦτο ἐνεργεῖν, ἢ τοιοῦτον, αὐτὸ τὸ κινεῖν ἐστὶ· τοῦτο δὲ ποιεῖ θίξει, ὥστε ἅμα καὶ πάσχει· διὸ ἡ κίνησις ἐντελέχεια τοῦ κινήτου, ἢ κινήτου, συμβαίνει δὲ τοῦτο θίξει τοῦ κινήτου, ὥσθ’ ἅμα καὶ πάσχει. εἶδος δὲ αἰεὶ οἴσεται τι τὸ κινεῖν, ἥτοι τόδε ἢ τοιόνδε ἢ τοσόνδε, ὃ ἔσται ἀρχὴ καὶ αἴτιον τῆς κινήσεως, ὅταν κινή, οἷον ὁ ἐντελεχείᾳ ἄνθρωπος ποιεῖ ἐκ τοῦ δυνάμει ὄντος ἀνθρώπου ἄνθρωπον.

As I mentioned above, these two passages mainly show why a movable natural mover⁵⁶ is always moved reciprocally by what it moves. Now according to Aristotle, it is what is actually X—the εἶδος in the second passage—that can make something else X. This is sometimes called Aristotle’s “causal synonymy”.⁵⁷ Also, it is only what is potentially X

⁵⁶ Cf. τὸ κινεῖν φυσικῶς κινητὸν [ἐστὶ] at 201a24 and τὸ κινεῖν ὥσπερ εἴρηται πᾶν τὸ δυνάμει ὄν κινητὸν at 202a3-4: Ross in his commentary ad loc. thinks that ὥσπερ refers to φυσικῶς.

⁵⁷ See e.g. *Metaphysics* Z 7-9, Λ 2, *GC* 1.6-10. See Mourelatos (1984: 1-16), Code (2004, 178), and Bodnár (2012). (1) There is hardly any problem that causal synonymy applies to natural substantial generation: it is what is actually a natural substance that generates another natural substance of the same kind. Aristotle’s favorite example in this regard is “man begets man” (see *Metaphysics* 1032a25, b32, 1070a8, a22, b34, 1092a16, *PA* 640a25, 646a34, *Physics* 194b13, 198a27, and *Eud. Ethics* 2.6 1222b16-17). (2) Aristotle appears to think that the same principle in a qualified sense applies to things that come about by art (τέχνη): “it follows that in a sense health [the composite] comes from health [the form in the soul] and house [the composite] from house [the form in the soul].” (*Metaphysics* Z7 1032b11-12, cf. Z9 1034a23-24). Causal synonymy only applies in a qualified sense because the art/form that is located in the soul of the artisan which initiates the generation is not realized in matter and is therefore different from the artifact, though it shares the same essence (τὸ τί ἐστὶ) with the artifact. (3) The same principle applies to qualitative changes as well. It is what is already hot that makes what is cold hot: “it is understandable that fire heats and the cold thing cools, and in general the active thing assimilates to itself the passive thing.” (*GC* 1.7 324a10-11, cf. *Metaphysics* Z9 1034a26-27). Aristotle does qualify the application of this principle to qualitative and quantitative changes at the end of *Metaphysics* Z9: “but we may learn from these instances a peculiarity of substance, that there must exist beforehand in complete reality another substance which produces it, e.g. an animal if an animal is produced; but it is not necessary that a quality or quantity should preexist otherwise than potentially.” (Z9 1034b16-19) Now some earth is not turned into brass by another piece of brass, so it is not necessary for there to preexist an actual quality “brassy”: though the brassmaker needs to have the art of brassmaking preexisting in his mind. However, the same process can *always* be described as a process in which some preexisting actual quality makes something else like it: as brass is a particular blend of hot/cold and dry/wet, the process of brassmaking can be reduced to a process of dry material acting on wet material and hot material acting on cold material in which what is actually dry and hot acts (see *Physics* 1.7 190b5-9 for a similar case of descriptive flexibility: there, substantial generation is described and realized as qualitative change or quantitative change; for Aristotle’s reductionist scheme of material qualities to elemental functions, see *GC* 2.2). (4) It is true, as Bodnár (2012) maintains, that Aristotle doesn’t understand growth as some large object making what was initially small large. However, Aristotle does understand natural growth as some like-parted part (such as flesh) causing some material (which is qualitatively contrary to this particular like-parted thing) to become such part (see *GC* 1.5, especially 321b33-322a4). In the case of artificial addition and cutting away, it can be easily described in some similar way. (5) As regards locomotion, first, natural locomotion is mutual replacement (ἀντιπερίσταςις): an air bubble in water travels upwards by being acted on by the water whose place it replaces and the water travels downward being acted on by the air whose place it replaces. In this way, what is already in some place causes something else to be in that place. Elements do have their “natural” place, however, place by itself does not have the force of attraction, an element is moved to its natural place through the interaction with other elements.

that can be made actually X, and “being potentially X” and “being X” are contraries that share the same subject (ὕποκείμενον).⁵⁸ The reason why a natural mover is always moved reciprocally by what it moves is that a natural mover is the *composite* of some actual attribute X and a subject which is receptive of both X and the contrary of X⁵⁹, so that, while it is actually X, it is also potentially the contrary of X. As what is actually X, it causes what is potentially X to be actually X. At the same time, because what is potentially X *ex hypothesi* shares the same subject with what is actually X, it is actually the contrary of X and can make what is potentially the contrary of X actually the contrary of X. *GC* 2.7 puts the more abstract language of *Physics* 3.1 in the less abstract example of the contrariety between hot and cold:

Moreover, contraries also suffer action, in accordance with the definition established in the early part of this work. For the actually hot is potentially cold and the actually cold potentially hot; so that hot and cold, unless they are equally balanced, are transformed into one another. All the other contraries behave in a

More broadly, there are essentially two kinds of locomotion: pushing and pulling, as I show above. Pulling is just causing something to be at the place the mover already occupies. Pushing is more difficult. However, it can also be conceived as causing something else that is potentially out of this place to be actually out of this place while the mover is actually out of this place before the moving.

⁵⁸ To give an Aristotelian example, a musical note, which is not white, cannot be made white because it *per se* is not potentially white, whereas a dirty towel, which is also not white, can be bleached white because it is potentially white. Black and white are contrary attributes of a common subject (i.e. surface = “what is receptive of colors”), whereas musical and white, though different, are not contrary properties because they don’t share a common subject except accidentally. See *Physics* 1.5 188a31-b3: “Our first presupposition must be that in nature nothing acts on, or is acted on by, any other thing at random, nor may anything come from anything else, unless we mean that it does so *per accidens*. For how could ‘white’ come from ‘musical’, unless ‘musical’ happened to be an attribute of the not-white or of the black? No, ‘white’ comes from ‘not-white’—and not from any ‘not-white’, but from black or some intermediate color. Similarly, ‘musical’ comes to be from ‘not-musical’, but not from any thing other than musical, but from ‘unmusical’ or any intermediate state there may be.”

similar way.⁶⁰ (GC 2.7 334b19-22)

So, according to causal synonymy, what is hot can cause what is potentially hot to be hot. At the same time, because what is potentially hot shares the same subject with what is hot, which subject is receptive of both hot and the contrary of hot, i.e. cold, what is potentially hot is what is actually cold and, as such, can cause what is hot to be cold. This, as an example, explains why a natural movable mover as such is *always* moved reciprocally by what it moves.

Further, we know from the *Physics* 8.10 passage concerning projectile motion that it is the causally prior mover that makes (ποιεῖ) a moved mover, which is by nature such as to cause and suffer motion (ὁ πέφυκε κινεῖν καὶ κινεῖσθαι),⁶¹ capable of causing motion (οἷόν τε κινεῖν).⁶² Since it is by being actually X that a moved mover is capable of causing another thing to be X, we can infer that the causally prior mover causes the moved mover to become actually X from being potentially X. Thus, not only is the moved mover as a mover both actually X and potentially not X at the moment of causing motion, it is potentially X before the first mover moves it, and is actually X after the first mover has finished moving it.⁶³ This is one of the two alternatives Aristotle implies in

⁵⁹ Here, I omit the intermediates between X and non-X for brevity's sake.

⁶⁰ Ἐπεὶ δὲ καὶ πάσχει τάναντία κατὰ τὸν ἐν τοῖς πρώτοις διορισμόν· ἔστι γὰρ τὸ ἐνεργείᾳ θερμὸν δυνάμει ψυχρὸν καὶ τὸ ἐνεργείᾳ ψυχρὸν δυνάμει θερμὸν, ὥστε ἐὰν μὴ ἰσάζῃ, μεταβάλλει εἰς ἄλληλα· ὁμοίως δὲ καὶ ἐπὶ τῶν ἄλλων ἐναντίων.

⁶¹ Which, I think, is conceptually identical to the “natural mover” in *Physics* 3.1.

⁶² *Physics* 8.10 267a2-5 “therefore, we must say that the first mover makes air or water or whatever that is by nature such as to cause and undergo motion, capable of causing motion.” (ἀνάγκη δὴ τοῦτο μὲν λέγειν, ὅτι τὸ πρῶτον κινήσαν ποιεῖ οἷόν τε κινεῖν ἢ τὸν ἀέρα ἢ τὸ ὕδωρ ἢ τι ἄλλο τοιοῦτον ὁ πέφυκε κινεῖν καὶ κινεῖσθαι).

⁶³ Even if there is no temporal gap between the events of the first mover moving the moved mover and the moved mover moving the thing moved, it is still conceivable that it is *qua* “not as X as the first mover and hence potentially as X as the first mover” that the moved mover is

the *Physics* 3.1 sentence: “the same thing can be both potential and actual, not indeed at the same time or not in the same respect.” For one of the two alternatives implied here is that the same thing can be both potential and actual *in the same respect* but *at different times*: e.g. a piece of iron is potentially hot before it is put on the stove, but is actually hot after it is put on the stove for some time and can cause something else to be hot. So, from the analysis of the *Physics* 8.10 passage and the side support of the *Physics* 3.1 passage, we find that a natural moved mover is not only always reciprocally moved by what it moves; diachronically speaking, it is also always moved by what is causally prior to it.

Now, by implying that “the same thing” (ταὐτά at 201a20) can be both potential and actual in the same respect at different times, Aristotle has to assume that “the same thing” is the subject (e.g. the piece of iron) and not the composite of the subject and the attribute (e.g. the piece of *cold* iron), for it is only the subject, not the composite of the subject and the attribute, that remains the same at different times. Therefore, although every subject has to have some attribute at any given time (e.g. the piece of iron has to be either cold or hot or somewhere in between at any given time), the “same thing” that admits of reciprocal as well as diachronic moving and being moved that Aristotle talks about in this paragraph refers to the subjectal part of the composite of subject and attribute. That is to say, what makes something admit of reciprocal as well as diachronic moving and being moved is its subject or itself *qua* subject. Hence, there is no single motion or single actual attribute that is characteristic of a moved mover *qua* moved, rather, what is characteristic of a moved mover *qua* moved is its having a specific

moved by the first mover, and it is *qua* “more X than the thing moved” that the moved mover moves the thing moved, so that the moved mover doesn’t need to be at the same time both potentially X and actually X (for in this case it will be both “potentially as X as the first mover” and “actually more X than the thing moved”).

underlying thing: the subject (τὸ ὑποκείμενον). So, the notion of a “moved mover” should really be understood as a kind of mover that *can* be moved with a definite species of motion and its contrary. Therefore, there is no contradiction in its being moved both by the causally prior mover and by the thing it moves, in different directions. In fact, as I have shown, as a natural movable mover, it is necessarily moved in both ways. Aristotle makes a similar claim in a passage in *Physics* 8.6 where he contrasts an unmoved mover with a moved mover:

But that which is moved by something that, though it is in motion, is moved directly by the unmoved stands in varying relations to the things that it moves, so that the motion that it causes will not be always the same: *by reason of the fact that it occupies contrary positions or assumes contrary forms* it will produce contrary motions in each several thing that it moves and will cause it to be at one time at rest and at another time in motion.⁶⁴ (*Physics* 8.6 260a5-10)

The importance of the subject as a basis for change and especially *reciprocal* change is not to be understated. Having the same subject (ὑποκείμενον) is said to be a necessary condition for reciprocal action and passion between things:

The hot, for example, would not be cooled and the cold in turn be warmed: for heat and cold do not change reciprocally into one another, but what changes, it is

⁶⁴ τὸ δὲ κινούμενον ὑπὸ τοῦ κινουμένου μέν, ὑπὸ τοῦ ἀκινήτου δὲ κινουμένου ἤδη, διὰ τὸ ἄλλως καὶ ἄλλως ἔχειν πρὸς τὰ πράγματα, οὐ τῆς αὐτῆς ἔσται κινήσεως αἴτιον, ἀλλὰ διὰ τὸ ἐν ἐναντίοις εἶναι τόποις ἢ εἶδεσιν ἐναντίως παρέξεται κινούμενον ἕκαστον τῶν ἄλλων, καὶ ὅτε μὲν ἡρεμοῦν ὅτε δὲ κινούμενον.

clear, is what underlies (τὸ ὑποκείμενον). Hence, whenever there is action and passion between things, the underlying nature must be one (μίαν εἶναι τὴν ὑποκειμένην φύσιν). No doubt, it is not true to say that all things are of this character: but it is true of all things between which there is *reciprocal* (τὸ ὑπ’ ἀλλήλων) action and passion.⁶⁵ (GC 1.6 322b15-21)

In other contexts, Aristotle also uses the expression “having the same kind (γένος)” or “having the same matter (ὅλη)” to express what is essentially the same idea:⁶⁶

(1) Kind (γένος)

It is possible—as we sometimes say—for the mover merely to touch the moved, and that which is touched need not touch a thing which touches it. Nevertheless, it is commonly supposed that touch must be reciprocal, because *movers of the same kind* (ὁμογενῆ) (*sc. as the moved*) cause motion while being moved.⁶⁷

(GC 1.6 323a28-31)

⁶⁵ οἷον τὸ θερμὸν ψύχεσθαι καὶ τοῦτο θερμαίνεσθαι πάλιν· οὐ γὰρ ἡ θερμότης μεταβάλλει καὶ ἡ ψυχρότης εἰς ἄλληλα, ἀλλὰ δῆλον ὅτι τὸ ὑποκείμενον, ὥστε ἐν οἷς τὸ ποιεῖν ἐστὶ καὶ τὸ πάσχειν, ἀνάγκη τούτων μίαν εἶναι τὴν ὑποκειμένην φύσιν. Τὸ μὲν οὖν πάντα εἶναι τοιαῦτα φάσκειν οὐκ ἀληθές, ἀλλ’ ἐν ὅσοις τὸ ὑπ’ ἀλλήλων ἐστίν.

⁶⁶ There is some question over what “having the same matter” in such contexts means. See, e.g., Wildberg (2004: 236-8), whose interpretation I follow. I take it that two things have the same matter in this context if they do not share the numerically same matter, but the generically same matter. Hence a bronze statue and a bronze axe have the same matter because their matter is of the same kind: bronze.

For the connection between kind, matter, and the subject, see e.g.: “Kind (γένος) then is used in all these ways: (1) in to continuous generation of the same kind, (2) in reference to the first mover which is of the same kind as the things it moves, (3) as matter; for that to which the differentia or quality belongs is the substratum (ὑποκείμενον), which we call (λέγομεν) matter.” (Metaphysics Δ 28 1024b6-9)

⁶⁷ ἔστι δ’ ὥς ἐνιότ’ φαμεν τὸ κινεῖν ἄπτεσθαι μόνου τοῦ κινουμένου, τὸ δ’ ἀπτόμενον μὴ ἄπτεσθαι ἀπτομένου· ἀλλὰ διὰ τὸ κινεῖν κινούμενα τὰ ὁμογενῆ, ἀνάγκη δοκεῖ εἶναι ἀπτομένου ἄπτεσθαι.

But since only those things which either involve a contrariety or are contraries—and not any things selected at random—are such as to <reciprocally> suffer action and to act, <reciprocal> agent and patient must be *like and identical in kind* (τῷ γένει ὁμοιον εἶναι καὶ ταὐτό) and yet unlike and contrary in species. For it is a law of nature that body is affected by body, flavor by flavor, color by color, and so in general *what belongs to any kind by a member of the same kind* (τὸ ὁμογενὲς ὑπὸ τοῦ ὁμογενοῦς)—the reason being that ‘contraries’ are in every case *within a single kind* (ἐν ταὐτῷ γένει), and it is ‘contraries’ which *reciprocally act and suffer action*. Hence <reciprocal> agent and patient must be in one sense identical, but in another sense other than and unlike one another. And since (a) patient and agent are identical (i.e. ‘like’) in kind but ‘unlike’ in species, while (b) it is ‘contraries’ that exhibit this character: it is clear that ‘contraries’ and their ‘intermediates’ are such as to *suffer action and to act reciprocally*—for indeed it is these that constitute the entire sphere of passing-away and coming-to-be.⁶⁸ (GC 1.7 323b29-324a9)⁶⁹

(2) Matter (ὕλη)

And again, is the *matter* of each [element] different? Or is it the *same*, since otherwise they would not *come-to-be reciprocally out of one another*, i.e.

⁶⁸ Ἀλλ’ ἐπεὶ οὐ τὸ τυχόν πέφυκε πάσχειν καὶ ποιεῖν, ἀλλ’ ὅσα ἢ ἐναντία ἐστὶν ἢ ἐναντίωσιν ἔχει, ἀνάγκη καὶ τὸ ποιοῦν καὶ τὸ πάσχον τῷ γένει μὲν ὁμοιον εἶναι καὶ ταὐτό, τῷ δ’ εἶδει ἀνόμοιον καὶ ἐναντίον· πέφυκε γὰρ σῶμα μὲν ὑπὸ σώματος, χυμὸς δ’ ὑπὸ χυμοῦ, χρῶμα δ’ ὑπὸ χρώματος πάσχειν, ὅλως δὲ τὸ ὁμογενὲς ὑπὸ τοῦ ὁμογενοῦς. Τούτου δ’ αἴτιον ὅτι τὰναντία ἐν ταὐτῷ γένει πάντα, ποιεῖ δὲ καὶ πάσχει τὰναντία ὑπ’ ἀλλήλων. Ὡστ’ ἀνάγκη πῶς μὲν εἶναι ταῦτα τό τε ποιοῦν καὶ τὸ πάσχον, πῶς δ’ ἕτερα καὶ ἀνόμοια ἀλλήλοις. Ἐπεὶ δὲ καὶ τὸ πάσχον καὶ τὸ ποιοῦν τῷ μὲν γένει ταῦτα καὶ ὅμοια τῷ δ’ εἶδει ἀνόμοια, τοιαῦτα δὲ τὰναντία, φανερόν ὅτι παθητικὰ καὶ ποιητικὰ ἀλλήλων ἐστὶ τὰ τ’ ἐναντία καὶ τὰ μεταξύ· καὶ γὰρ ὅλως φθορὰ καὶ γένεσις ἐν τούτοις.

contraries out of contraries? For these things—fire, earth, water, air—are characterized by the contraries.⁷⁰ (GC 1.3 319a32-b2)

If agent and patient have not the same matter, an agent acts without being acted on. ... Those agents, then, whose forms are not in matter, are unaffected: but those *whose forms are in matter* (ἐν ὕλῃ) are such as to be affected in acting. For we maintain that *one and the same* (τὴν αὐτὴν εἶναι) matter is equally, so to say, the basis of either of the two opposed things—being as it were a kind; and that which can be hot must be made hot, provided the heating agent is there, i.e. comes near.⁷¹ (GC 1.7 324a34-b9)

Now, as we maintain, some things are such as to act and others such as to suffer action from them. Moreover, some things—those *which have the same matter* (ὅσων ἡ αὐτὴ ὕλη ἐστί)—‘reciprocate’, i.e. are such as to act upon one another and to suffer action from one another; while other things—agents which have not the same matter as their patients—act without themselves suffering action.⁷² (GC 1.10 328a18-22)

⁶⁹ Cf. GC 1.6 323a30.

⁷⁰ Καὶ ἄρα γε ἑτέρα ἑκατέρου ἡ ὕλη, ἢ οὐκ ἂν γίνοιτο ἐξ ἀλλήλων οὐδ’ ἐξ ἐναντίων; τούτοις γὰρ ὑπάρχει τἀναντία, πυρί, γῆ, ὕδατι, ἀέρι.

⁷¹ ὅσα γὰρ μὴ ἔχει τὴν αὐτὴν ὕλην, ποιεῖ ἀπαθῆ ὄντα. ... Ὅσα μὲν οὖν μὴ ἐν ὕλῃ ἔχει τὴν μορφήν, ταῦτα μὲν ἀπαθῆ τῶν ποιητικῶν, ὅσα δ’ ἐν ὕλῃ, παθητικά. Τὴν μὲν γὰρ ὕλην λέγομεν ὁμοίως ὡς εἰπεῖν τὴν αὐτὴν εἶναι τῶν ἀντικειμένων ὅποτερουοῦν, ὥσπερ γένος ὄν, τὸ δὲ δυνάμενον θερμὸν εἶναι παρόντος τοῦ θερμαντικοῦ καὶ πλησιάζοντος ἀνάγκη θερμαίνεσθαι.

⁷² Ἔστι δὴ, ὡς ἔφαμεν, τῶν ὄντων τὰ μὲν ποιητικά τὰ δ’ ὑπὸ τούτων παθητικά. Τὰ μὲν οὖν ἀντιστρέφει, ὅσων ἡ αὐτὴ ὕλη ἐστί, καὶ ποιητικὰ ἀλλήλων καὶ παθητικὰ ὑπ’ ἀλλήλων· τὰ δὲ ποιεῖ ἀπαθῆ ὄντα, ὅσων μὴ ἡ αὐτὴ ὕλη.

Furthermore, as regards difficulty #1 outlined above concerning the relation between the motion undergone by a moved mover and the motion it causes, it is now easy to see that the reason why the motion in a moved mover is not its actuality *qua* mover.⁷³ The reason lies precisely in the fact that it is *qua* what it potentially is that a moved mover is moved by something else, be it some causally prior mover or the thing moved by it, and it is *qua* what it actually is that a moved mover is a mover, so the motion that is in a moved mover is its actuality *qua* movable, not its actuality *qua* mover. This might seem to be a straightforward point. However, the peculiarity of the moved movers makes it tempting to think that it is with an internal actual motion that a moved mover causes motion in something else, and this actual motion in the mover counts as its actuality *qua* mover, so that the *Physics* 3.1-3 definition of motion would only apply to the unmoved movers. I've shown why it is not correct to think in this way.

3.5 Pay-offs

3.5.1 “Laboriousness” (πόνος) and the Discontinuity of Motion

There are two arguments to explain why the motion that a natural mover causes cannot be continuous and hence eternal, the one more familiar, the other less so. The weaker, yet more familiar one comes from considering the nature of motion. The argument is roughly the following: (a) the motion that a natural mover causes is always rectilinear between two contraries,⁷⁴ (b) rectilinear motion cannot go on to infinity in a finite space, hence (c) a natural mover cannot cause continuous and eternal motion.⁷⁵

⁷³ See section 3.2 (1) above.

⁷⁴ Rectilinear motion need not be restricted to locomotion of course, the change between two qualitative contraries is also rectilinear.

⁷⁵ See e.g. *Physics* 8.7 261a27-b7 and *Physics* 8.8.

This is an argument sufficient for its conclusion. However, the fact that a natural mover cannot *cause a single continuous motion* doesn't mean that it cannot *cause motion continuously*: the above argument cannot rule out the possibility that, although any single motion that a natural mover causes is limited and hence non-eternal, a natural mover can nevertheless eternally cause motion.⁷⁶ Indeed, Aristotle does think that in the universe there exists a single mover that in some sense causes the eternal succession of perishable motions,⁷⁷ so it remains a question whether a natural mover can be such a mover.

The stronger argument that can respond to this question comes from considering the nature of a natural mover.⁷⁸ In a number of passages, Aristotle makes the interesting claim that the continuity of motion or activity is *laborious* (ἐπίπονος) for a mover or an agent that is in the relevant sense a matter or a potentiality:

And [the heavenly bodies] do not tire in this activity; for movement is not for them, as it is for the perishables, connected with the potentiality for opposites, so that the continuity of the movement should be *laborious* (ἐπίπονος); for it is substance in the sense of *matter* and *potentiality* (ὕλη καὶ δύναμις οὐσα), not actuality, that causes this.⁷⁹ (*Metaphysics* Θ 8 1050b24-28)

First, then, if [νοῦς] is not the act of thinking (νόησις) but a *potentiality* (δύναμις),

⁷⁶ I cannot kick a ball 80 meters far in a squash court. However, I can kick a ball 80 meters far on an open pitch.

⁷⁷ See *Physics* 8.6 258b24-259a7. See chapter 1 for an analysis of the argument there.

⁷⁸ I haven't seen any formal discussion of this point. Beere hints at my interpretation but offers no substantial argumentation. See note 85 below.

⁷⁹ οὐδὲ κάμνει τοῦτο δρῶντα· οὐ γὰρ περὶ τὴν δύναμιν τῆς ἀντιφάσεως αὐτοῖς, οἷον τοῖς φθαρτοῖς, ἢ κίνησις, ὥστε ἐπίπονον εἶναι τὴν συνέχειαν τῆς κινήσεως· ἡ γὰρ οὐσία ὕλη καὶ δύναμις οὐσα, οὐκ ἐνέργεια, αἰτία τούτου.

it would be reasonable to suppose that the continuity of its thinking is *laborious* (ἐπίπονον) to it.⁸⁰ (*Metaphysics* Λ 9 1074b28-9)

For it (i.e. the mover) has no need to change together with (συμμεταβάλλειν) that which it moves, but will be able to cause motion always, for causing motion in this way is *not laborious* (ἄπονον); and this motion alone is regular, or at least it is so in a higher degree than any other.⁸¹ (*Physics* 8.10 267b2-4)

But it is equally impossible also that either of these two affections (i.e. sleeping and waking) should perpetually attach itself to the same animal, e.g. that some species of animal should be always asleep or always awake; for all those which have a natural function must lose power when they work beyond the time-limit in which they can do something; for instance, the eyes [must lose power] from too long continued seeing, and must give it up; and so it is with the hand and every other member which has a function.⁸² (*De Somno* 1 454a24-29)

Compare:

But again there cannot be any contrary that is also essentially a productive or moving principle; for it would be possible for it not to be. Or at least its action

⁸⁰ πρῶτον μὲν οὖν εἰ μὴ νόησις ἐστὶν ἀλλὰ δύναμις, εὐλόγον ἐπίπονον εἶναι τὸ συνεχὲς αὐτῷ τῆς νοήσεως.

⁸¹ τοῦτο γὰρ οὐκ ἀνάγκη συμμεταβάλλειν, ἀλλ' αἰεὶ τε δυνήσεται κινεῖν (ἄπονον γὰρ τὸ οὕτω κινεῖν) καὶ ὁμαλῆς αὕτη ἢ κίνησις ἢ μόνη ἢ μάλιστα.

⁸² οὐκ ἐνδέχεται δὲ οὐδὲ θάτερον τούτων αἰεὶ ὑπάρχειν τῷ αὐτῷ, οἷον αἰεὶ τι γένος ζώων καθεύδειν ἢ αἰεὶ τι ἐργηγορέναι. ἔτι ὅσων ἔστι τι ἔργον κατὰ φύσιν, ὅταν ὑπερβάλλῃ τὸν χρόνον ὅσον δύναται τι ποιεῖν, ἀνάγκη ἀδυνατεῖν, οἷον τὰ ὄμματα ὀρῶντα, καὶ παύεσθαι τοῦτο ποιοῦντα, ὁμοίως δὲ καὶ χεῖρα καὶ ἄλλο πᾶν οὗ ἔστι τι ἔργον.

would be posterior to its potency.⁸³ (*Metaphysics* Λ10 1075b30-33)

The reason why the movements relapse is this. The agent is itself acted upon by that on which it acts; thus that which cuts is blunted by that which is cut by it, that which heats is cooled by that which is heated by it, and in general the mover (except in the case of the first mover) itself receives some motion in return; e.g. what pushes is itself in a way pushed again and what crushes is itself crushed again.⁸⁴ (*De Generatione Animalium* 4.3 768b15-20)

So, it is not just because the motion that a natural mover causes cannot go on to infinity that a mover that is in the relevant sense matter or potentiality *cannot* cause continuous motion. Such a mover cannot cause continuous motion because causing such motion is laborious to it. Importantly, it is the material and potential aspect of its being, and not the actual aspect, that is the cause of the laboriousness (ἡ γὰρ οὐσία ὕλη καὶ δύναμις οὐσα, οὐκ ἐνέργεια, αἰτία τούτου). Now, for a natural mover, as I have shown, the actual aspect is its being *qua* mover, and the potential aspect is its being *qua* movable. So, a natural mover necessarily stops causing motion toward “X” in a limited period of time, not just because there is a limit in the thing moved as to how “X” it can be, but also, more importantly, because in causing motion toward “X”, it *qua* movable (ὕλη καὶ δύναμις οὐσα) is moved reciprocally toward “not X” so that after a while it loses the ability to

⁸³ ἀλλὰ μὴν οὐδὲν γ’ ἔσται τῶν ἐναντίων ὅπερ καὶ ποιητικὸν καὶ κινητικόν; ἐνδέχοιτο γὰρ ἂν μὴ εἶναι. ἀλλὰ μὴν ὕστερόν γε τὸ ποιεῖν δυνάμει.

⁸⁴ Αἴτιον δὲ τοῦ μὲν λύεσθαι τὰς κινήσεις ὅτι τὸ ποιοῦν καὶ πάσχει ὑπὸ τοῦ πάσχοντος, οἷον τὸ τέμνον ἀμβλύνεται ὑπὸ τοῦ τεμνομένου καὶ τὸ θερμαῖνον ψύχεται ὑπὸ τοῦ θερμαινομένου, καὶ ὅλως τὸ κινεῖν ἔξω τοῦ πρώτου ἀντικινεῖται τινα κίνησιν οἷον τὸ ὠθεῖν ἀντωθεῖται πῶς καὶ ἀντιθλίβεται τὸ θλίβον.

cause “X”.⁸⁵ This is most apparent in the *De Somno* passage, where Aristotle appeals to the fact that any activity of a living body *qua* living cannot continue indefinitely because there is a limit to what a natural agent can do, and the agent must take rest after it tires in this activity (cf. the *Metaphysics* Θ passage).⁸⁶

To conclude, it is because a natural mover is always moved reciprocally by what it moves that the motion it causes cannot be continuous and eternal. It is in this sense that the continuity of motion is “laborious” to a natural, movable mover.

