

On Sarah Broadie’s “Heavenly Bodies and First Causes”

Two Turning Points in the History of Theology: Aristotle’s Divine “Fifth Element” and the Perversion by Alexander of Aphrodisias

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This is the 6th “digital extension” of Aristotle’s “Not to Fear” Proof for the Necessary Eternality of the Universe.¹

...in pursuing the truth one must start from the things that are always in the same state and suffer no change (*metabolēn*). Such are the heavenly bodies; for these do not appear to be now of one nature and again of another, but are manifestly always the same and share in no change (*Metaphysics* XI 7, 1063a13-16).²

...that lucky old sun got nothin' to do
but roll around heaven all day.³

Overview

I.

In her “Heavenly Bodies and First Causes,”⁴ Sarah Broadie explains why Aristotle seemingly held throughout his whole professional life the Unmoved Mover of *Metaphysics* Lambda 6 as an immaterial first cause. Ironically, for reasons too complex to explain, I had not been aware of the article until after Aristotle’s “Not to Fear” Proof and its five digital extensions⁵ had already been published.⁶ The publications conclude that the Northern Greek from Stagira dropped the Mover

¹ Published 11 February 2021 at www.EPSpress.com/NTF/OnHeavenlyBodies.pdf; Gregory L. Scott, *Aristotle’s “Not to Fear” Proof for the Necessary Eternality of the Universe* (New York: ExistencePS Press) 2019. I had already promised that a 6th digital extension on Alcmaeon of Croton and Aristotle would be forthcoming before discovering Broadie’s article. However, because this extension constitutes a natural series with the two previous extensions, arising from the Marquette conference in Broadie’s honor (February 2020), the one on Alcmaeon will instead be the 7th. I am grateful to Sylvia Berryman for feedback on an earlier draft.

² Transl. by W.D. Ross, *The Complete Works of Aristotle*, ed. Jonathan Barnes (Princeton: Princeton University Press) 1985, first printing 1984; my italics. Unless stated, all other translations from the *Metaphysics* are by Ross.

³ Music by Beasley Smith and words by Haven Gillespie, 1949; a favorite song of Louis Armstrong, Ray Charles *et al.*

⁴ Sarah Broadie, “Heavenly Bodies and First Causes,” in *A Companion to Aristotle*, ed. Georgios Anagnostopoulos (Chichester, West Sussex: Wiley-Blackwell) 2009: 230-241.

⁵ The URL’s of the extensions are listed at the end.

⁶ The reason I say “ironically,” and to provide transparency, is that Broadie sponsored my position as a Visiting Research Fellow at Princeton University in the 1990’s and has been instrumental in the development of my thought (more details are provided in the 4th digital extension). I dedicated Aristotle’s

by mid-career, and probably long before he left the Academy, in favor of the universe *qua* The All (*to pan*) being necessarily eternal in its own right. However, Broadie tackles some related issues that, if addressed, will enable a better understanding of Aristotle's final ontology, *especially whether the outer spheres are ensouled and alive or whether they are "elemental,"* like fire and water, an issue I had not resolved in my book. Nor did I need to, because on either alternative the universe has no possibility of ever going out of existence, for the following basic reasons. Aristotle has a sense of "ontological" necessity that is equivalent to "always"; he holds a Principle of Plenitude in the *Physics* that is scoped to *eternal* things ("what may be, is"); "eternal" and "infinite" function the same; our moving universe has an infinite past and yet still exists. Thus, our moving universe cannot vanish; otherwise, it would have vanished already. Hence, the universe is necessarily eternal in virtue of its own nature, *without* an (immaterial) Unmoved Mover. In Part 1, then, I examine Broadie's article and argue that, despite my disagreement with her on the *mature* Aristotle holding the Mover, her insights help us determine that his final ontology involves a fifth "divine" element that is not anthropomorphic and that involves no mind or thinking. This is the first turning point in this context in the history of theology, and that the Northern Greek held the fifth element was widely held in antiquity, even after Alexander of Aphrodisias around 200 CE distorted the Stagirite's theology, a topic that takes us to Part 2.

II.

When I first published my book, I noted in passing that the dilemmas of the Unmoved Mover had not been debated after Theophrastus, nor had Lambda *per se* been commented on, for 500 years, until Alexander. My statements were based simply on relatively common knowledge and my own recollection. However, I took this all, too hastily, also as evidence that not only the later Peripatetics but the other schools of philosophy until Alexander knew Aristotle had moved away from the youthful doctrine of the Unmoved Mover; hence their lack of concern with debating it. I suggested in addition that the Stagirite might deserve credit, or at least share credit with Theophrastus, for the kind of ontology that the later Peripatetics and even other schools of philosophy often shared despite differences in details, to wit, the universe is necessarily eternal simply in virtue of its own nature and no *supernatural* justification—call it God, Pure Actuality, Divine Craftsman or the like—is needed for it.

In reply to private feedback, I revise here in Part 2 with more evidence my position regarding the aftermath until Alexander to the following: Given their silence on the issue, other schools like the Epicureans and Stoics may *or may not* have known of Aristotle's pertinent metaphysical doctrines, namely, the evolution to a fifth divine element from the earlier, more Platonic doctrine of the Unmoved Mover.⁷ That issue is too difficult to ascertain and may never be determined. Nevertheless, I continue to assert confidently that there is no evidence for any other Peripatetic embracing the Unmoved Mover for half a millennium. Moreover, given the same evidence, it is doubtful that anyone apart from Theophrastus even cared to debate the issue in print, and he

"*Not to Fear*" Proof to her but believe she agrees that truth is more important than friendship and *a fortiori* more important than acquaintanceship.

⁷ I appreciate Monte Ransome Johnson and Brad Inwood warning me of the dangers of too bold a claim on this topic (and this note is not meant to suggest that they have approved of, or even read, the rest of this digital extension).

himself only presents the doctrine as an *aporia* (puzzle) rather than as an ultimately acceptable option.⁸

The lack of subsequent philosophers in general and later Peripatetics in particular even disputing the Unmoved Mover is more telling with respect to its alleged importance for the Stagirite. Indifference is surely more devastating than debate. As far as I can establish, only five scholars—Eudemus of Rhodes (?350-290? BCE), Cicero (106-43 BCE) (and his Epicurean source Velleius⁹), Nicolaus of Damascus (?64 BCE – 6 CE?) and Xenarchus of Seleucia (latter half of the 1st century BCE)—make a passing reference *possibly* to the Mover of Pure Actuality, and, whether or not they are referring to *this* Mover, there is absolutely no support on their behalf for it. Even in the case of Eudemus of Rhodes, who elucidates the Stagirite's *Physics*, he can be easily read as merely helping explain *multiple* "prime unmoved movers" relative to *Physics* VIII 6, and that chapter can refer to *enmattered* "first unmoved movers" that are the eternal analog of a man hitting a stone with a stick, whom Aristotle describes is first *and* unmoved (in contrast to his hand and to the stick). There is no indication from what I can gather that Eudemus focused on Lambda. In the case of Cicero, the possible reference to an Unmoved Mover is in a hodgepodge of discordant and inconsistent Aristotelian thumbnail sketches of God that is derived from a confused Epicurean source, comprising a handful of sentences. In the case of Nicolaus, the possible reference is merely to Lambda *as a whole*, whichever chapters he refers to, and in the case of Xenarchus to *multiple* "incorporeal causes," whatever that means. In any event, Xenarchus clearly rejects such causes.

⁸ I also revise here my initial mischaracterization of Werner Jaeger. Originally, I suggested in the book that his theory of Aristotle's evolutionary development involved the Stagirite himself dropping the Unmoved Mover. At www.EPSpress.com/NotToFearUpdates.html I started correcting in 2020 the few statements in this respect, statements that were intended as *recent* support for my interpretation but that were not needed for my crucial arguments. Jaeger (correctly) thinks that the Northern Greek evolved his metaphysical thought but believes that the ancient always maintained the Unmoved Mover of Lambda 6 or the God of Lambda 7 or both (Werner Jaeger, *Aristotle: Fundamentals of the History of his Development*, translated with the author's corrections and additions by Richard Robinson, 2nd ed., Oxford: Clarendon Press, 1948, first publ. 1934). However, Jaeger does not recognize that the two entities may not be identical, as I have discussed vis-à-vis Michael Bordt, who emphasizes the *lack* of identification without developing the full consequences. See www.EPSpress.com/NotToFearUpdates.html#Bordt for my comments on this topic. Jaeger even emphasizes that the theory of Lambda apart from Chapter 8 *was early and was a sketch*, implying nevertheless that it was a post-summary rather than what it could very well have been, and in my view was, a preliminary outline (e.g., pp. 49; 142 and 219-223).

Ironically, after returning to Jaeger's book after 20+ years, I realized how he provides even more evidence for my position, and I provide some of the most salient points throughout this digital extension. A few other considerations can be noted immediately: Jaeger is wrong, I believe, in suggesting that Aristotle for the most part or always composed only dialogues until Plato's death, even though this is a commonly-held belief (because some of the esoteric work that we now have as treatises is even on Jaeger's view Platonic (cf. pp. 24, 28, 32, and 128). Jaeger is right, though, in reporting from antiquity the paradoxes that were recognized to be pervasive throughout Lambda and in assessing some dilemmas himself (especially pp. 349-53). Jaeger also accurately asserts that Lambda 8 came from a later time than the rest of Lambda (pp. 342ff). Doubly ironically, though, and analogous to Alexander of Aphrodisias and Plotinus, of whom more later, Jaeger's encyclopedic knowledge of ancient Greek philosophy and his championing of *both* Aristotle's evolutionary thought *and* the Unmoved Mover as God has been perhaps most responsible for preventing my type of interpretation from being recognized in the 20th and 21st centuries.

⁹ I owe the recognition of Velleius as the Epicurean source to David E. Hahm and highly recommend his article for more of the background of the fifth element: "The Fifth Element in Aristotle's *De Philosophia*: A Critical Re-Examination," *The Journal of Hellenic Studies*, Vol. 102 (1982), pp. 60-74. Published by *The Society for the Promotion of Hellenic Studies*.

The Unmoved Mover *qua* No Potentiality of Lambda is not clearly mentioned even once before Alexander. I discuss all of this much more in this Part 2.

Hence, considering, as I already did in my book, the cursory discussion of the Unmoved Mover by Theophrastus in his own *Metaphysics aka On First Principles*, when he rejects the Mover in favor of essentially the same conclusion as the "Not to Fear" Proof, namely, that the universe is necessarily eternal by nature, I continue to affirm that additional proof for Aristotle abandoning the Mover (of No Potentiality) is the lack of *any* sympathy for it on the part of the later Peripatetics until Alexander.¹⁰ The picture obviously changes with the commentator from Aphrodisias, and a second turning point in the history of theology therefore occurs, I maintain, when he *misconstrues* Lambda to be the Stagirite's mature theory and, with inadvertent and ironic support from Plotinus, establishes the tradition that scholars to this day debate, if they are intrigued by Aristotle's "God."¹¹ To reiterate, on my account the best explanation for this whole historical sequence of metaphysical thought is that the Mover was merely Aristotle's early attempt to supplant the theology of Plato (and of Parmenides). The theology was understood by the later Peripatetics "in the know" to have been only Aristotle's youthful position, no more plausible than the "Unmoved Movers" of Anaxagoras and Xenophanes.

III.

By the end of Part 2, the basic arguments for my position will be finished, and readers primarily interested in the history of theology may be satisfied. For those, though, who want more details of the period between Theophrastus and Alexander, and for the viewpoints of others, like Julian and Simplicius, who have also helped determine the modern perception of Aristotle concerning the Unmoved Mover *qua* God, I add Part 3. I finish with an Appendix, tying together, e.g., the "cylindrical helix" of Xenarchus and Aristotle's intuitionist mathematics.

¹⁰ On pp. 300-4, I discuss one of the advantages of my position: It resolves a dilemma that those like Daniel Devereux have had. Devereux and others argue persuasively that Theophrastus' own *Metaphysics* was written early in his career, and they wonder why Aristotle did not handle any of the explicit or implicit criticisms of the Unmoved Mover (Daniel T. Devereux, "The Relationship between Theophrastus' *Metaphysics* and Aristotle's *Metaphysics* Lambda," in *Theophrastean Studies: On Natural Science, Physics and Metaphysics, Ethics, Religion, and Rhetoric, Studies in Classical Humanities*, Vol. III., eds. William W. Fortenbaugh and Robert W. Sharples, New Brunswick, USA, and Oxford, UK: Transaction Books; 1988: pp. 167-9). The Stagirite's reaction, on my interpretation, was to drop the indefensible Unmoved Mover and to evolve to (at least) the conclusion of the "Not to Fear" Proof. Hence, Theophrastus' (and others') criticisms indeed had a very weighty impact on the youthful Stagirite, *assuming* that Aristotle had not already dropped the Mover before Theophrastus wrote his own treatise. However, we should not assume this and, in my mind, Aristotle had probably dropped the Mover by 360-355, and hence Theophrastus was probably referring to long-discarded doctrine.

¹¹ Technically, as Lloyd Gerson explains, the commentary of Lambda is by an "anonymous continuator" because Alexander himself apparently only covers the first five books of the *Metaphysics* ("Plotinus and the rejection of Aristotelian Metaphysics," in Lawrence P. Schrenk, ed., *Aristotle in Late Antiquity*, Washington D.C.: Catholic University Press, 1994, pp. 3-5. Also available at <https://www.ontologymirror.com/theophrastus-metaphysics.htm>; see in addition *Aristotle's "Not to Fear" Proof*, p. 281). In my view, Andronicus of Rhodes is also partially responsible for the tradition that most moderns accept, even though, apparently, he did not comment on the treatise, only ordering the texts. Nevertheless, he contributes to the impression that Lambda is one of the final books of a whole "unit," putting it after, say, Theta, which many including myself consider to be later than Lambda.

PART 1: The First (Relevant) Turn in the History of Theology

Broadie opens her article with a summary of Aristotle's cosmos as related to Lambda. She emphasizes that the Northern Greek's thought is Platonic in crucial ways, and in this manner she sometimes follows Philip Merlan, whom I discuss in detail in both the 4th and 5th digital extensions and who himself also influenced W.K.C. Guthrie, the author of the renowned 6-volume *A History of Greek Philosophy*.¹² I agree with her and Merlan in the following regard: Aristotle is much more Platonic than the stereotype, in which he is the scientific empiricist and his Athenian mentor the abstract, arm-chair idealist, even if I disagree with the two modern scholars on some of the particular ways in which Aristotle keeps Platonism. For instance, Broadie proposes that:

Finally, triumph of triumphs, it [Aristotle's theory of Lambda] supplies what Platonism could not: an obvious, scientifically impeccable, procedure for deciding the number of these *incorporeal substances* and cosmic first causes.¹³

This is one of the most obvious ways in which she follows Merlan, but see my Postscript of the 5th digital extension, in which I argue that the at least 47 *corporeal* unmoved movers also improve upon Platonic ontology and that Aristotle in no way needs, and cannot rely on, *multiple immaterial* ones, because, even in Lambda 8, matter explicitly is the principle of individuation. (The calculations by Aristotle have been interpreted by various scholars as 47, 49 or 55 moving spheres.) Alternatively, to say the least, the Stagirite repeats (at least) 47 times the same mistake from Lambda 6. Moreover, on this topic, James Hankinson implicitly recognizes the question at the core of my concerns, without exploring it in detail. Nevertheless, he implies the absurdity, on the one hand, of the love of intelligent, ensouled spheres for unmoved movers generating a certain type of eternal circular motion (a topic that is never developed by Aristotle or by Hankinson) and, on the other hand, Aristotle expending significant intellectual effort to explain the physical mechanism of the rotations without that love. That is, while examining the very intricate details and problems of the motions of the celestial bodies, noting that the Northern Greek might be following Eudoxus or Callippus (in Lambda 8), and explaining how similar material or form will not seemingly cause different velocities, Hankinson affirms:

Their different particular velocities and directions will then have to be explained by appeal to some further principle; but it is far from clear what that might be, *unless we are to ascribe intelligence, and hence voluntary motion, to the heavenly bodies...but in that case, the whole project of explaining the movements of things in terms of their sheer physical natures seems to be fatally compromised*.¹⁴

"Seems to be fatally compromised" is surely a paradigm of litotes, understatement for the sake of emphasis. What is the use of digging deeply into difficult astronomical theory if the cause of the

¹² W.K.C. Guthrie, *A History of Greek Philosophy* (Cambridge: Cambridge University Press) 1984, first published 1962; note especially Vol. 6, pp. 271-6, where Guthrie discusses Merlan, saying "Since I believe he [Merlan] has provided the solution [to the seeming discrepancy of Lambda 6 with an apparent single Unmoved Mover and Lambda 8 with at least 47 unmoved movers], I cannot do better than indicate the main points" (p. 271).

¹³ Broadie, *op. cit.*, p. 239; my bracketed insertion and italics.

¹⁴ Robert James Hankinson, "Xenarchus, Alexander and Simplicius on Simple Motion, Bodies and Magnitudes," in *Bulletin of the Institute of Classical Studies* 46 (2002-2003): 19-42; p. 31; my italics.

eternal circular motions is *love*? Presumably we would have to investigate what I asked in my book and previous digital extensions: How could *different* spheres have the same love of either the one Unmoved Mover of Lambda 6 or of the associated unmoved movers (following Merlan) of Lambda 8, and why, for example, does that love cause circular motion in a grand "racetrack" rather than twirling in place?¹⁵ When all is said and done, we might as well expect fervent believers of the Bible or of the Koran to explain creation *in great detail as sophisticated Big Bang theory* rather than, in the case of the former, as God, Adam, Eve and the Garden of Eden.

Broadie also avers:

The separate, incorporeal, unmoved mover of the furthest sphere is the supreme god, and the incorporeal unmoved movers of the other spheres are divinities too, being, like the former, eternal blissful sheer activities (p. 240).

If something eternal is "divine" because of its omnitemporality, then the furthest sphere can be, and is, divine in and of itself, with no need for an incorporeal mover to provide the divinity, as we will see later holds for the Northern Greek in *De Caelo*, and seemingly in *De Anima* and in *On Plants*. If, however, being a "god" involves an anthropomorphic type of thinking and if "bliss" presupposes a mind, soul or body that feels emotions, as seems to be always the case for the founder of biology (apart from any questionable passages in the infamous *De Anima* III 4-5¹⁶), then we are saddled with the seemingly insurmountable paradoxes that Broadie begins to recognize at the end of her article without her considering further their untenable ramifications, of which more below. I need not reiterate here the many absurdities already highlighted in my previous publications, resulting, e.g., from the doctrine of the Unmoved Mover having explicitly *no* potentiality in Lambda 6 and yet being nevertheless a living "god" in Lambda 7. "Blissful" activities presuppose life, which itself presupposes matter and therefore potentiality, unless the words are being used in fantastical or extremely unusual ways.

To continue on the theme of divinity for Broadie:

We might expect this theology of incorporeals to demote the eternal corporeal and moving substances to non-divine status: but we would be wrong. Aristotle continues to assume that the heavens are divine (p. 240).

¹⁵ In the *Laws* X 893c, the Athenian remarks that "Some objects are immobile in that their centers stay in the same spot, but they rotate" (transl. Trevor Saunders, in *Plato: Complete Works*, Ed. John Cooper, Assoc. Ed. D.S. Hutchinson, Indianapolis: Hackett Publishing Co., 1997). Aristotle recognizes spinning in place for celestial bodies at *De Caelo* II 8, 290a8ff.

¹⁶ I have suggested in a previous publication that the soul *qua* "mind" in *De Anima* III 4-5, which is completely immaterial, was interpolated by a later editor. I should emphasize now that it might be instead very early Aristotle. In either event, it was not from the period of the later Aristotle who holds both a mature ontology and a much more realistic psychology. Consider Jaeger on the Northern Greek's discussion of soul in the mostly lost *On Philosophy*: "What led him [Aristotle] to inquire into the date of its [Orphism] origin was doubtless *its recent return in a more spiritualized form in Plato's doctrine of the after-life and the soul's progress*" (*op. cit.*, p. 131; my italics). The *early* Stagirite, still greatly under the influence of Plato, may have connected his biology to the corresponding immaterial Unmoved Mover by invoking the doctrine of immaterial minds (which are either equivalent to souls or which presuppose them) in III 4-5. That doctrine is the predecessor of Descartes' (preposterous) theory of the pineal gland, linking the absolutely immaterial soul to the body, in *The Passions of the Soul* (1649).

The last statement is perfectly correct even on my interpretation: The heavens are always "divine" for the Stagirite, just as air was divine for Diogenes of Apollonia.¹⁷ Indeed, because the heavens are divine in and of themselves, they hardly need another divinity to keep them in existence, locomoting. Furthermore, they are "necessary" in the ontological sense. A caution: Because of the confusion over "necessary" (and "possible") in these matters, as demonstrated partially in my previous publications, it is prudent to clarify now even more the modal terms to obviate arguments at cross-purposes, because the (ontological) sense of "necessary" is different from the sense Broadie employs in her article. She uses it as "under all physically possible circumstances" (p. 233), and I use it as "always" or "omnitemporal."

These formulations may seem to be the same but are not, despite both of them arguably stemming from the *fourth* sense of "necessary" that Aristotle lists in *Metaphysics* V 5, which he says is *the source* of the others: "that which cannot be otherwise." In that list of five senses, neither Broadie's sense nor my sense is precisely articulated. However, I have discussed this matter to some extent already, showing how Aristotle seems to have understood the other, ontological sense of "necessary" as he matured, similar to his grasping a fifth sense of the term "unity" after Theophrastus' early work, which, following the Stagirite's own, earlier work, itself only recognized four senses.¹⁸ Some additional comments now vis-à-vis Broadie's sense will be helpful.

Although my own meaning is not *precisely* given as such, it is encapsulated in Aristotle's final comment of V 5, immediately after he presents the five senses. He says there, at the end of the chapter:

"the 'necessary' **in the primary and proper** sense is the *simple*, for it cannot be in more than one condition... Therefore if there are certain things which are **eternal and immutable**, there is nothing in them which is compulsory or which violates their nature."¹⁹

This is the core of *ontological* necessity as "omnitemporality," of a thing or event that is *always* the same (and hence "simple"). That this sixth sense is a later one and was interpolated later, after the first original five senses, is indicated not only by its position in the text but by Aristotle making it now the "primary and proper sense," *notwithstanding the priority he had already given to the fourth sense*.

¹⁷ For detailed insights on "divinity" in *Parts of Animals* and much more, whether in Aristotle or related authors, see David Lefebvre, "Aristote, Théophraste, Straton et la 'philosophie des êtres divins'" in *Réceptions de la Théologie Aristotélicienne: D'Aristote à Michel d'Éphèse*, dirs. F. Baghdassarian et G. Guyomarc'h (Louvain-Neuve: Peeters) 2017: 59-88.

Aristotle's theory of the 5th element, or at least a generic equivalent, as being "divine" was not only imagined and considered by a few philosophers, stemming from the Milesians or other pre-Socratics. In the general culture, it is arguably found even if in mockery in Aristophanes' *Clouds*, where the clouds, not Zeus, are divine and moved by the "whirling aither" (*aitherios dinos*) (l. 380).

¹⁸ As I discuss on pp. 229 and 301-302; cf. also the 4th digital extension (pp. 4-5) and the 5th digital extension (pp. 3 & 21).

¹⁹ 1015b12-16; trans. Hugh Tredennick, *The Metaphysics*, in *Aristotle in Twenty-Three Volumes XVII* (Cambridge, MA: Harvard University Press) 1980; first printed 1933; his italics but my bolding.

To return to Broadie's formulation for "necessary": The temporal scope of her formulation is not clear. Is the scope for "all physically possible circumstances" one minute, a year, a million years, a trillion years or eternity? The duration makes a difference because what is physically possible in one epoch might be very different from another. For example, whether (and how) certain microbes and their carriers, say, caimans and bees, possibly infect dinosaurs in specific ways, or vice-versa, surely was different 300 million years ago from October 15, 2020, when no dinosaurs exist but caimans and bees still do.

Besides, in Broadie's formulation, necessity is explained in terms of possibility, which itself might be thought to be grounded in impossibility, all of which would arguably be in line with the 4th sense: "cannot be otherwise." However, I argue in *Aristotle's "Not to Fear" Proof* (pp. 104-5) that this grounding cannot be the case, and others claim that there is a vicious circularity in the modal terms. To begin with: necessary, possible and impossible have their own negations—necessary/not necessary, possible/not possible and impossible/not impossible—so impossible is *not* based on possible, or vice-versa, at least in any direct way (*On Interpretation* 12, 22a10-12). They may both be "co-rulers" (or better yet, with "necessary," a triumvirate). Furthermore, following Plato's emphasis on eternal truths being primary but not following the doctrine of the Forms or of Ideal Numbers, Aristotle emphasizes that eternal realities and truths take priority (and here "truth" is used strictly, as requiring categorical statements that are the bearers of truth). *Ontological possibilities* (such as "Collisions are possible" and "Expansions of our solar system are possible"), which are *de re* properties that are more fundamental than logical possibilities, are finite, and for Aristotle we cannot create infinities out of finitudes, as Broadie appears to agree, given her emphasis that infinite motion cannot be created out of finite motions (*Physics* VIII). In other words, we must *start* with eternity and extract, as it were, any finitude or "possibility" that we wish to consider, analogous to starting with three-dimensional objects to extract a plane and then a line and then a point (that has location but no magnitude).²⁰ For Aristotle, we cannot proceed in reverse, constructing, for example, a line out of points, because even a vast (or, speaking loosely, infinite) number of "no magnitudes" still results in no magnitude. All of this, *with (ontological) necessity being primary*, breaks any seeming vicious circularity in the modal notions.

Leaving these issues aside, how would Broadie reconcile that possibility is primary, given that Aristotle gives no such indication in the *Prior Analytics* when he states (A.3, 25a37-39) that possibility has three senses: (i) in accord with necessity, (ii) not in accord with necessity, and (iii) potential? Finally, if we use possibility in a merely logical way that has physicality as its domain but that can be fictional (such as "Specialists of Kant can jump over 4-story buildings"), then we

²⁰ See also *De Caelo* II 1 and footnote 11 of the 5th digital extension, for how the infinite and perfect "limit" contains the imperfect temporal finite "cessations." The priority of the infinite has been veiled because of statements that suggest, but which I would argue only suggest, the opposite: The finite is the limit (cf., e.g., *Physics* III 6, 207a24-31). As is commonly known, the Northern Greek often takes different perspectives in examining an issue, and he seemingly arrives then at different results, like the famous blind men touching an elephant at different spots. However, Aristotle is better viewed as jumping from one blind man's perspective to another *and then assembling the results*. For the Stagirite it is the *totality* of the explanations, the "be-causes," as one scholar, maybe Gregory Vlastos, once put it, that give the best understanding of any matter under inquiry.

could never exhaust the full set of Broadie's "**all**...possible circumstances." Someone will always come along with new scenarios, e.g., "Specialists of Kant can jump over 5-story buildings, over 6-story buildings..." In brief, we cannot ground necessity on that which could never be satisfied, be it possibility *or* impossibility. So many impossible things or events could be formulated that we would never be able to articulate them *all*, rendering vacuous any modal term dependent on impossibility (or possibility). Generally, ontology is more fundamental than logic, and in my own work I rely on Broadie's similar commitments in this regard. Logic requires propositions, which requires thinkers who propose the thoughts that are the subject of logic and of *de dictum* necessity. Another way in which Aristotle emphasizes this is when he discusses motion, time and the soul and says, analogously:

...if there cannot be some one to count there cannot be anything that can be counted either, so that evidently there cannot be number; for number is either what *has been*, or what *can be* counted.²¹

Thus, if there is no thinker to formulate, e.g., a syllogism, there is no logical necessity. Robert Wisnovsky is one of the very few, if not the only one, to my knowledge who has recognized at least the basics of Aristotle's "triangular model" of the modals in the theological context, howsoever Wisnovsky applies the model. In his chapter "Necessity and Possibility (A): Materials from the Arabic Aristotle," and while discussing the Northern Greek's *On Interpretation*, he writes:

...Aristotle has to decide...whether the contradictory of "Rob is white" is "Rob is non-white" or "Rob is not white." Then Aristotle has to decide what happens if he tosses in adverbs or adjectives that in some way qualify the proposition, **such as the temporal operators "always", "sometimes" or "never"; and their parallel modal operators "necessary", "possible", and "impossible."**²²

Clearly, "necessary" is aligned with "always," and "sometimes" with "possible." However, in developing his chapter, Wisnovsky leaves aside the ramifications of the passages on negation (e.g., "possible/not possible" and "impossible/not impossible") and the three senses of "possibility" that I explain in, for instance, my 4th digital extension (pp. 1-4). Wisnovsky also seemingly accepts Akrill's view that Aristotle gave up the triangular model (in which "possibility" is "two-sided" because it is opposed to *both* "necessity" and "impossibility") in favor of the kind of "possibility" that is opposed only to "impossibility," the so-called "one-sided" view (p. 215). My different emphasis on the two-sided temporal-ontological sense of the modals as compared to Wisnovsky's ultimate emphasis on their logical sense leads us to different conclusions, and whether Akrill's view is only relevant to *de dictum* logic or to *de re* domains, including ontology and the real world that is often, *but not always*, the subject of logical deductions, is a question I leave for the future or for others. Suffice it to emphasize here that *the ontological senses of the modals involve time*, a topic I have already developed previously.

²¹ *Physics* IV 14, 223a22-25; my italics; transl. by R.P. Hardie and R.K. Gaye, in *The Complete Works of Aristotle*, ed. J. Barnes, *op. cit.*; my italics. Unless stated, all translations of the *Physics* are theirs.

²² Robert Wisnovsky, *Avicenna's Metaphysics in Context* (Ithaca: Cornell University Press) 2003, p. 213; my emphases.

Let us complete the examination of the Stagirite's alleged Platonism for this digital extension, as promulgated by Broadie.²³ She astutely perceives that Aristotle:

...may have seen the theory of Ideas, too, not merely as a mistake and an obstacle to philosophical progress, but as *foreshadowing the as yet undiscovered true theory of absolutely changeless causes.*

In short, it is reasonable to assume on more than one ground that a certain hospitality towards admitting absolutely changeless causes (since in relation to changeable things they could only be causes, not also effects) helped to shape Aristotle's argumentation in this area.²⁴

Broadie here reveals yet again her sympathy with Merlan but in my view provides, apart from the correct priority of eternal realities and truths even for the Stagirite, more evidence that "*absolutely changeless causes*" were part of the Northern Greek's *early* professional thought. The reason is that the material outer spheres and *aither* of his late doctrine are allowed one change, as given explicitly in Theta 8: to move eternally on the same path. However, that (one) motion is *unvarying* and thus, in a sense, also changeless. As I have put it, the outer (material) spheres *function* like the Forms, which is why the Stagirite also says in *Metaphysics* XI 7, as we saw at the very top of this article, that the heavenly bodies, which we know for Aristotle move always in the same way, are in the "same state and suffer no change (*metabolēn*)." They could not be *absolutely* changeless in any and *all* respects because then they could not move. Aristotle must mean that their crucial *movement*, too, is always consistent and, *as movement*, unvarying and changeless (both in direction and speed). Philoponus seems to have recognized this or something almost identical. According to Hankinson: "Philoponus was to argue that...the *motions* of the heavenly bodies *manifested rest, in the sense of constancy*..."²⁵

²³ Broadie imbues Aristotle's doctrine with other aspects of Platonism that I do not see, but the details are too extensive to cover here. For example, she focusses on goodness and on whether and how we imitate the Unmoved Mover *qua* "God," also a very Platonic concern, but I have already dealt amply with this matter and its stunning paradoxes (e.g., again, how something, the *Unmoved Mover*, with absolutely no potential, could have a mind or life and why we and the planets do not want to always be at *rest*, if imitation is important). I emphasize that these Platonic influences, *about which Broadie may be perfectly correct*, show the youthfulness of Lambda. Indeed, in *Timaeus* 34b, the perfect spheres move in a circle in a "world" with a soul, easily presaging the theory in Lambda: Like (intellectual) father, like (intellectual) son, at least before the son moves out, takes his own residence, and develops his own views and identity.

²⁴ Broadie, *op. cit.*, p. 237; my italics.

²⁵ Hankinson, *op. cit.* p. 34, ft. 51; my italics. Hankinson might say that I am twisting Philoponus' and his own ideas, for the following reasons. First, some background: Hankinson, like Broadie, analyzes motion, that is, movement (and by implication self-movement), as a kind of process or "coming-to-be," and, like Broadie, adds that for the Stagirite motion (*kinēsis*) "is a process, something which is potentially completable" *but not fully completed*. Hankinson then adds:

...in the case of the terrestrial elements, their motions are not of uniform velocity, since they gather speed as they approach their proper (i.e., their natural...) places (*Cael.* 1.8, 277a27-33;...): so there is another sense in which different segments of their motions are non-uniform. *The circular motions of the heavenly bodies, on the other hand, are uniform in velocity* (*Cael.* 2.6; *Phys.* 8.10, 267a21-b9; *pace Xenarchus*...); and *in this sense* they are not motions, *kinēseis*, at all, but rather states of actuality (*energeiai*, or *entelecheiai*). [To this paragraph, Hankinson adds a footnote, the aforementioned statement:]. Philoponus was to argue that in this sense the motions of the heavenly bodies manifested rest, in the

We can now focus on the crucial topic that Broadie examines: *Why* Aristotle requires that the first movers be not only unmoved *but without matter or potentiality*,—that is, why the first movers are incorporeal. "Incorporeal" is, however, perhaps a misleading word. Air, radiation or heat is not "corporeal" in the English sense, so it is better in my opinion to say "non-physical," and best to say "without any potential whatsoever," but we can assume that Broadie conveys all of this with "incorporeal."

As I understand her explanation, the crux of the issues for the Northern Greek can be encapsulated as follows:

1. There must be a first cause of eternal movement.
2. Eternal spheres (substances like stars, planets, the sun or the *aither* as the revolving outer heaven) cannot be self-moved.
3. The outer spheres cannot be moved by the inner spheres.
4. Any and all *material* causes of the motion of the outer spheres, having matter and potential themselves, might not exist (with "might" being equivalent to "potentially" or its synonym in this context, "possibly").
5. Thus, the first cause (of the eternal motion) must be incorporeal.
6. Finite things or events cannot cause infinite motion.
7. Therefore, the first incorporeal cause, the Unmoved Mover, must be infinite also.

sense of constancy: *in Phys.* 198, 22ff; *in de An.* 75, 11ff... (Hankinson, *op. cit.*, p. 34; my italics).

There are a number of ways to reconcile the dilemma of how for Aristotle eternal planets are "states of actuality" and *not* in motion, leaving aside that Hankinson himself had just said that the "circular motions...are uniform in velocity." *Kinēsis* is an ambiguous term and can be used in different ways, depending on the context. One is "bodily movement," as given in *Dramatics aka Poetics* 26.1461b31, following Plato's own similar usage in *Laws* II 665a. In the *Categories* 15a12-13, the Northern Greek also says "There are six kinds of change (*kinēseōs*): generation, destruction, increase, diminution, alteration, *change of place*" (transl. J.L. Ackrill, *The Complete Works of Aristotle*, ed. J. Barnes, *op. cit.*; my italics). "...[M]otion (*kinēseōs*) in its most general and proper sense is change of place, which we call 'locomotion'" (*Physics* IV 1, 208a31-33). I trust, then, that in any relevant debate this final sense should be accorded preference, *ceteris paribus*. This takes us to my final comment.

With respect to Hankinson's topic, Aristotle may be trying to evade the dilemma that if something is eternally changing location it is only "actual" but not in motion; in other words, any sense (or meaning) of motion that entails only "coming-to-be" will lead to a contradiction when applied to something eternally moving (because something eternal cannot "come-to-be"). There are various options, then, for resolving this dilemma of the traversal of the heavenly bodies not being in motion, whether by distinguishing *general* eternal motion from a specific, "abstracted" finite part of the eternal motion or taking up different senses of "motion." At the worst, we have to say that Aristotle eventually came to accept that motion and full actuality are compatible in some cases or with some senses of the words, as in the *Categories*, because in Theta 8, 1450b23-28, *kinēsis* is used repeatedly as "motion" for the eternal heavenly spheres, with Aristotle also according *energeia* to them. Also, at *Meteorology* I 2, the Stagirite categorically asserts:

This world necessarily has a certain continuity with the upper motions; consequently all its power is derived from them. (For the originating principle of all motion must be deemed the first cause. Besides, that element is eternal and its motion (*kinēseōs*) has no limit in space, but is always complete (*en telei*)..." (338b20-25; transl. E.W. Webster, in *The Complete Works of Aristotle*, ed. Jonathan Barnes, *op. cit.*).

Suffice it to say now that howsoever Philoponus construed *kinēsis* and *energeia* for Aristotle, the Christian considered the constant traversal of the moving planets (and not just the planets themselves) as being *equivalent* to "at rest" or "unchanging," which is the thrust of my own point.

Statement (1) is clearly false if it suggests a first, temporal *efficient* cause. The past, and motion to the past, is unquestionably infinite for the Northern Greek. (1) can only be true in the sense I have explained or in an equivalent manner: first "in comprehension." (3) and (6) are undoubtedly true for Aristotle, and Broadie cites some of the supporting passages. (4) is ambiguous and (2) is false; hence (5) and (7) do not follow for the (mature) Stagirite. I now examine (2) in detail, which allows us to see how (4) could be true or false for him depending on how it is interpreted: In Lambda 6 this statement is considered true, but in Theta 8 false.

Regarding (2): According to Broadie, the *Physics* provides the defense for (eternal) self-motion being *impossible*. I reproduce her crucial passages now. She offers the Northern Greek's basic reasons, then an objection and finally a more sophisticated vindication for the Prime/Unmoved Mover needing to be incorporeal.

In the cosmology described..., the celestial spheres are alive and in movement. It is natural to say, without further analysis, that they move themselves. However, at some point Aristotle looked critically at the notion of self-movement, and concluded that, strictly, the phrase is incoherent. *In fact, every so-called self-mover comprises one element that is subject of the movement and one that is its source, and these are necessarily distinct.* From this Aristotle builds his famous general doctrine that every causal series of movements begins with an unmoved, motionless, first mover (*Phys* VIII.5 257a32ff; see also 256b13–257a31). This enables him to argue that a necessarily eternal movement must have a necessarily eternal first mover *immutable in all respects*. Since we know that there is necessarily eternal movement, we now know that there exists a kind of cause or principle that is *absolutely changeless*. *Such a being is not perceptible*, because only physical objects are perceptible, and nothing is a physical object that is *completely immune to change*.²⁶

...How exactly does Aristotle get to the general doctrine that every causal series of movements begins with an unmoved, motionless, first mover? His assumptions are (A1) that everything in movement is moved by something, either itself or something else (*Phys* VIII.4–5 256b3), and (A2) that every causal series of movements begins from a first mover (*Phys* VIII.5 256a21–9). Hence every such series begins from a self-mover. The next block of argument shows that "self-mover" necessarily stands for something complex: nothing can move precisely itself. Therefore the mover-element in a self mover cannot, as such, be moved at all: not by anything else, and not by itself. *Aristotle takes this as meaning that the first mover of a series is motionless, without movement*.²⁷

...But what he never considers is that something might just be in movement without being moved by anything, whether itself or something else. *It would be unmoved in the sense of not being moved by anything, yet it would be not at all motionless*.²⁸ If this is a coherent description, and Aristotle says nothing to show otherwise, then why not apply it to the heavens in their eternal and unimpedible rotations? *That would be to treat the motion of the heavens as metaphysically*

²⁶ Broadie, *op. cit.*, p. 237; my italics.

²⁷ *Ibid.*, p. 238; my italics.

²⁸ This is consistent with my position.

primitive.²⁹ If the heavens are not moved by anything, they are not moved by motionless first movers. Nor are they self-movers in the loose sense. (Does this spell death to the idea that the heavens are animate? Not necessarily. The idea would be endangered if we insisted that the soul of an animate being is what moves the body, for if, as we are supposing, the celestial spheres just move, then they are not moved by any souls. *However, it may be possible to think of the spheres' rotations as expressing their souls without thereby thinking of them as due to mover-souls.* The case is not closed.)³⁰

...**Why does Aristotle find literal self-movement impossible?** His reasons are crabbed in the extreme, but the spirit of them is important as it sheds

²⁹ "Metaphysically primitive" is as apt a phrase as one could coin, in my estimation. Berryman, in private correspondence, wondered, then, why I do not "address the argument at the very end of *Phys.* 8.1, where Democritus' treatment of atomic motion as explanatory primitive is rejected." I repair that gap now, even though part of the reason has already been given in my book (which she had not been able to read), in the section on "eternal accidents." The Stagirite writes in 8.1:

Nor yet (to take a more general ground) is it sound reasoning to conclude that you have reached a fundamental principle *when you have shown that this or that always is, or always occurs, thus and no otherwise.* Democritus, it is true, held it to be enough for the establishing of determining principles to have shown that this or that has been so in all former times, *and did not feel bound to seek any deeper principle behind what has always been.* But this took him right in certain cases only, and not in all. For instance the angles of a triangle are always equal to two right angles, *but a reason can be assigned for the eternity of this property that lies behind the fact itself.* But a *first* principle can have *no such other cause behind it*, since principles are eternal on their own merits. Let this suffice to demonstrate that there never was nor will be a time when movement (*kinēsis*) was not or will not be (252a33-b7; my italics; transl. by P.H. Wicksteed and F.M. Cornford, *Aristotle Physics: Books V-VIII*, Cambridge, MA: Harvard University Press, 1995, first printed 1934).

As I discuss (pp. 198-199), Aristotle uses here exactly the same example, angles of a triangle always being equal to the sum of two right angles, that he uses in his explanation of "eternal accidents" in the *Metaphysics*. Suffice it now to repeat what Aristotle says there, with a few remarks. After noting that "accident" means something like chance, not happening necessarily or usually, he adds:

"Accident" has also *another sense*, namely, whatever belongs to each thing in virtue of itself, *but is not in its essence*; e.g., as having the sum of its angles equal to two right angles belongs to the triangle. *Accidents of this kind may be eternal, but none of the former kind can be* (*Metaphysics* V 30, 1025a30-34; my italics).

The Stagirite's point regarding Democritus is two-fold: a triangle having 180 degrees is eternal, but it is an eternal *accident*, not an *essential* property, and *a fortiori* not a *fundamental* principle, even if eternal. It is derivable (necessarily) from the essence of triangle as "3-sided geometrical figure." Hence, there are a number of principles in physics, but just because they apply eternally, does not make them all *fundamental*. After criticizing the principles of his predecessors and whether there are one, two or three, Aristotle gives a lengthy account of his own fundamental principles in *Physics* I 7-9. Arguably, other principles later in the *Physics* also count as fundamental given that Aristotle shows "nature" to be equivocal. In short, there can be a number of principles that are fundamental or "primitive," and whether all fundamental ones are primary in the same way, and whether some are first among the *fundamental group* of principles, is an interesting question but one that cannot be answered here, with my limitations of space and goals.

In any event, as seen more below, at least from one perspective, *the* principle of nature is motion for Aristotle, and, as he says, to understand nature one must understand motion. Thus, if motion is *essential* to nature, arguably it is a fundamental principle. If derived from nature's essence, as 180 degrees is derived from the essence of a triangle, then it is a principle *qua* "eternal accident," and perhaps I then need to qualify "metaphysically primitive" as being a loose expression (referring to a *group* of important, fundamental primitives). Jaeger discusses a passage that pertains to this issue, but the manuscripts have different readings (Jaeger, *op. cit.*, 365).

³⁰ Broadie, *op. cit.*, p. 238; my italics.

light on his refusal, or inability, to consider that something might be in movement yet not *moved* by anything. Aristotle understands movement or change in general as "imperfect (or: incomplete) activity (or: fulfilment, or: realization)." The subject of change S lacks a certain perfect or complete activity, say of that of being in the state F, and the change, i.e. S's becoming F, is the activity of the potential of S, when not-F, for being F; on the other hand, the agent or mover of this change is somehow already in possession of the complete activity of being F. **The mover must differ from the subject or it would be both F and not-F. The crucial point is the connection between change of whatever kind and incompleteness.**

We may think we can frame the concept of a kind of physical substance that *just is* in movement, eternally and necessarily (and even animatedly), without any mover. But from Aristotle's standpoint, this would be incoherent. To fit the description, the substance must have **complete autonomy** over its activity, so that the activity, i.e. **its movement, is completely unconditioned by any independent circumstance or origin.** But how could a substance that **essentially** expresses its nature through movement, which is **incomplete activity**, be complete enough to enjoy such perfect autonomy over what it does? **To give this its cosmological application: either the rotation of the heavens is not to be considered an incomplete activity, in which case we get the absurdity that it is not really a movement at all; or the rotation depends on a mover, and therefore on a first mover that will be non-physical.**³¹

I address the crucial points related to Aristotle finding "literal self-movement impossible" and to Broadie's admission that Aristotle's reasons are "crabbed in the extreme." Examining rigorously each and every one of her points and implications might swell this article to twice its length, and I therefore assign to a footnote some of the other, minor matters. My primary goal is simply to show that self-movement without a first *incorporeal* mover for Aristotle is indeed possible on his theory, even though the relevant (eternal) "self-movement" may be more along the line of Thales' magnet being able to move (having a "magnet-soul") or of elements like fire "moving themselves" (even without a "soul") than along the line of a living creature, which can move in a great variety of ways.

Some preliminary remarks are necessary, in part because I am not sure how Broadie is using "motion" or "movement" in all of her pages and because of the richness of the term "motion" for the Northern Greek. I assume the two terms are synonymous in this context but motion, including self-motion, is a topic that is as vast as "nature" (*phusis*) and thus as the *Physics* and very ambiguous. The topic stems in part from the Stagirite paying homage in *Physics* I 2 to those like Heraclitus, who felt that all things were in flux (in contrast to Parmenides and Melissus), and stating that "this...is one account of nature, namely, that it is the primary underlying matter of things which have in themselves a principle of motion or change (*kinēseōs kai metabolēs*)." ³² The Northern Greek emphasizes motion at the beginning of Book III 1, indicating that "...nature is a principle of motion and change (*kinēseōs kai metabolēs*), and it is the subject of our inquiry. We must therefore see that we understand what motion is" (200b12-15), and as he begins to analyze

³¹ *Ibid.*, pp. 238-9; Broadie's italics, but my bolding.