3.5.2 An Interpretive Problem in GC 1.6-7

A problem concerning GC 1.6-7 has puzzled commentators lately.⁸⁷ To give some context, Aristotle focuses on touch (ἅφῃ) in GC 1.6, and on acting and being acted on (ποεῖν καὶ πάσχειν) in GC 1.7. In both chapters, Aristotle takes special care to distinguish between two kinds of touch and two kinds of acting and being acted on, the one kind being reciprocal and the other kind being unilateral.⁸⁸ Now, to touch is just to move (κινεῖν), and acting is a kind of moving, therefore, in both chapters, Aristotle talks about reciprocal and unilateral moving as well.

The problem is this: in certain parts of both chapters where he ought to be discussing reciprocal and unilateral moving and acting, Aristotle seems to be a little

⁸⁵ Beere (2010: 322-3) hints at this interpretation in his comments on the *Metaphysics* Θ passage, but offers no substantial argument: “if we assume that every capacity worthy of the name is distinct from its corresponding *energeia*, and we assume that the exercise of every capacity involves interaction with other things, then every exercise of a capacity is laborious because its interaction with the environment constitutes some resistance to its exercise, and this resistance will, especially in continuous changing, wear out the capacity.”

⁸⁶ Cf. my analysis of *De Somno* in chapter 1.

⁸⁷ See for example in Natali (2004: 209-210) and Williams (1982: 115-117).

⁸⁸ A reciprocally touches B when A touches, and is touched by, B; A unilaterally touches B when A touches, but is not touched by, B. Similarly, A reciprocally acts on (ποεῖ) B when A acts

careless with his expressions. In places where one would expect Aristotle to say “unmoved reciprocally” or “unaffected reciprocally”, Aristotle simply says “X causes motion while itself being *unmoved* (ἀκίνητον ὄν)” (GC 1.6 323a14, 31) and “the first mover being *unmoved*” (τὸ πρῶτον κινουὺν ... ἀκίνητον GC 1.7 324a30-31) and “the first agent being *unaffected*” (τὸ πρῶτον [ποιοῦν] ἀπαθές GC 1.7 324a33). A similar problem occurs in the *Physics* 3.1 201a 19-27 passage cited above: there, when Aristotle clearly focuses on reciprocal causation, he sounds as if he was talking about the moved movers in general, not just the reciprocally moved movers.

The traditional interpretation, represented by Joachim, has been to understand Aristotle to mean “unmoved reciprocally” and “unaffected reciprocally” whenever he says “unmoved” and “unaffected”.⁸⁹ This coheres with most of the contexts in which these expressions occur, with the important exception of GC 1.7 324a33 onward. As Joachim notes,⁹⁰ the context at GC 1.7 324a33 onward seems to suggest that the unaffected agents under discussion are “absolutely unaffected” rather than “relatively (i.e. reciprocally) unaffected” unmoved movers: here Aristotle distinguishes between the agents whose forms are not in matter at all, and those whose forms are in matter (324b4-13). The first kind of agents are not only reciprocally unmoved but also absolutely unmoved, because they lack matter and potentiality in the relevant respects, as Joachim correctly points out.⁹¹ It is important for Joachim that not all reciprocally unmoved movers are absolutely unmoved. The “first heaven”, for instance, though a mover of the “lower cosmos” without being moved reciprocally by it, is itself moved by

on, and is acted on by, B; A unilaterally acts on B when A acts on, but is not acted on by, B.

⁸⁹ See Joachim (1922: 146-7, 153-4). See also Philoponus (136, 7-137, 3 and 150, 27-29). See also Natali (2004: 209), who mentions some further reference.

⁹⁰ See Joachim (1922: 154).

the “prime mover”.⁹² Joachim goes on to exclude the art of medicine (ἡ ἰατρική), Aristotle’s own example at 324a34-b1, from being an unaffected agent of this kind on the ground that it also involves matter in some way or other, despite Aristotle’s clear endorsement to the contrary. Joachim seems to think that an absolutely unaffected agent needs to have no matter in *any* respect, and hence there can only be one unaffected agent in the universe: the prime mover.⁹³

Recent scholars, on the other hand, take Aristotle at his word and argue that, in all these expressions, Aristotle seems to be referring to movers and agents that are unmoved and unaffected *tout court*, so that he is not talking about reciprocal causation at all.⁹⁴ what Aristotle is saying is only that certain movers are not moved when they cause motion. However, interpreted in this way, it is hard to see how these passages contribute to the general aim of the two chapters, part of which is to deal with the problem of reciprocal causation. This is especially the case with the passage at GC 1.7 324a30-b4,⁹⁵ where reciprocal causation seems to be the central issue.⁹⁶

So what does Aristotle mean when he uses the expression “unmoved mover” and “unaffected agent”? The problem is solved if we realize that what Aristotle puts into contrast in GC 1.6-7 with “unmoved mover” and “unaffected agent”—“moved mover” and “affected agent”—are indeed, as I argued above, *movable* mover and *affectable* agent respectively. That is to say, whereas a movable mover as such is movable and indeed moved both by a causally prior mover and reciprocally by something that is moved by it,

⁹¹ Joachim (1922: 154).

⁹² See Joachim (1922: 154).

⁹³ See Joachim (1922: 154).

⁹⁴ See Williams (1982: 116, 122-3), Natali (2004: 209).

⁹⁵ The passage is quoted in section 3.2 (2) above.

its contrary pair—an unmoved mover, or rather, an *immovable* mover—is unmoved both by a causally prior mover and reciprocally by anything that is moved by it. The *same* reason which Joachim points out that distinguishes a moved mover from an absolutely unmoved mover—that the former has the relevant matter whereas the latter doesn’t and is therefore impossible to be moved in that respect—also distinguishes a pair of reciprocal movers from a pair of unilateral mover and the unilaterally moved. This implies that there is no such a mover that is movable by a causally prior mover yet at the same time immovable by what it moves,⁹⁷ because the same matter which makes it movable by the causally prior mover necessarily makes it also movable by what it moves.

To conclude, it is indeed not surprising that Aristotle doesn’t feel the need to specify “unmoved” as “unmoved reciprocally” and “unaffected” as “unaffected reciprocally” even when the context cries out for it: what is immovable is immovable both by a causally prior mover and reciprocally because it lacks the one element that makes both motions possible: the relevant matter. It is also natural for him to go on focusing on the problem of matter and potentiality, as he does in the latter half of *GC* 1.7.

⁹⁶ Williams (1982: 123) acknowledges the fact.

⁹⁷ The way in which the heavenly moved movers cause motion may be a counter-example, as Joachim correctly points out. However, first, in the context of *GC* 1.6-7, Aristotle seems not primarily interested in such cases. Second, it is only in a very restricted sense that the heavenly

3.6 Moved Mover and Possibility

As I mentioned above, Joachim takes having matter and having potentiality to mean having *any* matter and having *any* potentiality. Since for Joachim, a “relatively unmoved mover” has matter whereas an “absolutely unmoved mover” doesn’t, an “absolutely unmoved mover” doesn’t have *any* matter, i.e. it is unmoved *simpliciter*.⁹⁸ Thus, Joachim is forced to deny the unmoved movers and agents such as the medical art, which are not reciprocally moved by what they move, the status of being an absolutely unmoved mover, because they are movable in some way or other after all.⁹⁹

However, looking broadly at other relevant texts in the corpus, we can find that “having matter” and “is movable” doesn’t mean that something can be moved *tout court*.¹⁰⁰ When talking about movable substance in *Metaphysics* Λ 2, Aristotle puts special emphasis on the fact that matter, understood here as what is *per se* movable, is different for different things:

Now all things that change have matter, but *different matter*. ... One might raise the question from what sort of non-being generation proceeds; for ‘non-being’ has three senses. If, then, one form of non-being exists potentially, *still it is not by virtue of a potentiality for any and every thing, but different things come from different things*; nor is it satisfactory to say that ‘all things were together’, for they differ in their matter, since otherwise why did an infinity of things come to be,

moved movers have matter (see *Metaphysics* Λ2 1069b24-28).

⁹⁸ See chapter 1 for the distinction between “unmoved *per se*” and “unmoved *simpliciter*”.

⁹⁹ See Joachim (1922: 154).

¹⁰⁰ I suspend the question of prime matter here. In any case, even if the prime matter exists, it *qua* movable mover has to cause specific motions. See *Metaphysics* Λ2 1068b28-34.

and not one thing?¹⁰¹ (*Metaphysics* Λ 2 1069b24-31)

Also see in *GC* 1:

If agent and patient have not the same matter, an agent acts without being acted on. ... Those agents, then, whose forms are not in matter, are unaffected: but those whose forms are in matter (ἐν ὕλῃ) are such as to be affected in acting. For we maintain that *one and the same* (τὴν αὐτὴν εἶναι) *matter is equally, so to say, the basis of either of the two opposed things*—being as it were a kind; and that which can be hot must be made hot, provided the heating agent is there, i.e. comes near.¹⁰² (*GC* 1.7 324a34-b9)

So, “having matter” always means having *some* matter and “having potentiality” having the potentiality for *some* pair of contraries. Thus, matter and potentiality are understood by analogy because there is no single class for things that are matter or potentiality.¹⁰³

This coheres with the causally specific nature of the possible motion a movable mover undergoes: certain motions count as causally relevant whereas other motions don’t, so a moved mover is not just a mover that is moved with any motion, and the medical art is not a moved mover of health in the patient’s body because, although it is corruptible *per*

¹⁰¹ πάντα δ’ ὕλην ἔχει ὅσα μεταβάλλει, ἀλλ’ ἑτέραν. ... ἀπορήσειε δ’ ἂν τις ἐκ ποίου μὴ ὄντος ἢ γένεσις· τριχῶς γὰρ τὸ μὴ ὄν. εἰ δὴ τι ἔστι δυνάμει, ἀλλ’ ὅμως οὐ τοῦ τυχόντος ἀλλ’ ἕτερον ἐξ ἑτέρου· οὐδ’ ἱκανὸν ὅτι ὁμοῦ πάντα χρήματα· διαφέρει γὰρ τῇ ὕλῃ, ἐπεὶ διὰ τί ἄπειρα ἐγένετο ἀλλ’ οὐχ ἓν; ὁ γὰρ νοῦς εἷς, ὥστ’ εἰ καὶ ἡ ὕλη μία, ἐκεῖνο ἐγένετο ἐνεργείᾳ οὗ ἡ ὕλη ἦν δυνάμει.

¹⁰² ὅσα γὰρ μὴ ἔχει τὴν αὐτὴν ὕλην, ποιεῖ ἀπαθῆ ὄντα. ... Ὅσα μὲν οὖν μὴ ἐν ὕλῃ ἔχει τὴν μορφήν, ταῦτα μὲν ἀπαθῆ τῶν ποιητικῶν, ὅσα δ’ ἐν ὕλῃ, παθητικά. Τὴν μὲν γὰρ ὕλην λέγομεν ὁμοίως ὡς εἰπεῖν τὴν αὐτὴν εἶναι τῶν ἀντικειμένων ὅποτερουοῦν, ὥσπερ γένος ὄν, τὸ δὲ δυνάμενον θερμὸν εἶναι παρόντος τοῦ θερμαντικοῦ καὶ πλησιάζοντος ἀνάγκη θερμαίνεσθαι.

accidens, it is nonetheless not movable with respect to getting healthy or sick. The importance of this will be seen both in the next and in the final chapter.

¹⁰³ See e.g. *Metaphysics* Λ5 1071a34 for matter. There are many other instances for potentiality.

Chapter 4 Aristotle on Unmoved Movers

4.1 Introduction

In chapter 1 I argued, with textual evidence from *Physics* 8 and *Metaphysics* Λ, that Aristotle does believe in a multiplicity of unmoved movers. In this chapter, my aim is to show why this is the case. I show that, because there is a unified way in which all unmoved movers cause motion as such, each one of them is an “unmoved mover” synonymously,¹ and therefore Aristotle has good reasons for believing in a multiplicity of unmoved movers as such. What I am reacting against is a Platonist way of interpreting Aristotle’s theory of the “prime mover”,² according to which the “prime mover” is a *paradigmatic* mover: not only does it cause the motion of its proper heavenly sphere—the sphere of the fixed stars—but also, more importantly, it moves the lower heavens and the mortal living beings by causing their own movers (viz. the lesser heavenly movers and the mortal souls) to *desire* and *imitate* it.³ Thus interpreted, those

¹ They are not synonymous (or univocal) unmoved movers in the sense that they share a definition. This is firstly because “unmoved mover”, as something conceptually prior, is not definable with conceptually posterior terms. Yet they might be synonymous *analogically*. See my chapter 2. See Frede (2000: 19-21) on “analogical equivocity” in *Metaphysics* Λ. See especially Frede (*ibid.*: 21): “In fact, many medieval philosophers came to think of analogically used terms as univocal rather than equivocal. For, though they do not satisfy Aristotle’s rather narrow notion of univocity, they are not plainly ambiguous, either.” The second reason why the unmoved movers are not synonymous unmoved movers is that they are serial, and there doesn’t exist a proper definition for things that are serial. See section 4.5 below for further discussion on this problem.

² I. e. the highest unmoved mover in the universe (τὸ πᾶν). Strictly speaking, τὸ πρῶτον κινεῖν as a term only means the “first mover” in a series of movers. See e.g. *De Anima* 3.12 434b32, *GC* 1.7 324a30, b12, and *Physics* 7.1 242a53.

³ By branding this interpretation “Platonist”, I don’t primarily mean that this is an interpretation certain Platonists first invented, although I have no doubt that there were many Platonists who held such views. What I mean by “Platonist” is the interpretation’s appeal to the clearly Platonic notions of imitation and paradigm. Such an interpretation is at least as old as Alexander, who is by no means a Platonist. See note 53 below.

other movers are causally primitive⁴ only in so far as they *imitate* the “prime mover”, but they can never be as good as the “prime mover” since they are all caused to move by the “prime mover” and hence are causally subordinate.⁵

It may be interesting to keep in mind another slightly different, but related Platonist interpretation of how different movers are related. Such an understanding is in fact “Platonist” in that certain Neoplatonists, such as Plotinus, first introduced it to Greek thought, and certain scholars with Neoplatonist baggage, such as Avicenna, later used it to interpret Aristotle. Wolfson (1958: 244) presents this point very nicely: “The answer [to the question how different movers are related] provided by Avicenna rests upon his conception that the Intelligences form a series of successive emanations, so that there is a causal relation between them, each Intelligence being the cause of an Intelligence emanating from it, and only God, who is at the top of the series, is an uncaused cause. ... It is a new conception, derived from the Christian doctrine of the eternal generation of Logos, and it was introduced into Greek philosophy by Plotinus, who had acquired it from his teacher Ammonius Saccas, who at one time was a Christian. This imposition of the Plotinian conception of immaterial emanation upon Aristotle’s conception of the plurality of immaterial movers of the planetary spheres, which Avicenna inherited from Alfarabi, provided a new principle of differentiation within the immaterial movers and hence also a new explanation of their numerability.”

⁴ I use the expression “causally primitive” instead of “unmoved mover” here because not all interpreters believe that the causally primitive mover for Aristotle is an unmoved mover. Kosman, for instance, takes the activity and essence of the “prime mover” to be a kind of self-motion, and all the other self-movers imitate the activity of the “prime mover”. See the subsequent note.

⁵ For how this works for the lesser heavenly movers, see e.g. Ross (1924, i. cxxxvi): “The ‘intelligences’, like the first mover, move ‘as ends’, i.e. they too move by inspiring desire or love. Their relation to the prime mover is nowhere specified, but if Aristotle is in earnest, as he certainly is, in describing the first mover as moving all things, as that on which the universe and nature depend, and in insisting on a single ruler of the universe, we must suppose that the first mover moves the intelligences. And since they are immaterial this movement will not be physical movement but the metaphorical ‘movement’ of desire and love. It will move them ὡς ἐρώμενον.” Also see Ross (1924, i. cxl): “If, as seems possible, Aristotle regarded the intelligences as actuated by love of the first mover, this itself implies an element of potentiality in them, since they are moved by desire of something which they themselves are not.” This is also the view of Kahn (1985: 183-205, esp. 190) and Sedley (2000: 327-330). Sedley’s view is more nuanced in that he acknowledges that a lower sphere’s love for the “prime mover” is mediated by its love for its proper mover. Although he remains agnostic on the relation between movers (see Sedley: 2000: 333 n. 11).

For how this works for the living beings in general, see Kosman (1994: 151): “Aristotle’s Prime Mover is thus revealed to be a paradigmatic principle, as we earlier thought it might be, and to be so in two respects. As self-moving [sic], it is the principle of the motion of all lesser animate self-movers; more significantly, as the exemplar of that mode of self-fulfilling activity identified in the *Metaphysics* as divine ἐνέργεια, it is the formal and ontological principle of all motion and change, as indeed it is of being in general.”

For the view that human virtuous action and contemplative activity are good with reference to the highest divinity, see Richardson Lear (2004), esp. chapter 4. Richardson Lear (2004: 83) acknowledges that the concept of imitation is essentially Platonic: “Aristotle rejects Plato’s theory of Forms as an account of how sensible things are related to their own natures... But he

The above interpretation concerns the relation between different movers, especially that between the “prime mover” and the other lesser unmoved movers.⁶ However, we would not be able to figure out the relation between different unmoved movers unless we know how each and every one of them causes motion. So, the question concerning the relation between movers naturally leads us to the question concerning the relation between an unmoved mover and what it moves. In the sublunary domain, this is the relation between a mortal soul and its living body, whereas in the supralunary domain, this is the relation between a heavenly unmoved mover and the sphere it moves.⁷ In what comes below, I show that *all* unmoved movers cause motion by unilaterally touching the things moved, so that the way in which the “prime mover” causes motion is not of a *privileged* kind that is different from the way in which a lesser unmoved mover, as such, causes motion.

It is to be noted, though, that in rejecting this Platonist interpretation of Aristotle’s theory of the unmoved movers, I am not thereby denying that there is indeed a hierarchy

did not reject the imitation or approximation at the heart of the theory as a possible model of final causation”.

⁶ Theophrastus mentions the problem as a difficulty for Aristotle’s theory of principles in *Metaphysics* 5a14-21: “Next after these the problem of desire (ἔφεςις) still wants more argument: what kind of thing it is and what is it of, given that the circular [bodies] are multiple and that the motions are in some way contrary and that their endlessness and end is unclear. For if the mover is one, it is odd that all [bodies] are not [moved with] the same [motion]; but if the mover is different for each [body] and the principles are multiple, then it is in no way clear why harmony in respect of desire exists among those who proceed with the best motion.” (Τὸ δὲ μετὰ ταῦτ’ ἤδη λόγου δεῖται πλείονος περὶ τῆς ἐφέσεως, ποία καὶ τίνων, ἐπειδὴ πλείω τὰ κυκλικά καὶ αἱ φοραὶ τρόπον τινὰ ὑπεναντία, καὶ τὸ ἀνήνυτον καὶ οὐ χάριν ἀφανές. εἴτε γὰρ ἐν τὸ κινοῦν, ἄτοπον τὸ μὴ πάντα τὴν αὐτήν· εἴτε καθ’ ἕκαστον ἕτερον αἱ τ’ ἀρχαὶ πλείους, ὥστε τὸ σύμφωνον αὐτῶν εἰς ὄρεξιν ἰόντων τὴν ἀρίστην οὐθαμῶς φανερόν).

⁷ This second question is the main target for Sarah Broadie’s famous 1993 article. She makes it very clear that she does not deal with the question of the relation between the different movers: instead, she focuses on the second question insofar as it concerns the “prime mover”. See Broadie (1993, 376): “*Je ne m’occuperai que du Premier Moteur dans Méta. Lambda, et au sein de Lambda je me bornerai à traiter des relations qui peuvent être supposées s’établir entre le Premier Moteur, la première sphère et le mouvement de cette sphère. Je ne dirai presque rien des*

among the unmoved movers. Toward the end of the chapter, I suggest that Aristotle has some conceptual resources to accommodate this ontological hierarchy.⁸

Further, at the very end of the chapter, I show that Aristotle at a number of places connects the immobility of an unmoved mover to the conception of necessity as “the simple” (τὸ ἀπλοῦν) and that he defines this simple necessity against a conception of possibility as “possible to be otherwise” (ἐνδέχεσθαι ἄλλως ἔχειν). Given what I showed in chapter 3, that what is possible or potential in causal contexts is always *possible to be otherwise with respect to a particular pair of contraries*, it is arguable that what is necessary as “the simple” is also necessary or immovable with respect to a *particular* pair of contraries. Therefore, simple necessity is a *weaker* notion than it is sometimes assumed to be: it does not single out the immobility with respect to *every* pair of contraries, according to which notion only the “prime mover” is simply necessary; rather, simple necessity only pertains to the immobility with respect to *some particular* pair of contraries, *whatever* it may be, according to which a variety of unmoved movers are simply necessary.⁹

4.2 GC 1.6 on Unilateral Touch

As I mentioned in chapter 3, Aristotle’s labor in *Physics* 7.2 is to prove that a mover, whether an unmoved mover or a moved mover,¹⁰ is always *together* (ἅμα)—in touch—¹¹with that which is moved by it, and that this applies to *all* three kinds of motion

autres sphères et de leurs moteurs.”

⁸ Cf. Wolfson (1958) for an interesting survey of how Avicenna and Averroës offer different accounts of this question.

⁹ See chapter 5.

¹⁰ See the quotation in note 12 below.

¹¹ In other words, “there is nothing between the thing moved and the mover” (*Physics* 7.2

or change: locomotion, qualitative change, and quantitative change.¹² So, from *Physics* 7.2, we know that causing motion is closely tied to touching. In *GC* 1.6, building on this assumption,¹³ Aristotle further distinguishes between two kinds of causally relevant touch: (1) reciprocal touch and (2) unilateral touch, and ties them to the two kinds of movers there are respectively: (1) reciprocal touch to *the moved movers* and (2) unilateral touch to *the unmoved movers*. In this section I give an outline of the relevant discussion in *GC* 1.6 and discuss the characterization of unilateral touch offered there.

GC 1.6 contains Aristotle's most detailed account of touch or contact (ἅφή).¹⁴ Admittedly, in this part of the book, Aristotle is primarily interested in the manner of elemental mixture (μίξις) and qualitative change (ἀλλοίωσις), however, since he does not restrict his discussion to qualitative change and agent and patient only, but includes a discussion of motion and mover quite generally, I take it that the theory of touch we find in *GC* 1.6 is more generally applicable.

244a5-6). For this interpretation of “together” as it concerns the moved movers, see Ross (1936: 627): “it is evident that Aristotle’s meaning [at *Physics* 5.2 226b22] is that two things are ἅμα if they are in one place which contains nothing but *the two*, i.e. where there is nothing between them.”

¹² See *Physics* 7.2 243a32-40: “that which is the first mover of a thing—in the sense that it supplies not that for the sake of which but the source of the motion—is always together with that which is moved by it (by together I mean that there is nothing between them). This is universally true wherever one thing is moved by another. And since there are three kinds of motion, local, qualitative, and quantitative, there must also be three kinds of mover, that which causes locomotion, that which causes alteration, and that which causes increase or decrease.” See also *Physics* 7.2 245a16-b2: “it is evident, therefore, that between the moved and the mover—the first and the last—in reference to the moved there is nothing in between.” Note that the “last mover” in this quotation can but need not be a moved mover: in reference to the motion of the first thing moved by an unmoved mover, the last mover is the unmoved mover. So the movers that are under discussion in *Physics* 7.2 need not be moved movers: indeed, the first mover in a self-moving thing mentioned at *Physics* 7.2 243a14 is an unmoved mover.

¹³ See *GC* 1.6 322b21-26.

¹⁴ N.B. For Aristotle, an animal perceives by touching something else so touch is also a form of sense-perception. Aristotle offers a theory of touch as a form of sense-perception in *De Anima* and *De Sensu*, which is different from his theory of touch or contact in general. In this part I am only interested in his theory of touch or contact in general, which applies to the inanimate things

In GC 1.6 Aristotle makes a twofold distinction of touch. With the *first distinction* (322b29-323a12)¹⁵ Aristotle tries to distinguish a causal, “proper sense of touch” (τὸ κυρίως λεγόμενον 322b32-3) that implies efficient causation (323a12) from a loose, geometric sense of touch that merely requires that the two things which touch have their extremes together (323a4).¹⁶ With the *second distinction* (323a12-34), Aristotle tries to

as well.

¹⁵ “Now no doubt, just as every other name is used in many senses (in some cases homonymously, in others one use being derived from other and prior uses), so too is it with contact. Nevertheless *contact in the proper sense* applies only to things which have position. And position belongs only to those things which also have a place; for in so far as we attribute contact to the mathematical things, we must also attribute place to them, whether they exist in separation or in some other fashion. Assuming, therefore, that to touch is—as we have defined it in a previous work—to have the extremes together, only those things will touch one another which, being separate magnitudes and possessing position, have their extremes together. And since position belongs only to those things which also have a place, while the primary differentiation of place is the above and the below (and the similar pairs of opposites), all things which touch one another will have weight or lightness—either both these qualities or one or the other of them. But bodies which are heavy or light are such as to act and suffer action. Hence it is clear that those things are by nature such as to touch one another, which (being separate magnitudes) have their extremes together *and* are able to move, and be moved by, one another.”

¹⁶ The first distinction helps make it clear that the touch in the proper sense that Aristotle is interested in in this chapter is dynamic, that is to say, it always implies one kind of motion (κίνησις) or another. According to Aristotle, touch in the proper sense belongs to things that have position (θέσις) and place (τόπος). See GC 1.6 322b32-323a1: “nevertheless touch in the proper sense applies only to things which have position. And position belongs only to those things which also have a place.” (Ὅμως δὲ τὸ κυρίως λεγόμενον ὑπάρχει τοῖς ἔχουσι θέσιν, θέσις δ’ οἷσπερ καὶ τόπος).

Since place implies above and below, and the contrariety of above and below implies the contrariety of weight and lightness, and weight and lightness implies action and passion, touch in the proper sense belongs to things that can act or be acted upon. See GC 1.6 322a1-12, esp. 322a6-11: “since position belongs only to those things which also have a place, while the primary differentiation of place is the above and below, all things that touch one another will have weight or lightness—either both these qualities or one or the other of them. But bodies which are heavy or light are such as to act and be acted on.” (Ἐπεὶ δὲ θέσις μὲν ὅσοις καὶ τόπος ὑπάρχει, τόπου δὲ διαφορὰ πρώτη τὸ ἄνω καὶ τὸ κάτω καὶ τὰ τοιαῦτα τῶν ἀντικειμένων, ἅπαντα τὰ ἀλλήλων ἀπτόμενα βάρος ἂν ἔχῃ ἢ κουφότητα, ἢ ἄμφω ἢ θάτερον. Τὰ δὲ τοιαῦτα παθητικὰ καὶ ποιητικὰ).

One should notice that by “act and be acted upon” Aristotle doesn’t just mean qualitative change, but moving and being moving in general, since things with their relative weight and lightness primarily cause locomotion. Aristotle’s remarks here also make it clear that he doesn’t only have qualitative change in mind: “hence it is clear that those things are by nature such as to touch one another, which (being separate magnitudes) have their extremes together and are able to moved, and be moved by, one another” (323a10-12). Contrasted with this proper, dynamic sense of touch is a loose, non-dynamic sense according to which, I take it, things touch as long as they have their extremes together. See *Physics* 5.3 226b21-3: “Things are said to touch when their

further divide the causal “touch proper” into “unilateral touch” and “reciprocal touch” and then to connect the one with the unmoved movers and the other with the moved movers. For my purpose in this chapter, I focus on the second distinction: the distinction between reciprocal touch and unilateral touch.

According to Aristotle, “the definition of *touching in general* is the one that holds between a pair of things which, having position, the one is able to cause motion and the other able to be moved, whereas <the definition of> *reciprocal touching* holds between a pair of things the one of which is able to cause motion and the other able to be moved, and to which *acting and being acted upon* belong” (GC 1.6 323a22-5).¹⁷ Now, “*touching in general (καθόλου)*” means to capture *any* two things that touch in the aforementioned “proper sense”: their relationship is not just spatial, but also causal.¹⁸ “Reciprocal touching”, as can be seen, belongs to “touching in general”, because whatever two things that “touch reciprocally” are, they are such that, having position, the one is able to cause motion and the other to be moved. However, “reciprocal touching” specifies a kind of causal touching that is *reciprocal*. As Aristotle argues here, “acting and being acted upon”, as a unit, belong to both the mover and the thing moved, so that

extremities are together.” Thus a straight line or more strictly speaking a circle is said by mathematicians to touch another circle by having their extremes together. See Euclid, *Elements* book 3 definitions 2 and 3. These geometrical figures may have position and place in a weaker sense (see Joachim’s note *ad loc.* and *Physics* 4.1 208b22-25), but having position and place for them doesn’t imply having weight and lightness—they don’t even need to be three-dimensional extension—and hence dynamic motion or action. So the first distinction makes it clear that touch in the proper sense is dynamic.

¹⁷ Ἀλλ’ ὁ διορισμὸς τοῦ ἅπτεσθαι καθόλου μὲν ὁ τῶν θέσιν ἐχόντων καὶ τοῦ μὲν κινητικοῦ τοῦ δὲ κινητοῦ, πρὸς ἄλληλα δὲ κινητικοῦ καὶ κινητοῦ, ἐν οἷς ὑπάρχει τὸ ποιεῖν καὶ τὸ πάσχειν. I follow Joachim’s interpretation here. Gill (1991:195-198) interprets “touch πρὸς ἄλληλα” as “relational touch” such that “two objects are in contact in this way if they are distinct located magnitudes and if ‘that which is able to move is able to move the moved and that which is able to be moved is able to be moved by the mover.’” This is a misunderstanding of the semantics of πρὸς ἄλληλα which does not just mean *any* relationship but a *mutual* relationship. It seems to me that her appeal to Alexander (*ibid.*: 197) isn’t convincing.

the mover not only acts but is also acted upon and, similarly, the thing moved is not only acted upon but also acts. Aristotle further specifies what this kind of touch is and what kind of mover touches in this way: “as a rule, no doubt, if A touches B, B touches A. For indeed practically all the movers within our ordinary experience cause motion by being moved: in their case, what touches inevitably must, and also evidently does, touch something which reciprocally touches it” (GC 1.6 323a25-27). Note that in both places Aristotle establishes the correspondence between reciprocal touching and reciprocal motion and action. This is also the kind of touching that is meant by “θίξις” at *Physics* 3.2 202a3-12.¹⁹

This leaves room for another kind of touch which is causal but non-reciprocal, and this is what Aristotle has in mind to clarify in GC 1.6 with the *second distinction* (323a12-34). He first introduces the two kinds of mover and agent:

The manner in which the mover moves the moved is not always the same:

whereas one kind of mover can only cause motion by being itself moved, *another kind can do so though remaining itself unmoved*. Clearly therefore we must

¹⁸ Pace Buchheim (2008: 83).

¹⁹ “The mover too is moved, as has been said—every mover, that is, which is capable of motion, and whose immobility is rest—when a thing is subject to motion its immobility is rest. For to act on the movable as such is just to move it. But this [the mover] does by contact, so that at the same time it is also acted on. Hence we can define motion as the fulfillment of the movable qua movable, the cause being contact with what can move so that the mover is also acted on. The mover or agent will always be the vehicle of a form, either a 'this' or 'such', which, when it acts, will be the source and cause of the change, e.g. the full-formed man begets man from what is potentially man.” (κινεῖται δὲ καὶ τὸ κινεῖν ὥσπερ εἰρηται πᾶν, τὸ δυνάμει ὄν κινητόν, καὶ οὗ ἡ ἀκίνησις ἡρεμία ἐστίν, ὃ γὰρ ἡ κίνησις ὑπάρχει, τούτου ἡ ἀκίνησις ἡρεμία. τὸ γὰρ πρὸς τοῦτο ἐνεργεῖν, ἢ τοιοῦτον, αὐτὸ τὸ κινεῖν ἐστὶ· τοῦτο δὲ ποιεῖ θίξει, ὥστε ἅμα καὶ πάσχει· διὸ ἡ κίνησις ἐντελέχεια τοῦ κινητοῦ, ἢ κινητόν, συμβαίνει δὲ τοῦτο θίξει τοῦ κινητικοῦ, ὥσθ' ἅμα καὶ πάσχει. εἶδος δὲ αἰεὶ οἴσεται τι τὸ κινεῖν, ἥτοι τότε ἢ τοιόνδε ἢ τοσόνδε, ὃ ἔσται ἀρχὴ καὶ αἴτιον τῆς κινήσεως, ὅταν κινῇ, οἷον ὁ ἐντελεχία ἄνθρωπος ποιεῖ ἐκ τοῦ δυνάμει ὄντος ἀνθρώπου ἄνθρωπον).

recognize a corresponding variety in speaking of the acting thing too: for the mover is said to act and the acting thing to impart motion.²⁰ (GC 1.6 323a12-16)

Here, the first kind of mover and agent are the “moved mover” and the “affected agent”. As I argued in chapter 3, this kind of mover and agent are moved reciprocally when they cause motion, and, as I showed just above, the mover and the moved touch each other reciprocally. The second kind of mover and agent are the “unmoved mover” and the “unaffected agent”. Aristotle connects this kind of mover to a *unilateral kind of touching* in the following way:

Yet it is possible—as we sometimes express it—for *the mover merely to touch the moved, and that which touches need not touch a thing which touches it.*

Nevertheless it is commonly supposed that touching must be reciprocal, because movers which *belong to the same kind* as the moved cause motion by being moved. *Hence if anything causes motion without itself being moved, it may touch the moved and yet itself be touched by nothing—for we say sometimes that the man who insults us touches us, but not that we touch him.*²¹ (GC 1.6 323a27-33)

It is implicit in what Aristotle says here that unilateral touch and unilateral causation belong to a pair of mover and moved that are not of the same kind. However, it is not

²⁰ Ἐπεὶ δὲ τὸ κινεῖν οὐχ ὁμοίως κινεῖ τὸ κινούμενον, ἀλλὰ τὸ μὲν ἀνάγκη κινούμενον καὶ αὐτὸ κινεῖν, τὸ δ' ἀκίνητον ὄν, δῆλον ὅτι καὶ ἐπὶ τοῦ ποιοῦντος ἐροῦμεν ὡσαύτως· καὶ γὰρ τὸ κινεῖν ποιεῖν τί φασι καὶ τὸ ποιοῦν κινεῖν.

²¹ ἔστι δ' ὥς ἐνιότ' εἰς φασιν τὸ κινεῖν ἄπτεσθαι μόνου τοῦ κινουμένου, τὸ δ' ἀπτόμενον μὴ ἄπτεσθαι ἀπτομένου· ἀλλὰ διὰ τὸ κινεῖν κινούμενα τὰ ὁμογενῆ, ἀνάγκη δοκεῖ εἶναι ἀπτομένου ἄπτεσθαι. Ὡστε εἴ τι κινεῖ ἀκίνητον ὄν, ἐκεῖνο μὲν ἂν ἄπτοιτο τοῦ κινήτου, ἐκεῖνου δὲ

quite clear how this works, and, in particular, the example Aristotle offers seems problematic, because the man who insults other people seems to belong to the same kind, i.e. the human kind, as the person he insults. The example has traditionally been taken as a metaphor, and interpreters offer different candidates for the unmoved, unilaterally touching mover mentioned here. Philoponus thinks that Aristotle has in mind here the objects of desire,²² Alexander and Zabarella think that it should rather be the celestial spheres,²³ whereas Williams thinks that it should be the “prime mover” of the universe.²⁴

All these controversies arise, I think, because the interpreters fail to appreciate the general applicability of unilateral touch and causation here and try to find some *specific* candidate for it. For some scholars such as Williams, the reason may be that they think that there is only one real unmoved mover—the “prime mover”. So, strictly speaking, only the “prime mover” touches its objects unilaterally. Yet as I showed in chapter 1, Aristotle does acknowledge the existence of a multiplicity of unmoved movers. Further, as I’ll show later, the cases of unaffected agent Aristotle himself evokes, such as the medical art and the housebuilding art, are real unmoved movers. For others, such as Alexander and Zabarella, the reason is that they mistakenly think that the kind of mover mentioned here is unmoved reciprocally but movable by a causally higher mover in the

οὐδέν· φαμέν γὰρ ἐνίστε τὸν λυποῦντα ἄπτεσθαι ἡμῶν, ἀλλ’ οὐκ αὐτοὶ ἐκείνου.

²² Philoponus *On coming-to-be and perishing*: 138, 27-8: “he is right to say ‘almost’ (323a25), because neither the image nor the object of love nor, generally speaking, what is desired, while causing change, is in turn changed itself” (trans. C. J. F. Williams).

²³ See Alexander quoted in Philoponus *ibid.* 135, 3-8: “but if what is said is to be understood as applying to the body whose motion is circular as well, in order to make the account more general, then, in Alexander’s opinion, ‘either both or just one’ (323a8) must be taken to refer, not to lightness and heaviness, but to the things that are in contact themselves. For it is in all cases necessary that there should be two things that touch, and these touching things, either both or just one of them, necessarily have either heaviness or lightness” (trans. C. J. F. Williams). See also Joachim (1922: 146-7).

²⁴ See Williams (1982: 119). See Natali (2004) for all these references.

relevant respect: they think that the movers mentioned here are the supralunary spheres which, with their own motions caused by the higher movers, move the sublunary elements unilaterally. However, as I showed in chapter 3, a moved mover that is movable by a causally higher mover is by definition movable in that respect, so that when it moves its object as a movable mover in that respect, it is also moved reciprocally. This all suggests that the kind of unilateral touch and causation mentioned here is more generally applicable. In the next two sections, I show why this is the case by looking in turn at the heavenly movers and mortal souls.

4.3 The Heavenly Unmoved Movers

4.3.1 Aristotle's Universe and Unilateral Touch

Aristotle's heavenly unmoved movers are there, unsurprisingly, to move the heavens, so let's look at Aristotle's universe first. According to the Eudoxus-style geocentric model which Aristotle clearly endorses,²⁵ the universe consists of multiple concentric spheres whose revolutions share a common center: the center of the spherical earth. The first sphere contains in it everything there is. Eudoxus apparently thinks that its daily rotation²⁶ from east to west along the axis between its north and south poles explains the daily westward motion of all the supralunary objects that are contained in it: the fixed stars, the sun, the moon, and all the planets.²⁷

Moving down to the lower spheres, we see that the planets, the moon, and the sun all have their own motions on top of the daily rotation in tandem with the fixed stars: the

²⁵ See *Metaphysics* Λ 8 1073b17-1074a14.

²⁶ The cycle will be a sidereal day, slightly less than a solar day.

²⁷ This was in any case the most advanced theory before Hipparchus (ca. 150 BCE) discovered the procession of the equinoxes.

sun, for instance, is also moved along the zodiac in a tropical year, and each planet has its own two synodic motions on top of the motion along the zodiac, similar to the one of the sun.²⁸ Eudoxus explains all these additional motions by introducing a series of further concentric spheres, each of which has its two poles set in a sphere outside it and is thus carried along by the outer sphere²⁹ but its two poles engender its own additional motion. The sun and the moon, for instance, each have two additional spheres,³⁰ whereas the planets each have three additional spheres.

Agreeing with this general picture, Aristotle modifies the part of Eudoxus' theory that concerns the number of the heavenly spheres and their corresponding movers. Presumably because Aristotle thinks that there cannot be more than one sphere immediately attached from inside to a superior sphere—the sphere of the sun and the sphere of Mars cannot both be immediately attached to the sphere of the fixed stars, for example—so for an inferior planet³¹ to be moved the way it is, there needs to be first some spheres canceling out the motions of the planet superior to the inferior planet.³² In this way, Aristotle multiplies the number of the spheres up to 56 or 48: one celestial

²⁸ See Henry Mendell at <http://web.calstatela.edu/faculty/hmendel/Ancient%20Mathematics/Eudoxus/Astronomy/EudoxusHomocentricSpheres.htm> (accessed 2016/3/20).

²⁹ In this way, the outermost sphere transmits, as it were, its daily westward rotation via the poles of the other sphere(s) that are situated in it.

³⁰ Two spheres (the celestial sphere and a sphere of yearly motion along the zodiac) would be enough to explain the sun's apparent motion. Schiaparelli thinks that the early astronomers inferred a movement of the sun in latitude (hence a third sphere) from the observed motion of the moon and the planets in latitude. (See Ross: 1924, ii. 388).

³¹ I.e. a planet that is located in an inferior sphere.

³² See *Metaphysics* Λ 8 1073b38-1074a5: "but it is necessary, if all the spheres combined are to explain the observed facts, that for each of the planets there should be other spheres (one fewer than those hitherto assigned) which counteract those already mentioned and bring back to the same position the outermost sphere of the star which in each case is situated below the star in question; for only thus can all the forces at work produce the observed motion of the planets."

sphere and 55 or 47 lower heavenly spheres.³³ The same goes for the number of their movers.³⁴

Now, whether Aristotle is right about the number of the spheres and of their movers or not, it is arguable that the way an unmoved mover causes its proper motion in its proper sphere is the same way across the board. Here, the unilateral kind of touch I described in the last section is relevant. I argue that both the unmoved mover of the celestial sphere and the 55 unmoved movers of the lower heavenly spheres cause their respective proper sphere to rotate by touching it unilaterally.

As I showed in chapter 2, toward the very end of *Physics* 8.10, Aristotle places the unmoved mover of the celestial sphere at its κύκλος,³⁵ and this κύκλος has been interpreted either as the celestial equator (Eudemus)³⁶ or the entire circumference of the celestial sphere (Alexander).³⁷ Now, whichever is the case, and whether the unmoved

³³ See *Metaphysics* Λ 8 1074a6-14: “Since, then, the spheres involved in the movement of the planets themselves are--eight for Saturn and Jupiter and twenty-five for the others, and of these only those involved in the movement of the lowest-situated planet need not be counteracted the spheres which counteract those of the outermost two planets will be six in number, and the spheres which counteract those of the next four planets will be sixteen; therefore the number of all the spheres--both those which move the planets and those which counteract these--will be fifty-five. And if one were not to add to the moon and to the sun the movements we mentioned, the whole set of spheres will be forty-seven in number.”

³⁴ See *Metaphysics* Λ 8 1074a14-22: “Let this, then, be taken as the number of the spheres, so that the unmovable substances and principles also may probably be taken as just so many; the assertion of necessity must be left to more powerful thinkers. But if there can be no spatial movement which does not conduce to the moving of a star, and if further every being and every substance which is immune from change and in virtue of itself has attained to the best must be considered an end, there can be no other being apart from these we have named, but this must be the number of the substances.”

³⁵ *Physics* 8.10 267b6-9: ἀνάγκη δὴ ἢ ἐν μέσῳ ἢ ἐν κύκλῳ εἶναι· αὗται γὰρ αἱ ἀρχαί. ἀλλὰ τάχιστα κινεῖται τὰ ἐγγύτατα τοῦ κινουντος. τοιαύτη δ’ ἢ τοῦ κύκλου κίνησις· ἐκεῖ ἄρα τὸ κινουόν.

³⁶ See Simplicius *In Physic.* 1354, 9-12: ὁ δὲ Εὐδημος ἐν τῷ μεγίστῳ κύκλῳ φησὶν εἶναι τῷ διὰ τῶν πόλων· οὗτος γὰρ τάχιστα κινεῖται, τὸ δὲ κινουόν δοκεῖ ἄρχεσθαι, ὅθεν τάχιστα ἂν κινήσαι καὶ ῥᾶστα. (Text: H. Diels, Berlin, 1895)

³⁷ See *ibid.* 1354, 16-22: [ἀλέξανδρος] λύων δὲ τὴν ἀπορίαν λέγει, ὅτι εἰ μὲν ἐν μορίῳ τινὶ εἴη τῆς περιφερείας τῆς ἐξωτάτω, κινεῖτο ἂν κατὰ συμβεβηκὸς τῷ κατὰ μόρια τὴν κίνησιν εἶναι τῆς σφαίρας· εἰ δὲ ἐν πάσῃ τῇ περιφερείᾳ (οὕτω γὰρ ἔσται ἐν τῷ τάχιστα κινουμένῳ), οὐκέτι ἂν

mover is the τόπος itself of the celestial sphere³⁸ or only *acts at* the circumference of the celestial sphere,³⁹ as something without three dimensional magnitude, the unmoved mover cannot reciprocally touch the celestial sphere.⁴⁰ However, since there is no void between the τόπος of the sphere and the sphere itself, and since the first unmoved mover causes the celestial sphere, which is a three dimensional magnitude, to rotate along its axis, the first mover has to touch the sphere. So the first unmoved mover *unilaterally* touches the sphere it moves.⁴¹

As we can see from the passage quoted above (*Metaphysics* Λ 8 1074a14-22), besides the unmoved mover of the celestial sphere, Aristotle also acknowledges that there are 55 or 47 unmoved movers of the planetary, the solar, and the lunar spheres. Each of these movers is, according to Aristotle, unmoved *per se* (καθ' αὐτό) but moved *per*

κινεῖτο κατὰ συμβεβηκὸς τῷ πᾶσαν τὴν περιφέρειαν μὴ κινεῖσθαι μηδὲ ἀλλάσσειν τὸν τόπον, ἀλλ' ἐν τῷ αὐτῷ μένειν αἰεί.

Strictly speaking it should be what touches the outer circumference of the celestial sphere. See *ibid.* 1355, 11-15: οὐ γὰρ οὖν δεδοικέναι, μὴ κατὰ συμβεβηκὸς κινήσωμεν τὸ πρῶτως κινουὺν ἐν τῷ ἀπλανεῖ λέγοντες αὐτὸ οὐρανῷ· οὐ γάρ ἐστιν ἐν τῷ οὐρανῷ κυρίως ἐκεῖνο, ἀλλ' ὁ οὐρανὸς ἐν αὐτῷ, εἴπερ τὸ ἐν τινι περιέχεται ὑπὸ τοῦ ἐν ᾧ ἐστι· περιέχει δὲ ἐκεῖνο τὸν ὅλον κόσμον τῇ ἀπείρῳ ἐκείνου δυνάμει.

³⁸ Or the τόπος-equivalent of the celestial equator.

³⁹ Because according to *Physics* 8.10 267b24-6, the unmoved mover is without parts and without magnitude. If we understand this to mean that the unmoved mover cannot have any magnitude at all, it clearly cannot be either the equator which is one-dimensional magnitude or the circumference which is two-dimensional magnitude. However, an unmoved mover may be conceived as without magnitude in the sense that a limit as such is without magnitude: thus three lines are the limit of a triangle, and as limit of two-dimensional extension they are two-dimensionally unextended.

Pace De Motu 3 669a20-24, which argues against unextended parts of some body—its termini—as the unmoved mover. However, it is important to keep in mind that the termini of some body may not be the same as the τόπος of that body.

⁴⁰ For one of the conditions of reciprocal touch is that both parties have magnitude: “assuming, therefore, that to touch is—as we have defined it in a previous work—to have the extremes together, only those things will touch one another which, being separate magnitudes and possessing position, have their extremes together.” (*GC* 1.6 323a3-5)

⁴¹ There is more to be said on this point concerning *De Motu*. See e.g. Coope (forthcoming) and Morison (forthcoming) for a different interpretation. For the purpose of this project, I take Aristotle's position in *Physics* 8.10 as final.

accidens (κατὰ συμβεβηκός) by others.⁴² It is *unmoved* in respect of the motion that it, *qua* mover, causes, but is *moved* by the movers of the spheres which are external to it and in which it happens (συμβαίνει) to be situated. Now, because such an unmoved mover is moved by being situated in certain spheres, it cannot be situated in the sphere it is a mover of: otherwise it would have to be a *per accidens* self-mover through the mediation of the sphere it is the mover of.⁴³ Further, I showed both in chapter 3 and earlier in this chapter that Aristotle thinks that all movers cause motion through contact, so such a mover has to touch the sphere it is a mover of. Now, since the mover is not in the sphere, the only other option is for it to touch the sphere at its periphery, and given it is said by Aristotle to be “without magnitude”,⁴⁴ it cannot be another body that touches the sphere at its periphery. So, such a mover has to be the innermost boundary of what contains the

⁴² See *Physics* 8.6 259b28-31: “We must distinguish, however, between accidental motion of a thing by itself and such motion by something else, the former being confined to perishable things, whereas the latter belongs also to certain first principles of heavenly bodies, of all those, that is to say, that experience more than one locomotion.” See also *Metaphysics* Λ 8 1073a22-b1: “We however must discuss the subject, starting from the presuppositions and distinctions we have mentioned. The first principle or primary being is not movable either in itself or accidentally, but produces the primary eternal and single movement. But since that which is moved must be moved by something, and the first mover must be in itself unmovable, and eternal movement must be produced by something eternal and a single movement by a single thing, and since we see that besides the simple spatial movement of the universe, which we say the first and unmovable substance produces, there are other spatial movements-those of the planets-which are eternal (for a body which moves in a circle is eternal and unresting; we have proved these points in the physical treatises), each of these movements also must be caused by a substance both unmovable in itself and eternal. For the nature of the stars is eternal just because it is a certain kind of substance, and the mover is eternal and prior to the moved, and that which is prior to a substance must be a substance. Evidently, then, there must be substances which are of the same number as the movements of the stars, and in their nature eternal, and in themselves unmovable, and without magnitude, for the reason before mentioned.”

⁴³ In the same way a soul is a *per accidens* self-mover through the mediation of the body it moves. See chapter 1.

⁴⁴ See *Metaphysics* Λ 8 1073a38: “Evidently, there must be substances which are of the same number as the movements of the stars, and in their nature eternal, and in themselves unmovable, and without magnitude, for the reason before mentioned.”

spherical body⁴⁵, which, *qua* boundary (ὄρος) and limit (πέρας) of some continuous magnitude, is itself without parts but is moved together with the body it is a boundary of. As such a boundary, the mover *unilaterally* touches the sphere it moves in respect of the motion it causes, whereas the body it is a boundary of *reciprocally* touches the sphere it moves.

So, both the unmoved mover of the sphere of the fixed stars and the unmoved movers of the lower spheres are the τόπος-like boundaries which unilaterally touch the sphere in question, and they all cause motion in their respective spheres by unilateral touch. The only difference lies in the fact that the unmoved mover of the sphere of the fixed stars is not itself moved whereas the unmoved movers of the lower spheres are. However, precisely because a lower unmoved mover is only moved *per accidens*, it *per se* causes motion in the same way as the first unmoved mover does.

4.3.2 Heavenly Mover causing Motion *qua* Good⁴⁶

Now, the above interpretation, which describes a heavenly unmoved mover as an efficient cause through unilateral touch, is mainly based on *Physics* 8.10 and *GC* 1.6-7.

⁴⁵ It is moved with what contains the spherical body, i.e. the sphere that is immediately outside the sphere in question, so it cannot be the τόπος of the sphere in question, which has to be by definition “the innermost *motionless* boundary of what contains it” (*Physics* 4.4 212a20-21).

⁴⁶ For an analysis of an external unmoved mover *qua* good both in the case of heavenly motion and in the case of animal self-motion, see Coope (forthcoming) and Morison (forthcoming). An important difference between their interpretation and mine is that I don’t distinguish between what they call an “external platform” and an external good. If both of them cause motion as external unmoved movers via unilateral touch (some external platforms certainly do not, but some might: think about the τόπος-equivalent of the universe), they are the same in so far as causing motion is concerned.

An external platform and an external good might seem different if one takes the former *only* as a physical item which causes via contact and the latter *only* as a mental item which causes through void. Part of my aim in this chapter is to suggest that practical or achievable good is not *just* a mental item.

Aristotle offers what appears to be a different picture of the heavenly unmoved movers in *Metaphysics* Λ7-9 as final causes. Aristotle clearly characterizes such a mover as causing motion *qua* the object of desire and thought,⁴⁷ the good (τὸ καλόν),⁴⁸ the final cause (τὸ οὗ ἕνεκα),⁴⁹ the end of locomotion (τέλος φορᾶς),⁵⁰ and, most notably, thought (νοῦς) or thinking (νόησις).⁵¹ So the natural question is: how do these two pictures cohere?

The traditional view on how a heavenly mover imparts motion as a final cause, as I have already mentioned in the introduction of this chapter, makes heavy use of the concept *imitation*. Something is worthy of imitation because it is good or desirable, so an object of imitation is in a way a final cause. However, what makes an object of imitation a special kind of final cause, different from a normal final cause such as a prey which is also good or desirable, is that the former is imitated but not attained by the imitator, whereas the latter is attained but not imitated by the predator.⁵² In other words, although all objects of imitation are desirable, not all desirable things are objects of imitation. Thus, imitation is an attractive way to conceptualize the relation between a heavenly sphere and its unmoved mover precisely because the heavenly sphere does not attain its unmoved mover, which is an active νοῦς, but may be said to *imitate* the activity of its unmoved mover, which is νόησις, with its own eternal rotation.⁵³ What is more, imitation is also

⁴⁷ *Metaphysics* Λ7 1072a26.

⁴⁸ *Ibid.* Λ7 1072a28.

⁴⁹ *Ibid.* Λ7 1072b1.

⁵⁰ *Ibid.* Λ8 1074a20, 23. It is clear from here, by the way, that there are more than one such movers.

⁵¹ *Ibid.* Λ 7, 9.

⁵² Both are final cause in the sense of “something at which the action aims”, as opposed to “some being for whose good an action is done”. See *Metaphysics* Λ 7 1072b1-3, trans. Ross.

⁵³ See Alexander *Quaestiones* 1.25 40.17-23: “so it (i.e. the heavens) remains for it to be moved in its eternal rotation by desiring the primary eternal and unmoved being. Its desire is not to acquire it, but to become similar to it as far as possible; and it becomes similar to it in respect of its movement, by the eternity and uniformity and evenness of the movement. For rotation which

attractive for a Platonist interpretation of the “prime mover” in that an object can be imitated by a multiplicity of imitators without directly touching them, thus allowing for a multiplicity of copies of a single Form.

According to the traditional interpretation, the “prime mover” is said to be *imitated* in two ways:

(1) First and foremost, it is said to be imitated by the sphere of the fixed stars.⁵⁴

The traditional story told since Alexander posits, in addition to the external “prime mover”, an internal mover—a soul that can desire and cause motion—for the sphere of the fixed stars: the soul, as a moved mover, desires and *imitates* the external unmoved mover which is a self-thinking νοῦς, and it is this soul that directly causes the rotation of the sphere in question. In this story, the external unmoved mover *qua* active νοῦς, as something good, *inspires* and thus unilaterally moves the soul of the sphere to imitate its activity, and this imitation results in the eternal rotation of the sphere, which is like νόησις at least in its eternity. This is to say, the external unmoved mover, *qua* active νοῦς, is both the final cause and the first efficient cause of the sphere’s eternal rotation. So, in the traditional story, the heavenly unmoved mover is the cause of the rotation of its sphere both efficiently and finally.

In her influential paper, Broadie argues against this interpretation. (a) From the point of view of ontological economy,⁵⁵ she points out that in *Metaphysics* Λ, Aristotle

always continues in the same place and in the same way is in a way like being at rest. Moreover, the perfection which each of the things which become similar to it is able to receive is also itself in general a becoming similar to what is perfect, and the perfection of the body that moves in a circle is rotation of this sort” (trans. Sharples, 1992: 87). See Sharples (2009: 155). See also Menn (2012: 449 n.39) who finds traces of this interpretation at Theophrastus’ *Metaphysics* 5a23-8.

⁵⁴ See the quote from Alexander in the preceding note.

⁵⁵ See Broadie (1993: 385) “*A chaque point stratégique, on est obligé d’endosser telle ou telle multiplication d’entités non mentionnées dans le texte,*” and a litter further (*ibid.*: 386): “une

never mentions an internal mover of a sphere *different* from its external unmoved mover.⁵⁶ (b) Sharply distinguishing what she calls “contemplative activity” and “kinetic activity”, Broadie points out that Aristotle never mentions *imitation* in *Metaphysics* Λ and that it is strange that causing rotation counts as an imitation of thinking: after all, if the soul wanted to imitate the unmoved mover, it would be better off contemplating than causing eternal rotation to its body.⁵⁷ Note that Aristotle in *De Anima* 1.3 specifically rejects the Platonist conception that the activity of the soul (thinking is such an activity) is itself a circular self-locomotion which causes the revolution of the heavens.⁵⁸ (c) According to Broadie, the eternal rotation which is efficiently caused by the unmoved mover is an end in itself, and the contemplating activity of the unmoved mover plays no role in explaining the eternal rotation.⁵⁹ This is to say, for the eternal rotation of a certain heavenly sphere, its external unmoved mover is only the efficient cause, and *not* the final cause. I agree with Broadie on (a) and (b).

(2) Second, the “prime mover” is said to be imitated, not only by the first heaven in its daily rotation, but also *in the same way* by the lower heavens, the elemental cycle, all the way to human beings in their contemplative as well as virtuous action. It is this claim that renders the “prime mover” the Platonic good. According to this interpretation, the lower heavens, the elemental cycle, and the living beings are moved or affected not just in a daily fashion in tandem with the first heaven—e.g. the sun rises and sets daily and human beings wake up and fall asleep daily—rather, their *proper* motion or activity

fâcheuse prolifération d’entités”.

⁵⁶ See Broadie (1993: 378-9).

⁵⁷ See Broadie (1993: 379-80), Laks (2000: 221), and Berti (2000:200-201). For some evidence for the “imitation-interpretation” in Aristotle, see Berti (2000: 203), Sedley (2000: 333-334), and Menn (2012: 448 n.39).

⁵⁸ See *De Anima* 1.3, esp. 407a3-6 and b7-9.

is also an imitation of the “prime mover”: thus, the yearly revolution of the sun along the Zodiac is an imitation of the “prime mover”; the cyclical intertransformation of the four simple bodies is an imitation of the “prime mover”; philosophical contemplation is an imitation of the “prime mover”; a virtuous activity is also an imitation of the “prime mover”.⁶⁰ This is to be distinguished from the so-called “providential view”, which no one today would hold, and according to which every motion or activity is designed and guided by the numerically single divinity to contribute to some common good which is good with reference to the divinity itself.⁶¹ In contrast to this “providential view”, the current view, following Aristotle’s lead,⁶² first distinguishes between the aim at which every motion or activity is directed (τινὸς ἕνεκα) and its beneficiary (ἕνεκά τινι), and then argues that, although the beneficiary in each case is the thing or the agent in question, the motion or the activity is good only because it *aims at* the highest divinity as an object of imitation. Here, the Platonist tenet is obvious: although inferior things can never, or only

⁵⁹ See Broadie (1993: 388).

⁶⁰ This is the view of Kahn (1985: 183-205, esp. 190) and Sedley (2000: 327-330). Sedley’s view is more nuanced in that he acknowledges that a lower sphere’s love for the “prime mover” is mediated by its love for its proper mover, although he remains agnostic on the relation between movers (see Sedley: 2000: 333 n. 11). For the view that human virtuous action and contemplative activity are good with reference to the highest divinity, see Richardson Lear (2004), esp. chapter 4. Richardson Lear (2004: 83) acknowledges that the concept of imitation is essentially Platonic: “Aristotle rejects Plato’s theory of Forms as an account of how sensible things are related to their own natures... But he did not reject the imitation or approximation at the heart of the theory as a possible model of final causation”.

See also Jonathan Lear (1988, 295-296): “And the desire which God inspires is none other than the desire of each organism to realize its form. ... However, from a metaphysical perspective, one can see that in trying to realize its form, the organism is doing all that it can do to become intelligible. It is also doing the best job it can do to imitate God’s thought—and thus to imitate God himself.” See also Lear (*ibid.*, 298): “Now it is part of man’s nature to satisfy the desire to understand. In coming to understand the world, man realizes his own essence. And in fulfilling his nature, man comes to imitate God in an altogether deeper sense than is available to other animals. For man is able to engage in the very same activity, contemplating, that is God. In coming to understand the world we become like God, we become God-like.”

⁶¹ See Kahn (1985: 185) for a reference to what he calls a medieval and 19th century interpretation.

for a very short period of time,⁶³ do what the “prime mover” does, their motion or action is nevertheless good because of its *similarity* to the activity of the “prime mover”.⁶⁴

One of the troubling things about this interpretation—the interpretation that the “prime mover” is imitated by the things below the first heaven—is that it makes the eminently good “prime mover”, *qua* efficient cause, impart motion from a distance.⁶⁵ We may very well grant that human beings imitate the highest divinity because we perceive the eternal daily rotation it causes and are inspired by it, so the highest divinity does touch our eyes unilaterally through the transparent medium between us. Still, other things—animals, plants, elements, and the lower heavens—neither perceive the highest divinity as such nor are immediately touched, like the first heaven, by the highest divinity. So, it would be in a mysterious way that the highest divinity exerted influence, like Newtonian gravity which operates through void, upon all things.⁶⁶ Indeed, interpreters who hold the Platonist view on this issue seem to distinguish sharply between the way the “prime mover” *directly* causes motion as a final cause, and the way in which certain motions are caused “mechanically”.⁶⁷

⁶² See *Metaphysics* Λ 7 1072b1-3, the text here is disputed, but the meaning is clear.