³² II 1, 193a28-29; my italics.

the terms "motion" and "change," he adds "*there are as many types of motion or change as there are of being*" (201a8-9). Aristotle then gives a general formula: "the *fulfilment of what is potentially, as such, is motion...what motion is, is clear from what follows: when what is buildable, in so far as we call it such, is in fulfilment, it is being built, and that is building. Similarly with learning, doctoring, rolling, jumping, ripening, aging*".³³ He explains further:

...motion occurs just when the fulfilment itself occurs, and **neither before nor after. For each thing is capable of being at one time actual, at another not.** Take for instance the buildable: **the actuality of the buildable as buildable is the process** of building. For the actuality must be either this [the process *qua* action] or the house [that is, "building" not as a verb but as a noun]. But when there is a house, the **buildable** is no longer there. On the other hand, it is the buildable which is *being* built. Necessarily, then, the **actuality** [of the motion, not the product] is the **process** of building...³⁴

Motion *qua* locomotion is only one form of "movement and change" (and perhaps the *kai* should be often translated as "that is," conveying that Aristotle associates the two terms that are frequently, and seemingly unnecessarily, paired together³⁵). Nevertheless, motion (*qua* locomotion) is the primary form (*Physics* VIII 7, 261a27-28). It is the form we are concerned with here, and, again, "coming-to-be and passing away" are other forms of change, as is alteration.

What needs underscoring now is that the motion (or the "process" of change) for which Aristotle has given a formula pertains to *finite* things or actions: events like building (or animals aging) that are, as we just saw him saying, "*capable of being at one time **actual**, at another **not***." Therefore, the formula he gives is not applicable to ontological necessities like eternal motion of an outer sphere that itself is locomoting always exactly the same, changelessly, because such a thing is not capable of being *actual* at one time and another *not*. Being eternal, it has no capability of being the opposite (recall the ontological necessity of *Metaphysics* V 5). Since this unchanging eternal motion is therefore not a process leading to some finite end or goal, like building or doctoring, the eternal locomotion cannot be "motion" *in the current sense* or else the formulation of motion *qua* change is faulty (or, again, implicitly restricted to finite actions). To underscore, as I have explained with respect to Theta 8 previously and as we see more below, *eternal motion has no potential*, so any formulation of motion or change in terms of potentiality will automatically rule out eternal motion, an oddity if there ever was one (pun definitely intended), given the number of times Aristotle says throughout his corpus that the eternal heavens move.

As I have emphasized repeatedly, Aristotle holds the Principle of Plenitude *for eternal things*: "what may be, is." That is, the relevant capability and existence collapse into each other, because the eternal nature is one *and unchangeable*. In virtue of the association of omnitemporality with (ontological) necessity, the existence (and hence in a way the capability) is necessary also. Whether Aristotle recognized this while writing the early chapters of the *Physics* or only after-

³³ 201a11-19; my italics.

³⁴ 201b6-14; italics by Hardie & Gaye but my bolding, bold-italics and inserted comments.

³⁵ The Northern Greek says that we "need not distinguish between movement and change" at *Physics* IV 10, 218b19-20, and my impression is that often for him movement or motion, like alteration, is simply a subcategory of change in general.

wards, or while writing their first versions, and whether he presupposes the scope of "motion and change" (or "motion, that is, change") to *finite* things or events, including "processes," I cannot easily determine and need not determine. Suffice it to say that, at worst, he had to modify his doctrine of the aforementioned passages as he got older; otherwise, he would, and could, never say that the eternal outer spheres are in motion. One option, as Hankinson suggests (see footnote 25), is that he calls the motion of the eternal outer spheres "actuality" (*energeia*) rather than motion (*kinēsis*), but I have already noted that, in Theta 8, Aristotle recognizes that an eternal sphere can have both.³⁶ The outer spheres eternally locomote despite them neither, e.g., "coming to be" nor altering in the strict sense of those terms.

I can now address Broadie's final dilemma and show that neither horn of the dilemma is dangerous to the conclusion of the "Not to Fear" Proof. Again, the dilemma is: "To give this [namely, movement considered as 'incomplete activity'] its cosmological application: *either* the rotation of the heavens is not to be considered an incomplete activity, in which case we get the absurdity that it is not really a movement at all; *or* the rotation depends on a mover, and therefore on a first mover that will be non-physical."

Regarding the first horn: The previous analysis reveals that the identification of "incomplete activity" with motion does not apply when eternally moving spheres are in scope. Thus, we should not, in Broadie's words, be providing a "cosmological application." We can only apply the principle of motion as "incomplete processes" to *finite* ones like the aging of animals or the building of houses *or to finite subsections of eternal motion*. Optionally, we can appeal to different senses of motion, e.g., "change of place," which *can* be a "complete activity" considered as a whole (that *finishes exactly when* the building built or when we address a finite segment of the eternal motion, such as when a location has been changed).

Normally, in evading a dilemma, we need grapple successfully only with one horn. Yet in this case, we can grapple for good measure with the second horn, too, namely, that rotation depending on a mover must be non-physical. Broadie defends this horn by stressing that, for instance, "The mover must differ from the subject or it would be both F and not-F." This is similar to the doctrine that Hankinson presents and that I address in footnote 25. However, Hankinson's concerns are not identical to Broadie's and an additional reply is necessary: The mover differing from the subject would only be a problem if the subject is F and not-F *at the same time and in the same respect*. Aristotle's position in this regard in the *Physics* does not appear to be fixed doctrine, and he sometimes makes "fresh starts," as if he himself is not convinced the matter is settled (e.g., VIII 5, 257a31ff; VIII 7, 260a20ff). Moreover, he refers at least four times in the *Physics* to his "course on the *Physics*" (VIII 1, 251a9; VIII 3, 253b8; VIII 5, 257b1 and VIII 10, 267b20), as if the texts

³⁶ I should add that in my book I discuss in detail Stephen Makin's typically excellent examination of Theta (*Aristotle Metaphysics Book Theta*, translated with an Introduction and Commentary, Oxford: Clarendon Press, 2006) and his recognizing that the model of potentiality and necessity in Chapter 8 is different from the previous models in Theta, including the model that Hankinson seemingly at least presupposes in his own discussion of Theta 6. Makin is the only one to my knowledge who recognizes this difference in models, but he does not leverage his insight with respect to, say, the context of Lambda 6.

were written at different times and combined, of which more below.³⁷ The impossibility of an eternal self-mover seems more like a puzzle that he is resolving, and perhaps the most telling evidence is his example of a man hitting a stone with a stick. Aristotle expounds on the stickholder, who is obviously enmattered, saying indubitably he is an unmoved *and* first mover:

...either the mover immediately precedes the last thing in the series, or there may be one or more intermediate links: e.g. the stick moves (*kinei*) the stone and is moved by the hand, which again is moved by the man; in the man, however, *we have reached a mover that is not so in virtue of being moved (kineisthai) by something else*. Now we say that the thing is moved by the last and by the first of the movers, *but more strictly by the first*, since the first moves the last, whereas the last does not move the first, and the first will move the thing without the last, but the last will not move it without the first: e.g. the stick will not move anything unless it is itself moved *by the man*.³⁸

To emphasize, the man *qua* stickholder (rather than his hand or the stick) is the first *and* unmoved mover, and in other circumstances we might argue that it is his thought or desire to hit the stick that is primary. All of these options, though, are first *in comprehension* because no one would dare argue that for Aristotle the man, thoughts or desires lacked antecedent causes or movements. In *this* sense, the man is "unmoved" and is "first," and here the substance, the man himself, is *both* mover and subject, contrary to the arguments that Broadie advances (at least if we consider his hand to be part of the "subject").

Were an eternal sensible substance similar to the stickholder, nothing implausible on the surface results from it being an eternal self-mover, and indeed the planets and *aither* could be like that. They move like the man, although of course they do not have legs,—but then neither do fish. The hand and stick are analogous to the inner spheres and elements, which the outer spheres move, and the inner spheres and sun move substances like plants and animals and thus sometimes, in a happy coincidence of explanations, stones. We might have to engage in a long analysis of any objection that an eternal sphere is not like a finite man and that the issues of self-movement in the former case are much different. That is, some of the related discussion, especially of *Physics* VIII, is very complex, or as Broadie says, "crabbed in the extreme," but I have already showed in the previous, 5th digital extension (pp. 9-16) some of the evidence for books or chapters of the whole treatise being written at different times.³⁹ My conclusion is that if the "cosmological application" of *the stickholder* does *not* apply to eternal things, then Aristotle modified his doctrine as he matured; otherwise, the first and unmoved *eternal* mover, the outermost sphere, can be similarly enmattered, *but with a special, appropriate matter*. Additional reasons are forthcoming, when we examine the option of the heavenly spheres being a fifth element, because

³⁷ Even if one asserts that the Greek at the relevant spots merely is meant to convey "earlier in the *Physics*" or "in the first part of the *Physics*," it is still peculiar that Aristotle uses this formulation because in other treatises he does not give a title when he refers to something already discussed in the same work. He will simply say "as I said," or the like. When he refers to an external, different treatise, he furnishes a "title," like in *Politics* VIII 7, when he mentions an explanation of *katharsis* in a *peri poiētikēs* (although that explanation does not exist in the extant text).

³⁸ *Physics* VIII 5, 256a6-13; my emphases.

³⁹ Jaeger, *op. cit.*, also demonstrates that not only the *Physics* but the *Metaphysics* and *De Caelo* are assemblages of texts from different periods, sometimes with interpolations.

that element is "unmoved" in the same way that the stick-holding man is but yet obviously is corporeal.

Related to the issues in the *Physics* is István Bodnár's examination of the later commentators and their discrepancies relative to Eudemus of Rhodes (not the Eudemus of Cyprus from Aristotle's earlier days at the Academy).⁴⁰ Eudemus himself wrote on, and allegedly elucidated, Aristotle's *Physics* (or at least some of the books, with, e.g., Book VII apparently being not in the Stagirite's "course on physics").⁴¹ The arguments in my publications, especially in Part 2 of the book and those relative to Merlan in the digital extensions, reveal how I disagree with Bodnár, insofar as he suggests that for Aristotle the prime unmoved movers are necessarily *pure intellect or pure soul*, without any potentiality and matter. To emphasize only one claim, all of *Physics* VIII 6, including the primary passage that Bodnár examines in comparison with and contrast to Lambda 8, can apply to unmoved movers that are the eternal analog of the enmattered man with the stick hitting a stone. As just explained, the man is "first and unmoved," because "first" is *from the standpoint of knowledge* and "unmoved" is also from the standpoint of knowledge or from the standpoint of not being moved by anything else (similar to what Broadie said). The first and unmoved movers in the celestial sphere could be the fifth elemental (outermost) sphere, even in VIII 6 and even if Aristotle had written that chapter before he arrives at his final ontological position. Finally, Bodnár does not consider that Eudemus, like Theophrastus in his own way in the *Metaphysics*, could have written his commentary much earlier than is often suggested (and, again, here I follow those like Devereux). In any event, Bodnár states at the end of his article: "After the evaluation of the testimony about Eudemus' doctrine concerning the unmoved prime movers, it should be stated that *all these testimonies testify to the fact that Eudemus upheld Aristotle's doctrine of prime movers.*"⁴² This, and almost all of Bodnár's examination, could therefore still be true were Aristotle to have dropped the *singular* Unmoved Mover of Pure Actuality and were Eudemus elucidating the spheres *qua* instances of the "fifth element."

To emphasize, the evidence shows that Aristotle himself combined texts in the *Physics* from different periods or that someone, somehow, patched texts together and, moreover, that the first and last sentences of VIII 10, which inject out of the blue that a first mover has to be indivisible, without parts and without magnitude (267b18-26), are themselves suspicious. The patchwork is indirect evidence that someone may have tried to make the chapters consistent, perhaps after the texts were hastily repaired by Apellicon's agents because of the damage at Scepsis, filling in sentences that, when examined carefully, stand out like bad counterfeit currency. Yet, even that option is not crucial for my position, because, granting that the *Physics* is pristine and absolutely authentic, Aristotle could have evolved to a theory that is both more sophisticated *and more sensible*.

⁴⁰ István Bodnár, "Eudemus' Unmoved Movers: Fragments 121-123b Wehrli," in *Eudemus of Rhodes*, eds. István Bodnár and William W. Fortenbaugh (New Brunswick, USA, and London, UK: Transaction Publishers) 2002: 171-189.

⁴¹ *Ibid.*, p. 186, ft. 17. This is just one piece of evidence that the *Physics* was not one, static text, and Jaeger notes that *Physics* VII "is known to have taken shape during or soon after Aristotle's time at the Academy" (Jaeger, *op. cit.*, p. 44).

⁴² *Ibid.*, pp. 187-8; my italics. For more on Eudemus in this context, see Jaeger, *op. cit.*, pp. 365-7.

In other words, given what Broadie herself exposes regarding Aristotle's seeming development, as I discuss below, I grant for the sake of argument that Aristotle *may* have held the position that eternal *incorporeal* unmoved movers were needed for him when he first wrote the *Physics*. However, I contend that he moved away from that position, just as he moved away from the Unmoved Mover of Lambda, whatever the relation of the *Physics* and the *Metaphysics*, especially Lambda. In my mind, both treatises could have been modified over many years, like a series of course notes, and, again, recall the times that the Northern Greek refers to his "course on the physics" throughout the *Physics* itself.⁴³ In that case, I grant that I cannot establish a consistent theory in which the first *movers* of the eternal spheres are *always* for him both enmattered and first *only in comprehension*. Yet all of that would be to Aristotle's detriment, with him, as a relative "beginner," not having a sustainable celestial ontology for his time.⁴⁴

⁴³ Jaeger emphasizes that the Aristotelian treatises at least in part were used for teaching and thus were revised over long periods of time. Similarly, it is a platitude for commentators to say that the *Dramatics*, which Jaeger almost completely ignores, is a series of lecture notes, even when there is no explicit statement in the corpus of a *course* on dramatic theory. It is possible that parts of the various treatises we have were lecture notes and were combined with other non-lecture notes that had been composed for *esoteric* use (that is, internal "publication," the target being those in the Lyceum, including anticipated later generations of students and teachers). As alluded to, with very good reasons based on style and other considerations, Jaeger considers Lambda (except for Lambda 8) to be a lecture-sketch; Lambda 8 and some other parts of the *Metaphysics* are clearly different, for (esoteric) use.

⁴⁴ Let us examine some remaining points of Broadie's passage, which function as some of the premises for her dilemma. Again, she writes:

We may think we can frame the concept of a kind of physical substance that *just is* in movement, eternally and necessarily (and even animatedly), without any mover. But from Aristotle's standpoint, this would be incoherent. To fit the description, the substance must have **complete autonomy** over its activity, so that the activity, i.e. **its movement, is completely unconditioned by any independent circumstance or origin**. But how could a substance that **essentially** expresses its nature through movement, which is incomplete activity, be complete enough to enjoy such perfect autonomy over what it does?

"Complete (or perfect) autonomy" is a questionable criterion in my view, one reason being that Broadie has already stressed that the inner spheres do not affect the outer. Why, then, do the eternal outer spheres not have the requisite autonomy and why are they not "completely unconditioned by any independent circumstance or origin"? Their origin is irrelevant because they have no beginning; they are eternal. In brief, their own nature entails that they have no dependence on anything else, as, e.g., the end of *Metaphysics* V 5 indicates, which gives the ontological sense of necessity and of simple, unchanging eternal things (and here the "thing" may be the "*eternally rotating planet*" and not just "planet").

In addition, regarding a substance *essentially* expressing its nature through movement *qua* incomplete activity: I have already discussed whether an eternal substance like an outer sphere has motion as part of its *essence* or as a necessary entailment, an "eternal accident," in footnote 29 and in pp. 197-200, and I simply add the following to break Broadie's equivalence of movement with *incomplete* activity. However, this may not be her problem but Aristotle's, and she may be inadvertently pinpointing a paradox with Aristotle's conception of *kinēsis* as "fulfilment of the potential *qua* potential" as he presents it early in the *Physics*. I mentioned this problem before but enhance it now. In III 1, 201a11-12, motion (*kinēsis*) is the actualizing (*entelecheia*) of the potential (*dunamei*) as such," but, in VIII 1, 251a8-9, "motion (*kinēsin*)... is the actuality (*entelecheia*) of the *movable* (*kinētou*) in so far as it is *movable* (*kinēton*)." In both cases the contrast seems to be between the actualizing process that has an end or product and the resultant product. Nevertheless, there is a difference between the two "definitions" of motion.

First, it is clear that Aristotle has no qualms about using the term *kinēsis* for eternal motion, despite there being no end or product. As he states, "motion (*kinēsis*) is eternal (*aidios*) and cannot have existed at one time and not at another: in fact, such a view can hardly be described as anything else than fantastic" (VIII 1, 251a9-10). Second, whatever the ramifications of Aristotle's change in definition, it is apparent

We can now examine the only major problem in this context, ascertaining whether for Aristotle the outer spheres are self-movers *qua* animate movers or, instead, "elemental movers," because the final option, that they move like plants, seems implausible. That is, there are three ways of self-moving for the Northern Greek:

- (i) animals move in any number of ways permitted by their natures, including stopping and reversing course; causing themselves on occasion to perish if they have the capability for suicide; etc.;
- (ii) elements move in accordance with their own nature, but they have no soul and, e.g., cannot choose to reverse courses against their natural movement, although they may be forced to move contrary to nature;⁴⁵ and

from the rest of VIII that motion is not always potential *in any and all respects*. It is "actual" in the sense of being the process of what occurs until, e.g., the building is built and the product (as work of craft), being finished, requires no more motion of the relevant kind. From this perspective, motion is not "incomplete activity," but is completed, at least once the building, say, of a house, is finished. Obviously, there is a difference between the actual (and even completed) *process* and the resulting artifact; one was ongoing for a year until the house was finished on noon of a certain date. In Theta 8, the movement of an eternal sphere can be in movement from one spot of the celestial circle to another spot, entailing *not* that there is *no* lack of fulfilment but *continual fulfilment ad infinitum*. In other words, the series of continual fulfilments, and thus the movements, in being *continuous and seamless*, function as "one" eternal motion, and as the Stagirite says in a related discussion of time and motion: "the whole is just a plurality of measures" (*Physics* IV 14, 224a1-2). There cannot be "potentiality" in this case, because Aristotle asserts in the discussion of Theta 8 that eternal motion has no potential (1050b20); if it did, it would have the opposite potential by definition (because, as he also says there, a potential is also the potential for the opposite, insofar as it is a potential), which is inconsistent with the ontological meaning of necessity (and eternity) as that which must always be the same. Thus, movement exists, of an unvarying kind, forever, without the *potential* of movement. Potential, like its synonym "possible" in this setting, must be used in an ontological sense, as something finite. Therefore, the notion of movement as the actualizing of the *movable* as *movable* seems consistent with Theta 8 and with eternal motion, whereas the definition of III 1, of *potentiality qua potentiality* not.

Broadie might object, saying that the "movable *qua* movable" is merely a species of "potential *qua* potential," in which case we should note that, as I explain on pp. 272ff, Aristotle allows an exception to eternal motion not having potential. He says in the same discussion in Theta 8:

...if there is an *eternal* mover (*ti kinoumenon*) [and for Aristotle there is], it is not potentially (*dunamin*) in motion (*kinoumenon*) *except in respect of 'whence' and 'whither' (pothen poi); there is nothing to prevent its having matter (hulēn) for this* (1050b20-22; my italics and comment).

This is why the outer spheres involve a special matter, not found on earth. As another option, the statement about eternal motion not having potential may mean eternal motion *in general*, in contrast to the finite parts, namely, particular *abstracted* motions from "whence to whither" of certain (eternal) bodies. To close, then, Broadie's dilemma: Even if the outer spheres do not have *complete* or *perfect* autonomy, they have at least *essential* or *necessary* autonomy, which is all they need—if only because nothing in the physical universe is so unconstrained as to be like a fictional deity that has no constraints whatsoever (*and ironically even the Unmoved Mover has constraints*—it cannot commit suicide or utter satires or create babies).

⁴⁵ Broadie says: "What makes it absurd to attribute soul to the elements is, *above all*, that they are formless – mere tracts or masses lacking shape and inherent boundaries" (p. 235; my italics). She cites no passage but, on my account, the primary reason that the elements have no souls is given at *Physics* VIII 4, 255a6-10: They only move by nature in one direction (e.g., fire up and earth down) and cannot of any volition stop or reverse course, which ensouled animals can do. Furthermore, I am not sure that an "indefinite soul" is a contradiction in terms.

- (iii) plants move in very constrained ways, having delimited souls.

We can quickly exclude (iii), given that the outer spheres hardly seem plant-like. Nevertheless, some intriguing insights arise from *On Plants*, and, although it is considered spurious, the author refers to his own *Meteorology* in II 2.⁴⁶ *On Plants* seemingly denies that plants could be *self-movers*: "...a plant has no movement of itself, for it is fixed in the earth, which is itself immovable" (816a26-27). Yet this statement must be qualified with the partial movements a plant *can* make, as just footnoted with respect to, for instance, growth. Nevertheless, all of this still leaves open whether there is a supra-animal soul and whether the outer spheres have it *and the kind of self-movement that would accompany it*: I 1 indicates that "sensation is common to all animal life, because sensation marks the distinction between life and death; *but the heavens, which pursue a nobler and more sublime path than we do, are far removed from life and death*".⁴⁷

Thus, the heavens do not have an animal-type soul, associated with *life and death*, but maybe they have a divine soul that, as Broadie puts it, expresses movement but does not cause it. In other words, similar to Plato's argument in the *Phaedo* that the Form "life" does not contain "death," the divine soul is associated *only* with *life* because divinities of any sort cannot perish. Maybe the heavenly soul is, extending the view of Thales, a glorified version of the soul of a magnet. The soul of an eternal, colossal celestial "magnet" might move itself and other things (as a motor) eternally, whether or not it has life *per se*. In any event, on Broadie's account:

...there is one fundamental assumption to which he [Aristotle] seems to hold unwaveringly: that the heavenly rotations are expressions, in some way, of soul and mind... We gather from Cicero that in a lost and relatively early work Aristotle

I should add that "self" here is a figure of speech, not implying animate life: We say "the fire itself...or the stone itself...or the house itself." Thus, "self-movement" need not imply a soul with volition; it could simply imply that something, an element, can move in virtue of "itself," that is, of its own nature or identity, analogous to the magnet but maybe not so constrained as magnetic movement.

⁴⁶ Nobody to my knowledge denies the treatise is Peripatetic. Moreover, the views of the Presocratics and Plato regarding plants are discussed in the book, which presumably Aristotle knew, none of which proves that Aristotle would subscribe to its theories, but the positions seem notably consistent at least with his mature works. Plants have a partial soul that does not match the higher animal soul (816a10-b6) and they have only some kind of motion (of parts and of growth or diminution) even if not locomotion as a whole relative to the earth (822b1). They are less worthy than animals, even though Aristotle recognizes that "some...hold that the plant is complete and perfect." However, he denies this, saying they are subordinated to, and created for, animals, not vice-versa (817b14-32; transl. by E.S. Forster, as are all other passages from the treatise, in *The Complete Works of Aristotle*, ed. J. Barnes, *op. cit.*). Perhaps Aristotle, or the Peripatetic(s) who wrote the treatise, would have modified their view if they had known of 1500-year-old redwoods. Be this as it may, even in *On Plants* "the world is a whole, perpetual and eternal and has never ceased to produce animals and plants and all their species" (I 2 817b38-318a1; my italics).