⁶³ E.g. Philosophers can only philosophize for a very short period of time, compared to the “prime mover”.

⁶⁴ See Sedley (2000: 333-334) for the desire to imitate the pure noetic activity of the “prime mover” on the part of the heavens, the elements, and the living beings.

⁶⁵ As I showed in chapter 3, Aristotle denies this in *Physics* 7.2. Moravcsik (1974: 629, cited in Johnson: 2005 p. 45, n. 17) thinks that causation at a distance is possible for Aristotle, using the example of an art and its artifact. But, as I’m going to show, the soul of the artisan, in which the art is located, unilaterally touches the body of the artisan which makes the artifact. So efficient causation does require spatio-temporal contiguity.

⁶⁶ All things are carried along in one way or another with the superior heavens. However, in so far as their proper motions are concerned, the divine seems to exert influence through void.

⁶⁷ See Kahn (1985, 183): “what is agreed, then, is that the PM [i.e. “Prime Mover”] causes motion in two ways: directly, as final cause or object of desire; and indirectly, by the mechanical motions and qualitative changes that result from its direct action on the heavens.” And a little further (1985, 184): “The broader view agrees in this account of the indirect, mechanical action of

So, on the one hand, the traditional interpretation which renders the “prime mover” the object of imitation for the first heaven lacks textual support, and the broadening of its “sphere of influence” smacks of mystery. On the other hand, those who vehemently disagree with such a Platonist scheme of imitation and argue that Aristotle’s “prime mover”, or his unmoved movers in general, are exclusively efficient causes, have no reasonable explanation for the above mentioned places where Aristotle clearly appeals to final causation.⁶⁸

4.3.3 The Solution

I now move on to the solution to this problem. In general terms, nothing prevents something from functioning as the first efficient cause of a certain motion or change by *being good* and *the end* to the thing undergoing this motion or change. In fact, in the case of animal self-locomotion, it is arguable that the object of desire, such as an apple, functions as the first efficient cause of an animal’s locomotion towards it precisely by being or appearing good to the animal in question.⁶⁹ And it is important that the good unmoved mover doesn’t operate through void: the apple is the first unmoved mover which, via the transparent medium in between, *touches* the animal’s sense-perceptive

PM, but it assigns an equally important role to direct teleological causality within the sublunary world. As supreme instance of unqualified actuality and divine life, the PM serves as a kind of metaphysical magnet drawing all natural potencies on to their realization in act and to the acquisition of their specific form.”

⁶⁸ See Broadie (1993) and Berti (2000). Broadie portrays her view as new and her counterpart—those who think that the “Unmoved Mover” is primarily a final cause—as traditional: this is not true—some ancient commentators indeed held the view that the “Unmoved Mover” is an efficient cause. Simplicius against Alexander in his *in Cael.* 271.13ff. See Laks (2000: 221 n.38).

⁶⁹ In a non-perceptive setting, the nutritive soul moves the nutritive organs unilaterally as the good and the end (see *De Anima* 2.4) of the nutritive activity which consists of digestion, distribution, and excretion.

organ *unilaterally* and causes the animal's sense-perceptive soul to perceive it and perceive it as desirable. In this case, the same apple is both the efficient cause and the final cause of the animal's sense-perceptive and locomotive activities: it causes these activities *qua* appearing good to the subject undergoing such activities.⁷⁰

If we turn to the heavenly unmoved movers, however, it seems more difficult to combine the two causes. Aristotle clearly thinks that the proper activity of a heavenly unmoved mover is νόησις,⁷¹ and that this activity is good or choice-worthy,⁷² yet it takes some explaining how a heavenly unmoved mover causes motion *qua* active νοῦς whose proper activity is νόησις of itself. As I've acknowledged in the last section, Broadie is quite right that imitation is never explicitly mentioned in *Metaphysics* Λ; however, a sharp distinction between the so-called “contemplative activity”⁷³ and “kinetic activity” is not necessary. Admittedly, the reciprocal kind of “kinetic activity” that belongs to a moved mover, as I analyzed in chapter 3, is incompatible with the νόησις that an unmoved mover engages in, because as changeable agents of change, a moved mover is itself changed when it brings about change, whereas the hallmark of νόησις or θεωρία is its immobility and completeness, and νόησις is notably not a function of any body.⁷⁴ Similarly, our difficulty in imagining how the thinking activity—νόησις—is *identical* to unilateral touch may be due more to our inability to imagine anything other than the reciprocal kind of touch. Yet, as I will show below, another kind of “kinetic activity”

⁷⁰ See Menn (2012: 444): “Aristotle is not saying that this kind of unmoved mover [e.g. a fruit] is only a final cause: it must first produce motion (at least, produce a cognition of itself as good and desirable) as an efficient cause, and only thereby can it act as a final cause.” See *De Anima* 3.10 and *De Motu* 6.

⁷¹ See *Metaphysics* Λ 7 and 9.

⁷² See *Metaphysics* Λ 7 1072b13-30.

⁷³ Aristotle mentions θεωρία in *Metaphysics* Λ only once, at Λ 7 1072b24.

⁷⁴ See *De Anima* 3.4 429a25-27.

which is non-reciprocal, such as the medical art *at work*,⁷⁵ may be *identical* with certain thinking activity, such as actively thinking about the question “what is the good (i.e. health) with regard to this part of the body?”. It is arguable that this active thought, by being active, unilaterally touches first the doctor’s body and then, through it, the patient’s body *in the same way as* the insulting remark, by being active, unilaterally touches first the insulter’s body and through it, the body and soul of the person insulted in *GC* 1.6. Indeed, as Menn points out, we can see from Aristotle’s criticisms of his predecessors Anaxagoras, Empedocles, and Plato in *Metaphysics* Λ 10 that he thinks that only his theory makes the first principle of motion also a cause *qua* good.⁷⁶ It implies that Aristotle’s own first principle, which is an ever active νοῦς, is, by its thinking activity, at the same time both a first efficient cause and a final cause.⁷⁷

A side piece of evidence may serve to connect this kind of thinking to the unilateral kind of touch. At the end of *Metaphysics* Λ 8, Aristotle explains why there is only one heaven.⁷⁸ In his explanation, he contrasts the ἀρχή of the heaven, which is one

⁷⁵ I take it that whenever Aristotle refers to the medical art as the first moving principle, he means the medical art at work, i.e. the second actuality of the psychic state which is called art.

⁷⁶ See Menn (2012: 444 n.32) and *Metaphysics* Λ 7 988b8-16, Λ 10 1075a36-b10 there quoted.

⁷⁷ See esp. *Metaphysics* Λ 10 1075b8-10: “Anaxagoras makes the good a motive principle; for νοῦς moves things. But it moves them for an end, which must be something other than it, except according to our way of stating the case; for, on our view, the medical art is in a sense health.”

⁷⁸ *Metaphysics* Λ 8 1074a31-b3: “Evidently there is but one heaven. For if there are many heavens as there are many men, the moving principles, of which each heaven will have one, will be one in form but in number many. But all things that are many in number have matter; for one and the same definition, e.g. that of man, applies to many things, while Socrates is one. But the primary essence has not matter; for it is complete reality. So the unmovable first mover is one both in definition and in number; so too, therefore, is that which is moved always and continuously; therefore there is one heaven alone. Our forefathers in the most remote ages have handed down to their posterity a tradition, in the form of a myth, that these bodies are gods, and that the divine encloses (περιέχει) the whole of nature.”

N.B. This passage does not contradict Aristotle’s cosmology which hypothesizes multiple *concentric* heavens (contra e.g. Guthrie: 1934, 95). The problem that this passage deals with, as is evident from Aristotle’s argumentation in the passage, is that there might be multiple alternative universes of the *same* kind as ours, whereas Aristotle’s concentric heavens are *different* in kind.

in number, with the ἀρχή of human beings (their soul), which is one in form but many in number (since there are as many souls as there are human beings). Given that the ἀρχή of the heaven has no matter and is therefore necessarily one in number, Aristotle infers, there can only be one heaven. However, this does not *necessarily* follow. In fact, this would *not* follow if we *only* understand the ἀρχή of the heaven as causing rotation in the same way as the object of thought and desire does.⁷⁹ This is because the object of thought and desire, as such, can move multiple things at the same time. A tasty bone, for instance, can move two dogs at the same time. So, the fact that there is only one incorporeal ἀρχή of the heaven *cannot* rule out the possibility that it inspires a multiplicity of bodily heavens to rotate. Indeed, just as human beings are one in form but many in number, these heavens might be thought to be one in form—because they all desire and imitate the same ἀρχή—but many in number—because they are all bodily. However, the number of each heaven is in fact necessarily one because the thinking ἀρχή unilaterally touches only one thing—the heaven it encloses (see περιέχει at 1074b3) and *touches*—whereas the bone can unilaterally touch both dogs with the transparent air in between as a medium. So, although an object of thought and desire can be thought and desired by multiple agents, because there is a one-to-one relationship between the heavenly unmoved mover and what it encloses and *touches*, there cannot be two or more heavens moved by it. This shows that Aristotle takes for granted that the thinking ἀρχή of the heaven does not cause motion unless coupled with unilateral touch: in fact, it is not implausible to think that the act of thinking is no other than *unilateral touching*.

To summarize, beyond the elevated style, there is nothing magic or unique in the

Cf. Merlan (1946: 12-13).

⁷⁹ See *Metaphysics* Λ 7 1072a26-7.

description of the unmoved movers as causing motion by being ends: it is not in the form of the Newtonian gravity which operates between void that some interpreters assume how ends attract and exemplars inspire in Aristotle; it means no more than the unilateral touch as opposed to the reciprocal touch Aristotle specifies in *GC* 1.6. Further, each heavenly unmoved mover *as such* causes motion by unilaterally touching the sphere it is an unmoved mover of. So, it is not by imitating the numerically single, absolutely unmoved “prime mover” from afar that the lesser heavenly movers are qualified unmoved movers, rather, all unmoved movers are such because they cause motion in the same manner.

4.4 The Psychic Unmoved Mover: Soul

Similar problems confront the interpretation of mortal souls as movers. The soul is explicitly described by Aristotle in *De Anima* 2.4 as (1) the essence and hence the formal cause of the living body,⁸⁰ (2) the final cause of all the natural bodies that it uses as tools,⁸¹ and (3) the efficient cause of the relevant bodily motion and function.⁸² However, as I will show below, there is at least some doubt over whether the same soul can be at the same time both (1) the formal cause of a living body and (3) the efficient cause of its motion and function. Besides, if in causing bodily locomotion towards some external object, the soul has to first perceive the object, given that perception is a kind of affection (πάθος) or alteration (ἀλλοίωσις), the soul is neither (2) the final cause nor (3) the first efficient cause—since it is the external object, and not the soul, that is the final cause and the first unmoved mover of some body’s self-locomotion towards it.

⁸⁰ See *De Anima* 2.4 415b12-15.

⁸¹ See *De Anima* 2.4 415b15-21.

⁸² See *De Anima* 2.4 415b21-27.

4.4.1 The Soul touches its Body Unilaterally

In this section, I argue that a soul is an immaterial substance which moves its essentially ensouled body through unilateral touch. Now, this interpretation involves an apparent difficulty: it seems to militate against Aristotle's definition of soul in *De Anima* 2.1 as the form⁸³ or the first actuality⁸⁴ of its body, and more generally, it seems to contradict Aristotle's hylomorphic conception of the body-soul relation, according to which a soul is the form of its body as matter.

The scholars who hold developmentalist views on Aristotle's psychology set the hylomorphic conception of soul against an "earlier" instrumentalist conception according to which a soul is an immaterial substance using the body as its instrument.⁸⁵ According to these scholars, the two conceptions are incompatible because the "later" conception suggests a mind-body monism, in which a soul is the *shape* or the "*functional state*" of its body,⁸⁶ whereas the "earlier" conception suggests a mind-body dualism, in which one substance utilizes another substance as a tool.⁸⁷ More recent scholars have been trying to

⁸³ See *De Anima* 2.1 412a19-21.

⁸⁴ See *De Anima* 2.1 412a27-28, b4-6.

⁸⁵ The most notable are Nuyens (1948: 57-58) and Ross (1961: 9-12), who think that Aristotle's conception of soul develops from the earliest Platonic stage shown in Aristotle's dialogues to a middle instrumentalist picture in the biological works and the *Parva Naturalia*, and finally to a hylomorphic picture in the *De Anima*. See also Menn (2002: 89).

⁸⁶ See Nuyens (1948: 58): "*Dans le De Anima, enfin, nous atteignons le terme ultime de l'évolution d'Aristote en face du problème des relations entre l'âme et le corps. L'âme est l'entéléchie ou la forme substantielle de l'être vivant. Elle est unie au corps aussi intimement que la forme l'est à la matière. Elle n'a pas son siège en quelque endroit du corps; le corps tout entier est son substrat. Elle naît et périt avec lui.*" See also *ibid.* p. 247 on the soul as efficient cause in the *De Anima* period: "*L'âme est cause motrice 'de la même manière' qu'elle est cause formelle et finale. Elle n'est plus décrite comme le maître qui siège dans un organe primaire et de là régit les mouvements du corps, ainsi qu'Aristote la représentait dans le De Motu Animalium.*" Cf. the following note for Nuyens' view on the "instrumentalist period".

⁸⁷ See Nuyens (1948: 57): "*Dans cette conception toutefois l'âme ne perd pas de coup son autonomie. Elle est la 'force vitale' qui, liée à un organe déterminé, réside dans le corps et le rend vivant. Elle est la souveraine qui commande au corps; c'est elle qui en a l'usage, le corps est son instrument. Nous ne saurions mieux caractériser cette doctrine qu'en l'appelant un*

reconcile the two conceptions.⁸⁸ They tend to point out that, because soul as the “form” of some ensouled body is just the “functional state” of that body, the relation between some ensouled body and its form is no different from or at least similar to the relation between an instrument and its function, so that the hylomorphic conception and the instrumentalist conception need not be in conflict.⁸⁹ Yet even if this is true, it is still quite hard to identify the functional state of an instrument with its user or mover. Indeed, if a soul is the form or the first actuality of its body,⁹⁰ and if the form is to the body as e.g. the shape is to the wax whereas the actuality is to the body as e.g. the ability to cut is to an ax,⁹¹ it is difficult to see how a soul moves its body via some form of touch, for neither does the shape seem to touch the wax nor does the ability to cut seem to touch the ax.

So it is difficult, given the general hylomorphic account of the body-soul relation, to conceive of soul as an efficient cause. However, there is ample evidence that Aristotle does consider soul to be a mover (τὸ κινεῖν) or an efficient cause (τὸ ὄθεν ἢ κίνησις),⁹² and that he does so consistently throughout his corpus. This is indeed not surprising, for as Aristotle acknowledges, causing motion, along with sense-perceiving, is recognized by his predecessors as one of the two distinguishing characteristics of soul.⁹³ Aristotle

‘instrumentisme vitaliste’; on la rencontre surtout dans les ouvrages de biologie et de morale.

See also Ross (1961: 10).

⁸⁸ See e.g. Lefeuvre (1972) and Nussbaum (1978).

⁸⁹ See e.g. Nussbaum (1978, 149-150): “To call a body or bodily part the ‘tool’ of soul can, then, be just to ascribe a function to it, to say that it enters somehow into an analytical account of how the animal performs its life-activities: to do a job, the creature has to have some tools, and these are the tools that do such-and-such jobs”.

⁹⁰ See *De Anima* 2.1 for the three definitions of soul.

⁹¹ Both examples are given in *De Anima* 2.1.

⁹² See in general Code (1987: 51-59) and Menn (2002: 83-139).

⁹³ See *De Anima* 1.2 403b25-28: “Two characteristic marks have above all others been recognized as distinguishing that which has soul in it from that which has not: motion and

agrees with his predecessors that soul is a mover or an efficient cause.⁹⁴ This is the most obvious in *De Motu*, where soul is identified as an internal moving principle.⁹⁵ In *De Anima*, Aristotle also makes it clear that a soul is an efficient cause (ὅθεν ἡ κίνησις) of its body, so that the body is moved locally, qualitatively, and quantitatively by its soul.⁹⁶ In *Physics* 8.2 and 8.6, as I discussed in chapter 1, although he doesn't use the word "soul" explicitly, Aristotle does acknowledge that an animal is a self-moving thing which contains within itself a mover that is unmoved *per se*.⁹⁷ Further, differently from his predecessors, Aristotle understands a soul as an *unmoved* efficient cause that is movable *per accidens* but immovable *per se*. Again, as I argued at length in chapter 1, all souls, whether vegetative, animal, or human, are unmoved movers. It is true they may be moved *per accidens* in two ways: (1) every soul is destroyed *per accidens* when its instrumental body gets destroyed; (2) an animal soul is moved *per accidens* locally by itself when the body in which it is located is moved by it locally.⁹⁸ However, they are unmoved *per se*: i.e. unmoved in the way in which they cause the motions of their proper bodies.⁹⁹

sense-perception. It may be said that these two are what our predecessors have fixed upon as characteristic of soul." What follows in *De Anima* 1.2 makes it clear that by "motion" Aristotle means "causing motion" and not just "being moved".

⁹⁴ See *De Anima* 3.3 427a16-20.

⁹⁵ See *De Motu* 9 and 10. *De Motu* 5 makes it clear that the moving principle in question is not just of locomotion, but of growth and qualitative change as well.

⁹⁶ See *De Anima* 2.4 415b9-12: "The soul is the cause or source of the living body. The terms cause and source have many senses. But the soul is the cause of its body alike in all three senses which we explicitly recognize. It is the source of movement, it is the end, it is the essence of the whole living body," and b22-27: "The soul is also the cause of the living body as the original source of local movement. The power of locomotion is not found, however, in all living things. But change of quality and change of quantity are also due to the soul. Sensation is held to be a qualitative alteration, and nothing except what has soul in it is capable of sensation. The same holds of the quantitative changes which constitute growth and decay; nothing grows or decays naturally except what feeds itself, and nothing feeds itself except what has a share of soul in it."

⁹⁷ See esp. *Physics* 8.6 259b3-20.

⁹⁸ See *Physics* 8.6 259b20.

⁹⁹ See *Physics* 8.6 259b21.

How, then, does a soul cause motion in its body as an unmoved efficient cause? I suggest that it causes motion by unilaterally touching its body. As I showed in chapter 2, *De Motu* 8 and 10 establish an analogy between the psychic principle (i.e. the soul) in relation to its instrument *pneuma* and the unmoved point of a joint in relation to the mobile point of the joint. Given that Aristotle locates the soul at the center of the body it is a principle of,¹⁰⁰ and describes it as a limit and not a magnitude¹⁰¹, it is reasonable to infer that it unilaterally touches its instrument *pneuma just like* the unmoved point of a joint which is a limit and not a magnitude touches the ball of the joint unilaterally. Moreover, this analogy is not just restricted in *De Motu*, it figures in *De Anima*, too.¹⁰²

There are other passages in the Aristotelian corpus which corroborate this claim. In *Physics* 8.5, Aristotle makes the claim that a self-mover must comprise an unmoved mover and something that is moved but need not move anything else, and he suggests that the first has to touch the second without the second having to touch the first.¹⁰³

¹⁰⁰ See *De Motu* 9 702b16-19: “The origin of the moving soul must be in the middle; for of both extremes the middle is the limiting point; and it is similarly related to the movements from above and below—e.g. from the head—and to those which spring from the spinal column, in creatures that have a spinal column,” and later 702bb34-703a3: “There must be something other than [the moved movers] which moves but is not moved. For otherwise, when the motion begins, the extremes, i.e. the origin, would rest upon one another, like two men putting themselves back to back and so moving their legs. There must be some one thing which moves both. This something is the soul, distinct from the magnitude just described and yet located therein.” Also see *De Motu* 10 703a14-15: “Now since this origin is for some animals in the heart, in the rest in a part analogous with the heart.”

¹⁰¹ See *De Motu* 9 702b16 and 703a2-3.

¹⁰² See *De Anima* 3.10 433b21-27: “To state the matter summarily at present, that which is the instrument in the production of movement is to be found where a beginning and an end coincide as e.g. in a ball and socket joint; for there the convex and the concave sides are respectively an end and a beginning (that is why while the one remains at rest, the other is moved): they are separate in definition but not separable spatially. For everything is moved by pushing and pulling. Hence just as in the case of a wheel, so here there must be a point which remains at rest, and from that point the movement must originate.”

¹⁰³ See *Physics* 8.5 258a18-23: “That which moves itself, therefore, must comprise something that imparts motion but is unmoved and something that is moved but does not necessarily move anything else: and each of these two things, or at any rate one of them, must be in contact with the

Given that an ensouled body is such a self-mover, with the soul being the unmoved mover and the body which is essentially ensouled being the thing moved, this implies that the soul unilaterally touches its essentially ensouled body.

Further, in at least two places in *De Anima*, Aristotle compares soul to the sailor in a ship in order to illustrate the way in which soul is an unmoved mover that is movable *per accidens*.¹⁰⁴ One might suppose that the sailor, as an extended being, reciprocally touches the ship it is the sailor of. However, another passage in *Physics* 6.10, which also alludes to the soul-sailor analogy, suggests that the sailor in the soul-sailor analogy is to be understood as strictly speaking an unextended being like the “now” (τὰ νῦν) in time and the points in a line which are limits of an extension.¹⁰⁵ So, just as the “now” unilaterally touches the continuum of time and the points unilaterally touches the one dimensional extension,¹⁰⁶ the sailor understood as the principle of the ship’s motion unilaterally touch the ship. Similarly, the soul, as an unextended principle, unilaterally touches its essentially ensouled body at its center.¹⁰⁷

other.”

¹⁰⁴ See *De Anima* 1.3 406a4-12 and 2.1 413a8-9. See also Tracy (1982: 97-112).

¹⁰⁵ See *Physics* 6.10 240b17-241a5: “As we have said, then, that which is without parts can be in motion in the sense in which a man sitting in a boat is in motion when the boat is travelling, but it cannot be in motion of itself. ... So it is not possible for that which has no parts to be in motion or to change in any way: for only one condition could have made it possible for it to have motion, viz. that time should be composed of moments, in which case at any moment it would have completed a motion or a change, so that it would never be in motion, but would always have been in motion. But this we have already shown above to be impossible: time is not composed of moments, just as a line is not composed of points, and motion is not composed of starts: for this theory simply makes motion consist of indivisibles in exactly the same way as time is made to consist of moments or a length of points.”

¹⁰⁶ Cf. *Metaphysics* B 5 1002a28-b11.

¹⁰⁷ The examples of plants and insects at *De Anima* 2.2 413b14-24 are no threat to locating the soul at the center of its body, for what Aristotle says there is that the soul of each plant and insect is actually one but potentially many, so that when say an insect is dissected, its soul, which was actually one located at the center of its body but potentially two, now becomes actually two, located at the center of their respective bodies. In this case, saying that the soul is potentially in many places of the body doesn’t mean it is not actually located at some specific place.

4.4.2 Soul as a Formal Cause vs Soul as an Efficient Cause

Now, regarding the specific tension between soul as a formal cause and soul as an efficient cause, I argue that there is a deeper sense in which souls-as-forms do serve as efficient causes and touch their proper bodies unilaterally.¹⁰⁸ This is most obvious in the case of an art (τέχνη) as the cause and the principle of some making (ποίησις), where Aristotle does allow non-material *forms* and essences such as the medical art or the housebuilding art to start the process of making. The case of art is relevant here because art is, alongside practical wisdom (φρόνησις), part of the calculative part of the soul (τὸ λογιστικόν), which is itself, alongside the scientific part (τὸ ἐπιστημονικόν), a part of the part of the soul that has reason (λόγον ἔχον) as opposed to the part (the nutritive and the perceptive) that is without reason (ἄλογον).¹⁰⁹ So art, as a psychic part and a psychic state (ἔξις),¹¹⁰ is a good representative for how souls in general, and a soul-part in particular, function as an efficient cause.

Aristotle describes the non-material forms and essences such as the medical art and the housebuilding art as efficient causes in the following way:

Health is the account (λόγος) in the soul and the knowledge. The healthy subject

comes out of a sick one in the following way: since this is health (ὕγεια), if the

¹⁰⁸ If “cause” is not a substance but a relative and signifies the relation between a pair of cause and effect, then it is not impossible for something to be at the same time the formal cause of x and the efficient cause of y. Indeed, in the case of formal cause and material cause, it can be argued that the same wood is the formal cause of the elements that this piece of wood (which is a table) is consisted of, and is at the same time the material cause of this table here.

¹⁰⁹ See *NE* 6.1 1139a3-15 and *NE* 6.4 1140a1-10. The difference between the calculative part and the scientific part is that the former deals with things that can be otherwise whereas the latter deals with things that cannot be otherwise. The difference between art and practical wisdom is that the former leads to a product whereas the latter leads to an action.

¹¹⁰ See *NE* 6.4 1140a6-10.

subject is to be healthy this must first be present, e.g. uniformity (ὁμαλότης), and if this is to be present, there must be heat (θερμότης); and the physician goes on thinking thus until he reduces the matter to a final something which he himself can make. Then the process from this point onward, i.e. the process towards health, is called a making (ποίησις). Therefore it follows that in a sense health comes from health and house from house, *that with matter from that without matter; for the medical art and the building art are the form of health and of the house*, and when I speak of substance without matter I mean the essence.¹¹¹ (Metaphysics Z 7 1032b8-14)¹¹²

Since not only the inherent elements are causes, but also something external such as the moving cause, clearly while principle and element are different, both are causes, and principle is divided into these two kinds; and that which acts as producing movement or rest is a principle and a substance. Therefore analogically

¹¹¹ ἡ δὲ ὑγίεια ὁ ἐν τῇ ψυχῇ λόγος καὶ ἡ ἐπιστήμη. γίγνεται δὲ τὸ ὑγιὲς νοήσαντος οὕτως· ἐπειδὴ τοδὶ ὑγίεια, ἀνάγκη εἰ ὑγιὲς ἔσται τοδὶ ὑπάρξει, οἷον ὁμαλότητα, εἰ δὲ τοῦτο, θερμότητα· καὶ οὕτως ἀεὶ νοεῖ, ἕως ἂν ἀγάγῃ εἰς τοῦτο ὃ αὐτὸς δύναται ἔσχατον ποιεῖν. εἴτα ἤδη ἡ ἀπὸ τούτου κίνησις ποίησις καλεῖται, ἡ ἐπὶ τὸ ὑγιαίνειν. ὥστε συμβαίνει τρόπον τινὰ τὴν ὑγίειαν ἐξ ὑγείας γίνεσθαι καὶ τὴν οἰκίαν ἐξ οἰκίας, τῆς ἄνευ ὕλης τὴν ἔχουσαν ὕλην· ἡ γὰρ ἰατρικὴ ἔστι καὶ ἡ οἰκοδομικὴ τὸ εἶδος τῆς ὑγείας καὶ τῆς οἰκίας, λέγω δὲ οὐσίαν ἄνευ ὕλης τὸ τί ἦν εἶναι.

¹¹² Cf. GC 1.7 324a26-b3: “For things are called movers in two ways. Both that which contains the origin of the motion is thought to cause motion (for the origin is first amongst the causes), and also that which is last, i.e. immediately next to the moved thing and to the coming-to-be. A similar distinction holds also of the agent: for we speak not only of the doctor, but also of the wine, as healing. Now, in motion, there is nothing to prevent the first mover being unmoved (indeed, as regards some first movers this is actually necessary) although the last mover always imparts motion by being itself moved: and, in action, there is nothing to prevent the first agent being unaffected, while the last agent only acts by suffering action itself. For agent and patient have not the same matter, agent acts without being affected: thus the medical art produces health without itself being acted upon in any way by that which is being healed. But the food, in acting, is itself in some way acted upon: for, in acting, it is simultaneously heated or cooled or otherwise affected. Now the art of healing corresponds to an origin, while the food corresponds to the last (i.e. contiguous) mover.”

there are three elements, and four causes and principles; but the elements are different in different things, and the proximate moving cause is different for different things. Health, disease, body; *the mover is the medical art*. Form, disorder of a particular kind, bricks; *the mover is the building art*. And since the moving cause in the case of natural things is, for man, for instance, man, and, in the products of thought, the form or its contrary, there will be in a sense three causes, while in a sense there are four. *For the medical art is in some sense health, and the building art is the form of the house*, and man begets man; further, besides these there is that which as first of all things moves all things.¹¹³ (*Metaphysics* Λ 4 1070b22-35)

Hence, non-material knowledge, such as the medical art, can be the first efficient cause (ὅθεν πρῶτον ἡ κίνησις) of making (ποίησις), which is a kind of change. Further, this knowledge (ἐπιστήμη) or, strictly speaking, this art (τέχνη), which is located in the soul of the artisan, is just the form (εἶδος), the account (λόγος), and the essence (τὸ τί ἦν εἶναι) of the product as a form-matter composite: e.g. the medical art is just the form of health. This is the case because, as Aristotle explains elsewhere in *Metaphysics* Λ 9, the knowledge of an object is just the object without matter, and in the case of things without matter, the knowledge is the same as the object of knowledge:

¹¹³ ἐπεὶ δὲ οὐ μόνον τὰ ἐνυπάρχοντα αἰτία, ἀλλὰ καὶ τῶν ἐκτὸς οἷον τὸ κινεῖν, δῆλον ὅτι ἕτερον ἀρχὴ καὶ στοιχεῖον, αἰτία δ' ἄμφω, καὶ εἰς ταῦτα διαιρεῖται ἡ ἀρχή, τὸ δ' ὡς κινεῖν ἢ ἰστὰν ἀρχή τις καὶ οὐσία, ὥστε στοιχεῖα μὲν κατ' ἀναλογίαν τρία, αἰτίαι δὲ καὶ ἀρχαὶ τέτταρες· ἄλλο δ' ἐν ἄλλῳ, καὶ τὸ πρῶτον αἴτιον ὡς κινεῖν ἄλλο ἄλλῳ. ὑγίεια, νόσος, σῶμα· τὸ κινεῖν ἰατρική. εἶδος, ἀταξία τοιαδί, πλίνθοι· τὸ κινεῖν οἰκοδομική [καὶ εἰς ταῦτα διαιρεῖται ἡ ἀρχή]. ἐπεὶ δὲ τὸ κινεῖν ἐν μὲν τοῖς φυσικοῖς ἀνθρώπῳ ἄνθρωπος, ἐν δὲ τοῖς ἀπὸ διανοίας τὸ εἶδος ἢ τὸ ἐναντίον, τρόπον τινὰ τρία αἰτία ἂν εἴη, ὡδὶ δὲ τέτταρα. ὑγίεια γάρ πως ἢ ἰατρική, καὶ οἰκίας εἶδος ἢ οἰκοδομική, καὶ ἄνθρωπος ἄνθρωπον γεννᾷ· ἔτι παρὰ ταῦτα τὸ ὡς πρῶτον πάντων κινεῖν πάντα.