The "we" that is sometimes used in the work may be a figure of speech or it may convey group authorship and is found in many other Aristotelian texts, if only to refrain from using the "I" that suggests subjectivity. Oddly, the author(s) never pursue the promise to examine desire *and movement* in plants (I 2 816b24-25). Abruptly, Chapter I 3 switches without transition to trees; thus, yet again we might have various texts being combined after the retrieval of Aristotle's and Theophrastus' combined library from Scepsis, as I have discussed in previous publications, especially in Appendix 2 of *A Primer on Aristotle's DRAMATICS (also known as the POETICS)*, 2019.

⁴⁷ 816a31-33; my emphases.

distinguished between "natural" and "voluntary" movement, and classed the movements of the sun, moon, and stars as voluntary.⁴⁸

Of course, *relative to Lambda*, the outer spheres *must* have a soul or mind, if they are to desire *and love* the Unmoved Mover, a "loving" that somehow, in a way that no one has ever explained plausibly, causes a very specific kind of "grand" eternal circular motion rather than a spinning.

There are (at least) two problems with the view that the outer spheres have a soul or mind. First, if ensouled, they should be able to stop and change direction, include going in reverse, but they never reverse direction or change paths for the Northern Greek, at least given human records (as I have discussed previously⁴⁹). This seems to go counter to his Principle of Plenitude that have eternal things in its scope. If they could, e.g., change or reverse direction, they must do so at some point in time. However, this issue is not fatal to the ensouled view because the Principle does not require that the (ontological) possibility be actualized regularly or every fifty years. It must occur at least once in eternity, and, the Stagirite could say, we are in the middle of a trillion-year rotation, and 500 billion years from now all the outer spheres and the *aither* will get tired, come to a stop, rest and then start up again in the reverse direction, like a cosmic coil unwinding. Many variations exist on this theme. Perhaps the outer spheres simply stop after a trillion years, rest, and then continue in the same direction or then change paths. Perhaps they come to a stop not because they need a rest but because, as discussed in the 5th digital extension, they fall out of love with the Unmoved Mover, like an ignored spouse, and have no reason to move. Alternatively, to emphasize or slightly modify the problem Theophrastus alluded to, if imitation of the Mover *qua* God is crucial, as *mimēsis* has been for many modern commentators of Lambda, the outer spheres, paradoxically not being very smart at all, *finally* realize that imitating the Unmoved Mover means being at rest, like the *Unmoved* Mover, not locomoting.

At any rate, the second, and more devastating, problem for the view that the "heavenly rotations are expressions...of soul and mind" is that *De Caelo* II 1 rules out a soul causing eternal movement:

Nor...is it possible that it [the moving heaven as a whole] should persist eternally *by the necessitation of a soul*. 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... An Ixion's lot must needs possess it, without end or respite.⁵⁰

Ixion committed murder, was reprieved and invited to Olympus by Zeus but then had the audacity to attempt to seduce Hera. After Zeus tricked him into copulating with a Hera-shaped cloud, he

⁴⁸ Broadie, *op. cit.*, p. 234; my italics.

⁴⁹ What I did not discuss is that Aristotle explicitly addresses in *De Caelo* II 5 why the heavens always seem to move in the same direction. He acknowledges in that short chapter that he cannot give anything other than a token answer, namely, that it is what it is and we should accept it as being the best, a very Platonic criterion.

⁵⁰ 284a26-b1; my italics; transl. J.L. Stocks, in *The Complete Works of Aristotle*, ed. J. Barnes, *op. cit.*; all translations from *De Caelo* are by Stocks unless noted. Without leveraging the relevant passage as I do, Broadie recognizes this difficulty, saying: "It is unthinkable to him [Aristotle] that a substance should eternally and necessarily (thus, under all physically possible circumstances) have its natural tendency forcibly suppressed, especially if it is a *divinely living* substance... (*Cael* II.1)" (p. 233; her italics).

was pinned to a fiery wheel for eternity. Like Prometheus, therefore, he suffers *bodily pain ad infinitum*. With no soul and thus no life, the heavens could *not* desire and love, and here we have a fatal contradiction with the analogy of the outer spheres (of Lambda) *loving* the Unmoved Mover, because love *presupposes* life and a soul.

In summary: If the moving outer spheres have no soul and life, they cannot feel bliss. If, on the contrary, they have a soul, they cannot be "happy" or "painless," given *De Caelo* II 1, and thus, again, cannot feel bliss, at least perpetually. Either way, they cannot feel bliss perpetually. Hence, when Broadie, or anyone else for that matter, asserts, as she does, that "the incorporeal unmoved movers of the other spheres are divinities too, being, like the former, *eternal blissful* sheer activities," we cannot accept this statement as *mature* Aristotelian doctrine.

Aristotle therefore relinquishes the "one fundamental assumption to which he *seems* to hold unwaveringly: that the heavenly rotations are expressions...of soul and mind." This leads us to the final option for the Northern Greek, namely, that the ether or outer spheres are elemental and are best thought of as a "fifth element" or "fifth essence."⁵¹ Broadie's thoughts in this respect are very illuminating and, indeed, help settle the progression of Aristotle's ontology, because, to reiterate, in my book I never resolved the issue. Nor, as mentioned, did I need to, in order to arrive at my final conclusions. I repeat her relevant paragraphs:

...there are no universal laws of motion holding of all bodies, or of all fundamental bodies, as such. In the Aristotelian universe, not only are the natures of earth and fire, water, and air, each marked off by a distinctive set of chemical powers, but each has its own distinctive law of natural motion.

It is therefore not surprising to discover that, for Aristotle, the existence of a sort of body whose natural motion is fundamentally different from those of the four sublunary elements, means nothing less than the existence, within the very same physical universe, of a type of physical substance that is fundamentally different from any of the kinds of matter we encounter on or near the earth, in our dealings with our immediate environment. **Such an additional kind of substance has to be postulated, according to Aristotle, to account for the circular movement of the heavens.** Under the influence of Aristotelian physics, this substance came to be known as the "fifth essence," but Aristotle calls it the *aithêr*. This was an already existing word meaning "sky." Its earlier use had been compatible with different theories as to the material of the sky: some philosophers had thought this was air, others a kind of fire. But in Aristotle's hands, "*aithêr*" comes to denote a *sui generis* kind of matter (*Cael* I.1-4).

This substance fills a theoretical role that is basic to Aristotle's cosmology: the role of *that which is necessarily eternally in movement*. Aristotle argues that

⁵¹ Hankinson (*op. cit.*, pp. 21-22, ft. 11) elegantly provides a synopsis of some of the background and development:

By Aristotle's time, four element theory [earth, water, air and fire] was the dominant model of physical chemistry, its only serious competitor being the atomism of Democritus and later Epicurus. Achieving its first fully-developed form in Empedocles (although even then owing much to earlier theorists such as Heraclitus), it was adopted by Plato in the *Timaeus* 49b-69c, and would also be central to the physics of the Stoics (Stobaeus 1.129.2-130.13; Diogenes Laertius 7.137; = 47 AB Long and Sedley), and to the theoretical physics and chemistry of Ptolemy and Galen.

time is infinite in both directions, that there is never time without physical change, and that these facts are necessary (*Phys* VIII.1–2). He argues that the necessary truth of the proposition "There is always physical change" can only be guaranteed if there is an eternal first cause of change, and that the immediate effect of such a cause must be a change that is individually **absolutely unitary and unbroken**.⁵² Such a change presupposes a single subject undergoing the change: a change produced by relay from one subject to another would lack the requisite unity. Consequently, there must be at least one eternal or **everlasting substance eternally exhibiting a single change**. What could such a change be like? For various reasons it cannot be growth or shrinkage or qualitative alteration; **it must be locomotion**. And of the various types of locomotion only the circular kind can be without temporal beginning and end, hence everlasting and absolutely unbroken (*Phys* VIII.7–9)... **It is a key tenet of the theory that this "always-running" of the heaven is natural to it.**⁵³

...

It is notable, however, that Aristotle accumulates major conclusions about the *aithêr* by treating it simply as a kind of body whose natural movement is rotation, as if the case is straightforwardly comparable to those of the four elements. Some of his most telling arguments speak generically of simple (i.e. uncompounded) bodies and simple natural movements, and depend on applying this generic perspective to all five kinds (*Phys* III.5; *Cael* I.5–7). Apparently this had not always been Aristotle's approach. [As noted already above:] We gather from Cicero that in a lost and relatively **early** work Aristotle distinguished between "natural" and "voluntary" movement, and classed the movements of the sun, moon, and stars as voluntary. Hence when **eventually** he designated the celestial rotation a "natural" movement, **this must have been a very deliberate move**. And indeed **he gains considerable theoretical advantages from putting the *aithêr* on broadly the same generic footing as the sublunary four.**⁵⁴

Whether or not expressions from the theater are appropriate in a paper on metaphysics, to these paragraphs and especially to the final conclusion I say "*Brava, Professor Broadie!*" I wish I had been the first to articulate the matters as such.

A skeptical reader might appeal to a point she made earlier, even though it was made to deny that elements have souls. The elements are allegedly formless and yet the outer spheres are formed, either as a circular planet or a spherical ether that moves around the earth, as for Plato in the passages noted earlier (see footnote 23). How, therefore, can the outer spheres be an element *per se*? If formed, they would seemingly have a soul. I leave aside the option that Aristotle could have been inspired by Thales' doctrine of magnets having souls because Aristotle surely was aware of this when he indicates that the four elements have no souls. If he gave the fifth element an "outer-sphere-soul" that is analogous to a magnet-soul, why not give fire also a "fire-soul"? Soul for him even in maturity always seems equated with animate nature and the ability, e.g., to move in

⁵² This is one reason for the Northern Greek that our universe could not have just arisen *ex nihilo*; nor can it later disappear into nothingness (*Physics* VIII 1, espec. 251b29-252a6). *A fortiori*, the universe cannot disappear and then later reappear, magically, in an almost identical state to what previously existed. This understanding is crucial to the "Not to Fear" Proof because the possibilities being fulfilled *or not* must be relevant to our *one and only* universe, The All, that persisted to the past, infinitely.

⁵³ Broadie, *op. cit.*, p. 232; her italics, but my bolding.

⁵⁴ *Ibid.*, p. 234; my bolding and inserted comment.

different directions as permitted by the ensouled physical structure and related environment (so ballerinas turn many pirouettes *en pointe* but cannot fly from one mountaintop to another unless they are sylphs in *La Sylphide*).⁵⁵

Thus, the formed "elemental" divine being of the outer spheres is *sui generis*, as Broadie stresses, and it is simply different and unique. Even though it is more similar to fire and air in some respects, it shares the ability to have form with earth. That is, "formless" cannot be perfectly correct. Even though some of the elements like air and fire might seem usually or always formless, water can be formed as an ice-cube and at least earth has instances of form, for example, a particular stone that a man hits with a stick. Another stone that one chooses to skip on the surface of water (because it is not pyramidal or perfectly round) usually has a flat oval form. *On Plants* notes that "whereas an animal has definite limbs, a plant is indefinite in form" (I 1 816b6-7) as one of the reasons for why a plant has not a full, animate soul. Yet, clearly plants have forms, which any farmer and any slightly educated person in ancient Greece would have known. Pull up a flower, bush or tree and you can sketch, albeit with great effort, the roots, stem, branches, etc. What *On Plants* must be denying regarding the formlessness of plants is "*easily-understood, definite form*," analogous to Aristotle saying that a "serious drama" (*tragōidia*) in the *Dramatics* 6 has no magnitude before immediately asserting that it has a beginning, middle and end. It is impossible for something with zero magnitude to have parts,⁵⁶ and so Aristotle must be speaking elliptically for no *observable* magnitude, as is confirmed when he discusses the topic shortly thereafter in the *Dramatics* and postulates an animal in effect 1000-miles long that cannot be observed in its entirety, in contrast to one with correct size and another with *no observable* size, perhaps (to provide an example) the tiniest of fleas or a Democritean atom (or, regarding hearing, the millet seed of Zeno).

Thus, the objection noting the *alleged* formlessness of an element could refer to Aristotle merely speaking elliptically and is not fatal to my thesis: The outer spheres like planets can be like stones in one respect, instances of a fifth element, and the *aither* itself might be actually a 6th element, if its nature and composition must be different from the planets within it. However, like Diogenes' air, the planets might be the same elemental material but compressed, and thus there is no need for a 6th element. In conclusion, the Stagirite's "theoretically stronger" ontology involves the outer spheres being "elemental" and eternal *by nature* (and, given the equivalence of eternity with ontological necessity, necessary too).

PART 2: A Second Turn in the History of Theology

The heavens were alive for Aristotle in his Academic youth, especially when influenced by Plato, but became a fifth element or "fifth essence" as he matured, without anthropomorphic characteristics such as thinking or loving. Broadie may be perfectly right insofar as Aristotle in his late teens and early 20's felt that self-moving spheres could not be metaphysically sound and

⁵⁵ For interesting wrinkles on this topic, see Sylvia Berryman, "Aristotle on *Pneuma* and Animal Self-Motion," *Oxford Studies in Ancient Philosophy*, Volume XXIII, Winter 2002: 85-97.

⁵⁶ *De Caelo* II 13, 296a16: "...since no body is a point [=location without magnitude], it will have parts."

that he needed an immaterial Unmoved Mover. However, by the time he was 24 years old, approximately 360 BCE, he would have had 7 full years of study at the Academy, being the equivalent of a PhD student at the end of an intensive program at an Ivy League university, Cambridge, Oxford, L'École Normale Supérieure, and the equivalent. His critical faculties, background from a medical family, independent thinking, focus and dedication would have long been in play, and who would deny that he was one of the best "PhD students" of all time? Surely, not Plato, who clearly esteemed his student, as displayed by Carlo Natali (and as discussed in my previous publications). Indeed, I venture to say that I could call the Stagirite a "philosophical Mozart," who was composing PhD-level works *by the time he was 19-20 years old* (already about 364) and at least half of the readers of this article, if not 9/10's, would accept the claim, with the other 1/10th quibbling about 2-4 years. Also, Plato by about 361 had been away in Syracuse for 3-4 years, which meant that there was no "intellectual lord" at the Academy during the period to whom the Northern Greek had to defer (although by accounts Aristotle was a friendly, if formidable, debater). I, for one, then, in no way believe he would have acceded for a long duration to any Platonic doctrine unless he was absolutely convinced by it, and he was apparently considered by some in later antiquity, albeit wrongly, to reject all or most Platonic theory.⁵⁷

With regard to metaphysics and the doctrine in the Platonically-influenced Lambda, even Broadie herself, as mentioned, acknowledges that there are problems. As gracious as always, she indicates:

Its richness notwithstanding, the theory of incorporeal substance in *Metaphysics* Λ is incomplete. It primarily says what must be *postulated* to account for eternal celestial movement, and on this score some important issues *remain unclear*.⁵⁸

She immediately articulates a few handfuls of the "unclear" but actually very serious issues on the final page of her article and leaves them unexplored, apparently as something that Aristotle never grappled with or at least never wrote about. My own evaluation shows that she is right on one point in the passage above: Aristotle *postulates* the Unmoved Mover and its characteristics to supplant a Platonic (and Parmenidean) ontology and to be impervious to Platonic objections. Afterwards, though, and probably very shortly after making Lambda known to others, on my view he was forced to engage not only with the objections that Broadie presents but many others that I have formulated in print, including those by Theophrastus. The objections are so obvious *and so devastating* that colleagues and critics would surely have offered feedback, as I mentioned when discussing Devereux, without—at least concerning the critics—necessarily maintaining the kind of graciousness that Broadie herself exhibits. It would be shocking that Aristotle championed the Unmoved Mover for a week or a month, if even that, given the immediate questions that would have flown at him: How can the Unmoved Mover of Pure Actuality with *no* potential interact with the physical universe, *actively or passively*? Assuming the Mover is identical with the God of Lambda 7, how can it be blissful, when it cannot have life, because life requires matter? Similarly, how can a thinking God be identical with the Unmoved Mover that is utterly without potential

⁵⁷ Jaeger's book is replete with evidence from later writers in antiquity. The issue is complex, and Jaeger also highlights the variety and fluidity of debated theories within the Academy, not only when Aristotle arrived, coincident apparently with the composition of the *Theaetetus*, but before and after; see, e.g., pp. 34-5.

⁵⁸ Broadie, *op. cit.*, p. 240; my italics.

and thus without the capacity to think, even if God were some disembodied and incorporeal equivalent of a brain in a vat? Finally, even granting for the sake of bemused argument that the planets *can* somehow apperceive the Mover and *can* love, why, as I have mentioned many times, would they not try to imitate the *Unmoved* Mover and rest in place *ad infinitum* instead of moving and, on that alternative, moving in a very particular way in a large circle rather than just spinning in place? If ancient Greek philosophers ever got embarrassed, we can imagine how red the youthful Stagirite's cheeks must, for once, have been when he initially floated a novel version of Xenophanes' and Anaxagoras' own Unmoved Movers. "Very clever on the surface," his polite colleagues would have said, "but consider now the ramifications..." Not-so-polite colleagues and competitors obviously would have been less gentle.

Some evidence for this is, again, the subsequent history of 500 years showing all others (apart from Theophrastus) not even caring to discuss the Unmoved Mover, one way or the other, much less embrace it, except for the aforementioned five possible exceptions—Eudemus (of Rhodes), an obscure Epicurean source and Cicero, who cites the Epicurean, Nicolaus of Damascus and Xenarchus—and I emphasize the "possible." I have already covered Eudemus and indicated that no good reason exists to think he defended the Unmoved Mover of *Lambda 6* rather than the unmoved movers that can be enmattered (of the *Physics* or possibly of *Lambda 8*). Let us now look at the relevant passages pertaining to the other four ancients to determine whether or not they might have concerned themselves with the Unmoved Mover, and if so, how, or whether, as I have suggested, it was merely alluded to (and disdainfully) in passing.

The most detailed account, and thus the least ambiguous, is given by Cicero; besides, he is the first chronologically among the three, apart from the Epicurean that we know, or better yet, merely know of, through him. So let us commence with the Roman. He writes:

Aristotle in the Third Book of his [*On*] *Philosophy* has a great many confused notions,...disagreeing with the doctrines of his master Plato; at one moment he assigns divinity exclusively to the intellect, at another he says that the world is itself a god, then again he puts some other being over the world, and assigns to this being the role of regulating and sustaining the world-motion by means of a sort of inverse rotation; then he says that the celestial heat is god—not realizing that the heavens are a part of that world which *elsewhere* he himself has entitled god. But how could the divine consciousness *which he assigns to the heavens* persist in a state of such rapid motion? Where moreover are all the gods of accepted belief, if we count the heavens also as a god? Again, *in maintaining that god is incorporeal, he robs him entirely of sensation, and also of wisdom.* Moreover, *how is motion possible for an incorporeal being, and how, if he is always in motion, can he enjoy tranquility and bliss...* **Theophrastus** also is *intolerably inconsistent*; at one moment he assigns *divine* pre-eminence to mind, at another to the heavens, and then again to the constellations and stars in the heavens. Nor is his pupil, **Strato**, surnamed the Natural Philosopher, worthy of attention; in his view *the sole repository of divine power is nature*, which contains in itself the causes of birth, growth and decay, but is entirely devoid of sensation and of form.⁵⁹

⁵⁹ *De Natura Deorum*, I 1.13 33-35; translated by H. Rackham (Cambridge, MA: Harvard University Press/Loeb Classical Library) 1933; my italics, bolding and insertion of "[*On*]" to disambiguate the reference.

Leaving aside that *On Philosophy* may have presented the various theological views that Aristotle rejects, Cicero must think that Aristotle's doctrines are static, for if evolutionary they need not be confused or inconsistent (even if they are incorrect). The same holds with Cicero's evaluation of Theophrastus, although Cicero presumably captures correctly the second Peripatetic's final doctrine, namely, that the heavens (or constellations thereof) are divine (in and of themselves). Leaving aside what "devoid of...form" means, Cicero also seemingly reports well the doctrine of "the Natural Philosopher," who, even as the third head of the Lyceum, had without question already rejected, too, incorporeal transcendental entities. Thus, *the second and third heads of the Lyceum had already ignored the relevance of the Unmoved Mover to ontology or theology.*

Cicero reveals no indication that he understands, or even had, Lambda. He betrays confusion over how the Mover of Lambda 6 relates to *ho theos* (God) of Lambda 7, and which one of these "entities," or both, are to be "over the world" and whether Aristotle anticipates the Unmoved Mover of Lambda 6 in *On Philosophy*, or vice-versa. Cicero queries how an incorporeal being could always be in motion for the Stagirite, manifesting a complete misunderstanding of the topic (which, again, may or may not be the same doctrine as in *On Philosophy*): The incorporeal Unmoved Mover of Lambda 6 has *no* potential and never moves. Rather it is the love of the outer spheres for the Mover that causes *their own* eternal movement. Cicero further claims "at one moment he [Aristotle] assigns divinity exclusively to the intellect," which suggests Lambda 7, although it could be the soul-mind of the heavenly movers. Cicero then adds "at another [moment]...he puts some other being over the world, and assigns to this being the role of regulating and sustaining the world-motion by means of a sort of inverse rotation." Is this last "being" also the (Unmoved Mover *qua*) "God" of Lambda 7 that thinks of itself thinking? If so, why is it different from the divine intellect? I could go on, but I trust this is sufficient. Cicero really had no understanding of the doctrine of Lambda, even if he captures some "sound-bites," of which more in a moment.

As I have suggested, at least parts of Lambda, including Lambda 6, could be earlier than *On Philosophy*, with Lambda written as early as 363-360 BCE by the brilliant "PhD student," even though Lambda is obviously not written in dialogue form. It is possible that Aristotle has merely laid out different options in *On Philosophy* that he rejects, as he often does in presenting *aporiai*. Alternatively, or in conjunction with presenting *aporiai*, he repeats in *On Philosophy* some themes from Lambda but in a form more suitable for public consumption. Consider Jaeger's own evaluation of Cicero's passage, with Jaeger's occasional admirable observations being sadly counterbalanced by infelicitous interpretations (such as the unmoved mover being a final cause) that in part stem from the Roman's confusion:

According to the unfavourable account in Cicero, *which comes from some Epicurean source also used by Philodemus*, Aristotle in his third book *On Philosophy* declared now that God was mind, now that he was the world, now that he was the ether, and now that he was some other being, to whom the world was subordinated, and who *guided* its movement by a kind of backwards turning (*replicatione quadam*) [Frg. 26 (Cic *De Natura Deorum* I 13 33)]. By applying the dogma of the Epicurean school the critic discovers gross contradictions in these statements, but, however superficial his judgement of them may be, the correctness of the account as such cannot be doubted. *The God to whom the*

*world*⁶⁰ is subordinated is the transcendental unmoved mover, who guides the world **as its final cause**, by reason of the perfection of his pure thought. **This is the original nucleus of Aristotelian metaphysics.** Besides this, Aristotle described the ether as a divine body, or as a more divine body, as he does in the treatises; he certainly did not call it God. [At this point, Jaeger adds a footnote: "Cicero translates 'ether' by *caeli ardor*. This is usual, and the description of it as *divine* is further evidence that what is meant is Aristotle's hypothesis of ether as the fifth element (cf. *Cic De Natura Deorum* I 14, 37, *ardorem, qui aether nominetur*...). **Aristotle must therefore have put forward the hypothesis while he was still in the Academy.** It became fairly general there, though it suffered some excisions and modifications. Its first presentation to the public was no doubt that in the *On Philosophy*."] The divinity of the ether does not seem to fit very well with a strict transcendental monotheism.⁶¹

To work backwards, like the retrograde motion of the planets referred to at the beginning of the passage: Of course, the divinity of the ether does not fit well with transcendental monotheism, as should be utterly clear after the discussion of Broadie's views. However, this does not mean the Northern Greek was muddled or inconsistent in his theory; it only means he gave up one of the positions. The first presentation of the fifth element *to the public* may well have been in the dialogue *On Philosophy*, but, astutely, Jaeger recognizes that *the fifth element was put forward already at the Academy*. All of this is perfectly consistent with Aristotle having already formulated the doctrine of the fifth element *because* he had dropped the paradox-laden doctrine of the Unmoved Mover of No Potentiality by 360-355.