We answer that in some cases *the knowledge is the object*. In the productive sciences knowledge is the substance or essence of the object, matter omitted, and in the theoretical sciences the account and the thinking is the object. Since, then, thought and the object of thought are not different in the case of things that have no matter, the divine thought and its object will be the same, i.e. the thinking will be one with the object of its thought.¹¹⁴ (*Metaphysics* Λ 9 1074b38-1075a5)¹¹⁵

Causing motion or change as something non-material isn't just restricted to the calculative part (τὸ λογιστικόν) of the soul to which all arts belong. It is arguable that the parts of the soul involved in causing animal self-locomotion are also non-material forms and actuality.

According to Aristotle's account of animal self-locomotion¹¹⁶ in *De Anima* 3.9-10 and *De Motu* 6-7, there are two soul-parts involved when an animal moves itself locally: first, the animal needs to have an external goal of locomotion, and this goal is either directly perceived by the sense-perceptive part of the soul (τὸ αἰσθητικόν), or is represented via imagination (φαντασία),¹¹⁷ or is conceived by practical thought (νοῦς πρακτικός).¹¹⁸ Second, in order to cause animal locomotion, the goal *cannot* be

¹¹⁴ ἢ ἐπ' ἐνίων ἢ ἐπιστήμη τὸ πρᾶγμα, ἐπὶ μὲν τῶν ποιητικῶν ἄνευ ὕλης ἢ οὐσίας καὶ τὸ τί ἦν εἶναι, ἐπὶ δὲ τῶν θεωρητικῶν ὁ λόγος τὸ πρᾶγμα καὶ ἡ νόησις. οὐχ ἑτέρου οὖν ὄντος τοῦ νοουμένου καὶ τοῦ νοῦ, ὅσα μὴ ὕλην ἔχει, τὸ αὐτὸ ἔσται, καὶ ἡ νόησις τῷ νοουμένῳ μία.

¹¹⁵ Cf. *De Anima* 3.4 430a2-9.

¹¹⁶ Of course, according to Aristotle, not all animals can move themselves locally. See *De Anima* 2.3 414b16-18: "Certain kinds of animals possess in addition the power of locomotion." See Ross' note (1967: 323) at *De Anima* 434b2.

¹¹⁷ According to what Aristotle says in *De Anima* 3.3, imagination (φαντασία) is neither sense-perception nor thought, but "a motion resulting from an actual exercise of a power of sense-perception" (429a1-2).

¹¹⁸ See *De Anima* 3.7 431a8-14, b2-9, and 3.10; see also *De Motu* 6: 700b11-26: "For, if we except the movement of the universe, things with life are the causes of the movement of all else,

perceived, represented, or thought of *only* as an object of perception and thought: the target needs to be perceived as pleasant or painful, so as to be pursued or avoided.¹¹⁹

This is done by the appetitive part of the soul (τὸ ὀρεκτικόν),¹²⁰ which is said by Aristotle to be the same in number but different in being from the sense-perceptive part.¹²¹

Further, Aristotle apparently thinks that the relevant soul-part becomes the first-actuality form of the object of motion and is in second-actuality when it causes animal locomotion. (a) The perceptive part of the soul receives the perceptible form of its object without matter, and, after having received it, itself becomes the perceptible form in actuality.¹²² (b) The activity of imagination and thinking is said by Aristotle, in the

that is of all that are not moved by one another by mutual impact. And so all their motions have a limit, inasmuch as the movements of things with life have such. For all living things both move and are moved for the sake of something, so that this is the limit of all their movement—that for the sake of which. Now we see that the living creature is moved by intellect, imagination, purpose, wish, and appetite. And all these are reducible to thought and desire. ... Therefore the object of desire or of intellect first initiates movement—not every object of intellect, but only the end in the domain of conduct. Accordingly it is goods of this sort that initiate movement, not everything fine.”

¹¹⁹ See the *De Motu* quoted in the note immediately above. See also *De Anima* 3.7 431a8-10: “To perceive then is like bare asserting or thinking; but when the object is pleasant or painful, the soul makes a sort of affirmation or negation, and pursues or avoids the object.” See also *De Motu* 7 701a34-36: “In this way living creatures are impelled to move and to act, and desire is the last cause of movement, and desire arises through perception or through imagination and thought.”

¹²⁰ See *De Anima* 3.10 433a22 ff.

¹²¹ See *De Anima* 3.7 431a10-14: “To feel pleasure or pain is to act with the sensitive mean towards what is good or bad as such. Both avoidance and appetite when actual are identical with this: the faculty of appetite and avoidance are not different, either from one another or from the faculty of sense-perception; but their being is different.” See also *De Anima* 2.3 414b1-6: “If any order of living things has the sense-perceptive, it must also have the appetitive; for appetite is the genus of which desire, passion, and wish are the species; now all animals have one sense at least, viz. touch, and whatever has a sense has the capacity for pleasure and pain and therefore has pleasant and painful objects present to it, and wherever these are present, there is desire, for desire is just appetition of what is pleasant”.

See Cooper (forthcoming) for an analysis of *De Motu* 7 on the importance of thought (νοῦς) and *thinking something as good* in the process of animal voluntary self-motion.

¹²² See *De Anima* 2.5 418a4-6: “the faculty of perception is, as we have said, potentially such as the object of perception already is in actuality. Not being like it, then, it is affected by it. Having

context of causing locomotion, to have “the same power as the objects” (τὴν τῶν πραγμάτων ἔχουσι δύναμιν) because “the form conceived is like what the actual objects would be” (τὸ εἶδος τὸ νοούμενον τοιοῦτον ... τυγχάνει ὄν οἷόν περ καὶ τῶν πραγμάτων ἕκαστον).¹²³ Thinking is also said to be identical with the form of its object in the passages quoted above.¹²⁴ At the end of *De Anima* 3.10, Aristotle offers a summary of the factors involved in animal locomotion:

There are three things (sc. involved in animal locomotion), (1) that which originates the movement, (2) that by means of which it originates it, and (3) that which is moved. The expression ‘that which originates the movement’ is ambiguous: it may mean either (a) something which itself is unmoved or (b) that which at once moves and is moved. Here that which moves without itself being moved is the practical good, that which at once moves and is moved is the faculty of appetite (for that which is moved is moved insofar as it desires, and appetite in the sense of *actual* appetite is a kind of movement), while that which is in motion is the animal. The instrument which appetite employs to produce movement is already bodily: hence the examination of it falls within the province of the

been affected, however, it has become like it and is such as it is” (trans. Lorenz). See also *De Anima* 2.12 424a17-19: “Generally, about all perception, we can say that a sense is what has the power of perceiving into itself the sensible forms of things without the matter.” See Lorenz (2007: 179-220) for a detailed analysis of the question in what sense is the faculty of perception altered and in what sense is the faculty of perception similar to its object.

¹²³ See *De Motu* 7 17-22: αἱ μὲν γὰρ αἰσθήσεις εὐθὺς ὑπάρχουσιν ἀλλοιώσεις τινὲς οὔσαι, ἡ δὲ φαντασία καὶ ἡ νόησις τὴν τῶν πραγμάτων ἔχουσι δύναμιν· τρόπον γὰρ τινα τὸ εἶδος τὸ νοούμενον τὸ τοῦ θερμοῦ ἢ ψυχροῦ ἢ ἡδέος ἢ φοβεροῦ τοιοῦτον τυγχάνει ὄν οἷόν περ καὶ τῶν πραγμάτων ἕκαστον, διὸ καὶ φρίττουσι καὶ φοβοῦνται νοήσαντες μόνον.

¹²⁴ See *Metaphysics* Λ 9 1074b38-1075a5 and *De Anima* 3.4 430a2-9, both quoted above.

functions common to body and soul.¹²⁵ (*De Anima* 3.10 433b13-21)

Here, both the object—the practical good—and the appetitive part of the soul are said to be a mover (τὸ κινεῖν), but they are distinguished in that the former is said to be an immovable mover (ἀκίνητον κινεῖν) while the latter is said to be a moved mover (κινεῖν καὶ κινούμενον). However, it is to be noted that the latter is here distinguished from the second kind of thing involved in animal locomotion—the “ὅ κινεῖ” —which is also described as a moved mover in other contexts.¹²⁶ The difference between these two kinds of moved mover is, I think, related to the two kinds of alteration (ἀλλοιώσις) Aristotle distinguishes in *De Anima* 2.5. There, in order to explain how sense-perception works as a special kind of alteration, Aristotle distinguishes (1) one kind of alteration which is “a destruction of something by its contrary”¹²⁷ and (2) another kind of alteration which is “the preservation of what is potentially by what is actually and is like it in the way that a potentiality is like its fulfillment”.¹²⁸ The latter kind of alteration is itself divided into two species: (2a) the alteration from e.g. potentially having knowledge to actually having knowledge and (2b) the alteration from having knowledge to actually using it. The second species, i.e. what is commonly known as the “transition between first actuality and second actuality”, is where sense-perception belongs, and from the examples Aristotle uses in *De Anima* 2.5, calculating, thinking and imagining should also follow

¹²⁵ ἐπεὶ δ’ ἔστι τρία, ἓν μὲν τὸ κινεῖν, δεύτερον δ’ ὃ κινεῖ, ἔτι τρίτον τὸ κινούμενον, τὸ δὲ κινεῖν διττόν, τὸ μὲν ἀκίνητον, τὸ δὲ κινεῖν καὶ κινούμενον, ἔστι δὴ τὸ μὲν ἀκίνητον τὸ πρακτὸν ἀγαθόν, τὸ δὲ κινεῖν καὶ κινούμενον τὸ ὀρεκτικόν (κινεῖται γὰρ τὸ κινούμενον ἢ ὀρέγεται, καὶ ἡ ὀρεξις κίνησις τίς ἐστιν, ἡ ἐνεργεία), τὸ δὲ κινούμενον τὸ ζῶον· ὃ δὲ κινεῖ ὄργανον ἢ ὀρεξις, ἥδη τοῦτο σωματικόν ἐστιν—διὸ ἐν τοῖς κοινοῖς σώματος καὶ ψυχῆς ἔργοις θεωρητέον περὶ αὐτοῦ.

¹²⁶ See *Physics* 8.5 256b13-21. For a relevant discussion, see chapter 3 on moved movers.

¹²⁷ See *De Anima* 2.5 417b3: φθορά τις ὑπὸ τοῦ ἐναντίου.

¹²⁸ See *De Anima* 2.5 417b3-5: σωτηρία ὑπὸ τοῦ ἐντελεχείᾳ ὄντος τοῦ δυνάμει ὄντος καὶ ὁμοίου

suit.¹²⁹ So, returning to the *De Anima* 3.10 passage, the appetitive part of the soul, on the one hand, perceives its object—the practical good—as desirable¹³⁰ and is moved by its object precisely in the sense (2b) that it is changed from being potentially such as (οἷον) the *form* of its object to being actually so. The *bodily* (433b20) means which desire employs, on the other hand, be it *pneuma*, which undergoes temperature change and expansion and contraction,¹³¹ or a limb, which undergoes locomotion, moves and is reciprocally moved by what is moved by it, and this kind of reciprocal moving and being moved is *just*, or at least includes, the first kind of alteration which is a destruction of something by its contrary.¹³²

Thus, in the case of animal locomotion, soul as a perceptive or calculative agent becomes the *form* of its object and again, as an appetitive agent in actuality (433b18), it functions as the efficient cause of its self-locomotion. It is true that, as something that has the power to perceive, to imagine, to think, and to desire, the soul is affected or altered (in the sense of the second kind of alteration) by its object—the practical good. However, it is important to notice that, after becoming the form of its object and actually desiring its object, the soul is *not* moved reciprocally (i.e. in the sense of the first kind of alteration) by its tools when it sets them in motion, because the soul, as something incorporeal, does *not* share the same kind of matter with its tools, whereas the tools, as such, are reciprocally moved by the bodily thing that they set in motion.

The cases of art and locomotion show how soul, as the form of X, causes a certain

οὕτως ὡς δύναμις ἔχει πρὸς ἐντελέχειαν.

¹²⁹ See *De Anima* 2.5 417b1-9.

¹³⁰ Cf. *De Anima* 3.7 431a10-11: “To feel pleasure or pain is to act with the sensitive mean towards what is good or bad as such.”

¹³¹ See *De Motu* 8 and 10.

¹³² See chapter 3.

motion or change with regard to X. It is more likely than not that the same applies to the other kinds of motion or change caused by soul. It may be argued, for example, that the nutritive soul is just an internalized or “naturalized” medical art,¹³³ so that what Aristotle says about the medical art would, *mutatis mutandis*, be applicable to the nutritive soul as well. After all, Aristotle does say that the nutritive soul *feeds* its body with food, so it is both a form of its body and the efficient cause of its body’s self-nutrition.¹³⁴

4.5 Ordered Series: a Synonymy or a Homonymy?

In the previous three sections, I argued that an unmoved mover, whether the “prime mover”, a lesser heavenly unmoved mover, or an internal unmoved mover like soul, causes motion *qua* good or *qua* form by unilaterally touching the body it moves. All unmoved movers are unmoved movers in the same sense. As a consequence, the usual alternative interpretation, according to which all things and agents imitate the highest divinity and are moved in their proper motion and action by it, is wrong. The unmoved mover of an animal’s digestive activity is its nutritive soul; the unmoved mover of the yearly rotation of the sun is the mover of the solar sphere which is unmoved *per se* but moved *per accidens*; the unmoved mover of the daily rotation of the first heaven and

¹³³ The nutritive soul is the ability (second potentiality) for self-nutrition and reproduction. Now (1) a living body having health or in a healthy state is what can nourish itself, and (2) reproduction is said to be part of health in *Historia Animalium* 8.18 601a28-29: “Birds thrive in times of drought, both in other aspects of health and in reproduction.” Therefore, a living body with a properly functioning nutritive soul is just a healthy living body. [We do say that, e.g., a blind man is nevertheless healthy if his blindness does not prevent him from self-nourishment.] The nutritive soul in the sense of a form of living body is just health. Thus, the only difference between the nutritive soul and the medical art is that the former is an internal form of the living body whereas the latter is an external form of the living body. It is interesting that, according to Aristotle, a doctor uses “food” to cure a patient (see *GC* 1.7).

¹³⁴ See *De Anima* 2.4 416b20-22. Also, as Aristotle’s analogy with ship’s rudder (b26-7) shows, food is here conceived of as a tool.

whatever is moved by the first heaven through reciprocal touch is the “prime mover”.

Thus, each of these unmoved movers is good for the thing undergoing the motion, and given Aristotle’s lack of interest in further explaining why each unmoved mover is good, it is certain that an unmoved mover is not only the ultimate answer for the question “what first causes motion?¹³⁵”, but also the question “aiming at what?¹³⁶”.

In this section, my aim is to place a significant qualification on the statement that all unmoved movers are unmoved movers *synonymously*, while still maintaining that they cause motion *in the same way*. In a nutshell, the qualification is this: (1) Aristotle thinks that, for the kind of sets whose members are prior or posterior to each other, the name of the set is predicated of each member only *homonymously*, because they share the same name (ὄνομα)—“τὸ πρῶτον κινουὺν ἀκίνητον”, but strictly speaking, not the same account of being (λόγος τῆς οὐσίας).¹³⁷ (2) Both the set of the heavenly unmoved movers and the set of the non-eternal unmoved movers are such sets: their members are prior or posterior to each other. (3) Therefore, although these unmoved movers cause motion in the same way, they are not strictly speaking “unmoved movers” synonymously.

I now explain what I mean. In a number of places in his corpus, Aristotle contrasts the kind of sets like genus and species,¹³⁸ whose members—these members can be either individuals or themselves sets—are *equal to each other in so far as they are members*,¹³⁹ with the kind of sets whose members are *prior or posterior to each other*.

¹³⁵ I.e. τί πρῶτον ἐκίνησε;

¹³⁶ I.e. τίνος ἕνεκα; Both are the “why” (διὰ τί) questions mentioned in *An. Post.* 2.1.

¹³⁷ See *Categories* 1 1a6-10: συνώνυμα δὲ λέγεται ὧν τό τε ὄνομα κοινόν καὶ ὁ κατὰ τοῦνομα λόγος τῆς οὐσίας ὁ αὐτός, οἷον ζῷον ὃ τε ἄνθρωπος καὶ ὁ βοῦς· τούτων γὰρ ἐκάτερον κοινῷ ὀνόματι προσαγορεύεται ζῷον, καὶ ὁ λόγος δὲ τῆς οὐσίας ὁ αὐτός.

¹³⁸ Aristotle seems to identify genus, species, and differentia as what can be predicated synonymously. See *Topics* 2.1 109b6, 6.10 148a23-b22.

¹³⁹ See e.g. *Categories* 5 3b34-4a9: “Substance, again, does not appear to admit of a more or a

The members of the former kind of sets are predicated synonymously while the members of the latter kind of sets are predicated only homonymously. To paraphrase the *Categories* 5 passage quoted in the preceding note, for the former kind of sets, there is a definition which describes the peculiar nature of each member, and no member is more or less a member of its set than any other. Thus, although Socrates is superior to me in that he can philosophize and I cannot, in so far as the *infima species* “human being” and its definition, say, for the sake of argument, “biped animal”, are concerned, Socrates is no more a human being than I am because the animal that is Socrates is no more *biped* than the animal that I am. Human beings as a species are superior to dogs in that the one can, according to Aristotle, engage in virtuous activities and the other cannot, yet in so far as the genus “animal” and its definition, say, for the sake of argument, “perceptive plant”,¹⁴⁰ are concerned, human beings and dogs are equally animals. For the latter kind of sets, by contrast, there is a hierarchy according to which every member of the set is either prior or posterior to any other member in so far as the set and its definition are concerned. Indeed, as we shall see, Aristotle believes that such a definition is only a common account (κοινὸς λόγος), not a proper account (ἴδιος λόγος), therefore the members of the second kind of set do not share the same account of being, and are predicated with the name of

less. I do not mean by this that one substance cannot be more a substance than another (we have said that it is), but that any given substance is not called more, or less, that which it is. For instance, if this substance is man, it will not be more a man or less a man either than himself at some other time or than some other man. One man cannot be more a man than another, as that which is white may be more or less white than some other white object, or as that which is beautiful may be more or less beautiful than some other beautiful object. The same quality, moreover, is said to subsist in a thing in varying degrees at different times. A body, being white, is said to be whiter at one time than it was before, or, being warm, is said to be warmer or less warm than at some other time. But substance is not said to be more or less that which it is: a man is not more truly a man at one time than he was before, nor is anything, if it is substance, more or less what it is. Substance, then, does not admit of variation of degree.”

¹⁴⁰ I mean by “plant” here the kind of living things that are capable of self-nutrition and

their set *homonymously*.¹⁴¹

This is most obvious in the case of soul whose members are the nutritive soul, the perceptive (and locomotive) soul, and the rational (practical and theoretical) soul. First, Aristotle believes that the definition of soul is a common definition and “soul” can only be predicated homonymously of different kinds of soul.¹⁴² In *Topics* 6, in discussing how to spot incorrect definitions, Aristotle uses Dionysius’ definition of life (“life” appears in Aristotle’s own definitions of soul in *De Anima* 2) to explain why a common definition or account (κοινὸς λόγος) is only *homonymously* predicated:

Further, see if he has rendered a single common account of terms that are used homonymously. For things whose account corresponding to their name is one and the same, are synonymous; if, then, the definition applies in a like manner to the whole range of the homonym, it does not define any one of the objects described by the term. This is what happens to Dionysius’ definition of life when stated as ‘a movement of a creature sustained by nutriment, congenitally present with it’: for this is found in plants as much as in animals, *whereas ‘life’ is generally understood to mean not one kind of thing only, but one thing in animals and*

reproduction.

¹⁴¹ Of course, this implies that the definition of genus is not such a “common account”, and there are some passages in which Aristotle does seem to suggest that genus is a “common” predicate (see e.g. *Sophistical Refutations* 22 178b38). Circular though it may seem, I take it that the definition of genus is here a proper account (ἴδιος λόγος) because it fully describes the being of an individual in so far as its belonging to the genus is concerned (thus, the definition of animal fully describes the being of an animal in so far as its being animal is concerned, whereas the definition of life, as we shall see below, doesn’t fully describe the being of a particular living being, in so far as it is living is concerned). At the same time, a genus *is* a common predicate of its species *in so far as its being a particular species of a genus is concerned* (thus, the definition of animal appears in the definition of human beings as something common to all species of animal).

¹⁴² On the homonymy of “life” and “soul” for Aristotle, see Shields (1999: 176-193).

another in plants. It is possible to hold the view that life is synonymous and of one kind only, and therefore to render the definition in this way on purpose: or it may quite well happen that a man may see the homonymy and wish to render the definition of the one sense only, and yet fail to see that he has rendered an account common to both instead of proper to one (μη ἴδιον ἀλλὰ κοινὸν ἀμφοῖν).¹⁴³

(*Topics* 6.10 148a23-36, trans. Pickard-Cambridge in Barnes)

Now, the standard example of a homonymous predication, given in *Categories* 1, is the case where animal is predicated both of a man and of a picture of the man. The man and the picture are animals *homonymously* because, as Aristotle defines it, they have only a name—animal—in common, but their definitions or accounts of being (λόγοι τῆς οὐσίας) which correspond to the name are different.¹⁴⁴ *The current case of life is slightly different:* there does exist a common definition of life—‘a movement of a creature sustained by nutriment, congenitally present with it’—which is applicable to both plant-life and animal-life. However, because the kind of life in a plant and the kind of life

¹⁴³ Ἔτι εἰ τῶν καθ’ ὁμωνυμίαν λεγομένων ἓνα λόγον ἀπάντων κοινὸν ἀποδέδωκεν· συνώνυμα γὰρ ὧν εἷς ὁ κατὰ τοῦνομα λόγος· ὥστ’ οὐδενὸς τῶν ὑπὸ τοῦνομα ὁ ἀποδοθεὶς ὅρος, εἰ δὴ ὁμοίως ἐπὶ πᾶν τὸ ὁμώνυμον ἐφαρμόττει. πέπονθε δὲ τοῦτο καὶ ὁ Διονυσίου τῆς ζωῆς ὅρος, εἴπερ ἐστὶ “κίνησις γένους θρεπτοῦ σύμφυτος παρακολουθοῦσα”· οὐδὲν γὰρ μᾶλλον τοῦτο τοῖς ζώοις ἢ τοῖς φυτοῖς ὑπάρχει. ἡ δὲ ζωὴ οὐ καθ’ ἓν εἶδος δοκεῖ λέγεσθαι, ἀλλ’ ἑτέρα μὲν τοῖς ζώοις ἑτέρα δὲ τοῖς φυτοῖς ὑπάρχειν. ἐνδέχεται μὲν οὖν καὶ κατὰ προαίρεσιν οὕτως ἀποδοῦναι τὸν ὅρον ὡς συνωνύμου καὶ καθ’ ἓν εἶδος πάσης τῆς ζωῆς λεγομένης. οὐδὲν δὲ κωλύει καὶ συνορῶντα τὴν ὁμωνυμίαν καὶ θατέρου βουλόμενον τὸν ὀρισμὸν ἀποδοῦναι λαθεῖν μὴ ἴδιον ἀλλὰ κοινὸν ἀμφοῖν λόγον ἀποδόντα. (Text: W. D. Ross, OCT, Oxford, 1958)

¹⁴⁴ See *Categories* 1 1a1-6: “When things have only a name in common and the definition of being which corresponds to the name is different, they are called homonymous. Thus, for example, both a man and a picture are animals. These have only a name in common and the definition of being which corresponds to the name is different; for if one is to say what being an animal is for each of them, one will give two distinct definitions.” (Ὁμώνυμα λέγεται ὧν ὄνομα μόνον κοινόν, ὁ δὲ κατὰ τοῦνομα λόγος τῆς οὐσίας ἕτερος, οἷον ζῶον ὃ τε ἄνθρωπος καὶ τὸ γεγραμμένον· τούτων γὰρ ὄνομα μόνον κοινόν, ὁ δὲ κατὰ τοῦνομα λόγος τῆς οὐσίας ἕτερος· ἐὰν γὰρ ἀποδιδῷ τις τί ἐστὶν αὐτῶν ἑκατέρῳ τὸ ζῶον εἶναι, ἴδιον ἑκατέρου λόγον ἀποδώσει).

in an animal differ, the definition of life is not proper (ἴδιος) to both kinds at the same time,¹⁴⁵ therefore life is predicated of both only homonymously. So, on the one hand, “life” as a predicate is not synonymous as genus and species are when they are predicated of their subsets or individuals, but on the other hand, neither is it strictly a homonymous predicate like “animal” in the case of man and picture. Another passage shows why the Dionysian life or its Aristotelian equivalent, soul, is such a tricky predicate. In *De Anima* 2.3, in explaining why there cannot be a single definition of soul,¹⁴⁶ Aristotle describes how different kinds of soul are *serial* (ἐφεξῆς) with a comparison to the set of figure (σχήμα), whose members—triangle, quadrangle, pentagon, etc.—¹⁴⁷are generally recognized to be serial:¹⁴⁸

It is now evident that a single definition can be given of soul only in the same sense as one can be given of figure. For, as in that case there is no figure distinguishable and apart from *triangle and those that follow in order* (τὰ ἐφεξῆς), so here there is no soul apart from the souls just enumerated. It is true that for figures there can be a definition (λόγος) that is common (κοινός) to all figures but not peculiar (ἴδιος) to any figure. So here in the case of the souls just enumerated.

¹⁴⁵ See note 141 above.

¹⁴⁶ I.e. in the sense in which there can be a single definition of a genus or a species.

¹⁴⁷ Aristotle seems to be considering only rectilinear figures here.

¹⁴⁸ Numbers and figures are clearly recognized as serial by Plato and the Academy. There is some question whether it was Plato’s or Xenocrates’ view that there is no Form or Idea over and above the particular idea numbers: i.e. whether there is, over and above the Idea of 2 itself, the Idea of 3 itself, etc., an Idea of number itself (see, e.g. *Metaphysics* M 4 1079a15-16). Merlan (1946: 11), whom I follow otherwise, thinks that it was Plato’s view. More recent scholars tend to take it as Xenocrates’ view. See Berti (2009, 130) on *Metaphysics* B3 999a6-13, a passage concerning priority: “As it would appear from Aristotle’s argument, this doctrine serves primarily to contrast the Idea of number in general and that of shape in general, which must have been admitted by Plato but denied by Xenocrates.”

Hence it is absurd in this and similar cases to look for a common definition (κοινὸς λόγος) which is not a peculiar definition (ἴδιος λόγος) of anything that is and does not apply to the appropriate indivisible species, while at the same time omitting to look for an account which will. The cases of figure and soul are exactly parallel; for the particulars subsumed under the common name in both cases—figures and living beings—constitute a *series, each successive term of which potentially contains its predecessor, e.g. the square the triangle, the perceptive the nutritive.*¹⁴⁹ (*De Anima* 2.3 414b19-32)

So, just as triangle, quadrangle, pentagon, etc. form a series in that triangle is potentially in quadrangle,¹⁵⁰ quadrangle is potentially in pentagon,¹⁵¹ etc., the nutritive soul, the perceptive soul, and the rational soul form a series in that the nutritive soul is potentially in the perceptive soul, and the perceptive soul is potentially in the rational soul. It is important that Aristotle's priority claim—that members are ἐφεξῆς—is about the universal (καθ' ὅλου), not the particular (καθ' ἑκάστων) triangle, quadrangle, etc.¹⁵² This is because a particular triangle can be materially cut with a line into a smaller triangle and a quadrangle, so in this particular and material sense, not only is a triangle potentially in a

¹⁴⁹ δῆλον οὖν ὅτι τὸν αὐτὸν τρόπον εἰς ἃν εἴη λόγος ψυχῆς τε καὶ σχήματος· οὔτε γὰρ ἐκεῖ σχῆμα παρὰ τὸ τρίγωνον ἔστι καὶ τὰ ἐφεξῆς, οὔτ' ἐνταῦθα ψυχὴ παρὰ τὰς εἰρημένους. γένοιτο δ' ἂν καὶ ἐπὶ τῶν σχημάτων λόγος κοινός, ὃς ἐφαρμόσει μὲν πᾶσιν, ἴδιος δ' οὐδενὸς ἔσται σχήματος. ὁμοίως δὲ καὶ ἐπὶ ταῖς εἰρημέναις ψυχαῖς. διὸ γελοῖον ζητεῖν τὸν κοινὸν λόγον καὶ ἐπὶ τούτων καὶ ἐφ' ἐτέρων, ὃς οὐδενὸς ἔσται τῶν ὄντων ἴδιος λόγος, οὐδὲ κατὰ τὸ οἰκεῖον καὶ ἄτομον εἶδος, ἀφέντας τὸν τοιοῦτον. παραπλησίως δ' ἔχει τῷ περὶ τῶν σχημάτων καὶ τὰ κατὰ ψυχὴν· αἱ γὰρ ἐν τῷ ἐφεξῆς ὑπάρχει δυνάμει τὸ πρότερον ἐπὶ τε τῶν σχημάτων καὶ ἐπὶ τῶν ἐμψύχων, οἷον ἐν τετραγώνῳ μὲν τρίγωνον, ἐν αἰσθητικῷ δὲ τὸ θρεπτικόν.

¹⁵⁰ I.e. triangle as a *separate* geometrical entity is potentially in quadrangle.

¹⁵¹ And triangle is in pentagon *by implication*. The same applies to each case below.

¹⁵² For the contrast between a universal figure and an individual figure, see *Metaphysics* Z 10 1035a30-b3 and 11 1036b32-1037a5. The difference seems similar to the one between an ideal

quadrangle, a quadrangle is potentially in a triangle as well, which would destroy the priority claim. Therefore, although we don't know what Aristotle's exact definitions of triangle, quadrangle, pentagon, etc. are, it is certain that Aristotle is talking about the universal triangle or the essence of triangle when he makes the priority claim.¹⁵³ So, just as triangle is potentially in the definition or the essence of quadrangle (i.e. if we are to define quadrangle, we should first be able to define triangle and not *vice versa*, or, in other words, if there is to be quadrangle, there should first be triangle and not *vice versa*),¹⁵⁴ the nutritive soul is potentially in the definition or the essence of the perceptive soul, and the perceptive soul is potentially in the definition or the essence of the rational soul. To put it more concretely, the soul of an animal not only perceives things; it also necessarily maintains and reproduces itself, which is the function of the nutritive soul in a plant: as a matter of fact, no animal perceives anything without its perceptive organs being properly maintained. Therefore, the different kinds of soul are not differentiated by their having mutually exclusive traits (διαφοραί): rather, they are differentiated by having one or two or three traits that are under one *common* account.¹⁵⁵ So, the reason why "soul" is predicated of different kinds of soul only *homonymously*, i.e. the reason why the definition of each kind of soul, minus its proper trait, is different for different kinds, so that no proper account (ἴδιος λόγος) can be given of soul in each kind,¹⁵⁶ is precisely that

number and a mathematical number. See *Metaphysics* M 6.

¹⁵³ In his recent book *Priority in Aristotle's Metaphysics*, (OUP 2011), Peramatzis makes a similar claim (see e.g. p.13). However, his focus is on the priority of actuality and form to composite and matter, and not (like mine) on different kinds of actuality and forms.

¹⁵⁴ See *Metaphysics* Δ 111019a1-4:

¹⁵⁵ This is not the case with the differentiae of a genus. See *Metaphysics* B 3 998b23-26: "the differentiae of any genus must each of them both have being and be one, but it is not possible for the genus taken apart from its species (any more than for the species of the genus) to be predicated of its proper differentiae."

¹⁵⁶ So the definition minus proper trait of, say, the perceptive soul is the definition of the

no perceptive soul exists in the world with *only* the power of perception and not *also* the power of self-maintenance, and no rational soul exists in the world with *only* the power of practical thought and not *also* the power of perception and self-maintenance. However, this also implies that, if we take the perceptive soul *qua* the power of perception alone, using the “*qua*” operator to abstract the power of self-maintenance which in the real world is a prerequisite, and if we also take the rational soul *qua* the power of practical thought alone, there is a sense in which the two, together with the nutritive soul, can be predicated by some proper account (ἴδιος λόγος) which is the definition of their genus-equivalent, because the “*qua*” operator blocks off, as it were, the reason why soul is predicated homonymously, as I explained just above. The importance of this last point will emerge as I begin discussing the heavenly movers now.

Aristotle clearly thinks that the same situation applies to the unmoved movers of the heavens.¹⁵⁷ In *Metaphysics* Λ 8, Aristotle acknowledges that they form a series ordered by priority:

Evidently, then, there must be substances which are of the same number as the movements of the stars, and in their nature eternal, and unmoved *per se*, and without magnitude, for the reason before mentioned. That the movers are substances, then, and that *one of these is first and another second* (καὶ τούτων τις πρώτη καὶ δευτέρα) according to the same order as the movements of the stars, is

nutritive soul, and the definition minus proper trait of the rational soul is the definition of the perceptive soul.

¹⁵⁷ As far as I know, Merlan (1946: 11) is the only modern scholar who connects the seriality of the heavenly movers to that of the souls and that of the figures and numbers.

evident.¹⁵⁸ (*Metaphysics* Λ 8 1073a36-b3)

Given what I discussed in section 4.3.1 above, the priority claim about the sets of the heavenly unmoved movers is easy to understand. The fixed stars show only daily rotation along the axis which runs between the north and the south poles of the celestial sphere, so their unmoved mover, which is the mover of the celestial sphere, is the first (πρώτη) substance, which is absolutely unmoved. The planets, the moon, and the sun show *additional* motions respectively, for each of which there is either one or more movers which is unmoved *per se*, but moved *per accidens* as something that is contained in the higher spheres. So the mover of the next sphere under the celestial sphere, which is moved together with the celestial sphere *per accidens*, but causes the second sphere to rotate as something unmoved *per se*, is the second (δευτέρα) substance. In the same way we have the third substance, the fourth substance, and so on, as many as there are heavenly spheres. Now, it is easy to see why the heavenly movers are serial in the same sense the souls and the figures are: the motion that is caused by the first mover is *in* the second mover, the motion that is caused by the second mover, together with the motion caused by the first mover, is *in* the third mover, and so on. And if we take the second mover as an example and ask what sort of a mover it is, the answer is going to be that it is not only an *unmoved mover* of the additional motion of the second sphere, but also a *moved mover* of the daily rotation which it helps transmit from the first sphere to the second. So, in the definition of what a particular heavenly unmoved mover is *qua* mover, just as in the definition of what a particular kind of soul is *qua* soul, there is reference not

¹⁵⁸ φανερόν τοίνυν ὅτι τοσαύτας τε οὐσίας ἀναγκαῖον εἶναι τὴν τε φύσιν ἀϊδίου καὶ ἀκινήτους καθ' αὐτάς, καὶ ἄνευ μεγέθους διὰ τὴν εἰρημένην αἰτίαν πρότερον. ὅτι μὲν οὖν εἰσὶν οὐσίαι, καὶ

just to the motion or life-activity proper to the substance in question, but also to the motion or life-activity that is caused by the substances prior in the series, therefore as a consequence, there is no synonymous genus predicable of such an unmoved mover *qua* mover. Thus, “mover” is predicated of the unmoved movers *homonymously*.

However, Aristotle does use the “*per se*” locution when he discusses the unmoved movers, as we see in the passage just quoted. When it comes to defining what a particular heavenly unmoved mover is *per se* (i.e. *qua* unmoved mover), the motions that are caused by the movers prior in the series are abstracted, and reference is only made to the motion that the unmoved mover in question, as an unmoved mover, causes. So in this case, as in the case of soul, there is a sense in which “unmoved mover” is predicated of an unmoved mover *synonymously*: every heavenly unmoved mover *per se*, i.e. *qua* unmoved mover, causes motion of its proper sphere in the same way via unilateral touch.

It might be argued in addition that there is a deeper parallelism between the two kinds of unmoved mover: (1) the heavenly mover and (2) the psychic mover—soul. I have shown that each heavenly mover is moved by the serially prior movers. In the case of the psychic movers, if we look at a particular kind of soul, say the perceptive soul, we find that its perceptive function is unilaterally affected by its nutritive function.¹⁵⁹ And if we look at the practically rational soul, we find that its activity of practical thinking presupposes its perceptive-locomotive as well as its nutritive functions (thus Philoctetes couldn’t have killed Paris if his foot—a locomotive ὄργανον—remains festered). So although a particular kind of soul is a single unity and causes the bodily activities as a single unmoved mover, there is a sense in which the serially posterior function (which is

τούτων τις πρώτη καὶ δευτέρα κατὰ τὴν αὐτὴν τάξιν ταῖς φοραῖς τῶν ἄστρον, φανερόν.

¹⁵⁹ See my discussion on *De Somno* in chapter 1.

by no means lower in esteem, for a virtuous action is presumably more esteemed than an accurate perception) is affected and moved by all the serially higher functions. In this way the successive kinds of soul map perfectly on the successive heavenly movers.

Whether my suggestion about the deeper parallelism between the two kinds of unmoved mover is right or not, there is no doubt that both sets of unmoved movers, i.e. the heavenly movers and the psychic movers, are *serial*. This tells us two things. On the one hand, as I have argued in this section, it is important to notice that, although there is no synonymous genus predicable of the two kinds of unmoved mover, either collectively or respectively, there is nonetheless a sense in which the unmoved movers, *qua* unmoved mover, cause motion in exactly the same way: i.e. *via* unilateral touch. On the other hand, being an ordered set in the Aristotelian way¹⁶⁰ also means that for either set, there is no paradigmatic being in relation to which each member of the set is a member. So, the “prime mover” is only the first in the series of the heavenly unmoved movers, and although it does move all the rest of the heavenly movers, it does not move them *qua* unmoved movers. To put it more concretely, although the “prime mover” is responsible for the daily rotation of the first heaven which not only moves other heavens but also gives the sublunary beings the eternal succession of day and night, which is extremely important for any kind of life, the “prime mover” is neither responsible for the yearly rotation of the sun which brings us the succession of seasons and monsoons, nor responsible for the monthly rotation of the moon which brings us tides, which are also extremely important for the kinds of life that are affected by them.¹⁶¹

¹⁶⁰ Or, in the Aristotle-Xenocratean way. See note 148 above.

4.6 Unmoved Mover and Necessity

Let me now move on to the connection between unmoved movers and necessity. First, Aristotle conceives of necessity in terms of immobility, i.e. the impossibility to be moved. This is clear from Aristotle's discussion of necessity in *Metaphysics* Δ 5. According to Aristotle, the sense of "the necessary" (τὸ ἀναγκαῖον) according to which all other things are said to be necessary is "that which cannot be otherwise (τὸ μὴ ἐνδεχόμενον ἄλλως εἶναι)¹⁶²". Now, for something to be otherwise is for it to be otherwise than its former state,¹⁶³ and such an alteration which happens in time is a change or motion (κίνησις).¹⁶⁴ As Aristotle says in Λ 7: "if something is *moved* (κινεῖται), it is capable of being otherwise (ἐνδέχεται ἄλλως εἶναι)."¹⁶⁵ So, that which cannot be changed, i.e. immovable, is necessary, and that which is necessary is that which cannot be changed, i.e. immovable.

Second, more importantly, there is something special in Aristotle's conception of necessity which makes it, for lack of a better word, causal. Aristotle clearly adopts the physicists' thesis that necessity is transmittable: i.e. in explaining why something is necessary, we trace the necessity back to something that is necessary in itself (e.g. "Why is it necessary that bricks fall?" "Because bricks are made of earth, and it is simply

¹⁶¹ See GA 4.10 777b16-778a4 on the influence of the sun and the moon on gestation. See also GC 1.10 336a31-b24.

¹⁶² See *Metaphysics* Δ 5 1015a33-36: "We say that that which cannot be otherwise is necessarily thus. And from this sense of 'necessary' all the others are somehow derived." See also Γ 5 1010b28-30 and Λ 7 1072b4-13, the latter also quoted below.

¹⁶³ In state (a) A is x and the statement "A is x" is true. In state (b) A is not x but y and the statement "A is x" is false and the statement "A is not x" is true.

¹⁶⁴ For me, an alteration in time from being sick to being healthy is a change in my bodily state. This view of change of course presupposes time which is itself dependent upon the motion of the first heaven.

¹⁶⁵ Λ 7 1072b4-5. See the full quotation below.

necessary that earth falls.”).¹⁶⁶ So it seems that, among things that cannot be otherwise, there is a hierarchy according to which something that is necessary in itself is the *cause* of other things’ being necessary. It seems that the unmoved mover is at least one of the things that can be at the top of such a hierarchy. This is clear at the end of *Metaphysics* Δ 5 where Aristotle talks about necessity in demonstration (ἀπόδειξις):

Again, demonstration is of what are necessary¹⁶⁷ because they cannot be otherwise, if they have been demonstrated *simpliciter*; and the *causes* of this (τούτου δ’ αἷτια) are the first things (τὰ πρῶτα), if the things from which the deduction proceeds cannot be otherwise. Indeed, for some things, there is something other than themselves that is the *cause* (αἷτιον) of their being necessary; for others, there is none, but *because of* them (διὰ ταῦτα) other things are of necessity. Therefore (ὥστε) the necessary in the primary and strict sense is the simple (τὸ ἀπλοῦν): for this does not admit of more states than one, so that it cannot even be in one state and also in another; for if it did it would already be in more than one. If, then, there are any things that are eternal and *immovable*

¹⁶⁶ See Menn (forthcoming: IIIγ p. 17).

¹⁶⁷ “Demonstration is of what are necessary” translates ἡ ἀπόδειξις τῶν ἀναγκαίων. It’s quite obvious that τῶν ἀναγκαίων is an objective genitive meaning the conclusions, both from what comes afterwards (I take it, as is obvious from my modified translation here, that the subject of ἐνδέχεται is an understood τὰ ἀναγκαῖα), and from a parallel usage at Z 15 1039b31. So Aristotle is not saying here, as Ross’ translation would seem to suggest, that the demonstration itself is something necessary. Indeed, it is Aristotle’s view that all deductions (συλλογισμοί) are necessary (see *Prior Analytics* 1.1 24b19-20) but that not all demonstrations are deductions (see *ibid.* 1.4 25b29-30). This difference between the necessity of the consequence and the necessity of the inference is later known as that between *necessitas consequentiis* and *necessitas consequentiae*. Menn (forthcoming: IIIγ p. 17) seems to have made a wrong interpretation of the *Prior Analytics* 1.1 passage. It does not affect his general point though, which I endorse.

(ἀκίνητα), nothing compulsory or against their nature attaches to them.¹⁶⁸

(*Metaphysics* Δ 5 1015b6-15)

In this passage, the first things (τὰ πρῶτα), i.e. the necessary premises of a demonstration, are said to be *causative* (αἷτια) of the fact that the conclusions of a demonstration are necessary. Since demonstration is knowledge that *describes* facts or things, it makes little difference whether we understand the conclusions here to be propositions such as “falling is said of bricks”, or facts such as bricks falling, or things such as falling bricks. The same applies to the premises. So, what Aristotle tries to say here is that there are certain “first things” which are necessary in the simple and strict sense which are the cause of other things’ being necessary. It seems that the eternal and immobile things mentioned at the end of the passage are necessary as the “first things” are, i.e. in the simple and strict sense. To corroborate the point that immobility is tied to necessity in the simple and strict sense, in another passage from *Metaphysics* Λ 7, Aristotle connects an unmoved mover’s being a necessary being (ἐξ ἀνάγκης ὄν) with its being an ἀρχή which is good and exists in a single way:

Now, if something is moved, it is *capable of being otherwise* (ἐνδέχεται ἄλλως ἔχειν). Therefore, if its actuality is the primary form of spatial motion, then in so far as it is subject to change, in this respect it is capable of being otherwise,—in

¹⁶⁸ Ἔτι ἡ ἀπόδειξις τῶν ἀναγκαίων, ὅτι οὐκ ἐνδέχεται ἄλλως ἔχειν, εἰ ἀποδέδεικται ἀπλῶς· τούτου δ’ αἷτια τὰ πρῶτα, εἰ ἀδύνατον ἄλλως ἔχειν ἐξ ὧν ὁ συλλογισμός. τῶν μὲν δὴ ἕτερον αἷτιον τοῦ ἀναγκαῖα εἶναι, τῶν δὲ οὐδέν, ἀλλὰ διὰ ταῦτα ἕτερα ἔστιν ἐξ ἀνάγκης. ὥστε τὸ πρῶτον καὶ κυρίως ἀναγκαῖον τὸ ἀπλοῦν ἐστίν· τοῦτο γὰρ οὐκ ἐνδέχεται πλεοναχῶς ἔχειν, ὥστ’ οὐδὲ ἄλλως καὶ ἄλλως· ἥδη γὰρ πλεοναχῶς ἂν ἔχοι. εἰ ἄρα ἔστιν ἅττα αἷδια καὶ ἀκίνητα, οὐδὲν ἐκείνοις ἐστὶ βίαιον οὐδὲ παρὰ φύσιν.

place, even if not in substance. But since there is something *which moves while itself being unmoved* (κινουῦν αὐτὸ ἀκίνητον ὄν), existing actually, this *can in no way be otherwise than as it is* (οὐκ ἐνδέχεται ἄλλως ἔχειν οὐδαμῶς). For motion in space is the first of the kinds of change, and motion in a circle the first kind of spatial motion; and this it produces. It is therefore a necessary being (ἐξ ἀνάγκης ἄρα ἐστὶν ὄν); and as a necessary being (ἢ ἀνάγκη [ὄν]), its mode of being is good, and it is in this sense a first principle (ἀρχή). For the necessary has all these senses—that which is necessary by force because it is contrary to impulse, that without which the good is impossible, and that which cannot be otherwise but can exist only in a single way (ἀπλῶς).¹⁶⁹ (*Metaphysics* Λ 7 1072b4-13)

Thirdly, in both passages, Aristotle claims that the necessary in the most salient sense has to be “the simple” (τὸ ἀπλοῦν) or “in a single way” (ἀπλῶς). In another passage at the end of *Physics* 8.6, Aristotle describes the unmoved mover as follows: “since it remains in a single way (ἀπλῶς) and unvarying (ὡσαύτως) and in the same state, the unmoved mover causes a single and simple motion”.¹⁷⁰ Now, there are different ways to understand what “simple” or “in a single way” means. (1) “Simple” may be *compositional*: it may mean “non-composed”, as in “simple bodies”. Thus, a body of pure

N.B. In this passage, I modify Ross’ translation quite heavily in a number of places.

¹⁶⁹ εἰ μὲν οὖν τι κινεῖται, ἐνδέχεται καὶ ἄλλως ἔχειν, ὥστ’ εἰ [ἡ] φορὰ πρώτη ἢ ἐνέργειά ἐστίν, ἢ κινεῖται ταύτῃ γε ἐνδέχεται ἄλλως ἔχειν, κατὰ τόπον, καὶ εἰ μὴ κατ’ οὐσίαν· ἐπεὶ δὲ ἐστὶ τι κινουῦν αὐτὸ ἀκίνητον ὄν, ἐνέργειά ὄν, τοῦτο οὐκ ἐνδέχεται ἄλλως ἔχειν οὐδαμῶς. Φορὰ γὰρ ἡ πρώτη τῶν μεταβολῶν, ταύτης δὲ ἡ κύκλω· ταύτην δὲ τοῦτο κινεῖ. ἐξ ἀνάγκης ἄρα ἐστὶν ὄν· καὶ ἢ ἀνάγκη, καλῶς, καὶ οὕτως ἀρχή. τὸ γὰρ ἀναγκαῖον τοσαυταχῶς, τὸ μὲν βίᾳ ὅτι παρὰ τὴν ὁρμήν, τὸ δὲ οὗ οὐκ ἄνευ τὸ εὖ, τὸ δὲ μὴ ἐνδεχόμενον ἄλλως ἀλλ’ ἀπλῶς.

¹⁷⁰ *Physics* 8.6 260a17-19: τὸ δ’ ἀκίνητον, ὥσπερ εἴρηται, ἅτε ἀπλῶς καὶ ὡσαύτως καὶ ἐν τῷ αὐτῷ διαμένον, μίαν καὶ ἀπλῆν κινήσει κίνησιν.

earth (if there is such a thing)¹⁷¹ is simple because it is non-composed, whereas a hunk of mud is not simple because it is a mixture of earth and water. When we talk about the simplicity of an unmoved mover in this way, we would rule out the lesser unmoved movers which, as we’ve seen, are a mixture of immobility and possibility to be moved. So this understanding of the simplicity of unmoved mover leaves us with only one unmoved mover, because there is only one mover that is simple in this way. The unmoved mover of the second heaven, for instance, is a mixture of the immobility of the motion of the second heaven and the possibility to be moved with the motion of the first heaven. (2) “Simple” may also mean “not otherwise”.¹⁷² This is actually how Aristotle explains “the simple” at *Metaphysics* Δ 5 1015b12-14 (quoted above):

Therefore (ὥστε) the necessary in the primary and strict sense is *the simple* (τὸ ἀπλοῦν): for it is not possible for it (i.e. the simple) to be in multiple ways (πλεοναχῶς ἔχειν), so that it cannot even be in one way and also in another way (ἄλλως καὶ ἄλλως)—for if it did it would already be in multiple ways.

So, “the simple” is impossible to be in more than one way, i.e. otherwise, whereas “the not-simple” is possible to be otherwise. To put it more concretely, “the simple” is impossible to be otherwise than X; “the not-simple” is possible both to be X and Y (whatever Y is); “the simply not” is impossible to be X. This is precisely the contrast

¹⁷¹ GC 1.10 tells us there is no such thing as pure earth.

¹⁷² This sense may be called “temporal” because the simple in this sense is not otherwise at different moment, whereas the “compositionally” or “locally” simple does not contain different parts at a single moment but may be otherwise as a whole at a different moment (such as a cup of water can as a whole turn into ice, so water is compositionally simple but temporally admissible to change). It is arguable that Aristotle’s modal semantics is temporal rather than local.

between necessity, possibility, and impossibility.¹⁷³ Now, when we talk about the simplicity of the unmoved mover in this sense, we are essentially contrasting the impossibility to be moved *in a certain respect* to the possibility to be moved *in that respect*, with the former signifying necessity while the latter signifying possibility—why the latter signifies possibility was explained in chapter 3. The passage at the end of *Physics* 8.6 mentioned above may be quoted in full:

The foregoing argument, then, has served to clear up the point about which we raised a difficulty at the outset—why is it that instead of all things being either in motion or at rest, or some things being always in motion and the remainder always at rest, there are things that are sometimes in motion and sometimes not? The cause of this is now plain: it is because, while some things are moved by an eternal unmoved mover and are therefore always in motion, other things are moved by *a mover that is moved and changing* (τὰ δ' ὑπὸ κινουμένου καὶ μεταβάλλοντος), so that they too must change. But the unmoved mover, as has been said, since it remains *simple* and *unvarying* and in the same state, will cause motion that is one and simple.¹⁷⁴ (*Physics* 8.6 260a11-19)

¹⁷³ This is the for Aristotle more common, two-sided sense of “possible” (=neither impossible nor necessary). For the distinction, see *Prior Analytics* 1.13 32a18-21.

It is important to realize that what is eternally moved is movable in the two-sided sense of “possible to be moved”, because an eternally moved thing returns to the original state every now and then, so that it is neither impossible nor necessary for it to be at any fixed status. Remember, motion for Aristotle is alway a change from status A to status B. See my chapter 3.

¹⁷⁴ φανερόν δὴ γέγονεν ἐκ τῶν εἰρημένων καὶ ὁ κατ' ἀρχὰς ἡπορούμεν, τί δὴ ποτε οὐ πάντα ἢ κινεῖται ἢ ἡρεμεῖ, ἢ τὰ μὲν κινεῖται ἀεὶ τὰ δ' ἀεὶ ἡρεμεῖ, ἀλλ' ἓνια ὅτε μὲν ὅτε δ' οὐ. τούτου γὰρ τὸ αἴτιον δῆλόν ἐστι νῦν, ὅτι τὰ μὲν ὑπὸ ἀκινήτου κινεῖται ἀϊδίου, διὸ ἀεὶ κινεῖται, τὰ δ' ὑπὸ κινουμένου καὶ μεταβάλλοντος, ὥστε καὶ αὐτὰ ἀναγκαῖον μεταβάλλειν. τὸ δ' ἀκίνητον, ὥσπερ

This is closely tied to what I argued in chapter 3, section 3.5.1. There, it was argued that because a moved mover is always a *movable* mover, the continuity of motion is wearisome (ἐπίπονος) to it. In the current passage, the mover that is moved and changing is such a movable mover that cannot eternally cause motion,¹⁷⁵ and it is contrasted with an unmoved mover that remains simple and in the same state while causing something movable to be moved. Although it is without question that *Physics* 8.6 focuses on proving the existence of the highest unmoved mover that guarantees the eternal motion of the first heaven, it is important that the *Metaphysics* Δ 5 interpretation of what “the simple” means does not rule out the lesser unmoved movers’ being necessary *qua* something simple. Hence (1) the unmoved mover of the second heaven, in so far as it is an unmoved mover, causes a single and eternal motion of the second heaven; (2) the nutritive soul of a plant, in so far as it is an unmoved mover, causes a single and continuous nutritive activity. The fact that it is perishable has nothing to do with its being an unmoved mover, but is due to the fact that it is contained within a bodily constitution. The same goes with the perceptive part of the soul of an animal, as I discussed in detail in chapter 1.

εἴρηται, ὅτε ἀπλῶς καὶ ὡσαύτως καὶ ἐν τῷ αὐτῷ διαμένον, μίαν καὶ ἀπλῆν κινήσει κίνησιν.

¹⁷⁵ That it is a movable mover and not a *per se* unmoved mover which is movable *per accidens* is seen from the passage that immediately preceeds at 260a5-10: “But that which is moved by something that, though it is in motion, is moved directly by the unmoved stands in varying relations to the things that it moves, so that the motion that it causes will not be always the same: by reason of the fact that it occupies contrary positions or assumes contrary forms at different times it will produce contrary motions in each several thing that it moves and will cause it to be at one time at rest and at another time in motion.” See my discussion in chapter 3 for why the mover in his passage is a movable mover.

Chapter 5 Natural Necessity, Conditional or Simple?

5.1 Introduction

Aristotle's conception of necessity in nature presents an obvious and at the first glance easily soluble problem. Since it is a characteristic of the sublunary things—things that we say are natural or have a nature—¹that they are non-eternal and that the events involving them occur not always but only for the most part,² how can there be necessity in the sublunary world, given the Aristotelian doctrine that what fails to always happen is not necessary? The standard answer³ to this problem is that the kind of necessity that is involved in the sublunary world is not absolute or simple necessity,⁴ but qualified or conditional necessity.⁵ The idea, if we try to flesh it out, is that what is necessary in nature is not necessary *in any case* or *at any time*, but is only necessary *given a certain condition* or *on a certain occasion*.⁶

There are *two* kinds of conditional necessity in the sublunary world. First, quite uncontroversially, the most prominent kind of condition under which things and events in the sublunary world are said to be necessary by Aristotle is the natural goal (τέλος), with

¹ It is a question whether the heavenly spheres have a nature or not. Though you might think that they have a natural tendency to travel in a certain way, Aristotle never explicitly claims that they have a nature, which is an internal principle of motion. I argued in chapter 2 that the heavenly spheres are moved by movers which are external to them, and are therefore not self-movers.

² See e.g. *PA* 1.1 639b23-640a9 and *GC* 2.11.

³ See e.g. Leunissen (2010: 100-101).

⁴ Things that are *of* simple necessity are necessary *simpliciter* (ἀναγκαῖον ἀπλῶς).

⁵ Things that are *of* conditional necessity are necessary *conditionally* (ἀναγκαῖον ἐξ ὑποθέσεως).

Leunissen (2010: 99-103) uses “qualified necessity” idiosyncratically. For her, “qualified necessity” when used “causally” is equivalent to “conditional necessity”, when used “modally” is equivalent to “for the most part”. I find her distinction here unconvincing. See more below.

⁶ See e.g. *APr.* 1.10 30b31-40 for an example of conditional necessity.

the necessity in question being “hypothetical necessity”.⁷ To give just one example of the so-called “hypothetical necessity”, we say that the front teeth of human beings are not *eternally* sharp (i.e. being able to cut through things) nor is *every* new front teeth sharp, but *on the condition that* one is to digest, it is necessary for the front teeth to be sharp.⁸

The second kind of condition under which things and events in the sublunary world are said to be necessary is the matter (ύλη), with the necessity in question being the so-called “material necessity”.⁹ Hence for example, it is only in so far as lead is the matter of a ball that it is necessary for the ball to be heavy.¹⁰ Under this interpretation, what is materially necessary falls short of being simply necessary precisely because it is by definition conditional. Thus, bones are not *eternally* sturdy (for a bone becomes fragile eventually), nor is *every* bone sturdy, but *on the condition that* a bone is made up of the right mixture of elements, it is necessarily sturdy. In the same way, a piece of earth is not eternally earthy (it might become wood, and then become fire, which is not earthy), but on the condition that it is a mixture of the cold and the dry, it is necessarily earthy.¹¹

⁷ It is a scholarly convention to call the conditional necessity of the teleological kind “hypothetical necessity”. I don’t mean by following this convention to deny that “material necessity” might also be ἐξ ύποθέσεως. See Rosen (2008: 1-58).

⁸ See e.g. *PA* 1.1 642a1-14, *Physics* 2.9 199b33-200a14 and *De Somno* 2. 455b26-29.

⁹ Although Aristotle never uses the exact term “material necessity”, there are several places (*PA* 1.1 640b9, and *GA* 2.1 731b21 and 5.1 778a35) where he clearly means by necessity the necessity coming from the material condition of a given thing.

N.B. Logicians sometimes talk about “material necessity” and, together with it, “formal necessity” in a somewhat different sense. For them, “material necessity” describes the modality of propositions, while “formal necessity” describes the validity of inferences. Although this language can be adopted to describe the current issue, I don’t think scholars of Aristotle use “material necessity” in this sense and I do not use it in this sense in this project.

¹⁰ Lead is not the matter of lead *qua* lead, therefore although lead is necessarily heavy, it is not due to material necessity that it is hard. The ball is necessarily hard because lead, which is its matter, is necessarily heavy, therefore the ball is heavy because of material necessity. Thus, material necessity is by definition a kind of conditional necessity, for the object in question shows certain characteristic due to its matter, which is different from the object itself.

¹¹ This is just to give a very rough example because it is at least not immediately clear why what is conditionally necessary cannot also, incidentally, be absolutely necessary or at least be eternal.

Now, concerning the second kind of conditional necessity—material necessity—some scholars refer to it as “simple-” or “absolute necessity”.¹² Despite their internal differences, these scholars tend to take the teleological condition as the only kind of condition there is, so whatever necessary that is not conditioned teleologically is unconditional, i.e. simple.¹³ However, these scholars tend to also use conditional language when they describe how material necessity functions. Gill, for example, wants to read material necessity in causal contexts as explaining “from bottom up”, which is to say that the underlying material *condition* determines some of the characteristics something has.¹⁴ More recently, Leunissen describes material necessity as a kind of “*a tergo* necessity” with similar implications. So, their true view, using my vocabulary, is that what is materially necessary is necessitated by the material *condition* of a thing.

Moreover, internal evidence from Aristotle’s corpus suggests that he takes matter

Gaskin (1995: esp. 115-116), for instance, tries to make the point that what is conditionally necessary can at the same time be simply necessary as long as the condition itself is simply necessary. Thus demonstrative understanding—what follows from simply necessary principles as a conclusion—is also simply necessary.

One crucial difference between Aristotelian and modern deductive systems which might have some bearing to this problem is that the axioms in an Aristotelian science have to be more true than what follows from them (see AP 1.2 70b20-24), whereas the axioms of, say, first order logic are in theory random, and they are true in the same way and to the same extent as what follows from them. This important difference suggests that Gaskin’s taking the consequent of a simply necessary condition to be simply necessary in the same way is problematic.