However, Jaeger's claims that (i) the transcendental unmoved mover guides the world as its final cause by reason of the perfection of its pure thought and (ii) "this is the original nucleus of Aristotelian metaphysics" are, respectively, fraught with serious error and yet amazingly correct. In being the *youthful* Stagirite's view, the Unmoved Mover was indeed "the *original nucleus*." However, the God of Lambda 7 that eternally "thinks of itself thinking" has absolutely no awareness of the world; thus, it cannot, and would not care, to guide it! Other reasons that the Mover cannot be a final cause are given in my book, and even Gerson, who intensely defends Aristotle theology with a God, shows it cannot be a final cause. Finally, as is obvious from the quotation, Cicero never read the appropriate texts himself. Instead, he took, as Jaeger emphasizes later (p. 143), an already constructed, "ready-made collection" from the Epicurean "dogma" that, if Cicero reports faithfully, itself did not understand or convey well Aristotle's positions.

To summarize: Cicero presents no clear evidence, or at least no understanding, of the Unmoved Mover of Lambda 6, and if he was referring to it, he thought it preposterous. In this regard, Cicero essentially follows Strato, despite the Roman's derision of the third head of the Lyceum not having a divinity with "sensation," with Cicero seemingly thinking that "God" (*theos*) and "divine" (*theios*) must be one and the same when they are not. Again, recall the divinity of Diogenes' air, which is not a thinking god *per se*; "God" (typically) entails "divinity," but the reverse is not necessarily the case for all Greeks.

⁶⁰ Jaeger, in the ongoing passages that I do not reproduce here, notes that the "world" is not the Epicurean conception but the old Academy's conception as the "heavens, the mere periphery."

⁶¹ Jaeger, *op. cit.*, p. 138-9; my various emphases.

Nicolaus of Damascus apparently wrote, at best, a compendium of some of Aristotle's works. This can be established from Averroes, who when discussing Lambda states:

Therefore it has become clear from this discussion what are the contents of each single book of this science *which are ascribed to Aristotle*, and that they follow each other in the best possible order of arrangement, and that they contain nothing lacking [in] arrangement and order, as we have seen that Nicolaus of Damascus declares in his book, who has for this very reason in the teaching of this science *preferred an arrangement he thinks better*.⁶²

Let us leave aside here not only the oddity that the single book is merely "ascribed to Aristotle" but the second oddity that in one breath Averroes claims the contents "contain nothing lacking [in] arrangement and order" while implying in the next breath that they do, because otherwise why would Nicolaus have preferred a better arrangement? Also, like Andronicus, Nicolaus seems to have only re-arranged, not commented on, the texts. There is no clear reference that I can determine in Nicolaus' work to the Unmoved Mover *per se*, much less an explanation or evaluation of it *qua* Pure Actuality, although Nicolaus curiously mentions, if only in passing, the Unmoved Mover of *Xenophanes*.⁶³ There are many possibilities as to which chapters Nicolaus referenced and whether he had all that we have. Was he only viewing Lambda 8 and the later books on the status of mathematical objects, which themselves were considered in antiquity to be from a different time, of which more below? Jaeger has argued powerfully that Lambda 8 is a late addition despite the ordering of the "corpus" that we possess by Andronicus. In addition, Gerson recounts, "Themistius has a commentary, or more accurately a paraphrase, of book twelve alone,"⁶⁴ and, leaving aside the chronology of Themistius and Nicolaus, the scholar from

⁶² H.J. Drossaert Lulofs, *Nicolaus Damascenus On the Philosophy of Aristotle: Fragments of the first five books translated from the Syriac with an introduction and commentary* (Leiden: E.J. Brill) 1969, p. 12; my italics. A tip of the hat goes to Claudio William Veloso for pointing me to Nicolaus.

⁶³ "Nic.'s statement that Xenophanes declared God to be infinite and motionless is mentioned only once (F. I)..." (p. 17, *ibid.*). Lulofs questions the authenticity of Nicolaus' statement (pp. 17-18) and adds that, because of some discrepancies in Nicolaus' citations of previous sources, "at the time of the composition of his *Peri Theōn* Nic. was still a beginner and had not yet made a serious study of Theopr. *Phusikōn doxai* (in whatever form they were available to him) **and of Ar.'s *Metaph.*** and *De anima*, so that his knowledge of the *corpus Aristotelicum* was restricted to such physical treatises as for instance the *Phys.*, *De Caelo*, *De gen. et corr.* and the *Meteor.*" (p. 18; my bolding)

Although I have been able to read the fragments on Aristotle's *Metaphysics* along with some of the additional ones, and some commentary, I have not had access to the rest of Lulofs' book, which, in any event, given the list of works at the beginning, does not include the *Metaphysics*. Because of Covid-19 lockdowns of both residences and libraries in New York City for the indeterminable future, I proceed with the caveat that future reading may cause me to add an additional note to this topic, at the URL for updates listed at the end. However, given that Nicolaus has had seemingly no impact whatsoever on the debates of the Unmoved Mover, I proceed with publication rather than delay it possibly for many months.

⁶⁴ See my p. 281. Jaeger also emphasizes:

Λ is an isolated lecture, giving a general view of the whole metaphysical system, entirely complete in itself, and presenting no trace of connexion with the rest. The concluding books MN have no relation to the preceding; this was remarked even in antiquity, and has led to their insertion before ΚΛ in many manuscripts, which, however, does not produce a more plausible train of thought (p. 170; cf. also p. 219).

Jaeger's summary of the entire *Metaphysics* and the relation or at times *lack of relation* of the books to one another (especially on pp. 168-70) is in my mind still one of the best. What is not best, though, is his

Damascus may have been using it, or merely parts of Lambda, in complete isolation from Books 1-11 and 13-14. In short, there may have been various manuscripts, and parts of manuscripts, existing in isolation, one or some of which Nicolaus had. As Jonathan Barnes reminds us, the later commentators considered there to be no "canonical" edition of Aristotle's works, despite Andronicus having assembled various texts.⁶⁵ In addition, Nicolaus' rearrangement may have been for historical or aporetic purposes, laying out systems that were *once* persuasive in order to demonstrate their inherent fallacies, similar to Theophrastus in his own *On First Principles*. Nothing, therefore, can be ascertained for our purposes from Averroes' oblique reference except that *something* of Lambda "ascribed to Aristotle" was read by Nicolaus, that the ancient scholar from Damascus considered it confusing and that he tried to make it clearer *for whatever purpose* with a different order. Finally, it would be surprising that later commentators like Alexander did not know of any significant treatment of the Unmoved Mover if Nicolaus had actually discussed, and especially illuminated (or supported) it, in print.

Let us try to determine now whether Xenarchus, our final option before the scholar from Aphrodisias, concerned himself with the Unmoved Mover. While discussing Strato, Berryman mentions a *possible* reference by Xenarchus to it:

Another Peripatetic in the first century B.C.E. rejected the fifth element. Xenarchus' attack goes hand-in-hand with his criticism of the Aristotelian notion of *incorporeal causes*.⁶⁶

I leave aside the oddity that plural "causes" are mentioned in contrast to the singular Mover, in part because I have already discussed Merlan's influential view of Aristotle's "polytheism" in the 5th digital extension. Again, the cryptic reference to Xenarchus is made in the context of issues pertaining to Strato, and it is questionable whether Xenarchus is considering the issues through the filter of work or of the other, still later Peripatetics. In any event, because Xenarchus rejects "incorporeal causes," which *on the surface* would include the Unmoved Mover, I postpone additional thoughts until Part 3, when I address how he *should* have concerned himself with the Unmoved Mover before he rejected it, given his attempt to undercut Aristotle's foundational ontology with the doctrine of helical movement, had the Stagirite really maintained the Mover until the end of his own life.

assumption that Lambda had to be kept late in the Stagirite's development of thought. Indeed, as Jaeger says elsewhere when discussing the dialogue *On Philosophy*: "The fundamental conceptions of the *Metaphysics* were undoubtedly already determined when Aristotle wrote the dialogue" (p. 167). Unwittingly, this supports my timeline, but Jaeger was seemingly thrown off in part because of the simplistic view that the Stagirite *only* wrote dialogues until Plato's death and until Aristotle went to Assos, starting about 347. Consider, however, that by then, *after 20 years of full-time philosophy at the Academy*, Aristotle was in effect the modern equivalent of not only a senior tenured professor at a superb university but a globally esteemed one. There is no reason he could not have written both exoteric dialogues and esoteric treatises in the 350's, if not already in the 360's. Finally, no less a figure than Bonitz, as Jaeger reminds us, "inferred that Book Λ is not the intended conclusion of the *Metaphysics* but an independent treatise, and *must be assigned to an earlier date*" (p. 342; my italics).

⁶⁵ See my *A Primer*, *op. cit.*, pp. 287-93.

⁶⁶ Sylvia Berryman, *Rethinking Aristotelian Teleology: The Natural Philosophy of Strato of Lampsacus*, PhD dissertation, University of Texas Austin, 1996, p. 28. The source she cites from Stobaeus is by Julian (331/332-363 CE), *Orationes* V 162Bff; my italics.

As mentioned, apart from the five sources mentioned, no one else between Theophrastus and Alexander seemed to care enough even to discuss, or at least discuss with any significant understanding or rigor (and here I allude to the Epicurean source for Cicero), the doctrine of the Unmoved Mover.⁶⁷ This might entail, ironically, that the Stagirite had a greater influence on Hellenistic and post-Hellenistic ontology than has been recognized, namely, helping ensure in the philosophical *zeitgeist* a predisposition for accepting the (necessarily) eternal universe, whether or not, e.g., any particular *cosmoi* that are parts of it changed, *with all parts being "natural."* However, this is a topic for another day, because there are other ontological views that involved no immaterial Unmoved Mover, which might equally well have influenced, say, the Epicureans and Stoics. At any rate, as I have argued, in Aristotle's later career and quite plausibly by the time he was 25-30 years old, 353 BCE at the latest (for additional reasons given below and because of the dating of the already discussed *On Philosophy*), the Northern Greek accepted a much more sensible ontology, no pun now intended, which, to emphasize, had no need whatsoever for an *immaterial first* Unmoved Mover, even if *enmattered first* unmoved movers were epistemically important.

The stage is now set for the next theological revolution: Given the texts that are at least relatively well known, *for the first time after Theophrastus*—and shortly after Alexander at least implicitly accepts in the 3rd century CE that (the mature) Aristotle holds the Unmoved Mover as lifelong

⁶⁷ As mentioned, Gerson explores the reception of Aristotle's *Metaphysics*, which I discuss at length (espec. pp. 281-90). Here again are a few of his points:

Strato's denial of the need for the hypothesis of an unmoved mover is nothing short of a rejection of the entire enterprise of the *Metaphysics*. *And this from within the Peripatos!*... The dominance of Stoicism throughout the Hellenistic period explains in part the near oblivion into which metaphysics in general and Aristotle's work in particular were cast... Considering that Stoics, and to a lesser extent Epicureans and Academic Skeptics, were the primary purveyors of theoretical philosophy throughout the Hellenistic period, *it is hardly surprising that the doctrines of the Metaphysics simply lay dormant* ("Plotinus and the rejection of Aristotelian Metaphysics," *op. cit.*, pp. 3-5; my italics).

David R. Lachterman also discusses the validity of Aristotle's alleged evolution, including a theme pertaining to the *Metaphysics*, and he highlights, e.g., Plutarch's treatment of the ethics ("Did Aristotle 'Develop'? Reflections on Werner Jaeger's Thesis," 1980, *The Society for Ancient Greek Philosophy Newsletter*, 33; available at <https://orb.binghamton.edu/sagp/33>). Yet there is absolutely nothing for Lachterman on the Unmoved Mover between Theophrastus and Alexander of Aphrodisias.

Without mentioning Nicolaus of Damascus for whatever reason, Miira Tuominen also reveals nothing pertaining to the history of the Unmoved Mover after Theophrastus until Alexander ("Philosophy of the Ancient Commentators on Aristotle," *Philosophy Compass* 7/12, 2012, 852-895). Indeed, according to her, the only book by Aristotle which was commented on *per se* before Alexander is the *Ethics*, by Aspasius (early 100s CE), who Tuominen states, "has written the earliest commentary, on the *Nicomachean Ethics*, that is to a significant degree extant and...in terms of content is Aristotelian as well" (p. 854).

Finally, in his recent "Recherches péripatéticiennes sur le moteur immobile: Aristote et Théophraste," Daniel Lefebvre examines Proclus' writing on Theophrastus concerning the Unmoved Mover, but Lefebvre's analysis suggests no other relevant commentator in the intervening period and has no impact on my thesis (*La Métaphysique de Théophraste: Principes et Apories*, ed. Annick Jaulin and David Lefebvre, Leuven: Peeters, 2015; 37-69).

Even were another able to find a mention or discussion of the Unmoved Mover apart from the aforementioned sources in the period between Theophrastus and Alexander, to my knowledge the discussion has had absolutely no impact on the debates of the Unmoved Mover over the last few centuries, to say the very least.

doctrine—Plotinus in the *Enneads* V.1.9 criticizes explicitly not only the Unmoved Mover(s) of Lambda but the "God" that thinks only of itself thinking:

Aristotle later said that the first principle was 'separate' and 'intelligible', *but when he says that 'it thinks itself', he no longer makes it the first principle.* Further, he makes many other things intelligible—as many as there are spheres in heaven, so that each intelligible moves each sphere—but by doing so he describes intelligibles in a way different from Plato, proposing an argument from plausibility, since he did not have an argument from necessity. One might pause to consider whether it is even plausible, *for it is more plausible that all the spheres, contributing to one system, should look to one thing that is the first principle.*

And one might enquire if the many intelligibles are, according to him, derived from one first principle, or whether he holds that there are many principles among the intelligibles. And if they are derived from one, it will be clear that it is analogous to the way that, among sensibles, one sphere encompasses another until you reach the outermost one that is dominant. So, in the intelligible world what is first will also encompass everything, that is, there will be an intelligible cosmos. And just as in the sensible world the spheres are not empty, but the first is full of stars, and the others also have stars, so, too, in the intelligible world the movers will have many things within themselves, and the truer Beings will be there. But if each one is a principle, the principles will be an arbitrary collection.

And what will be the explanation for their functioning together and agreeing on a single task, namely, the concord of the entire universe? How can there be equality in number of the sensible spheres in heaven in relation to the intelligibles or movers? *And how can these incorporeals be many in this way, without matter to separate them?*⁶⁸

This retort is legitimate in that it addresses the self-intellection of the God of Lambda 7 and the multiple unmoved movers of Lambda 8, with the criticisms already presented in my previous work (e.g., "incorporeals being many without matter" was addressed in the discussion of Merlan). Oddly, Plotinus ignores the arguably worse paradox, namely, the Unmoved Mover of Lambda 6 having no potentiality and thus having no ability to interact, actively or passively, with the physical universe. Nevertheless, Plotinus' own, replacement theory, whether it is right or wrong in and of itself (and I for one do not subscribe to Neo-Platonism), is surely another major turning point in the history of theology because a fairly accurate summary of the Stagirite's youthful but discarded view—a *proverbial straw man!*—is also taken by him to be Aristotle's best doctrine. Presumably, the assumption that the Mover is the Stagirite's best doctrine is in large part, if not wholly, because of Plotinus' younger contemporary, the commentator from Aphrodisias, but in any event Plotinus properly rejects the straw man on some of the same grounds that Theophrastus and I have given. Fatefully, not only for this reason but others, Neo-Platonism is born.

⁶⁸ Plotinus, *The Enneads*, edited by Lloyd P. Gerson; transl. by George Boys-Stones, John M. Dillon, Lloyd P. Gerson, R.A.H. King, Andrew Smith, and James Wilberding (Cambridge: Cambridge University Press) 2018; pp. 544-5; my italics.

Arguably most impactful, though, is Alexander's infelicitous assumption that the Unmoved Mover is Aristotle's late or only doctrine.⁶⁹ The error becomes enshrined as gospel, again, to emphasize, in part because Plotinus then follows suit and treats it, too, as the Stagirite's salient position. Plotinus' critique in no way, though, touches the truly mature doctrine of the "Not to Fear" Proof (and of the fifth-element view). Yet this is only because Plotinus seems to have not recognized the mature doctrine as something Aristotle held, and it would be interesting to imagine what arguments, if any, he might have advanced against the theory involved in the Proof.⁷⁰ At any rate, unsurprisingly, the more effort that scholars over subsequent generations have expended to justify the Stagirite's unjustifiable youthful position as articulated and championed by Alexander, the more the Stagirite's later and better doctrine has been obscured, including the importance of *De Caelo* II 1 and *Metaphysics* Theta 8.

Summary and Conclusion of Parts 1 & 2

Broadie attractively conveys the theoretical advantage of the elemental view over the ensouled view of the outer spheres—with, I remind the reader one last time, the ensouled view being a precondition of the outer spheres loving the Unmoved Mover—and I am beholden to her for those insights. However, notwithstanding that she also lists some of the serious problems of Lambda, more crucially in this context she implies that it is *mature* Aristotelian doctrine. I can explain her seemingly inconsistent position only by assuming a laudatory desire on her part to protect the texts, always or almost always, or by assuming that she believes Aristotle was willing to live with inconsistencies temporarily, like many other philosophers who never lived long enough to reconcile earlier and later positions or who never wrote a third text to explain why two texts differ. I myself prefer to protect Aristotle's thought and reputation, which of course depend *on* the texts but are not identical *with* them. The manuscripts are too often (technically) contradictory, inconsistent or corrupted, and only a Jaegerian-type view, namely, that inconsistencies in some manuscripts are at least occasionally a result of the Stagirite evolving doctrinally over a 45-year professional career, is plausible in my opinion.⁷¹ In other words, the primary effort should be

⁶⁹ In my mind, Alexander also misinterprets, e.g., the complex doctrine of necessity for Aristotle, placing too much emphasis on the logical sense over the ontological sense. For an illuminating introduction to the topic, see Wisnovsky, *op. cit.*, especially Chapter 11, even though I would question Wisnovsky's seeming sympathy with the thinker from Aphrodisias in this regard, for reasons at least implied by my own, previous explications of Aristotelian necessity.

⁷⁰ Intriguingly, Andrea Falcon writes the following, which I leave for specialists of Plotinus: By way of introduction to his discussion of Aristotle's arguments for the existence of a simple body that *naturally* performs circular motion, Simplicius quotes Plotinus: "*There would be no problems for Aristotle if one accepted his assumptions (hypotheses) on the fifth body*" (Simplicius, in *DC* 12.13–15; cf. Plotinus, *Enn.* II 1.2.12–13). *These lines became a favorite quotation in the context of the ancient debate on the existence of a fifth body* (Andrea Falcon, *Aristotelianism in the First Century BCE*, Cambridge University Press: Kindle Edition, 2012; p. 33; my italics for both Falcon and Simplicius).

⁷¹ By "Jaegerian-type view," I do not mean that Jaeger was right in every respect; far from it, given what I said earlier. Rather I suggest that Aristotle was greatly influenced by Plato in some ways when young (which accords with Broadie) but then developed many of his views over time, *both* the Platonic ones and his own "Stagirite" ones. As noted, despite this evolution Jaeger surprisingly in some ways maintains that the Northern Greek kept an Unmoved Mover and a God (assuming, as almost all have, that they are the

made to determine the Northern Greek's best and latest theory, and not, if the relevant texts are contradictory in a loose or strict sense, to try as much has been done historically to reconcile the irreconcilable.

PART 3: Strato, Xenarchus and Later Antiquity

Berryman on Strato (and Xenarchus)

The following was unneeded for my basic arguments but provides additional details related to the eternal motion of the universe, with which later thinkers from antiquity, especially the later Peripatetics, concerned themselves when discussing Aristotle. Apart from Theophrastus presenting the Unmoved Mover as an *aporia*, but not as an option he accepts, this additional history confirms that the Unmoved Mover played no role whatsoever in their discussions of the metaphysical or celestial matters until Alexander of Aphrodisias. Again, the underlying question is: If the Unmoved Mover was so important for Aristotle, why did these later thinkers, even Strato, ignore it? The details also reveal how excellent modern scholars concerned with the period from Aristotle to Alexander simply *assume* that the Stagirite maintained the doctrine of the Unmoved Mover until his demise, and how these scholars ignore the (ramifications of the) omission of the Unmoved Mover in the discussions of the later Peripatetics. Finally, the details furnish more evidence, if indirectly, that Aristotle considered the outer heavens to be a fifth element and divine in virtue of their own nature, with no need of an Unmoved Mover *qua* God.

Let us start by examining further the relevant part of Berryman's analysis:

Solmsen argues that Aristotle needs the natural motion of the elements for a different reason, namely to justify introduction of the fifth element. The argument in *De Caelo* depends on the claim that circular motion is simple. *From this premise*, Aristotle concludes that here must be a simple body to which it belongs *by nature* (DC I 2, 269a3-7). *The continuity and eternity of the rotation of the heavens is also adduced as evidence that celestial motion must occur in an element to which it is natural* (DC I 2, 269b6-11; II 3, 286a17-18). *The fifth element, aether, is fundamentally different from the sublunary elements in that it is unchanging in nature, neither light nor heavy and not analysable into opposite qualities* (DC I 3, 269b18-270b32). Its unchanging nature makes the two spheres, sub- and superlunary, radically distinct. *The heavens are said to be divine in nature* (DC II 3, 286a11-14).⁷²

Berryman now indicates that the notion of a fifth simple body found no outside adherents and

same), all of which is surely a model of irony. I should add also, though, that Jaeger emphasizes, correctly in my view, how Plato himself developed over time:

The *Theaetetus*, which is contemporary *with Aristotle's entrance into the Academy*, is the first of a group of dialogues that are radically different from the earlier ones both in form and in content, and it ushers in the transference of Plato's main philosophical interests to methodological, analytical, and abstract studies (Jaeger, p. 25, *op. cit.*; my italics).

It is an interesting question whether and how Plato might have been increasingly influenced by his brilliant student, *especially*, but not limited to, the period from about 360 onwards, when Aristotle was already Associate (if not Full) Professor caliber. In any event, I address both this issue and Jaeger more below and especially in the next digital extension, while discussing Alcmaeon of Croton.

⁷² Berryman, *Rethinking Aristotelian Teleology*, *op. cit.*, p. 27; my various emphases.

was a point of dispute even in Aristotle's own school, and she discusses some of the details from Theophrastus' seeming perspective pertaining to pure fire,—details that are beyond the scope of this article. I refer the interested reader to her own text and also to Lefebvre, who, suffice it to say, states: "Theophrastus situates "divinity" and "the honorable" in the heaven and stars..."⁷³ which accords with my own position on how the Lesbian from Eresus⁷⁴ either follows Aristotle or helps persuade him to drop the Unmoved Mover in favor of the natural eternity of the universe. Berryman continues, and not only do I repeat a passage we have seen but add bracketed numbers for analysis:

Another Peripatetic in the first century B.C.E. rejected *the fifth element*. Xenarchus' attack goes hand-in-hand with his criticism of the Aristotelian notion of incorporeal causes.

[1] Strato's rejection of the fifth element is clear from one piece of direct testimony:

Parmenides, Heraclitus, Strato, Zeno held that the heavens are fiery ([Stobaeus] *Eclogues* I 23,1=84W)⁷⁵

Unfortunately the doxographer [Stobaeus] tells us nothing more than this. The plausibility of the report is confirmed by others... *Strato does not regard the motion of the cosmos as governed by divine influence* and thinks that all bodies have weight and are subject to natural forces. Aristotle's fifth element, by contrast, is weightless and does not participate in the rectilinear upward and downward motion of the other elements. **[2] Insofar as Strato rejects the existence of a superlunary fifth element, he would reasonably hold that the heavenly spheres should be considered as part of the natural world.** **[3] Rejection of a separate, unchanging sphere would be only one aspect of a view that a divine and unchanging source has no part in the explanation of the natural world.** In considering Strato's views on the nature of the soul, it will also become clear that Strato had additional reasons for rejecting the notion of an affinity in kind between the stuff of the stars and the material basis of human cognition. **[4] A thoroughly naturalistic view of the universe would certainly hold Aristotle's fifth element in dim repute.**⁷⁶

I have italicized the most important words, including one crucial statement, namely: "Strato does not regard the motion of the cosmos as governed by divine influence." Obviously, the Unmoved Mover *qua* God is not part of Strato's ontology. Is his position, though, apostasy or simply, *at its*

⁷³ "...Théophraste situe "divin" et l'"honorable" dans le ciel et les astres..."; Lefebvre, *op. cit.*, 2017, p. 87; my translation. Cf. also his discussion pp. 71ff.

⁷⁴ Calling Theophrastus a Lesbian, even though I use an upper-case "L," may strike some as unduly provocative or at minimum inappropriate. I see no reason, though, why gender or sexual orientation should outweigh geography, given that Theophrastus was from Lesbos. If Aristotle can be a "Northern Greek" and "Stagirite," and Plato an "Athenian," as they surely are, then Theophrastus is a Lesbian or an Eresusan (or whatever a citizen of Eresus would be called).

⁷⁵ The Greek is *...purinon einai ton ouranon*, as found in *Ioannis Stobaei: Anthologii*, rescensuit Curtius Wachsmuth, Vol. 1 (Berolini: Apud Weidmannos) 1884, in the section *Peri tes ouranou ousias kai diaireseos*, p. 200. It is noteworthy that *ether* is not used, and the ambiguity of *ouranos* will be discussed shortly. To anticipate one point: It is the *ouranos* rather than the *ether* that is being claimed to be "fiery," which is an important difference. The text is available at:

<https://ia800204.us.archive.org/16/items/joannisstobaeiano1stovuoft/joannisstobaeiano1stovuoft.pdf>

⁷⁶ Berryman, *op. cit.*, pp. 27-8; all emphases across her paragraphs are mine.

foundation, Aristotle's mature theory? The answer should be clear by the end, if not already, but let us finish first with Berryman's passage.

The simple boldfaced statements are the ones that, in my view, might be incorrect, for the following reasons. Proceeding in reverse: Although [4] might be plausible if the "fifth element" *somehow* were the "separate" divine and unchanging source *qua* Unmoved Mover, it would be utterly implausible on Broadie's "elemental" account that is "theoretical stronger" and on my own explanation of Aristotle's theological evolution. That is, the visible and hence *enmattered* "divine" ether, the fifth element, is the outermost sphere of the heavens but is certainly part of *visible* nature and is as "naturalistic" as anything else can be; in fact, nature arguably depends on it. Divinity is part of nature for the late Stagirite, not separate from it, as strange as this may be for moderns accustomed to "god" and "divinity" being supernatural. The two concepts need not be, and in some cases are not, identical.

[3] is perfectly correct as far as it goes but is irrelevant here because, to emphasize, the "divinity" of the ether and the eternal spheres on Aristotle's mature view (at least following *De Caelo* II 1 and the arguments above) is not a matter of being a "god" like the Unmoved Mover that is itself separate *and* incorporeal *and* that "thinks of itself thinking." Rather, analogous to Diogenes of Apollonia's divine air, the outer spheres are divine, always affecting if not determining the elements of the lower cosmos and ensuring *their* eternal movement.⁷⁷ Indirect evidence is found in *De Anima* unless the final statement is also presented as Aristotle's own view, in which case the evidence is direct, because, given the other Aristotelian texts noted already, like in *De Caelo*, it is at least his later view (as Broadie has effectively confirmed):

Alcmaeon...says that it [the *psuchē*] is immortal because it resembles the immortals; and that this immortality belongs to it in virtue of this ceaseless movement; for **all the divine things**, moon, sun, the planets, and the whole heavens, are in perpetual movement.⁷⁸

Immortality *and* divinity could be based, therefore, on omnitemporal movement and not, e.g., on a postulate of the Unmoved Mover *qua* God that thinks of itself thinking.

[2] involves a qualification, but whether or not Strato accepts or rejects the existence of the superlunary fifth element, the heavenly spheres are part of (physical) nature for the first Peripatetic.

⁷⁷ Alternatively, air is divine for Diogenes because it is "that from which all the rest come into being," as reported by Simplicius (G.S. Kirk, J.E. Raven and M. Schofield, *The Presocratic Philosophers*, Cambridge: Cambridge University Press, 2nd ed., 1983, first published 1957; p. 437) or because it is has reached everywhere and is in everything, including soul and intelligence (*ibid.*, p. 442). Aristotle's own divinity (in his later thought) need only be a result of similar, not exactly identical, reasons. Eternality and being the "originating first cause" of all motion would therefore suffice for the ether and the outermost spheres to be "divine" (e.g., *Meteorology* I 2, 339a24). Again, "first" here *cannot* be a kinetic, efficient cause but must be understood epistemically, that is, in terms of importance or priority.

⁷⁸ *De Anima* I 2, 405a29-b1; transl. J.A. Smith, in *The Complete Works of Aristotle*, ed. Barnes, *op. cit.*; my emphases.

This takes us to [1], which, however, need not undercut my thesis that the Stagirite evolved to the fifth element, because that evolution for Aristotle could be perfectly accurate *and yet Strato might still believe he has a better ontology than Aristotle's fifth-element theory*. At any rate, the Unmoved Mover plays no role whatsoever in all of this, my ongoing crucial theme.⁷⁹

Berryman also appears to suggest that the very short and ambiguous report by Stobaeus represents Strato's own view of the extreme heavens, which itself is palatable, but if she also implies that somehow the Aristotelian simple bodies of the fifth element are thereby unwarranted *for Xenarchus*, too, or *that the fifth element is thus not held by Aristotle as his mature ontology*, at least the latter implication would be unwarranted. Stobaeus only reports Strato's principle, and, for Aristotle, "heaven" (*ouranos*) is ambiguous, as *De Caelo* I 9, 278b10-21, reveals: It means either (i) the extreme outer circumference or the bodies contained there, or (ii) the lower cosmos including the moon, sun and some of the stars, or (iii) the entire combination. Which sense is Stobaeus using? It is unclear, and if Stobaeus only means that for Strato *either the lower cosmos (ii) or the combination (iii)* (of the outermost heaven with the lower cosmos) is fiery (but *only because* of the lower cosmos) this might be perfectly legitimate. However, it does not then follow that Strato need agree with Theophrastus in holding—if indeed Theophrastus really held the view—that *Aristotle himself* maintains the **outer circumference (i)** is fiery *qua pure fire*, and we have already noted a text in which the Stagirite seemingly denies that.

Even less does Stobaeus' cryptic passage have any bearing on whether the Stagirite in his mature days held the elemental view of the outermost heavens rather than the Unmoved Mover. Solmsen's position on the surface *appears* to be correct, as Broadie perhaps implies. Just as the nature of fire is to go up, at least to its limit, the nature of the outermost ether is to move in a

⁷⁹ Curiously and tellingly, the only remark that Berryman makes on the "first mover" in "Aristotle on *Pneuma* and Animal Self-Motion," *op. cit.*, is this: "Aristotle's cosmology is driven by the circular motion of the heavenly sphere (*Phys.* 8. 7, 260b25-8); the particular capacity of its first mover is to be able to initiate local motion in other things without itself being acted on" (p. 91). If "first mover" here means the Unmoved Mover of Lambda 6, then she is attributing a "capacity" to something that has no potential, which is implausible (given that "capacity" and "potential" are typical synonyms for *dunamis*). If "first mover" means the heavenly sphere, then her exact wording would apply equally well to what I claim is the final ontology as described by Broadie, the "fifth element," an ontology that has no soul for the outermost spheres *and yet that is also not affected by the lower cosmos*. The more important ramification is this: Any later Peripatetic who read, or heard, the ancient equivalent of Berryman's sentence might think that the Stagirite was referring by "first mover" to Pure Actuality when he was really referring to the fifth element.

At any rate, because Berryman juxtaposes Strato and Xenarchus in the passage just quoted, I am not sure whether her explanation also refers to Xenarchus. However, we can deduce that she holds, correctly, that *both* later Peripatetics dismiss not only the Unmoved Mover but the details of the fifth element. One ground at least for Strato appears (for Berryman) to be the suggestion by Theophrastus that for Aristotle the ether is a "pure fire." Yet this seems to be contradicted by *Meteorology* I 3, in which Aristotle says *Anaxagoras* thinks that the outer sphere is "pure fire," an account the Stagirite rejects in the same chapter as he begins to explore how the "interval" between the outermost sphere and the lower cosmos with the four elements should be described. (Aristotle also says in *De Caelo* I 3, 270b24-25, that *Anaxagoras* takes ether to be equivalent to fire.) Moreover, the Northern Greek in *Meteorology* I 1-2 has already carved out a clear distinction between the outermost ether and the region closer to earth where the four elements, including of course fire, reside, and he states his own view confirming this at I 3, 340b4-10. However, I promised earlier not to get involved in the intricate, difficult details of the mechanical interaction of the superlunary and sublunary spheres, so I stop here. For a more extensive treatment of those issues, including the ones pertaining to fire and especially related to Xenarchus, see also Hankinson, *op. cit.*

circle, forever. The minutiae of the interaction of the two regions at their boundary are difficult and perhaps for Aristotle inconclusive. However, Solmsen (and Berryman) have reversed the order of (formal) causation, if and when either suggests that the existence of a fifth element is *dependent on a corresponding simple motion*: Just as an individual is not human *because* it breathes but breathes *because* it is human (considering that dogs breathe also), so Aristotle may, and does, hold that the simple motion is *dependent on a corresponding element*. Just as we experience and deduce the qualities of the other four elements, so we experience and deduce the qualities of the fifth element. Indeed, he states that the simple bodies possess "a principle of movement in their own nature" (*De Caelo* 1 2, 268b28).

If, therefore, Xenarchus was using the text to which Stobaeus refers, he could have had the same interpretation as Berryman and thus denied not only the "incorporeal causes" (whatever those are for him) but the fifth element *because* he somehow considered Aristotle holding the element to be "fiery." Does, however, the phrase "incorporeal causes" include the singular Unmoved Mover of Lambda 6? Probably but not necessarily: The phrase could refer to the immaterial causes of the *Physics* only. Optionally, the phrase could refer only to Lambda 8 and its (minimum of) 47 unmoved movers, a chapter that might have been standing by itself (even if eventually incorporated by Andronicus into the rest of "the corpus"), for reasons that Jaeger gives.⁸⁰ Again, on Merlan's view, which has been accepted by some very prestigious scholars, the unmoved movers in Lambda 8 are also immaterial for the Northern Greek.

I examine Xenarchus more below but let us finish with Strato and some final thoughts that Berryman's treatment inspires. Although not likely, is it possible that the third head of the Lyceum was unaware of Aristotle's evolution in theology, from the Unmoved Mover *qua* "God" to the fundamental ontological principle that The All was necessarily eternal in its own right, Strato's own position (again, leaving aside differences in detail)? Readers might immediately scoff at this suggestion but the historical account suggests at first blush that Strato was not even in the favored, innermost circle of Theophrastus' leadership. The combined library of the first and second heads were bequeathed by the Lesbian to Neleus, *not* to the philosopher from Lampsacus. There is no disputing this, even if some dispute (and badly in my view, as I have argued previously) that the combined library was corrupted in Scepsis.⁸¹ Why would the library *not* have stayed in Athens

⁸⁰ Jaeger, *op. cit.*, especially Chapter XIV, "The Revision of the Theory of the Prime Mover," and pp. 343-344.

⁸¹ Falcon offers mixed support for the associated history, saying: This story has been dissected and examined *from every possible angle and its various elements have been endlessly discussed*. Here suffice it to say that no one any longer believes that the story—which need not be pure fiction—can *adequately explain the sudden decline of the Peripatos right after the death of Theophrastus*, or the fact that Aristotle's physics does not seem to have made a dent in the debates of the Hellenistic period (Falcon, *op. cit.*, 2012; pp. 185-186; my italics).

I have examined the issues primarily relative to whether the *Dramatics* and *some* other texts could have been corrupted at Scepsis and badly repaired by Apellicon's agents. The "sudden decline of the Peripatos" is a very different issue, and Falcon's citing Epicurus having access to one text (or even a few texts) hardly changes my picture, as I discuss in *A Primer*, *op. cit.*, espec. pp. 264-78, with Epicurus briefly discussed on p. 270. It is foolish for anyone to say *or suggest* that either (i) *all* texts had been corrupted at Scepsis (with *no* copies of any of them having been distributed while the library was still in Athens) or (ii) *no* manuscripts

unless there was mistrust or some other serious problem with the transition to Strato? As I discuss at the end of my book, maybe it was only a very "inner circle" that knew Aristotle's "dangerous" view, namely, that God is a rhetorical front for political expediency, or, alternatively, maybe Strato was part of the inner circle but so unapologetically atheistic that he would jeopardize the existence of the Lyceum in an often viciously religious Athens, of which more in a moment.

The most important, precise issue, therefore, is whether Strato knew that the mature Aristotle was the source of the fundamental ontological principle that Strato himself (and Theophrastus) accepts, namely, that The All is necessarily eternal, howsoever the thinker from Lampsacus cashes out the details, be they issues of overall structure, teleology, materiality, or action. Let us assume he knew. Was there any reason, though, to broadcast in his own writings the fundamental ontological principle *as Aristotle's truly mature view*?

A host of reasons exist why the answer is negative and I offer only a few here. Theophrastus had already rejected the Mover on many scholar's interpretations and it would have been common knowledge within at least the Lesbian's inner circle that Aristotle's later view involved the necessary eternality of The All. Why then publish the obvious? Alternatively, let us assume, again, that Strato had been in the inner circle and stipulate further that he could finally have published theological doctrine without fear after the Lyceum re-opened, after its year-long closing during Theophrastus' leadership, when Athens shortly after 307 BCE passed a law requiring the schools to have a government license.⁸² Still, Strato would have had no reason to complicate or lengthen his ontological texts by attributing its source to Aristotle. In fact, as the following shows, he may have had reason *not* to give Aristotle credit, even where credit was due.

Perhaps Strato did not want to remind Athenian readers of the very influential Macedonian who had been in their midst until 323 and of the ensuing hatred because of Macedonian subjugation. Perhaps he was annoyed that the "crown jewels," the esteemed libraries of the first two heads, had not been left with him, which might well have contributed to the Lyceum losing some of its reputation. Perhaps he decided to take as much credit as possible for a powerful ontological

had been corrupted at Scepsis (and that they returned pristine or had copies of *all or most* of them already distributed in Athens before Neleus left). There are a number of possibilities if one claims, as I do, that *some* texts had been corrupted and *some* had copies distributed before Neleus hauled the combined library to his hometown. "Endless" is much vaster than Falcon seems to recognize, although probably he only uses the term rhetorically, and, in any event, although I cover the ancient Greek sources and some of the modern treatments of the "endless" discussion, I seriously doubt that he and the others have covered my "possible angle," as discussed in *A Primer*. In my mind, the best summary, which, as a *summary*, may agree with others, is that the whole library was taken to Scepsis, with only about 20-30 books having been copied and distributed already; damage to at least some of the texts and probably to many occurred in that town in modern Northwestern Turkey; and the repair, including assemblage into "units," was, following Strabo, too hasty and done more to get the books on the market, whether in Athens (back to the Peripatetics for payment) or in Rome, than to ensure philosophical integrity. The repairs only had to be somewhat plausible to make the books legitimate and thus worth buying.

⁸² In some ways, obtaining a government license was the progenitor of our university accreditation but with the added, much more serious twist that a philosopher could apparently be exiled or put to death if he did not follow the law,—think Anaxagoras and Socrates, to name just two, who presumably were used as justification for the law to be passed. Nowadays, if you are not accredited, obviously you cannot award proper degrees, but you can still run the educational business and spout your ideas without fear of government agents taking you to jail where you might have to drink hemlock.

doctrine that at least most other schools of philosophy shared even if from different influences (and by "powerful doctrine" I mean only the most important principle, namely that the physical universe as The All, *contra* Plato of the *Timaeus*, was not created and was eternal, and, secondarily, that it was divine on account of its eternality or the like, not on account of anthropomorphic qualities). With Aristotle's (and Theophrastus') library gone and eventually hidden underground for *many* decades, who and what would contradict him? In Shakespeare's *Much Ado about Nothing*, Leonato says:

there has never yet been a philosopher who could endure a toothache patiently, even though *they all write as if they had risen above human suffering and misfortune*.⁸³

Anyone who believes that all philosophers are so wise as to be above vanity or (a proper) pride, righteousness, desire for justice or revenge, annoyance, a concern for fame, fitting assurance of reputation, or the like are subject to Leonato's rapier, and the ancient Greek thinkers, no matter how sublime, were liable to human emotions also. Yet let us leave aside emotions and pretend that the ancient Peripatetics were *perfectly* reasonable and ethical, always.

Strato not mentioning Aristotle was perhaps very clever, or, if that suggests deviousness, very apropos. Strato never claims, to my knowledge, that he is the first ever to countenance the necessary eternality of the universe, and thus technically he does not plagiarize. Also, he changes Aristotle's view of the fifth element. This means that Theophrastus should have received credit instead were Aristotle to be ignored, and, thus, if we are going to ask why Strato does not credit Aristotle, we should ask why the third head also does not credit the second head. In any event, no one knows the future and even Strato could not anticipate what would happen to the writings of the Stagirite and of the Lesbian after the immense political upheavals from 323 BCE onwards and after Neleus expatriated the libraries. Many other options exist, and I offer only one more for our purposes: As I discuss in detail in the next digital extension, Aristotle himself seemingly adopted the (necessary) eternality of the universe from Alcmaeon of Croton or from the Milesians without crediting them *in this regard* in the Stagirite's own extant texts.⁸⁴ That is, the Stagirite with his mature doctrine of the fifth element can be rightly perceived as only *modifying* a Presocratic view, not offering something completely different, radical or *ex nihilo*, and the fact that the Presocratics did not understand Aristotle's precise sense of "necessary" is irrelevant: Given that the ontological sense simply (if powerfully) associates "necessary" with eternality, the Presocratics could be said to have *intuited* the necessity by asserting the eternality, despite them not having disambiguated the precise senses of the modal term. Hence, unless we are missing texts in which Aristotle acknowledges someone like Alcmaeon providing the rough foundation for his own, more mature theory, it would be perfectly consistent with the Stagirite's own parsimony for Strato *not* to credit the first head of the Lyceum.

⁸³ Act 5, Scene 1, lines 35ff; a modern rendition of Shakespeare's original.

⁸⁴ On the topic of thinking versus sensation, Guthrie discusses Aristotle on Alcmaeon and writes: "Aristotle not only sides with Alcmaeon, but like him cites as evidence the superiority of man to the other animals. That he does not mention Alcmaeon by name may be accidental (*he is in general annoyingly parsimonious with references to particular predecessors...*)" (*Vol. I: the earlier Presocratics and the Pythagoreans of a History of Greek Philosophy*, *op. cit.*, p. 348; my italics).

Finally, given that the Peripatos lost its single leader after Lyco, Strato's successor, and became a shell of its former self, "the Peripatetic view" is a serious misnomer. There could have been many Peripatetic philosophies, only sharing an origin and, for instance, the spirit of empiricism coupled with logical analysis, but differing as much in detail as Strato's celestial physics differs from Aristotle's. The next, and only extant example to my knowledge, of a relevant "Peripatetic view" regarding the Unmoved Mover before Alexander pertains to Xenarchus following Strato by rejecting "incorporeal causes." Let us switch therefore from Berryman to Falcon, who digs deeper into the related topics.

Falcon on Xenarchus (Alexander, Julian, Simplicius *et al*)

Given the above, it *appears* that Xenarchus did not accept the Unmoved Mover of Lambda, assuming he had known about *it*. Did he reject it specifically, though, or only the plural "incorporeal causes"? To reiterate, this label could represent (i) the minimal 47 unmoved movers of Lambda 8 or (ii) those causes combined with the Pure Actuality of Lambda 6 or (iii) the unmoved movers of *Physics* VIII 10 that ostensibly have neither magnitude nor parts nor divisibility, or (iv) a combination of any or all of these three options from the two treatises (I say "ostensibly" because I have given evidence previously for why "neither magnitude nor parts nor divisibility" might have been wrongly interpolated into VIII 10).

The primary (bifurcated) question now is whether Xenarchus even knew about the Unmoved Mover of Lambda 6 and, if he did, whether he considered it important enough to discuss. The answer seems to be no, for the following three reasons: The testimonia show him working only with *De Caelo* in the domain of physics; he gives no argument that addresses Lambda 6 *per se*, unlike Plotinus, who, as we saw earlier, definitely addresses Lambda; and his focus on love shows no application whatsoever of that important phenomenon to how the outermost spheres move, which, given his evaluation of Aristotle, would be a grave and puerile error were the outermost spheres moving eternally in a circle in accord with *Lambda*, that is, *because* of the *love* of the spheres (for the Mover *qua* God). Let us examine these reasons in more detail.