¹² See Cooper (1987: 260 n. 20), Gill (1997: 146-147), Lennox (2001: 233), and Johnson (2005: 151-155). Leunissen (2010: 99-103) distances herself from the scholars mentioned above, because she sees that what is materially necessary need not always come about. However, because she still thinks that material necessity is not conditional (103), she has to invent another category—“modal necessity”—to explain why what is materially necessary does not always come about (102-103). According to her, material necessity is unqualified causally (i.e. it is not conditioned by an end) but qualified modally (i.e. may fail to be necessary). See more on this in section 5.5 below.

Of course there are other scholars who take material necessity to be conditional. See Rosen (2008: 84-90). See also Gaskin on “*a tergo*” necessity in Gaskin (1995: 122-124).

¹³ See Leunissen (2010: 101-103), Cooper (1987: 260 n. 20), Johnson (2005: 151). Aristotle seems to be suggesting the same view at the beginning of *Physics* 2.9, which passage is discussed below.

(ὅλη) to be a relative (“πρός τι”),¹⁵ so “material necessity” always means the necessity coming from the material condition of a given thing. For example, there is nothing inherently material about wood as such,¹⁶ however, when there is a wooden bed, wood is the *material* condition of the bed, and the wooden characteristics the bed necessarily shows is due to material necessity. So, from Aristotle’s own understanding of matter, we too can conclude that material necessity is a kind of conditional necessity.

Given that hypothetical necessity and material necessity *exhaust* the kinds of necessity there are in the sublunary world, and given that both are conditional and qualified necessity, it is believed that the absolute and simple kind of necessity does not exist in the sublunary world. This explains, it is claimed, why things that exist and events that happen in the sublunary world are never eternal but “for the most part” at most.¹⁷

In this chapter I intend to show three things. First, quite contrary to the views outlined above, although Aristotle does recognize different kinds of conditional and qualified necessity at work in the sublunary world, unqualified necessity does figure at the same time. This is what Aristotle calls “[necessity] κατὰ φύσιν” and what I shall call

¹⁴ See e.g. Gill (1997).

¹⁵ See *Physics* 2.2 194b8-9: “And matter is a relative, for different froms there is different matter.” (ἐτι τῶν πρὸς τι ἡ ὅλη· ἄλλω γὰρ εἶδει ἄλλη ὅλη). See also *Metaphysics* H 4. Gill (1989: 65-67) thinks that matter is not relative but substantial, citing its relation to the composite as evidence. I don’t see how the fact that matter is related to the composite proves against its being relative.

I here pass over the problem of prime matter. I don’t think Aristotle believes in a prime matter which is stripped of any form: Aristotelian elements always possess two characteristics, one of which can be regarded as material, the other formal.

¹⁶ The reason why many scholars tend to think about material necessity as simple necessity, I think, is precisely because they take “material” not as a relative term, but as an inherent characteristic of a thing. Yet in this way it seems that the line between matters and forms can only be drawn arbitrarily. Gill (1997) tries to draw this line between what is “like-parted” and what is not. Thus earth by its nature is material. Wood, although formal relative to earth, is by its nature also material. But this seems just to be redefining “formal” as what we would call “physical (change)” as opposed to “chemical (change)” (e.g. Earth becoming wood is a chemical (like-parted) change and therefore is not a formal change).

“natural necessity”. Natural necessity is simple and thus non-conditional for Aristotle because, as I show in what is to follow, it is understood by Aristotle as necessity in the causally primitive sense of “that cannot be otherwise” ([ὁ] οὐκ ἐνδέχεται ἄλλως ἔχειν) outlined in *Metaphysics* Δ 5, which I discussed at the end of chapter 4. In addition, I show that simple necessity is predicable of what has a nature *because* what properly speaking has a nature is an unmoved mover, and the fact that it is non-eternal in some other way does not contradict its being simply necessary as an unmoved mover, as I explained in chapter 4. Second, I show how both the hypothetically necessary and the materially necessary—as I understand the term—are derivative from what is naturally necessary: as what has a nature can either be the form or the matter of something in a given context, (a) some thing’s being necessarily *φ* *hypothetically* is caused by its *form*’s being necessarily *φ* κατὰ φύσιν, and (b) some thing’s being necessarily *φ* *materially* is caused by its *matter*’s being necessarily *φ* κατὰ φύσιν.¹⁸ Third, I suggest ways in which one may reconcile natural necessity as a simple necessity with the contingency of the sublunary events.

¹⁷ See Leunissen (2010: 103-111, esp. 105).

¹⁸ It has been argued by some scholars, e.g. Ackrill (1963: 132-133) and Patzig (1968: 21-42), that it is at least misleading for Aristotle to apply “necessity/necessarily” univocally to both simple necessity and conditional necessity, and that conditional necessity characterizes not the necessity of a predication or that of a proposition, but the *validity* of an inference. According to these scholars, Aristotle confuses what Thomas Aquinas calls *necessitas consequentis* with *necessitas consequentiae* (*Summa Contra Gentiles* 1.67.9; also cf. Boethius *Consolatio philosophiae* V, 6.27–30). On this reading, my claim that conditional necessity is derivative from natural necessity would be wrong, because conditional necessity on their view is not the necessity of a proposition derivative from the necessity of its premises, but the necessity of the entire syllogism. In a nutshell, my view is that this absolutist picture of necessity is a Stoic-Thomist one, and that it is a mistake to read it into Aristotle. The condition of what is conditionally necessary, as such, is only contingent in the absolutist picture; in an Aristotelian picture, however, it is simply necessary as such, given that it is an unmoved mover in some sense (see my chapter 4). Indeed, any Aristotelian goal, practical or natural, has to somehow figure in the definition of man or the definition of some natural organism. Thus, although my nutritive soul, being mortal, is not eternal in the absolutist picture, it is still simply necessary as the unconditioned condition of my

5.2 Classifying natural necessity

5.2.1 Hypothetical necessity vs Natural necessity

Now, my thesis would be wrong if hypothetical necessity and material necessity exhaust the kinds of necessity in the sublunary world for Aristotle. Two key passages in which Aristotle contrasts what I call “natural necessity” with hypothetical necessity seem to suggest this. In a passage from *On the Parts of Animals* (hence *PA*), natural necessity is introduced as one of a contrasted pair in the following way:

One should explain in the following way, e.g. breathing exists for the sake of this, while that comes to be from necessity because of these. But necessity sometimes signifies that *if that*—i.e. *that for the sake of which—is to be, it is necessary for these things to obtain*, while at other times it signifies that things *are thus in respect of their character and nature* (οὕτως ἔχοντα καὶ πεφυκότα). For it is necessary for the hot to go out and enter again upon meeting resistance, and for the air to flow in. But this is already necessary (ἤδη ἀναγκαῖόν); it is as the internal heat retreats that during the cooling the inhalation of the external air occur. This then is the way of investigation, and it is in relation to these things such as these that one should grasp the causes.¹⁹ (*PA* 1.1 642a31-642b4)

Here, we see that the necessity of “[being] thus in respect of character and nature (οὕτως

bodily growth and maintenance, the materials for which are in turn conditionally necessary.

¹⁹ Δεικτέον δ’ οὕτως, οἷον ὅτι ἔστι μὲν ἡ ἀναπνοὴ τοῦδὲ χάριν, τοῦτο δὲ γίγνεται διὰ τὰδε ἐξ ἀνάγκης. Ἡ δ’ ἀνάγκη ὅτε μὲν σημαίνει ὅτι εἰ ἐκεῖνο ἔσται τὸ οὗ ἕνεκα, ταῦτα ἀνάγκη ἐστὶν ἔχειν, ὅτε δ’ ὅτι ἔστιν οὕτως ἔχοντα καὶ πεφυκότα. Τὸ θερμὸν γὰρ ἀναγκαῖον ἐξίέναι καὶ πάλιν εἰσιέναι ἀντικροῦον, τὸν δ’ ἀέρα εἰσερεῖν. Τοῦτο δ’ ἤδη ἀναγκαῖόν ἐστιν. Τοῦ ἐντὸς δὲ θερμοῦ ἀντικρόπτοντος, ἐν τῇ ψύξει τοῦ θύραθεν ἀέρος ἢ εἰσοδος. Ὁ μὲν οὖν τρόπος οὗτος ὁ τῆς μεθόδου,

ἔχοντα καὶ πεφυκότα)” is contrasted with hypothetical necessity (“if that is to be, it is necessary for these to obtain”).²⁰ What is this “natural necessity”, which is different from hypothetical necessity? Since in the immediate context Aristotle’s examples for this necessity concern heat and air, which generally pass for Aristotle as material, one is tempted to understand natural necessity here as material necessity, i.e. conditional necessity of the material kind. On this reading, the breathing organ necessarily performs its function because it is made up of certain materials which have certain qualities. The second passage comes from *Physics* 2:

As regards what is ‘of necessity’,²¹ we must ask whether it is ‘hypothetical’, or ‘simple’ (ἀπλῶς) as well. The current view places what is *of necessity* in the process of production, just as if one were to suppose that the wall of a house necessarily comes to be *because* what is heavy moves *naturally* (πέφυκε) downward and what is light to the top, wherefore the stones and foundations take the lowest place, with earth above because it is lighter, and wood at the top of all as being the lightest. Whereas, though the wall does not come to be without these, it is not due to these, except as its material cause: it comes to be for the sake of sheltering and guarding certain things. Similarly in all other things which involve production for an end; the product cannot come to be without *things which have a necessary nature* (ἀναγκαίαν ... τὴν φύσιν), but it is not due to these except as its

καὶ περὶ ὧν δεῖ λαβεῖν τὰς αἰτίας, ταῦτα καὶ τοιαῦτά ἐστιν.

²⁰ It is true that the theory outlined in the breathing example is not Aristotle’s own (see Lennox: 2001, 151); see Michael of Ephesus’s commentary *ad loc.* for the attribution of the theory to Plato). But this does not entail that the theory of necessity alluded to here is not Aristotle’s. Using someone else’s theory as an example to illustrate his own point is a common strategy of Aristotle’s.

material (ἀλλ' ἢ ὡς ὕλην); it comes to be for an end.²²

(*Physics* 2.9 199b34-200a10)

Here, Aristotle opens the passage by distinguishing what is of necessity hypothetically from what is of necessity “simply” (ἀπλῶς). With his further clarification, we can see that what is of necessity simply is *naturally* so (πέφυκε) or is due to a necessary nature (ἀναγκαίαν ... τὴν φύσιν), so I take it that the simple necessity in this passage is equivalent to natural necessity. Similar to the first passage, because the things which show necessary characteristics here, i.e. stones, earth, wood, are material in the context (and Aristotle is quite explicit about this at 200a9-10), it might seem that the simple and natural necessity mentioned here is equivalent to material necessity. Indeed, this is the very passage that leads scholars to identify simple necessity with material necessity.

However, several other passages in which Aristotle mentions “necessity according to nature” suggest that to understand this dichotomy between hypothetical necessity and natural necessity as one between hypothetical and material necessity is problematic. In a nutshell, I intend to show that natural necessity is to be understood as the necessity in the sense of “that cannot be otherwise”, and that because this sense of necessity, when it is used non-derivatively, is understood by Aristotle as simple or absolute necessity, it follows that it cannot at the same time be conditional necessity, hence cannot be material

²¹ Aristotle is here talking about necessity in nature, as is plain from the opening of *Physics* 2.8.

²² Τὸ δ' ἐξ ἀνάγκης πότερον ἐξ ὑποθέσεως ὑπάρχει ἢ καὶ ἀπλῶς; νῦν μὲν γὰρ οἴονται τὸ ἐξ ἀνάγκης εἶναι ἐν τῇ γενέσει ὥσπερ ἂν εἴ τις τὸν τοῖχον ἐξ ἀνάγκης γεγενῆσθαι νομίζοι, ὅτι τὰ μὲν βαρέα κάτω πέφυκε φέρεσθαι τὰ δὲ κοῦφα ἐπιπολῆς, διὸ οἱ λίθοι μὲν κάτω καὶ τὰ θεμέλια, ἡ δὲ γῆ ἄνω διὰ κορυφότητα, ἐπιπολῆς δὲ μάλιστα τὰ ξύλα· κορυφώτατα γάρ. ἀλλ' ὅμως οὐκ ἄνευ μὲν τούτων γέγονεν, οὐ μέντοι διὰ ταῦτα πλὴν ὡς δι' ὕλην, ἀλλ' ἔνεκα τοῦ κρύπτειν ἅττα καὶ σώζειν. ὁμοίως δὲ καὶ ἐν τοῖς ἄλλοις πᾶσιν, ἐν ὅσοις τὸ ἔνεκά του ἔστιν, οὐκ ἄνευ μὲν τῶν ἀναγκαίων ἐχόντων τὴν φύσιν, οὐ μέντοι γε διὰ ταῦτα ἀλλ' ἢ ὡς ὕλην, ἀλλ' ἔνεκά του.

necessity, which, as I have defined above, is a kind of conditional necessity.

5.2.2 Necessity by force vs Natural necessity

In a similar context where Aristotle tries to sort out teleology from necessity of a non-teleological nature in *Posterior Analytics*, after distinguishing “for some purpose” and “from necessity”, he introduces a further distinction of necessity between “necessity by nature” and “necessity by force”:

There are very many things of this sort, especially among natural processes and products; for one nature makes for some purpose and another makes from necessity. But there are two types of necessity: *one, in accordance with nature and impulse; the other, by force and contrary to impulse.*²³ (*Post. An.* 2.11 94b37-95a1, trans. Barnes (1994)).

Now, assuming that Aristotle is talking about the same natural necessity in the *Post. An.* passage as in the *PA* passage and in the *Physics* passage, which I think is a reasonable assumption, what we learn from this passage is that necessity “in accordance with nature” is not only different from hypothetical necessity—conditional necessity of the teleological kind: it is also distinguished from necessity by force. One further passage

²³ Πλεῖστα δὲ τοιαῦτ' ἔστι, καὶ μάλιστα ἐν τοῖς κατὰ φύσιν συνισταμένοις καὶ συνεστῶσιν· ἡ μὲν γὰρ ἔνεκά του ποιεῖ φύσις, ἡ δ' ἐξ ἀνάγκης, ἡ δ' ἀνάγκη διττή· ἡ μὲν γὰρ κατὰ φύσιν καὶ τὴν ὁρμήν, ἡ δὲ βία ἢ παρὰ τὴν ὁρμήν. (Text: W. D. Ross, OCT, Oxford, 1964)

Barnes' translation (second edition) “one *kind* of nature...another *kind* of nature” (emphasis mine) is misleading because it suggests that any one nature belongs *either* to this kind *or* to that kind. This is not true. The nature of a dog makes its bones the way they are *for some purpose* and the same nature also makes the dog, taken as a whole, the way it is *from necessity*.

You might be able to read a hendiadys in κατὰ φύσιν καὶ τὴν ὁρμήν, since a stone does not

confirms this distinction:

Of those [actions] not due to [the agent] himself (i.e. his practical self), some are due to chance, the others to *necessity*; of these latter, again, *some are by force, the others by nature*.²⁴ (*Rhetoric* 1.10 1368b33-6, trans. Roberts in Barnes)

What is this distinction between natural necessity and necessity by force about? It is conceptually a *different* distinction from that between natural necessity and hypothetical necessity, for although something which is a goal (τέλος) can at the same time be the compelling force (βία), Aristotle's conception of force and that of goal are different. The key to understanding this pair, I think, lies in the concept of "force". If we follow the accounts of "force" and "by force" in *EN* 3.1, *Physics* 8.4, and *De Caelo* 3.2, we can see that the idea behind such a distinction is that natural necessity results from oneself whereas necessity by force comes from outside sources.

That is by force (βίαιον) of which the principle is *outside*, being a principle in which nothing is contributed by the person who acts or is acted upon, e.g. if he were to be carried somewhere by a wind, or by men who had him in their power.²⁵ (*EN* 3.1 1110a1-4, trans. Ross in Barnes)

necessarily drop, but a stone necessarily has the *natural impulse* to drop.

²⁴ τῶν μὲν οὖν μὴ δι' αὐτοὺς τὰ μὲν διὰ τύχην πράττουσι τὰ δ' ἐξ ἀνάγκης, τῶν δ' ἐξ ἀνάγκης τὰ μὲν βία τὰ δὲ φύσει. (Text: Kassel, Berlin, 1976)

²⁵ βίαιον δὲ οὐ ἢ ἀρχὴ ἐξωθεν, τοιαύτη οὖσα ἐν ᾗ μηδὲν συμβάλλεται ὁ πράττων ἢ ὁ πάσχων,

Of things which are moved *per se*, some are moved by themselves, others by *something else*: and in some cases their motion is natural, in others by *force and unnatural* (βία καὶ παρὰ φύσιν). Thus in things that are moved by themselves, e.g. all animals, the motion is natural.... The fact that a thing that is in motion is moved by something <else> is most evident in things that are moved unnaturally, because in such cases it is clear that the motion is derived from something *other than* the thing itself.²⁶ (*Physics* 8.4 254b8-27)

But since a source of movement *within* the thing itself is its nature, while a δύναμις is a source of movement in something *other than* it or in itself *qua other*, and since movement is always *due* either *to nature* or *to force* (βία), movement which is natural, as downward movement is to a stone, will be merely accelerated by a δύναμις, while an unnatural movement will be due to it alone.²⁷ (*De Caelo* 3.2 301b17-22)

In all the five passages that precede, we see that Aristotle contrasts “by force” with “by nature”. Given that “by force” means “by an *external* cause” and “by nature” “by an *internal* cause”, this contrast seems extremely natural. So the distinction between natural necessity and necessity by force we see in *Post. An.* 2.11 and *Rhetoric* 1.10 has deeper causal roots.

οἷον εἰ πνεῦμα κομίσαι ποιῇ ἢ ἄνθρωποι κύριοι ὄντες. (Text: Bywater, OCT, Oxford, 1894)

²⁶ N.B. I’ve modified the translation as it concerns κινεῖται. It is my policy to translate κινεῖται always as “is moved” rather than “moves”, given Aristotle’s doctrine in *Physics* 7.1 and 8.4 that whatever moves is moved by something.

²⁷ Ἐπεὶ δὲ φύσις μὲν ἐστὶν ἢ ἐν αὐτῷ ὑπάρχουσα κινήσεως ἀρχή, δύναμις δ’ ἢ ἐν ἄλλῳ ἢ ἢ ἄλλο, κίνησις δὲ ἢ μὲν κατὰ φύσιν ἢ δὲ βία πᾶσα, τὴν μὲν κατὰ φύσιν, οἷον τῷ λίθῳ τὴν κάτω, θάπτω

In another passage in *Metaphysics* E 2, Aristotle contrasts “necessity by force” with “that which cannot be otherwise”:

... among things which are, some are always in the same state and are of necessity (not necessity in the sense of by force but that which means that which cannot be otherwise) ...²⁸ (*Metaphysics* E 2, 1026b28-9)

Given that the conjunction of “by force” and “by nature” sounds exhaustive for things in nature from semantic grounds (something in nature is either internal or external to another thing),²⁹ this contrast between necessity by force and necessity in the sense of “that which cannot be otherwise” ([τὸ] μὴ ἐνδέχεσθαι ἄλλως [ἔχειν]) seems to identify the latter with natural necessity in natural contexts. Further evidence from *Metaphysics* Δ 5 corroborates this identification.³⁰

5.2.3 Situating Natural Necessity in *Metaphysics* Δ 5

Metaphysics Δ 5 is Aristotle’s main account of necessity as a concept. When we examine the text closely, we see that Aristotle here first introduces three ways in which “necessary is spoken of”: (1) that without which, as a co-cause, the good cannot be achieved, (2) that which is by force and contrary to nature, and (3) that which cannot be

ποιήσει τὸ κατὰ δύναμιν, τὴν δὲ παρὰ φύσιν ὅλως αὐτή.

²⁸ ἐπεὶ οὖν ἐστὶν ἐν τοῖς οὖσι τὰ μὲν αἰεὶ ὡσαύτως ἔχοντα καὶ ἐξ ἀνάγκης, οὐ τῆς κατὰ τὸ βίαιον λεγομένης ἀλλ’ ἣν λέγομεν τῷ μὴ ἐνδέχεσθαι ἄλλως.

²⁹ See the passage from *De Caelo* above.

³⁰ Both Ross and Cooper have used the *Metaphysics* Δ5 passage for the classification of the natural necessity in both *PA* 1.1 and *Physics* 2.9, so I don’t claim originality in this.

otherwise.³¹ First, for our current purpose, it is important to notice the verbal echo between τὸ μὴ ἐνδεχόμενον ἄλλως ἔχειν ἀναγκαῖον φάμεν οὕτως ἔχειν in sense (3) here with οὕτως ἔχοντα καὶ πεφυκότα in the first, *PA* 1.1 passage. As we take Aristotle to refer to natural necessity in the *PA* passage, this echo suggests that natural necessity belongs to the third sense here. More importantly, if we move beyond the simple echo of words, it is apparent that sense (1) of Δ 5, namely hypothetical necessity, maps neatly on to the first kind of necessity in the *PA* passage, whereas sense (2) of Δ 5, namely necessity by force, maps neatly on to the necessity by force in the *Post. An.* and the *Rhetoric* passages. It is remarkable that both kinds of necessity—hypothetical necessity and necessity by force—are contrasted with the “natural necessity” in their respective contexts. This two-sided contrast, taken together with what we see in the *Metaphysics* E passage—that “necessity by force” is contrasted with “that which cannot be otherwise”—, strongly suggests that we categorize “natural necessity” in the two contexts under sense (3) of Δ 5: “that which cannot be otherwise”.

Moreover, Aristotle himself acknowledges in *Metaphysics* Δ 5 that the first two senses are derivative from the third sense—(1) the co-cause *cannot be otherwise* than being present for the good to be achieved, while (2) what is under force *cannot act*

³¹ N.B. I do offer an English translation here since what I have to say in the main text amounts to a paraphrase of the Greek passage quoted.

Ἀναγκαῖον λέγεται (1) οὐδ' ἄνευ οὐκ ἐνδέχεται ζῆν ὡς συναιτίου (οἷον τὸ ἀναπνεῖν καὶ ἡ τροφή τῷ ζῳῷ ἀνασυναιτίου (οἷον τὸ ἀναπνεῖν καὶ ἡ τροφή τῷ ζῳῷ ἀναγκαῖον, ἀδύνατον γὰρ ἄνευ τούτων εἶναι), καὶ ὧν ἄνευ τὸ ἀγαθὸν μὴ ἐνδέχεται ἢ εἶναι ἢ γενέσθαι, ἢ τὸ κακὸν ἀποβαλεῖν ἢ στερηθῆναι (οἷον τὸ πιεῖν τὸ φάρμακον ἀναγκαῖον ἵνα μὴ κάμνη, καὶ τὸ πλεῦσαι εἰς Αἴγιναν ἵνα ἀπολάβῃ τὰ χρήματα). ἔτι (2) τὸ βίαιον καὶ ἡ βία· τοῦτο δ' ἐστὶ τὸ παρὰ τὴν ὁρμὴν καὶ τὴν προαίρεσιν ἐμποδίζον καὶ κωλυτικόν, τὸ γὰρ βίαιον ἀναγκαῖον λέγεται, διὸ καὶ λυπηρόν (ὥσπερ καὶ Εὐρηγὸς φησι “πᾶν γὰρ ἀναγκαῖον πρᾶγμ' ἀνιαρὸν ἔφυ”), καὶ ἡ βία ἀνάγκη τις (ὥσπερ καὶ Σοφοκλῆς λέγει “ἀλλ' ἡ βία με ταῦτ' ἀναγκάζει ποιεῖν”), καὶ δοκεῖ ἡ ἀνάγκη ἀμετάπειστόν τι εἶναι, ὁρθῶς· ἐναντίον γὰρ τῇ κατὰ τὴν προαίρεσιν κινήσει καὶ κατὰ τὸν λογισμόν. ἔτι (3) τὸ μὴ ἐνδεχόμενον ἄλλως ἔχειν ἀναγκαῖον φάμεν οὕτως ἔχειν (*Metaphysics* Δ 5 1015a20-35).

according to either its own impulse or the impulse of something other than the forcing thing, i.e. *be otherwise* than being acted upon by the force which it is under, so he goes on to specify the primary and proper third sense: τὸ πρῶτον καὶ κυρίως ἀναγκαῖον.³² Something is necessary in this sense, according to Aristotle, if its being necessary is not caused by something other than itself, as in the “co-cause” and the “by force” cases, but is the cause of both its own necessity and the necessity of the others that are dependent on it.³³ Given that natural necessity is not, according to Aristotle in the passages quoted above, those two derivative kinds of necessity, it seems that we have no choice but to place natural necessity in this primary sense of necessity.³⁴

If we infer from Aristotle’s discussion of simple necessity in *Metaphysics* Δ 5, because the primarily necessary, “the simple”, by its definition does not derive its necessity from anything else, its being necessary is *unconditional*. It follows that if we categorize natural necessity as a kind of *simple* (absolute) necessity, it by implication cannot be a kind of *conditional* or *qualified* necessity. So back to where we start on the first dichotomy between hypothetical and natural necessity (the first three passages), the distinction there cannot be between the two kinds of conditional necessity, the one teleological and the other material. The contrast seems rather to be, similar to the one between natural necessity and necessity by force, between a kind of unconditional

³² καὶ κατὰ τοῦτο τὸ ἀναγκαῖον καὶ ἄλλα λέγεται πως ἅπαντα ἀναγκαῖα· τό τε γὰρ βίαιον ἀναγκαῖον λέγεται ἢ ποιεῖν ἢ πάσχειν τότε, ὅταν μὴ ἐνδέχεται κατὰ τὴν ὁρμὴν διὰ τὸ βιαζόμενον, ὡς ταύτην ἀνάγκην οὐσαν δι’ ἣν μὴ ἐνδέχεται ἄλλως, καὶ ἐπὶ τῶν συναιτίων τοῦ ζῆν καὶ τοῦ ἀγαθοῦ ὡσαύτως· ὅταν γὰρ μὴ ἐνδέχεται ἔνθα μὲν τὸ ἀγαθὸν ἔνθα δὲ τὸ ζῆν καὶ τὸ εἶναι ἄνευ τινῶν, ταῦτα ἀναγκαῖα καὶ ἡ αἰτία ἀνάγκη τίς ἐστὶν αὕτη (*Ibid.* 1015a35-1015b6).

³³ τῶν μὲν δὴ ἕτερον αἴτιον τοῦ ἀναγκαῖα εἶναι, τῶν δὲ οὐδέν, ἀλλὰ διὰ ταῦτα ἕτερά ἐστιν ἐξ ἀνάγκης. ὥστε τὸ πρῶτον καὶ κυρίως ἀναγκαῖον τὸ ἀπλοῦν ἐστίν (*Ibid.* 1015b9-12).

³⁴ See Cooper (1987: 259-260), who similarly places what he calls “Democritean necessity”, which is practically the same as my “natural necessity”, in the third sense of *Metaphysics* Δ 5. The only difference is that I don’t see anything particularly material about natural necessity.

necessity and a kind of conditional necessity. And indeed, this seems to be exactly what the latter half of *Metaphysics* Δ 5 tries to tell us, if natural necessity is indeed a kind of simple necessity.

5.3 Natural Necessity as Simple and Absolute Necessity

Now, the above analysis offers a case of plausibility for the thesis. This is to say, it only offers a testimony, based on comparing the classification of necessity in Aristotle's different texts, *that* Aristotle is likely to have categorized natural necessity in this way. It does not explain *why* Aristotle has good reasons for such a categorization. Importantly, the problems outlined in the first paragraph still remain unanswered: for Aristotle, individual substances in the sublunary world, whether *qua* composites of form and matter, or *qua* individual forms, are without exception non-eternal, and the events involving these individual substances happen only for the most part. Furthermore, in some places where Aristotle deals with necessity in the sublunary world specifically, he seems to be claiming that the only kind of necessity in the sublunary world is hypothetical necessity.³⁵ To make the situation even worse, the primary sense of necessity outlined in *Metaphysics* Δ 5 is traditionally thought to belong exclusively to the prime, numerically singular, unmoved mover—God.³⁶ The last sentence of the chapter

³⁵ *Physics* 2.9 and *PA* 1.1 639b21-26 and 642a1-13. The Greek in *PA* 1.1 639b21-26 is ambiguous.

³⁶ Even Menn, who is in general against the traditional interpretation of Owens and Frede & Patzig concerning *Metaphysics* Δ, seems to take the traditional view in the particular case of Δ5. See Menn (forthcoming: Iy1 p. 34): “thus the kinds of necessity that people ordinarily talk about and use in explanations, whether physical constraint (the physicists are notoriously always asking ‘by what necessities’ things come about) or deductive validity, are shown to be dependent on a higher and better kind of necessity. This is almost the only example in Aristotle of what should according to Owens and Patzig and Frede be a common pattern, of showing that some term X is said primarily of God and only derivatively, perhaps by a series of derivations, of other things”.

(*Metaphysics* Δ5 1015b14-15), among many other considerations, seems to strike home just this point: “so if there are certain *eternal* and unmoved beings, there is nothing by force or contrary to nature for them.”³⁷

The connection between unmoved mover and simple necessity is a crucial one. As I showed in chapters 1 and 4, Aristotle does acknowledge and has conceptual reasons to acknowledge the existence of a multiplicity of unmoved movers, including the non-eternal unmoved movers in the sublunary world. The non-eternal unmoved movers in the sublunary world are moved and qualified only *per accidens*, but are unmoved and unqualified *per se*, i.e. in respect of the proper motions that they are the first movers of. Further, at the end of chapter 4, I showed that Aristotle’s conception of simple necessity is closely tied not only to the immobility of the “prime mover” specifically, but more generally to the immobility of any unmoved mover, including that of a non-eternal unmoved mover. So, the fact that individual souls are *per se* unmoved movers in the strict sense (just as the “prime mover” is a *per se* unmoved mover) makes them simply necessary *per se*, despite the fact that they are movable *per accidens* and non-eternal.

At the end of chapter 4, I discussed Aristotle’s mentioning of necessity in demonstration (ἀπόδειξις) at *Metaphysics* Δ 5 (1015b7-16). I argued that the unmoved movers are among the “first things” and the “simple things” which, when framed as simply necessary premises, make the conclusion of a demonstration necessary.³⁸ Now, according to some scholars, only the “prime mover” has the qualification of being simply necessary in such a way.³⁹ However, for Aristotle, a science is consisted of conclusions

³⁷ εἰ ἄρα ἔστιν ἅτα αἰδία καὶ ἀκίνητα, οὐδὲν ἐκείνοις ἐστὶ βίαιον οὐδὲ παρὰ φύσιν.

³⁸ Cf. *Post. An.* 1.6.