According to Falcon, our understanding of Xenarchus comes primarily from Simplicius, who himself reports Alexander of Aphrodisias' own account of Xenarchus in a commentary on *De Caelo*.⁸⁵ Falcon collects the testimonia and there is no indication whatsoever that the *Physics* and the *Metaphysics*, especially *Lambda*, were read by the first century Peripatetic, assuming he was truly a Peripatetic. Falcon covers some of the disputes regarding this last topic, but I grant for the sake of argument that Xenarchus was Peripatetic in spirit, at least at times. Whether he had access to the texts that Andronicus of Rhodes compiled is an open question, which Falcon discusses, but if the Seleucian did, it is baffling why he did not address the arguments from at least the *Physics* on celestial movement when he attacks the Stagirite's view of the fifth element. We can easily understand why Lambda 6 did not enter a sophisticated criticism of the celestial *mechanics* of the fifth element, but why not Lambda 8 or the *Physics*? Xenarchus implicitly suggests that the fifth element was Aristotle's mature position, of which more below when I deal with love. That is, the Seleucian's focus only on the fifth element indirectly confirms the position that I adopt from

⁸⁵ Falcon, *op. cit.*, 2012. I am grateful to Berryman for recommending this work; see her own related "Book Review": Sylvia Berryman, *Aestimatio* 10 (2013): 163-165.

Broadie. Again, all of the testimonies regarding "physics" reveal Xenarchus concentrating on *De Caelo* (see Falcon, pp. 68-70), and the "incorporeal causes" that he rejects may refer therefore to the doctrine in *De Caelo* I 2-3:

On all these grounds...we may infer with confidence that there is something beyond the bodies that are about us on this earth, different *and separate* from them; and that the superior glory of its nature is proportionate to its distance from this world of ours.⁸⁶

Whether or not Xenarchus fully understood the ramifications, the rest of I 3 discloses, though, that it is the ether which is "divine," consistent with the elemental view of Broadie and myself. Moreover, "what is separate" need not mean "incorporeal" but simply "in a different region," analogous to my arm being separate from my torso (but, thankfully, still attached to it). Indeed, as shown before, Aristotle rejects an ensouled "god" in *De Caelo* II 1, and divinity there is not anthropomorphic.

The whole issue has been complicated because the Northern Greek appears to accept a "god" in other parts of *De Caelo*, e.g., at II 3, 286a9-12.⁸⁷ However, this acceptance appears to be rhetorical for Aristotle, as I have argued in Part 2 of my book concerning other occurrences of *theos* in the corpus. Even Simplicius takes the use of "god" here in II 3 to be simply "divine," which is perfectly consistent with the "elemental" view of the outermost spheres being divine (*without* thereby suggesting a soul, mind or life). As Guthrie comments:

Simpl. feels bound to remark here that by *theos* A. means no more than the *theion sōma*. In fact A. is using the word quite generally to mean the highest divinity. ***This however for Simpl. could only apply to the incorporeal unmoved***

⁸⁶ *De Caelo* I 2, 269b12-16; Aristotle is somewhat clearer, but still ambiguous in I 3 when he adds: ...all men have some conception of the nature of the gods, and all who believe in the existence of gods at all, whether barbarian or Greek, agree in allotting the highest place to the deity, surely because they suppose that immortal is linked with immortal and regard any other supposition as impossible. *If then there is, as there certainly is, anything divine, what we have just said about the primary bodily substance was well said* (270b5-11; my italics).

The problem, as I show partly in this article and in previous publications, is that *De Caelo* has inconsistent views in different chapters, and the Unmoved Mover was called the "primary substance" in Lambda 6. Thus, any reader of the Aristotelian corpus, Xenarchus included, has to choose which stance will be attributed to the Northern Greek, unless one writes a full commentary on the treatise, which Xenarchus obviously did not do, and explains the discrepancies. It would be easy to take the "bodily" in "*primary bodily substance*" in I 3 as a figure of speech, or to ignore the "bodily," or to take "what was well said" to mean something still permitting incorporeal entities in another part of Aristotle's overall scheme.

⁸⁷ Given my previous publications, the inconsistencies in various texts should hardly be a surprise, and Jaeger a century ago had already said:

Later on Aristotle used his hypothesis to construct a cosmic physics without star-souls or mythical additions. We now have the later view fully developed in the first book of the *De Caelo*, which makes an impressive beginning with the new doctrine; *it is not too rash, however, to assert that this lecture has undergone later alterations, and that in its original form it belongs to the period when the notion of ether was new* (*op. cit.*, p. 154).

mover, and the coincidence of the term *theos* here with *ouranos* is another indication that ***the unmoved mover was not a part of A.'s theology***.⁸⁸

Assuming, as I do, that Guthrie reports correctly, Simplicius is quite right on the first point, with *theos* in this context really only meaning "divinity," which is also applicable to the fifth element (*sans* soul). However, Simplicius is wrong on the second and third points, namely, the bolded sentences in the quotation, because, given II 1, Aristotle had *dropped* the Unmoved Mover by this point. Ironically, though, the claim that "the unmoved mover was not a part of A.'s theology" is true, but only insofar as we restrict ourselves to *the mature Stagirite*, and such a restriction was obviously not Guthrie's (or Simplicius') intent.

Especially given *De Caelo* II 1, in which gods are rejected by Aristotle, any other occurrence of "god" as something anthropomorphic, such as "the (living or blissful) gods," must have been the youthful Aristotle. Alternatively, and at the worst for my interpretation, the passages were kept or written by the mature Stagirite as mere rhetoric, to assuage the needs or deflect the threats of religious listeners or readers. Again, as I have argued, *theos* may even be used rhetorically in Lambda 7, because having a life of "bliss" is absolutely inconsistent with a Pure Actuality that has *no* potential. Nevertheless, like modern scholars—including, as we just saw, Guthrie and Falcon—Xenarchus may have assumed that "what is separate" (and "divine") in *De Caelo* is *God as an incorporeal cause*.

Because he clearly rejects incorporeal causes, Xenarchus may not have cared to expend *any* effort to discuss the differences between any "incorporeal cause" of *De Caelo* and those of Lambda and *Physics* VIII, even assuming he had first-hand access to the latter two books, which apparently was not the case. Also, the Unmoved Mover may have been only part of a misunderstood oral tradition by his day, considering that Theophrastus arguably did not embrace it and that Strato completely ignored it. Why would later Peripatetics resurrect the doctrine? To underscore, even if Xenarchus had first-hand access to *Lambda*, why the emphasis on arguing instead in a very sophisticated fashion against the fifth element on strictly physical grounds, as if "mere physics" was the crucial consideration? In that regard, let us look more at him relying on the helix to argue that there should be, for Aristotle, a sixth body or element (and thus that Aristotle's theory of a maximum of five simple bodies or elements is problematic), all of which reflects no concern at all for the Unmoved Mover. The reader should go to Falcon for the details; here I only cover the basics and why helical motion causes Xenarchus to reject Aristotle's fifth element before I examine love and its own role, or better yet, lack of role in this arena for the Seleucian.

Everyone in this debate agrees that the four elements have their own *simple* straight-line movement (up for fire and air and down for earth and water) and the fifth its own, *simple* circular movement for the ether. Aristotle typically subdivides types of motion into circular and straight (e.g., *Physics* IV 9, 217a19-20), even if he sometimes adds "twirling and carrying" (which for him are reducible to circular and straight). Apollonius of Perga, 75-100 years after the Stagirite, proposed that the helix or a helix-type line was also simple, which means for Xenarchus that there

⁸⁸ W.K.C. Guthrie, *On the Heavens*, with an English Translation, in *Aristotle in Twenty-Three Volumes* VI (Cambridge, MA: Harvard University Press) 1986, first printed 1939; pp. 148-9; my emphases.

should be a third option to not only Aristotle's two geometrical paths, straight and circular, but to their corresponding types of motion.⁸⁹ A helix-path was inspired seemingly by a line drawn across *and around* a cylinder (and similarly the line would occur if we were holding a marking device steady as the contacted cylinder moved past the marker *while turning*).

As Falcon states:

Xenarchus objects that if we cannot rule out that the **cylindrical helix** is a simple line, we cannot rule out the existence of yet another simple motion, the motion that a body performs in moving along the spiral. **Following Aristotle, we will have to conclude that there exists an additional body *beside* the five bodies performing that simple motion.**⁹⁰

Thus, Xenarchus concludes, Aristotle's ontology is deficient because it only acknowledges five (simple) bodies or elements. Xenarchus' replacement theory in this regard is unable to be precisely determined, according to Falcon (p. 42), although Falcon concludes: "...his reworking of Aristotle's physics is fully compatible with a commitment to the eternity of the natural world" (p. 45), in contrast to the explanation that Falcon, like everyone else in modern times, *has expected*:

...the explanation of circular motion is not *ipso facto* the explanation of celestial motion. *On the contrary, at least in the Peripatetic tradition, a psychological cause is typically invoked in the explanation of celestial motion.*⁹¹

As we have seen throughout this digital extension, the texts do not license Falcon's final claim. Although mere circular motion admittedly may not be sufficient in and of itself to explain celestial motion, all Aristotle needs to add, since we actually see, and human records confirm, the association of circular with celestial motion, is the condition "in virtue of its own nature" or "eternal." This last condition, entailing ontological necessity, rules out sublunary (finitely existing) circles, and I have already delved into this issue earlier with respect to motion as an essential characteristic of nature (and primarily of the heavens) or as an "eternal accident" that is necessarily entailed by the essence of nature. "The Peripatetic tradition," even including Theophrastus, did *not* invoke a "psychological cause" (namely, love) to explain circular celestial motion. Causal love, as a "tradition," was only in the youthful Stagirite's Lambda. We can counterbalance further the imputation of psychology not only with the arguments I have given over two years but with an additional remark that I have never cited, from *Physics* IV: "...regular circular motion is *above all* the measure, because the number of this is *the best known*."⁹²

⁸⁹ Falcon says: "From Proclus, in his commentary on the first book of Euclid, we learn that the cylindrical helix was shown to be a uniform line by Apollonius of Perga (second half of the third century BCE). This discovery initiated a debate on the nature and number of simple lines that continued at least until Geminus (first half of the first century BCE)" (p. 76, *op. cit.*). For additional details on a seeming condition for a simple line or motion, congruence, and whether the helix qualifies, see also Hankinson, *op. cit.*, espec. pp. 23-24.

⁹⁰ Falcon, *op. cit.*, p. 80; my bolding.

⁹¹ *Ibid.*, p. 41; my italics.

⁹² *Physics* IV 14, 223b18-19; my italics.

I might add now that there is marked confusion in the whole area of what movement of a helix, or path on a helix, really means, in part because "cylindrical helix," to use Falcon's phrase is ambiguous. For those going to the original texts and to Berryman, Hankinson and Falcon concerning this whole issue, I offer more in the Appendix, showing how not only the ancients but people to this day still discuss 3-dimensional *movement* in various ways, without recognizing the ambiguities. I also discuss whether Xenarchus was better positioned to be aware of the ambiguity as a result of, e.g., the Antikythera Mechanism (that helped predict eclipses and planetary alignment), but how even that mechanism or its reputation *or other celestial models* would not have been relevant to the important philosophical issues. However, these complications are not required for the fundamentals of my current argument. That is, the *lack* of any relevant discussion of love and of the Unmoved Mover on the part of Xenarchus *to explain the celestial movement*, what Falcon calls the "psychological cause," help reveal that Xenarchus did not consider Aristotle to have seriously promulgated the Mover as *the* cause of celestial motion. Let us confirm this with a few final remarks, at this current level of detail.

Some thinkers like Alexander contested that the cylindrical helix is really a simple figure with a corresponding simple motion, and Xenarchus arguably should have done the same.⁹³ The helix *can* be considered complex—a combination of straight and circular—because, for example, we can draw a straight line *across* a cylinder (as if one were ready to bisect it) but not around it, which entails that the straight line and any motion following its path has no additional circular aspect. One need only look at one of the cylinder's straight-line edges when one sees a silhouette of it, similar to looking at the horizon. At any rate, in a spatially finite universe, as holds for Aristotle, we could not have infinite motion along the path of a cylindrical helix, whether it is simple or complex, because the cylinder *functions* as a straight line, as we see more in the Appendix with diagrams, and eventually the associated motion would hit the limit of the universe. For the Stagirite, motion in some type of (pure) circle, *with no rectilinear component*, is the only kind of continuous motion that can be eternal *in a finite universe* (on the obvious assumption that the circumference of the circle is not greater than the dimensions of the universe), given the *Physics*.

Xenarchus *could* have considered the option that the cylindrical helix is twisted to return to its starting point, like the "slinky toys" some of us had as youngsters *or like twisted rope (or hair)* that the Greeks were surely familiar with, formed into a loop. Then, admittedly, any associated spiral motion might be truly "circular" in the necessarily relevant manner and thus possibly infinite in finite space.⁹⁴ However, now we have *additional* complications for any Unmoved Mover causing grand circular movement *rather than* pirouettes in place (of the outer bodily spheres) *because* of the love of the outermost spheres: Why does the love not cause *circular*

⁹³ See Falcon, pp. 34-5 and 75ff; also p. 101 for why the helix is not a simple shape or movement for Alexander of Aphrodisias.

⁹⁴ We presumably run into dilemmas with the view that the helix was simple *and that all parts therefore have to be in the same relation to each other*, or "congruent," because a slinky toy or a braided rope in a circle will have parts of the helix that are narrower on the inside of the "donut" than the parts on the outside. Again, though, I stay away from the intricate details of the geometrical theory, as was discussed in the final couple of centuries BCE and as both Falcon and Hankinson recount. The general, basic points suffice for my concerns.

(*cylindrical*) *helical* movement rather than the other kinds of circular movement that I have discussed previously?⁹⁵

In brief, even though Xenarchus writes about love and desire, he does not apply those concepts to Lambda, which is a stunning omission given that love in Lambda provides the cause of eternal motion. The omission is doubly remarkable given that, according to Falcon, Xenarchus focusses also on the *Timaeus*, in which psychological considerations like intelligence in the context of celestial ontology is rampant (e.g., 34b). Love there is also the second-most important characteristic of souls, including star souls and human souls (42a).⁹⁶

We should be crystal clear on this issue: The helix *complicates* the issue of eternal circular-*type* motion, but the easier options pertaining to motion *without the helix* are still devastating in and of themselves to the theory of the Unmoved Mover. Xenarchus does not even have to consider helix-*type* movement if the reason for the eternal motion of the outer spheres is a *psychological* one, namely their love for the Unmoved Mover (or their own unmoved movers, if the plurality of spheres in Lambda 8 is the topic). The love, rather than a theory justifying a correspondence of an element with a simple motion, presumably explains the puzzle, *at least fundamentally*, and the secondary details would then be built on *that* foundation.

In summary: Any reasonably rigorous criticism of the Stagirite by Xenarchus would have to account for how love causes at least one kind of circular or spiral motion, no matter how many elements exist. Arguably, if Lambda applies, we can ignore straight motion *and* helical motion because the loving eternal spheres for whatever reason do not care about *those* kinds of motion; *somehow*, they are intelligent enough to have anticipated, for example, *Physics* VIII 8, where Aristotle argues that rectilinear motion cannot be eternal and *somehow* they have intuited that loving an Unmoved Mover restricts them from moving directly in a straight line to where the Unmoved Mover might be thought to be, unlike human love, when love often causes the lover to go straight to the beloved. (However, maybe the outermost spheres are so stupid that they do not realize that the Unmoved Mover cannot have location, so they keep moving in a circle hoping to

⁹⁵ In the previous digital extension, I considered the oval or ellipse to be "circular." Aristotle denies that the whole heaven *qua* sphere could be oval-shaped, or anything other than a perfect sphere (*De Caelo* II 4, 287a12-23); likewise, the stars are spherical. In many ways, his arguments follow Plato's *Timaeus*, with the sphere, e.g., having only one surface. (Curiously, unless I blinked when reading that difficult work, neither thinker considers that an egg also has only one surface but is not perfectly spherical.) In any event, to be clear, we should distinguish between the shape of the object that is moving and the path that it moves along. As I discuss more in the Appendix, Plato's and Aristotle's colleagues in, or visitors to, the Academy, like Eudoxus of Cnidus, had already recognized retrograde motion of various stellar bodies, and thus "circular" movement needs to be understood broadly, as not requiring a simple, perfect circular path; otherwise, retrograde motion, which is like a curlicue, would be excluded. Nevertheless, my goal in undercutting how love causes circular heavenly motion can be achieved by assuming only two kinds of perfectly circular movement: a large circle and a spinning in place that Plato describes in *Laws* X 898a as being the best type of circular movement.

⁹⁶ Falcon, *op. cit.*, pp. 68-69 and 150ff, especially 156. Falcon does not suggest that Xenarchus agrees with Plato but agreement or disagreement is irrelevant. Xenarchus would have become aware of the Platonic psychological considerations in the realm of theology, which would have highlighted the Aristotelian similarities and dissimilarities.

find it somewhere, sometime, *ad infinitum*. What does Alexander Pope pen—"hope springs eternal..."?) In any event, different kinds of circular motion exist, and helix-type motions, howsoever they are conceived (simple or complex), only adds another variation. Although not conclusive in and of itself, Xenarchus' lack of concern for love in this whole issue is therefore still more evidence that the (love of the) Unmoved Mover of Lambda was not considered by Aristotle to be important.

The most compelling reason, I continue to assert, for Xenarchus ignoring the Unmoved Mover is that the fifth element *per se* was considered Aristotle's most mature view, which is why the Seleucian or anyone else proposing a relevant advance on Aristotelian ontology—like Strato in his own way and the other schools of philosophy in theirs—would only have to address the fifth element, either explicitly *or implicitly*, by providing a better *celestial mechanics*. Love can be left to ethics, biology and psychology, *pace* Empedocles. Even leaving aside love, Xenarchus ignoring the Unmoved Mover, were it really the Stagirite's mature ontology, would be even more remarkable considering the Seleucian's focus at times on the *Timaeus*. Aristotle's doctrine of the outer spheres moving in a circle is almost identical to Plato's same doctrine, as I mentioned in, e.g., footnote 23. Xenarchus' concern with Plato's treatise is raised by Proclus, all of which entails that Xenarchus would have pre-dated Proclus (and Plotinus also) in criticizing any Aristotelian (incorporeal) unmoved mover. Yet then another oddity surfaces: At least to my knowledge, Proclus never refers to Xenarchus' own criticism of the Unmoved Mover, which is puzzling if in fact the Seleucian had indeed disparaged the "incorporeal cause" of Lambda in any depth during any discussion, whether directly related to the *Timaeus* or not.

Let us finish with another discussion of Aristotle's fifth element, as juxtaposed with incorporeal and intelligible substances, by examining Julian (331/332-363), the last pagan Roman emperor. Julian helps establish the relevant *medieval, Renaissance and modern* tradition, *viz.*, that Aristotle employs an incorporeal Unmoved Mover to explain eternal motion, a doctrine that Falcon assumes himself, like virtually everyone else *after* Alexander and Plotinus. Is Julian trustworthy, though, in this respect? Falcon translates the following passage from the emperor:

But we see, says a clever Peripatetic like Xenarchus, the body that is fifth and has circular motion as cause of these things. *Even Aristotle made a fool of himself in inquiring and fussing about these things, and so too Theophrastus*, who certainly did not know what he himself had said. Take the way that when [Theophrastus] reached the incorporeal and intelligible substance, he stopped *without fussing over the cause*, but with a statement that this is how these things *naturally* are—but, of course, *in the case of the fifth body too* he should have assumed that this was how it *naturally* was and not gone on to inquire into the causes, but *should have stopped with these things and not squandered himself on the intelligible*, since [the intelligible] is *by nature* nothing in its own right but pointlessly *sustains a piece of guesswork devoid of meaning...* These are the *sort of things* Xenarchus says, *as I remember having read (Oratio 8 [5] 3, 107.7–108.1).*⁹⁷

I leave aside Julian relying on memory and indicating that Xenarchus' accounts are (only) the "sort of things" rather than, apparently, the precise things that Xenarchus wrote. I also leave aside

⁹⁷ Falcon, *op. cit.*, pp. 123-4; my italics.

the complications regarding Theophrastus after one remark, because they do not impact my thesis. Falcon explains this whole issue, and the complications amount to the view that Aristotle and Theophrastus (or anyone else) should *consistently* seek a "first cause." That is, if either of the earlier Peripatetics need not seek the cause of the *intelligible* ground of the universe, why seek the cause of the *physical* ground of the universe, namely the fifth body?⁹⁸ Presumably the "first cause," *whatever* it is, is uncaused or needs no additional explanation, and although Julian does not say this, or attribute it to Xenarchus in the passage above, one reason is that continuing to ask for a ground triggers an infinite regress. The crucial issue here, though, is that Julian simply suggests the "squandering" occurs by not assuming the sufficiency of (the nature) of the fifth body and by (foolishly) continuing onto the intelligible as a more fundamental cause. In other words, the precise reason for Xenarchus rejecting the incorporeal intelligible (according to Julian) is not a possible infinite regress but "pointlessly" sustaining a "piece of guesswork devoid of meaning." This is in effect one objection I have published before: The Unmoved Mover was a clever guess that was concocted, following the similar "Unmoved Movers" of Anaxagoras and Xenophanes, to solve a Platonic metaphysical problem, but it is a phrase that posits what really needs to be proven, like a mythical goat-stag. Moreover, it appears that Julian assumes Xenarchus to believe that Aristotle held *both* a fifth element and an incorporeal Unmoved Mover, conflating two incompatible ontologies.

Falcon's own account adds some additional, enlightening particulars:

Xenarchus reportedly said that both Aristotle and Theophrastus were ridiculous in their attempts to go beyond the physical world in order to study this principle [namely, as *Falcon* construes it, the transcendent unmoved cause of the motion of the heavens that has "no magnitude, is partless, and is indivisible," which only comes from *Physics* VIII]. This claim can be taken as evidence that Xenarchus, **in opposition to Aristotle and Theophrastus**, conceived of the physical world as the totality of what there is. **It can also be taken as an indication that, at least for Xenarchus, physics had the resources to fully explain the physical world.**⁹⁹

...
Julian was the last pagan Roman emperor. The oration *To the Mother of the Gods* was composed in 362. In this passage, Julian is concerned with the view that an **adequate explanation of nature is not possible** without appealing to an intelligible reality. **In antiquity, Plato and Aristotle were rightly regarded as the champions of this philosophical position. Although they developed different and mutually incompatible conceptions of the intelligible world, both invoked *extra-natural* principles in their attempt to explain the natural world.** I hasten to add that Julian does not regard Plato and Aristotle as offering mutually incompatible accounts of the intelligible world. **On the contrary, his view is that they developed a single philosophical position.** More specifically, Aristotle's philosophy is regarded by Julian as incomplete if it is not brought into agreement with that of Plato. The Platonic/Aristotelian position is presented by Julian as the view that hyl-

⁹⁸ On this topic, see also Lefebvre, *op. cit.*, 2017, pp. 73-74. A modern equivalent of this idea is the renowned astronomer Carl Sagan noting that, if people have the courage not to wonder where God came from, they should have the courage not to wonder where the universe came from.

⁹⁹ Falcon, *op. cit.*, p. 188; my bolding.

morphism does not suffice for an adequate explanation of nature. There must be a cause distinct from matter and form that accounts for their combination in the hylomorphic compounds. This cause is not merely thought to be an additional principle alongside matter and form. Rather, it is conceived as a principle categorically different from matter and form.