³⁹ See the note on Menn’s interpretation of *Metaphysics* Δ 5 above.

that are demonstrated from such necessary “in itself” premises,⁴⁰ *and* there are more sciences than theology. Physics and biology are both sciences for Aristotle. As the first principle of individual biology, each soul as a species (such as the dog-soul) is “in itself” predicated with what it is, and such a predication is one of the necessary premises from which true and necessary conclusions are demonstrated. Thus, individual souls as species do qualify as such first things and simple things, and the simple necessity in their “in itself” predication is just natural necessity.⁴¹

This in a way also shows why simple necessity is not a negatively defined concept. That is to say, with respect to simple necessity, A is necessarily A not just because it is impossible for it to be other than A in an obvious sense, but A is necessarily A because of what A is. Thus, although it is true that a white Socrates is always a white Socrates and *cannot be otherwise*, say, a black Socrates, it does not follow that it is simply necessary for white Socrates to be white Socrates, for white Socrates or white man does not have an essence or a definition.⁴² That is to say, “A is A” is not a content neutral axiom for Aristotle.⁴³ Thus, what is necessary as “the simple” has a *determined* way in which it is necessary. This is sometimes invoked through the locution οὐτως, as we have seen at *Metaphysics* Δ 5 1015a34 and *PA* 1.1 642a34, and sometimes also captured by the φύσις related terms, as we have seen at *PA* 1.1 642a34-35 (πεφυκότα). On the flipside, the fact that simple necessity is not negatively defined allows what is naturally necessary to be

⁴⁰ On the necessity of such premises, see *Post. An.* 1.4 73a24, b18 and 1.6. On the “in itself” (καθ’ αὐτό) predications, see *Post. An.* 1.4 73a35-b5. In calling such premises and conclusions necessary, I’m not thereby implying that they must themselves be modal propositions in form (“A holds of B in itself.” vs “Necessarily, A holds of B in itself.”). See Barnes (1993: xxi-xxii). This is a very important point.

⁴¹ Another fact worth remembering is that each καθ’ ὅλου soul, which “in itself” predication requires it to be, as a species is eternal for Aristotle. See Cooper (1987: 269-274).

⁴² See *Metaphysics* Z 4 1029b22-1030a2.

simply necessary. Thus, for the nutritive soul, for example, although it can be otherwise in many respects, in the respect in which it is the unmoved mover and the first cause of nutritive activities, it is simply necessary for the nutritive soul to be οὕτως, or it is *naturally* thus.

In this way, what is naturally necessary is simply and absolutely necessary in its own domain. The first two passages, in which Aristotle seems to be appealing to material necessity, can thus be interpreted as the simple necessity coming from the nature of the thing in question: in the *PA* 1.1 passage, the thing in question is air, and in the *Physics* 2.8 passage, the things in question are stone and earth. Stone and earth are indeed the matter out of which a wall is built, however, they are such as they are (i.e. hard and sturdy) not because they are the matter of the wall, but because of their own nature. The reason why Aristotle specifies such things that have a necessary nature as *matter* at 200a6, is that his argument is not about stone and earth *per se*, but about that which stone and earth are matter of, i.e. the wall. His point there is that, the coming-to-be of the wall is not due to the necessary nature (200a8-9) of stone and earth, as Democritus or Empedocles would like to claim, but rather due to the purpose, say to protect against trespassing. So far as the wall is concerned, although it is materially necessary for it to be hard and sturdy—because it is made of stone and earth which are necessarily hard and sturdy by nature—, its coming-to-be is not due to the natural necessity of its matter. Further, it is arguable that the being of the wall, i.e. the way it is what it is, is also not due to the natural necessity of its matter: the wall is tall and insurmountable, but neither stone nor earth is *per se* either tall or insurmountable.

⁴³ See Patzig (1968:24).

5.4 Derivative Necessities

There is a second kind of necessity, different from what I described as natural necessity above, which is the real focus of *Physics* 2.9. Aristotle claims at *Physics* 2.9 200a13-15 that “what is necessary is on a condition, not as an end, for the necessary is in the matter (ἐν τῇ ὕλῃ), while that for the sake of which is in the definition.”⁴⁴ According to the example that he gives for this kind of necessity (a10-13), it is *necessary* for a saw to be of iron, on the condition that it is to do what it is supposed to do.⁴⁵ This means that what something is made of, i.e. what its matter is, is conditioned on and necessitated by what it is or what it is for. This is the so-called “hypothetical necessity” or conditional necessity of the teleological type. It is different from, but works together with, what I call natural necessity.⁴⁶

However, given that what is hypothetically necessary is conditioned on the goal, the goal as what makes something else necessary has to be itself necessary. I discussed this in relation to the *Metaphysics* Δ 5 passage on demonstrative necessity at the end of chapter 4: that the necessity of the conclusions is caused by the necessity of the premises.⁴⁷ That the *Metaphysics* Δ 5 passage on demonstrative necessity is relevant to the discussion of “hypothetical necessity” at *Physics* 2.9 199b34-200a15, is shown by what immediately follows, in which Aristotle compares necessity in mathematics to necessity in nature:

⁴⁴ ἐξ ὑποθέσεως δὴ τὸ ἀναγκαῖον, ἀλλ’ οὐχ ὡς τέλος· ἐν γὰρ τῇ ὕλῃ τὸ ἀναγκαῖον, τὸ δ’ οὐ ἔνεκα ἐν τῷ λόγῳ.

⁴⁵ τοῦτο μέντοι τὸ οὐ ἔνεκα ἀδύνατον γενέσθαι, ἂν μὴ σιδηροῦς ᾗ· ἀνάγκη ἄρα σιδηροῦν εἶναι, εἰ πρίων ἔσται καὶ τὸ ἔργον αὐτοῦ.

⁴⁶ Cooper (1987: 243-274) argues for the same conclusion, using different terminology.

⁴⁷ I argued why conditional necessity is *not* validity (i.e. the necessity of the inference, also

What is necessary in mathematics is in a way similar to that in things which come to be through according to nature. Since a straight line is what it is, it is necessary that the angles of a triangle should equal two right angles. But not conversely; though if the angles are not equal to two right angles, then the straight line is not what it is either. But in things which come to be for an end, the reverse is true. If the end is to exist or does exist, that also which precedes it will exist or does exist; otherwise just as there, if the conclusion is not true, the principle will not be true, so here the end or ‘that for the sake of which’ will not exist. For this too is itself a principle, but of the reasoning, not of the action; while in mathematics the principle is the principle of the reasoning only, as there is no action. If then there is to be a house, such-and-such things must be made or be there already or exist, or generally the matter relative to the end, bricks and stones if it is a house. But the end is not due to these except as the matter, nor will it come to exist *because of them*. Yet if they do not exist at all, neither will the house, or the saw—the former in the absence of stones, the latter in the absence of iron—just as in the other case the principles will not be true, if the angles of the triangle are not equal to two right angles.⁴⁸ (*Physics* 2.9 200a15-30)

known as *necessitas consequentiae*) in chapter 4, note 167.

⁴⁸ ἔστι δὲ τὸ ἀναγκαῖον ἔν τε τοῖς μαθήμασι καὶ ἐν τοῖς κατὰ φύσιν γιγνομένοις τρόπον τινὰ παραπλησίως· ἐπεὶ γὰρ τὸ εὐθὺ τοδί ἐστιν, ἀνάγκη τὸ τρίγωνον δύο ὀρθαῖς ἴσας ἔχειν· ἀλλ’ οὐκ ἐπεὶ τοῦτο, ἐκεῖνο· ἀλλ’ εἴ γε τοῦτο μὴ ἔστιν, οὐδὲ τὸ εὐθὺ ἔστιν. ἐν δὲ τοῖς γιγνομένοις ἕνεκά του ἀνάπαλιν, εἰ τὸ τέλος ἔσται ἢ ἔστι, καὶ τὸ ἔμπροσθεν ἔσται ἢ ἔστιν· εἰ δὲ μὴ, ὥσπερ ἐκεῖ μὴ ὄντος τοῦ συμπεράσματος ἡ ἀρχὴ οὐκ ἔσται, καὶ ἐνταῦθα τὸ τέλος καὶ τὸ οὗ ἕνεκα. ἀρχὴ γὰρ καὶ αὕτη, οὐ τῆς πράξεως ἀλλὰ τοῦ λογισμοῦ (ἐκεῖ δὲ τοῦ λογισμοῦ· πράξεις γὰρ οὐκ εἰσὶν). ὥστ’ εἰ ἔσται οἰκία, ἀνάγκη ταῦτα γενέσθαι ἢ ὑπάρχειν, ἢ εἶναι [ἢ] ὅλως τὴν ὕλην τὴν ἕνεκά του, οἶον πλίνθους καὶ λίθους, εἰ οἰκία· οὐ μέντοι διὰ ταῦτά ἐστι τὸ τέλος ἀλλ’ ἢ ὡς ὕλην, οὐδ’ ἔσται διὰ ταῦτα. ὅλως μέντοι μὴ ὄντων οὐκ ἔσται οὐθ’ ἢ οἰκία οὐθ’ ὁ πρίων, ἢ μὲν εἰ μὴ οἱ λίθοι, ὁ δ’ εἰ μὴ

In this passage, in order to show that matter is necessitated by the end in a natural process and not *vice versa*, Aristotle appeals to the demonstrative structure of mathematics. It is the definition of the straight (τὸ εὐθύ), together with that of triangle, that is the ἀρχή (principle or premise) that makes it necessary that the internal angles of a triangle equal two right angles. This means that, although if the angles of triangle were not equal to two right angles, straight line wouldn't be what it is either, there is still a hierarchy between the two things or propositions. It is *because of* the straight being what it is that the angles of triangle are equal to two right angles. Aristotle argues for the same position in *Metaphysics* Δ 5, the position which I showed at the end of chapter 4. Considering that in both the *Metaphysics* Δ 5 passage and the relevant passages in *Posterior Analytics*⁴⁹ Aristotle thinks that the premises of demonstrative knowledge are simply necessary, I argue that here, in *Physics* 2.9, the definition of the natural goal, too, can be put into a proposition that is simply necessary. Consider the definition of wall as “a protective structure against trespassing” and the definition of “the straight” as “a line which lies evenly with points on itself”: neither the individual wall nor the individual straight line eternally exists, but the wall is what it is and the straight line is what it is in every individual case.⁵⁰ So, in saying “the necessary is in the matter (ἐν τῇ ὕλῃ), while that for the sake of which is in the definition”, Aristotle is only referring to the kind of necessity that is conditioned by the end: he doesn't mean to rule out that the end and the definition which comprises the end are necessary in a more fundamental way: they are indeed the “simple things” that in turn makes other things necessary *derivatively*.

ὁ σίδηρος· οὐδὲ γὰρ ἐκεῖ αἱ ἀρχαί, εἰ μὴ τὸ τρίγωνον δύο ὀρθαί.

⁴⁹ See *Post. An.* 1.4 73a24, b18 and 1.6.

⁵⁰ Of course, in the case of the wall, the end itself may be means for further ends: “why should there be no trespassing?” “In order that the people and property inside be safe.” “Why should the

By the same token, material necessity is another kind of derivative necessity which presupposes natural necessity.⁵¹ In the example of the wall in *Physics* 2.9, as *something that is made of stone*, the wall is necessarily hard and sturdy because of stone, whereas stone is, for the sake of the argument, necessarily hard and sturdy by nature.⁵²

Admittedly, things on the material side have less claim to natural necessity because they don't strictly speaking have an active nature.⁵³ They don't reproduce themselves nor can they remain what they are for an extended period of time. This is not only true for the elements but also for the things that have a nature otherwise, but when subsumed under another nature, serve as matter. For a pack of wolves, for example, a good human being is a dead and *material* human being: i.e. meat and bones that do not reproduce themselves nor remain what they are for an extended period of time, while the pieces of wood that make up a table do rot and cannot, like trees, produce further wood. This explains why, I think, material necessity is less prominent in Aristotle's discussion of natural phenomena. However, be as it may, in the limited time period that a certain thing remains what it is *qua* matter, it is necessarily what it is by nature and makes the thing that it is the matter of such and such by material necessity.

people inside be safe?" etc. For the sake of the argument, I treat the end here as simply necessary.
⁵¹ Although Aristotle never uses the exact term "material necessity", there are several places (*PA* 1.1 640b9, and *GA* 2.1 731b21 and 5.1 778a35) where he clearly means by necessity the necessity coming from the material condition of a given thing.

⁵² The wall is also necessarily hard and sturdy because of what it is. However, this is different from the reason why *anything* that is made of stone is necessarily hard and sturdy.

5.5 Natural Necessity, “Always or for the most part”, and the Accidental

One of the considerations that motivate recent scholars to exclude simple necessity from the operations in the sublunary world is the fact that Aristotle often makes the observation that natural events are contingent: i.e. a natural cause not always (ἀεὶ) but only for the most part (ὥς ἐπὶ τὸ πολὺ) brings about the outcome.⁵⁴ If so, it is argued, the kind of necessity that figures in the sublunary world can only be qualified.⁵⁵

There are two ways to explain why a result is contingent. (1) First, it is contingent because the cause is itself contingent. Indeed, none of the natural causes in the sublunary world is eternal, so there is little wonder that the results they bring about are contingent. Besides, the natural causes themselves are not always active when they exist. My perceptive soul, for example, is not always active, and having a nutritive soul doesn't mean that I eat or digest all the time when I am alive. (2) Second, a result is *even more* contingent because, even if we disregard the contingency that the cause itself imports, still the cause does not necessitate the result *necessarily*, i.e. always, but only for the most part. In this vein, Kupreeva (2010) and Leunissen (2010) have recently distinguished between two senses of necessity for Aristotle: a causal sense and a modal sense. According to them, Aristotle can say that a cause *in the causal sense* necessitates⁵⁶ its result which *in the modal sense* may or may not come about: “the cause does not necessitate its result necessarily” is therefore *not* an oxymoron. Thus, for example, material necessity is both *unqualified* in the causal use and *qualified* in the modal

⁵³ The elements only have a nature to be moved. See *Physics* 8.4.

⁵⁴ See e.g. *PA* 1.1 639b23-640a9 and *GC* 2.11.

⁵⁵ See Leunissen (2010: 100-101).

⁵⁶ Necessity in this causal sense is compared to inferential validity (i.e. *necessitas consequentiae*) by both scholars. See Leunissen (2010, 99), and Kupreeva (2010, 216): “the necessity of an individual outcome is made dependent on the validity of an inference from the earlier cause to its

use—unqualified because “materials act according to their own natures independently of ends that are to be realized” and qualified “because the material cause necessitates its effect [only] for the most part”.⁵⁷ See also Kupreeva (2010: 216): “[Aristotle distinguishes] first a non-modal sense [of necessity], which refers to conditional necessity as operating in each process of change through several causal factors (so that for each process of change we have a final cause which defines the condition of material causation, but also the efficient cause which will to some extent rely on matter in contributing to the outcome), and second, a modal sense, i.e., one that is based on the distinction between the necessary and the contingent”.⁵⁸

The first kind of contingency explained above coexists well with there being simple necessity in nature, given what I’ve argued in this project so far. To say that something is simply necessary according to its nature is not to deny its corruptibility or its temporal discontinuity. In so far as the temporal dimension is concerned, natural movers are moved movers in that other things (the sun, the moon, and the planets) cause their periods to be what they are,⁵⁹ and they in turn transmit this temporal extension to their effects *per accidens*. To say that something is simply necessary *per se* is to say that it is what it is and it causes its effects to be what they are as an unmoved mover.

Therefore, Aristotle’s conclusion in *GC* 2.11 that all sublunary things are contingent, i.e. non-eternal, cannot rule out the kind of simple necessity in nature that I discuss in this

effect that comes about later.”

⁵⁷ See Leunissen’s chart in Leunissen (2010: 103).

⁵⁸ As might be seen from the quotation, Kupreeva comes to this conclusion presumably because on the one hand she finds (as I do) the close connection between causes and necessity in Aristotle, and on the other hand, she is confronted (as I am) with the fact that none of the effect caused by any of the four causes in nature appear to be 100% necessary—the effects are always “for the most part”. Besides, according to Kupreeva, since sometimes there can be different kinds of causes for the same result, they surely cannot *all* necessitate in the modal sense *at the same time*.

chapter.⁶⁰

The second kind of contingency is also compatible with there being simple necessity in nature. This kind of contingency comes about because of the so-called “(external) hindrance/impediment”. In a possible allusion to his teacher’s Syracuse-Aegina misfortune,⁶¹ we see Aristotle qualify “always” (ἀεί) with “the impediment” (ὃ ἐμποδίζει):

Those things are natural which, by a continuous movement originated from an internal principle, arrive at some completion: the same completion is not reached from every principle; nor any chance completion, but *always* (ἀεί) the tendency in each is towards the same end, *if there is no impediment* (ἂν μή τι ἐμποδίση). The end and the means towards it may come about by chance. We say, for instance, that a stranger has come by chance, paid the ransom, and gone away, when he does so as if he had come for that purpose, though it was not for that that he came. This is accidental, for chance is an accidental cause, as I remarked before. But when an event takes place always (ἀεί) or for the most part (ὥς ἐπὶ τὸ πολὺ), it is not accidental (συμβεβηκός) or by chance (ἀπὸ τύχης). Among natural things it is *always thus* (ἀεὶ οὕτως), *if there is no impediment* (ἂν μή τι ἐμποδίση).⁶²

⁵⁹ See *GC* 1.10 336a31-b24 and *GA* 4.10 777b16-778a4.

⁶⁰ For a good discussion of the problem of necessity in *GC* 2.11, see Kupreeva (2010: 203-233).

⁶¹ See Plutarch *Life of Dion* 5.3.

⁶² φύσει γάρ, ὅσα ἀπὸ τινος ἐν αὐτοῖς ἀρχῆς συνεχῶς κινούμενα ἀφικνεῖται εἰς τι τέλος· ἀφ’ ἐκάστης δὲ οὐ τὸ αὐτὸ ἐκάστοις οὐδὲ τὸ τυχόν, ἀεὶ μέντοι ἐπὶ τὸ αὐτό, ἂν μή τι ἐμποδίση. Τὸ δὲ οὐ ἔνεκα, καὶ ὃ τοῦτου ἔνεκα, γένοιτο ἂν καὶ ἀπὸ τύχης, οἷον λέγομεν ὅτι ἀπὸ τύχης ἦλθεν ὁ ξένος καὶ λυσάμενος ἀπῆλθεν, ὅταν ὥσπερ ἔνεκα τοῦτου ἐλθὼν πράξῃ, μὴ ἔνεκα δὲ τοῦτου ἔλθῃ. καὶ τοῦτο κατὰ συμβεβηκός (ἡ γὰρ τύχη τῶν κατὰ συμβεβηκός αἰτίων, καθάπερ καὶ πρότερον εἵπομεν), ἀλλ’ ὅταν τοῦτο αἰεὶ ἢ ὥς ἐπὶ τὸ πολὺ γένηται, οὐ συμβεβηκός οὐδ’ ἀπὸ τύχης· ἐν δὲ τοῖς φυσικοῖς αἰεὶ οὕτως, ἂν μή τι ἐμποδίση.

Although the point of the passage lies elsewhere, it is implied in passing that the reason why from a given internal principle, i.e. nature, there is not *always* a continuous development toward its end is that there might be some impediment. What is this impediment? The impediment is said elsewhere to be either the matter or other principles—presumably other natures.⁶³ What is interesting here is that the impediment, as something that makes the natural end be achieved only for the most part (ὥς ἐπὶ τὸ πολὺ), is accidental (συμβεβηκός).⁶⁴ And the outcome of such impediment is also accidental (κατὰ συμβεβηκός or ἀπὸ συμπτώματος).

Now, to say that something is κατὰ συμβεβηκός or ἀπὸ συμπτώματος doesn't just mean that it happens rarely, at least not for Aristotle, who almost certainly coined the expression. Etymologically speaking, such an expression relates to the “coming together” or “falling together” of two things. In causal contexts, κατὰ συμβεβηκός means to pick out the salient characteristics that X has that are due to (κατά) what does not belong to X in what X is, but has come together with it.⁶⁵ Interpreted in this way, the impediment in

⁶³ See GA 5.10 778a4-9: “It is the aim, then, of nature to count this coming into being and the end of animals by the numbers of these higher periods [i.e. month, year, etc.], but nature does not bring this to pass accurately because of the indeterminacy of the matter and because there are many principles which impede (ἐμποδίζουσιν) generation and decay from being according to nature, and often cause things to fall out (συμπιπτόντων) contrary to nature.”

⁶⁴ Cf. GC 2.6 333b4-7: “For the things which come-to-be by nature all do so either always or for the most part in a given way; while any exceptions—any results which occur neither always nor for the most part—are products of chance and spontaneity.”

⁶⁵ See Physics 2.5: 196b24-29: “ὥσπερ γὰρ καὶ ὃν ἐστὶ τὸ μὲν καθ’ αὐτὸ τὸ δὲ κατὰ συμβεβηκός, οὕτω καὶ αἷτιον ἐνδέχεται εἶναι, οἷον οἰκίας καθ’ αὐτὸ μὲν αἷτιον τὸ οἰκοδομικόν, κατὰ συμβεβηκός δὲ τὸ λευκὸν ἢ τὸ μουσικόν· τὸ μὲν οὖν καθ’ αὐτὸ αἷτιον ὀρισμένον, τὸ δὲ κατὰ συμβεβηκός ἀόριστον· ἅπειρα γὰρ ἂν τῷ ἐνὶ συμβαίῃ.” This passage shows that Aristotle does understand κατὰ συμβεβηκός etymologically (see the last sentence). Here, the characteristics—the activity of housebuilding and the house—are accidental to a white guy in that

natural processes is accidental (συμβεβηκός) precisely in the sense that it, as something that does not belong to the nature in question in what it is, has come together with (συνέβη) or has got in the way of (ἐνεπόδισε) the natural process. So the outcome, which is either a freak (τέρας)⁶⁶ or some other way of failure, belongs to the nature in question *per accidens* (κατὰ συμβεβηκός). And this kind of outcomes doesn't happen to the nature in question always or for the most part because there is no further cause linking the coming together of the two: as Aristotle himself puts it: ἄπειρα γὰρ ἂν τῷ ἐνὶ συμβαίῃ (*Physics* 2.5 196b29).

The reason why a natural cause does not necessitate its natural end *always* but only *for the most part*, therefore, is due to something that is accidental to it. This is to say a natural cause may fail to lead to its natural end, but even if it fails, it only fails *per accidens*. This means that, conversely, a natural cause *per se* is always what it is and has characteristics and tendencies that it is the cause of. Given that we understand natural necessity only in the *per se* sense—recall that the soul is a *per se* unmoved mover which *per accidens* is moved both by itself and by other things—it is safe to infer that this kind of contingency, the *per accidens* kind, is compatible with natural necessity being simple. Indeed, it is simply necessary for the nature of something, as an unmoved mover, to be what it is, non-derivatively.

5.6 Conclusion

In this chapter, I've done three things. First, I show that, from Aristotle's several remarks on how necessity is spoken of, there is ample evidence that what I call "natural

the housebuilding ability does not belong to him in what he is (for not all white guys can build whereas all housebuilders can), but to what has come together with him.

necessity” is classified as a kind of simple necessity. Then, relating to what I’ve argued in chapters 1 and 4, I explain why it makes sense, given Aristotle’s conception of scientific knowledge, to classify natural necessity as a kind of simple and absolute necessity. Second, I show that the two kinds of necessity, which according to the received view are the only kinds of necessity that there are in the sublunary world, should be understood as conditional necessity derivative from natural necessity. Third, I suggest ways in which one may reconcile natural necessity with the *brutality* of the sublunary world.

⁶⁶ See GA 4.4 770b9-17. See Johnson (2005: 198-201).

Conclusion

In this investigation, I have offered a package of answers to a set of related questions concerning Aristotle's notion of unmoved mover. As I outlined in the introduction, according to the interpretation that I take issue with in this project, (1) there is only one real unmoved mover for Aristotle—the “prime mover” or God; (2) the “prime mover” causes motion by being a paradigm to everything else; (3) simple necessity belongs to the “prime mover” alone, so the kind of necessity exhibited by things in the sublunary world can only be conditional or hypothetical. In response, I have argued in this project that (1) Aristotle acknowledges a multiplicity of unmoved movers in the world, including the movers of the heavens and the mortal souls (chapters 1 & 2); (2) an unmoved mover causes motion by unilaterally touching the thing moved, whereas a moved mover causes motion by reciprocally touching the thing moved and is moved by it in return (chapters 3 & 4); (3) simple necessity belongs to an unmoved mover as such, therefore we find simple necessity exhibited wherever we find unmoved movers, be it in the heavens or in the sublunary world (chapter 5).

Now, I am aware that I have covered a lot of ground, both textual and conceptual, in this investigation, and that some of the interpretive steps that I have taken may seem hasty, if not mistaken, to a more experienced hiker.¹ However, because the answers to the set of questions I raise in this project belong to a binary of packages—either to a “monotheistic” package or to a “polytheistic” one—the relative merit of the two

¹ For the hiking metaphor, see the introduction in Myles Burnyeat, *A Map of Metaphysics Zeta*, Mathesis Publication, 2001.

packages can be weighed on an accumulative scale of improbability.² (1) First, concerning the question of the number of the unmoved movers or gods, it is true that the polytheistic reading has its own issues to deal with;³ however, the monotheistic reading scores a higher rating of untrustworthiness in that it has to resort to a cherry-picking developmental theory. In order to discredit the passages in which Aristotle clearly takes it for granted that there are a plurality of such movers, this version of developmental theory argues for a particular chronological order, not just of Aristotle's surviving works and of the different books within a single work, which may still be reasonable; it also argues for a particular chronological order of the different chapters within a single book (thus *Metaphysics* Λ 8 was later than the rest of Λ) and even of the different passages within a single chapter (thus certain passages in *Physics* 8.6 and *De Caelo* were later additions). This is too *ad hoc* a theory to be true. (2) Second, concerning the question of the way in which an unmoved mover causes motion, the monotheistic interpreter, on the one hand, who already believes that there is only one such mover, thinks that the "prime mover" causes motion by being a paradigm to everything else. The difficulty such an interpretation faces is, first of all, why the motion in something counts as an imitation of the immovable paradigm, which is apparently not moved by anything and is therefore not moving. And, if one deals with it by saying that the motion of something (an imperfect fulfillment) is an imitation of the thinking of the "prime mover" (a perfect fulfillment), there is still the question how the "prime mover" asserts its influence *in distance* to everything else *directly*. Human beings may be able to perceive the fixed stars, calculate their daily motions, appreciate their orderliness, and decide to emulate the cause of such

² Hence the "campaign" that I run here is a mostly negative one.

an order—the “prime mover”—by philosophizing on it; however, it is difficult to see how animals and plants are influenced by the “prime mover” in what they do, except that some of them operate on a daily cycle: it would seem that the mover of the yearly solar motion, which gives us four seasons or monsoons, has a bigger impact. So, if the “prime mover” is indeed external to the universe, as Aristotle apparently claims, it would be in a mysterious and unattested way, according to the monotheistic interpretation, that it asserts its influence *in distance*. The polytheistic interpreter, on the other hand, has to explain how, if all unmoved movers cause motion in the same manner, there exists an order of priority and posteriority amongst them. I suggested at the end of chapter 4 that Aristotle has conceptual resources to accommodate such an order. (3) Third, concerning the modal status of the sublunary substances, it appears on the face of it impossible for the polytheistic interpreter to maintain that the non-eternal unmoved movers exhibit simple necessity. However, for the monotheistic interpreter, who wishes to restrict simple necessity to the “prime mover”, there is also bad news. The fact that Aristotle acknowledges more sciences than theology and mathematics, and his belief that scientific knowledge is demonstrated from simply necessary premises, make it *impossible* that simple necessity is restricted to the “prime mover” and to the principles of geometry and arithmetic. In scientific biology, for example, each soul as a species needs to figure in the simply necessary definitions⁴ from which scientific conclusions are demonstrated. This is indeed not surprising, given that mortal souls are acknowledged as unmoved movers by Aristotle, and that he connects immobility to simple necessity. So in conclusion, the

³ It has to deal with, for example, the beginning paragraph and the last sentence of *Metaphysics* Λ 10. See more in chapter 1, section 1.7.

⁴ E.g. a dog is such and such a mammal; a mammal is such and such a footed animal. Both these are simply necessary, *per se* predications.

polytheistic interpretation of the notion of unmoved mover, as a package, is more attractive and trustworthy than its alternative.

Now, a few words on originality. (1) I *do not* claim originality in the general thesis of the first two chapters, i.e. that there are a multiplicity of unmoved movers in the world for Aristotle. Although it is still sometimes taken for granted that Aristotle acknowledges only one real unmoved mover, the “prime mover” or God, there has always been dissident voice.⁵ My debt to Cherniss in the first part of chapter 2 is also obvious.⁶ In the first two chapters, I made two original points. First, in chapter 1, I offered a new interpretation of the key passage in *Physics* 8.6 concerning animal self-motion.⁷ Drawing on Aristotle theory of sleep and digestion in *De Somno*, I argued that it is because an animal’s locomotive activity is affected by its nutritive activity that the animal is not a local self-mover in the strictest sense. Second, in the second half of chapter 2, I suggested an analogy between the three pairs: (a) the psychic principle and *pneuma*, (b) the fixed point of a joint and the mobile point of a joint, and (c) the heavenly mover and the heavenly first body; further, I argued that, based on this analogy, the heavenly mover should be understood as an unmoved, rather than a self-moving, mover. (2) In the second part of my investigation, I *do not* claim originality in the general anti-Platonist thesis, which is shared by Broadie (1993) and Berti (2001), among others, and my discussion of the final and the efficient causation is indebted to Menn (2002) and (2012). However, my investigation into moved movers in chapter 3 is new and it helps

⁵ See Merlan (1946), Wolfson (1958), Frede (2000), Morison (2004), and especially Menn (2012).

⁶ See Cherniss (1944: 540-564).

⁷ My interpretation is new as far as the current Aristotle scholarship is concerned. It may in fact be Simplicius’ interpretation. See my detailed discussion in chapter 1, section 1.5.

solve, I believe, some conceptual and interpretive problems.⁸ Besides, the special emphasis that I put on the notion of touch is, I believe, a powerful new way of arguing against the Platonist interpretation of Aristotle's notion of unmoved mover. (3) The last part of my investigation is original. Its being original is part of the reason that I include it in my dissertation.⁹

⁸ See chapter 3, sections 3.2 and 3.5.2.

⁹ I explained the main reason in the introduction.

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