... Xenarchus appears to be committed to the view that we do not need a higher causal principle because we already have a *natural* cause that accounts for the regular combination of matter and form: the body that moves in a circle.¹⁰⁰

Working from the top down: As we saw before, there is no evidence that Xenarchus read the *Physics* and knew about the Mover being without magnitude, parts and divisibility. Again, the later Peripatetic worked apparently only from *De Caelo* in this context. Also, on the account of Devereux *et al*, Theophrastus only went beyond the physical world as an *aporia*, and even he, already before Strato, had accepted The All as being "natural" in and of itself (with no Unmoved Mover). Thus, Xenarchus has a very distorted view of at least Theophrastus, *assuming* Julian and Falcon are correct in their assessments. Yet, if Broadie's elemental theory and my own interpretation are correct for Aristotle, there was no opposition between Xenarchus and the earlier Peripatetics, whether Xenarchus recognized it or not. Nevertheless, as I have briefly discussed in my book (pp. 288-9), physics may cover the whole physical world for the mature Aristotle but there still may be metaphysical issues that do not involve positing an Unmoved Mover, e.g., do Forms or Ideal Numbers exist? To put this another way, arguing properly *against* the existence of (an "extra-natural") God is still theology; it is not science, even if subordinate empirical considerations are brought to bear.

Returning to Julian, we need not question that in antiquity Plato and Aristotle were construed as offering "extra-natural" principles for explaining the physical universe. However, obviously I maintain that this description only holds for Aristotle in his early career, insofar as he was still greatly influenced by his Athenian mentor, similar to him accepting Platonic catharsis in the Stagirite's *early* dialogue *On "Musical" Composers aka On Poets*. This Platonism is in contrast to Aristotle relinquishing catharsis by the time of the later *Dramatics*, despite the mistaken tradition of the last 1000 years.¹⁰¹ If I correctly assess that the Stagirite dropped the Unmoved Mover by

¹⁰⁰ *Ibid.*, p. 124-5; his italics but my bolding.

¹⁰¹ The most rigorous arguments regarding catharsis not being authentic in the definition of "tragedy" in Chapter 6 are given in my *Aristotle on Dramatic Musical Composition: The Real Role of Literature, Catharsis, Music and Dance in the POETICS* (New York: ExistencePS Press) 2018, 2nd edition, based on articles published by Cambridge and Oxford that have been accepted in print by a number of specialists on three continents after more than ten years of exposure. I mention this in part because I expect that all, or almost all, readers of an abstract of the "Not to Fear" Proof will initially and utterly disbelieve that the Unmoved Mover was only established to be Aristotle's (mature) position half of a millennium after the Stagirite, on a foundation of quicksand, namely, Alexander's and Proclus' positions. Too many generations have accepted the Unmoved Mover as the Stagirite's true theology. Thus, as happened with my work on the *Dramatics*, most readers will not even go past the abstract, and hence they should be aware that my account of Aristotle's evolution in theology is not a "one-off." That is, the *Dramatics aka Poetics*, which has not one poem and which I have also demonstrated is concerned not with literature *per se* but with performed "musical" drama that itself has verse merely as a part, similarly was ignored in ancient and Byzantine times, until the Arabic scholars wrote the first commentaries starting in the 10th century. However, they mangled the fundamentals, thinking, e.g., that the treatise was about mere poetry, thereby setting the precedent even

mid-career, and even probably by 360-355 BCE, and accepted instead the necessary eternality of the universe, with the *natural* outer spheres being "divine" despite them being neither ensouled nor "extra-natural," then we can easily grasp why Xenarchus had no need to debate the Unmoved Mover, even *if* he had read the arguments in Lambda or in *Physics* VIII. To underscore, *our modern view that Aristotle always justifies eternal motion in an "extra-natural," or what some would call "super-natural," way derives from those like Alexander, Plotinus and Julian.* Finally, if Xenarchus had no access to, or concern with, Aristotle's *Metaphysics*, then he would have had no full understanding of Aristotle's account of "necessity" as given in V 5, an absolutely crucial doctrine in this arena.¹⁰²

In short, Alexander, Plotinus, Julian, Simplicius, Falcon, Berryman and very possibly Xenarchus and their readers to this day assume that "what is separate" and what is "divine" is the Unmoved Mover *qua* God of Lambda, but I have already explained how Xenarchus seems to have received his impression from *De Caelo*. There is nothing extant revealing that Xenarchus himself refers to *the Unmoved Mover of Lambda 6*.¹⁰³ At any rate, when all is said and done, he has seemingly had no impact on the debates of the Unmoved Mover to this day. Nonetheless, that he is yet another Peripatetic who rejects any Unmoved Mover *qua* "incorporeal cause" is enlightening for one of my theses: Not a single Peripatetic or even anyone else from a different school after Aristotle until Alexander agrees *with what Merlan calls the Stagirite's "great discovery,"* of which more at the end of this Part 3. Given the above, at best only five writers in that half a millennium considered the doctrine worth at least mentioning, for whatever purpose, even though *at least* three of them, Cicero, his Epicurean source and Xenarchus, definitely reject it. That is, insofar as Xenarchus rejects "incorporeal causes," he presumably rejects the incorporeal Mover of Lambda 6 even if, contrary to the superficial evidence that he only used *De Caelo*, he also used Lambda (or *Physics* VIII). We still, then, have no unambiguous record of anyone until the thinker from Aphrodisias embracing the Unmoved Mover of Lambda.

It is fitting to start concluding this digital extension while on the topic of Alexander, given that it was his perversion of Aristotelian theology that started a prejudice lasting to this day, with, e.g., Myles Burnyeat ranking Alexander as "the best and most purely Aristotelian of the ancient commentators."¹⁰⁴ Presumably leaving aside the later theologians who have tried to defend into modern times the Stagirite's Unmoved Mover, Falcon also ironically concludes: "It is important

for the Italian commentators of the *cinquecento* working directly from the Greek manuscripts. Is all of this the beginning of a larger pattern? It remains to be seen, but given that Aristotle developed many of his views over his long career, as Jaeger has partly shown, I myself would not be shocked to see some other "standard" Aristotelian positions at least seriously questioned if texts are shown to be inconsistent.

¹⁰² Cf. my footnote 19 above and its relevant discussion in the body.

¹⁰³ For this assumption on Falcon's part, and not because of anything Xenarchus says, see Falcon, pp. 40-1; 46; 59 (where Falcon only considers intelligent, living bodies encircling the earth, not the fifth element); 123-4 (with the caveat about Aristotle making a fool of himself, whatever that means); 128; and especially 187-8 and 225 (regarding Aristotle's *Physics*, but as understood by Falcon, not necessarily by Xenarchus).

¹⁰⁴ Myles F. Burnyeat, *Aristotle's Divine Intellect* (Milwaukee: Marquette University Press) 2008; p. 42. As I discuss in my book, and as should not be surprising given the modern British scholar's praise of Alexander, Burnyeat accepts that Aristotle always maintained the Unmoved Mover *qua* God. I do not deny that Alexander can be at times an excellent commentator, only that he occasionally misconstrued important doctrines and ignored Aristotle's evolution, at least in the theological respect.

to realize...that Alexander may have been *the first and last true defender* of this physical account [of Aristotle holding a 'separate', extra-natural cause of eternal motion of the outer bodies, whether or not one somehow considers them "elemental"]."¹⁰⁵ With the kind of accolades that Burnyeat and Falcon bestow on Alexander, it is no wonder that the Unmoved Mover is still taken seriously, indeed *more seriously than even the later Peripatetics themselves for generations after the Stagirite took it!*¹⁰⁶ Imagine scientists today taking the doctrine of the flat earth or of alchemy *more earnestly* than those who first proposed it, and you have a suitable analog.

Without being the first to highlight the topic and as we saw above, Falcon also notes with respect to Julian that the post-Hellenistic commentators often tried to harmonize Aristotle and Plato. My own recent accounts, including this digital extension, have shown that a similar motivation sometimes still exists, with, for example, Broadie and Merlan. Even I myself take the Unmoved Mover to be the Stagirite's early attempt to advance Platonic theology, not ancient Greek theology in general, with Aristotle maintaining certain Platonic assumptions, notwithstanding that the youthful Stagirite modifies the unmoved movers of Xenophanes and Anaxagoras to posit an ingenious, if ultimately untenable, entity.¹⁰⁷ I also have demonstrated how the *mature* Aristotle is more Platonic than recognized in the context of musical and dramatic theory.

We should therefore return to Merlan's question relating Aristotle to Plato, which I raised in the 5th digital extension and which I mentioned above. It deserves repeating, now that we have examined in much more detail the tradition for 500 years after the Stagirite, because to my knowledge Merlan never considers that tradition in his evaluation of the Unmoved Mover. The query is rhetorical for Merlan: "Was not the concept of a First Mover the *great discovery* by which Aristotle ceased being a disciple among disciples?"¹⁰⁸ Yet claiming that Aristotle ceased to be the disciple among disciples, obviously of Plato, because of the "great discovery" of the First (incorporeal) Mover, *when not one Peripatetic afterwards for half a millennium embraced it*, is like claiming a well-known sailor discovered in 1000 CE a westward path from Spain to China that took only three weeks of sailing, a path that no one attempted again until Christopher Columbus arrived in a Bahamian island in 1492, thinking it was the East Indies *and thinking he*

¹⁰⁵ Falcon, *op. cit.*, p. 188; my italics and bracketed insertion.

¹⁰⁶ A very recent article by Stavros Kouloumentas that discusses Alexander and Alcmaeon continues the praise:

We may begin with Alexander of Aphrodisias (late second-early third century AD) *who represents the peak of the Peripatetic commentary tradition*. He offers excellent guidance to the interpretation of Aristotle, since his aim is to analyse and supplement the text in the light of what Aristotle states elsewhere, as well as to defend the teacher's views against competing doctrines (Stavros Kouloumentas, "Aristotle on Alcmaeon in relation to Pythagoras: an addendum in *Metaphysics Alpha?*", in *Aristotle and his Commentators*, edited by Pantelis Golitsis and Katerina Ierodiakonou [Volume 7 in the series *Commentaria in Aristotelem Graeca et Byzantina*, edited by Dieter Harlfinger, Christof Rapp, Marwan Rashed, and Diether R. Reinsch] Berlin/Boston: Walter de Gruyter, 2019: 49-70; p. 60; my italics).

¹⁰⁷ Even though I disagree with Jaeger on whether Lambda was held by Aristotle after mid-career and on a great number of individual claims, I nevertheless find the modern a fount of wisdom regarding the youthful Stagirite embracing Plato's concerns on many fronts, for example, combining myth, spirit or soul and scientific astronomy, including the rational order of the eternal planets (Jaeger, *op. cit.*, pp. 154-61).

¹⁰⁸ Philip Merlan, "Aristotle's Unmoved Movers," *Traditio* Vol. 4 (1946), 1-30; p. 6; my italics.

had confirmed the voyage from 1000 CE. Given that the Unmoved Mover is Merlan's notion of a "great discovery," I wonder what another Aristotelian "discovery" (such as formal logic or the principles of biology) is for the 20th-century scholar. At any rate, let us conclude with the arguably more reasonable view, as presented by Falcon and Jaeger. Falcon says:

...one should keep in mind that the introduction of a celestial simple body different from (and irreducible to) earth, water, air, and fire has global consequences. More directly, this introduction is crucial for the thesis that the world is eternal *in the strong sense* that it is not subject to generation and destruction. *In antiquity, Aristotle was rightly regarded as the champion of this thesis.*¹⁰⁹

It was not the Unmoved Mover that the mature Stagirite championed (except by distorters like Alexander, Julian, and their readers) but eternity "in the strong sense," namely, in the sense of ontological necessity (whether or not antiquity fully realized the doctrine from *Metaphysics V 5*). Wittingly or not, Falcon confirms what Jaeger says on this final issue. After discussing the passage of Philo with which I open my book, namely, that Aristotle sardonically claims he fears those who assert the universe is created "with hands," Jaeger advises:

Where Aristotle is attacking the physicists' view of the destruction of the world it is biting sharp. It is distinctly milder and more respectful when he is rejecting Plato's account of creation in the *Timaeus*—for that is what 'a work made with hands' refers to. Here we have the same personal air as we found in the criticism of the Forms in the second book [of *On Philosophy*]. The third book too, as we learn from Cicero's account, was written with polemical reference to Plato throughout. *This must apply mainly to the doctrine that the world is eternal, for that was Aristotle's greatest innovation,* and since the passage does not come from any of the existing treatises, and is undoubtedly taken from a dialogue in view of its style, the only source that can possibly be suggested for it is the dialogue *On Philosophy*. It was this work, now lost but much read in antiquity, that contained the two philosophical views then considered most characteristic of Aristotle: *the adoption of the ether as the element of the heavens, and the assertion that the cosmos is indestructible and uncreated.* The doxographers commonly mention the two together as his distinctive additions to Plato's cosmology, and *this is correct.*¹¹⁰

If any doctrine is responsible for Plato famously complaining that Aristotle was like a foal, kicking the Athenian himself at birth, it is probably this polemic in the third book, published for other Athenians, educated Greeks in general and posterity. Jaeger emphasizes that *On Philosophy* "is in fact the sole literary work of which we definitely know that its contents were anti-Platonic" (p. 44). If only implicitly, the polemic in part argues against the Divine Craftsman (whether Aristotle specifically names it or not) and, instead, for a world being eternal. Nevertheless, despite Plato's complaint, Aristotle's doctrine was so persuasive that Plato seemingly accepts it himself in late works, even if he modifies the theory to suit his own purposes, in the *Phaedrus* 245c-e and at the end of the *Laws*, in passages I examine in the next and final planned digital extension.

¹⁰⁹ Falcon, *op. cit.*, p. 187; my italics.

¹¹⁰ Jaeger, *op. cit.*, p. 140; my emphases.

APPENDIX: "The" helix, 3-dimensional movement, Plato's "visible model," and the Antikythera Mechanism

We have covered some reasons Xenarchus did not place any credence on the Unmoved Mover of Lambda, observing that the later Peripatetic argues against the Stagirite not as Plotinus (properly) does in this respect but instead only by ostensibly undercutting the fifth element with *simple* helical movement. I noted that whether the helix is simple or complex was debated until at least Alexander of Aphrodisias. I also remarked that Falcon's "cylindrical helix" is ambiguous and I should add now that Plato speaks of a need for a "visible model" while speaking of the heavens. Moreover, there is confusion in this whole area of 3-dimensional movement, for clearly the outer spheres are not just moving as a single dimensional line or as a two-dimensional plane. Yet some of the explanations by various thinkers appear to involve abstract mathematics that are at most two dimensional rather than three dimensional *per se*. The following ties these various themes together and is intended as a cautionary propaedeutic for anyone digging deeper into the topics. Even assuming that the best "visible models" of the time had been known by the Peripatetics—the constructions of Eudoxus of Cnidus by Aristotle, and the orrery of Posidonius (c. 151 – c. 35 BCE) and the Antikythera Mechanism¹¹¹ or its like by Xenarchus—my conclusion that the Stagirite dropped the Unmoved Mover and that Xenarchus only cares to argue against the fifth element, because *it* was the only crucial doctrine, would not be affected in any way whatsoever.

I first disambiguate "helix" and helical movement, which itself requires understanding the differences in movement considered from 1-dimensional, 2-dimensional and 3-dimensional perspectives. Plato may well have recognized these (and associated) complexities with respect to celestial motion in general because he notes in the *Timaeus* the importance of a "visible model." I cite a few examples of almost incomprehensible explanations of celestial ordering and related movements in the relevant Aristotelian corpus, especially Lambda 8, and then demonstrate that even if the Stagirite and Xenarchus had employed the best "visible models" of their own days, Aristotle would neither have needed, nor have chosen, to appeal to the Unmoved Mover of Pure Actuality to explain the eternal motion of the outer spheres. Nor would he have needed to renounce the theory of the fifth element, which itself is simply incompatible with the outer spheres being ensouled and which can evade the objection of Xenarchus.

Helix types

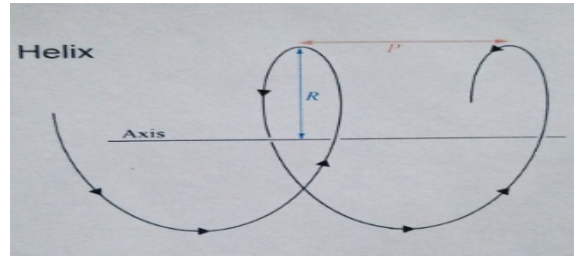
Let us disambiguate types of helixes *qua* geometrical static figures and *qua* potential (or actual) *paths* of helical movement versus helical movement itself, whether we consider any helical movement to be simple or complex. Here are the three options:

¹¹¹ According to various sources, the Mechanism was constructed between 205 BCE and 87 BCE. It is arguably an eighth wonder of the ancient world and was not an orrery *per se* but captures information in a system of clock-like dials that provide the ability to forecast when, e.g., an eclipse will occur. More details can be gleaned from Alexander Jones, *A Portable Cosmos: Revealing the Antikythera Mechanism, Scientific Wonder of the Ancient World* (New York, NY: Oxford University Press) 2017, but the basics can be seen at a website created by the Hellenic Republic of Culture and Tourism *et al*: <https://www.youtube.com/watch?v=UpLcnA1pVRA>

My thanks to Xenophon Moussas, Professor of Space Physics (ret.), Department of Astrophysics, Astronomy and Mechanics, National and Kapodistrian University of Athens, for bringing the Mechanism to my attention and to Brad Inwood for directing me to Jones' book.

Diagram 1

One-dimensional helix (with *suggested* motion of a mathematical *point*, which by definition is location without magnitude and which is by itself zero-dimensional, in this case the beginning "endpoint" of a 1-dimensional helical line):

**Diagram 2**

Two-dimensional helix (and *suggested* motion of a 2-dimensional *line* that itself moves along a helical *planar* path, starting at the lower left and finishing at the lower right):

**Diagram 3**

Three-dimensional helix (and *suggested* motion of a 3-dimensional solid, or, in this case, two intertwined ones, that move along the helical path, starting at the left edge and finishing at the right):



We have therefore distinguished three kinds of helix *static* shapes from any implied or real motion along its "path." For Aristotle, given the *Physics*, it is a platitude that movement always occurs in space, within the boundaries of the whole finite spherical universe, which obviously is 3-dimensional, like a ball and its interior, with the earth being at the center. As I have discussed in previous publications, the Stagirite also wisely recognizes that we cannot try to construct a line from points (when "point" means "location *without* magnitude"), or a plane from lines, or a solid from planes, without drowning in paradox; yet we *can* abstract the plane from the solid, etc. However, it is questionable whether he fully recognizes that the same and related considerations apply to motion even though he recognizes that time, a property of motion, cannot be composed of "nows" (the analog of points on a line). Time is rather the duration *between* two "nows" and is the measure of motion. We can reasonably speak of various-shaped objects (a faceted diamond, round pebble, or jagged piece of a twig) flowing helically in the 3-dimensional figure, 2-dimensional plane, or 1-dimensional line, as shown (in reverse) in Diagrams 1-3. We could even

speak of a bronze helix-shaped cylinder *moving itself either on a circular path or on a helical path* (as in Diagram 3), just as a soccer ball could move on the same circular or helical path. However, the option of a helix sculpture moving on a (different) helical path is too difficult to represent two-dimensionally on a page, and I would need a good artist or a video demonstration to show it best. Below I cover a moving polyhedron and ball, with further diagrams, and what confusions can occur, and I refer the reader to a related video, which discusses a (3-dimensional) cone and how one perceives related movement, including subsumed 1-dimensional (and 2-dimensional) movement. This should all suffice for my purposes.

What is crucial now is to observe that the 1-dimensional and 2-dimensional helical paths *and any associated* movements are implied by the 3-dimensional movement (no matter what the shape of the moving object). That is, Diagrams 1 & 2 can be abstracted from Diagram 3, and an *edge* of the solid figure in Diagram 3 provides the 1-dimensional helical path of Diagram 1; likewise, the helical plane of Diagram 2 can be abstracted from a plane of Diagram 3. This is no different, in essence, from looking at a box, and abstracting the planes, lines and points (corners) of the box from the full solid. *Likewise, with any corresponding motion.* Trace your finger along a front edge of the box (call it the x-axis). This is (finger-tip) movement in one dimension (although of course your hand is going through the 3-dimensional space that the box is contained within). After you reach the corner, continue tracing at a right angle on the corresponding edge (the y-axis). You have now traced a "2 dimensional" figure, and the associated movement can be weakly represented (statically) like this:

Diagram 4



In other words, you have now traced an "L" and "implied" either the whole plane or two-thirds of a triangle, given that you have moved in two dimensions (x and y). You then could, after reaching the next corner, continue 90 degrees on the z-axis. You have now merely "implied" the shape of the full (solid) box, although perhaps of other solids, too, and, without explanation, an observer might well think you have simply traced a single line going in three dimensions. At any rate, your movement is 3-dimensional in that it has gone through the x-y-z axes (while of course continuing to be in the same space you were in before, say, a room that itself is contained in the 3-dimensional universe). From the perspective of, e.g., human bodies and kinesiology you can use the concepts sagittal, transverse (or axial), and coronal (or frontal) planes if you prefer.

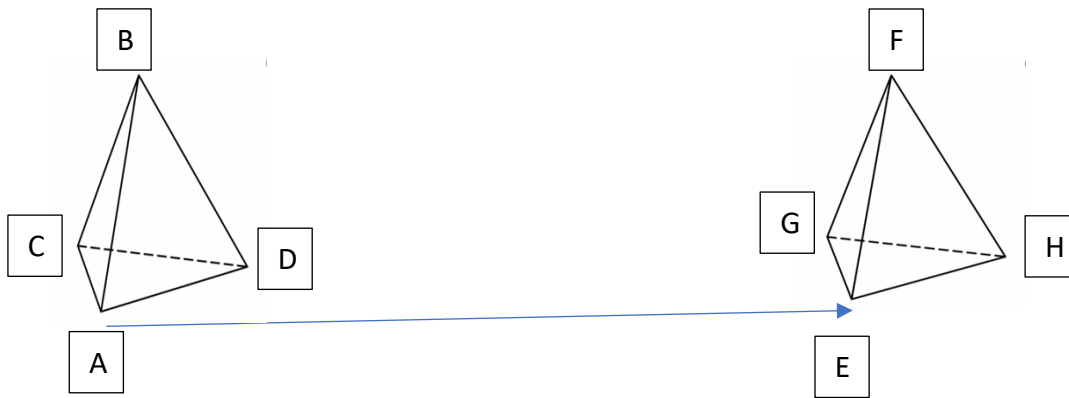
Often, for the sake of efficiency, movement and *what* is moving (including its shape) is not explained fully, because the explanation would be too difficult or lengthy. It is said that a picture is worth a thousand words and arguably at times a video is worth a million; certainly, it can be worth a million pixels. On occasion, and I provide an example below, Aristotle will note that motion goes from point A to point B, as if he were speaking of a mathematical point in one dimension. However, if what moves is 3-dimensional itself, existing naturally on x-y-z axes, which is obviously the case for the universe and all physical bodies, he should speak instead, if the body is a polyhedron, of points A-B-C-D going to E-F-G-H, as follows.

Diagram 5 (Implied Motion from Endpoint A to Endpoint B)

The labeled rectangles refer to the nearby endpoints of the line, and the arrowhead indicates the direction of an implied movement but should be ignored; that is, imagine the path of the line stops where the line contacts the arrowhead.

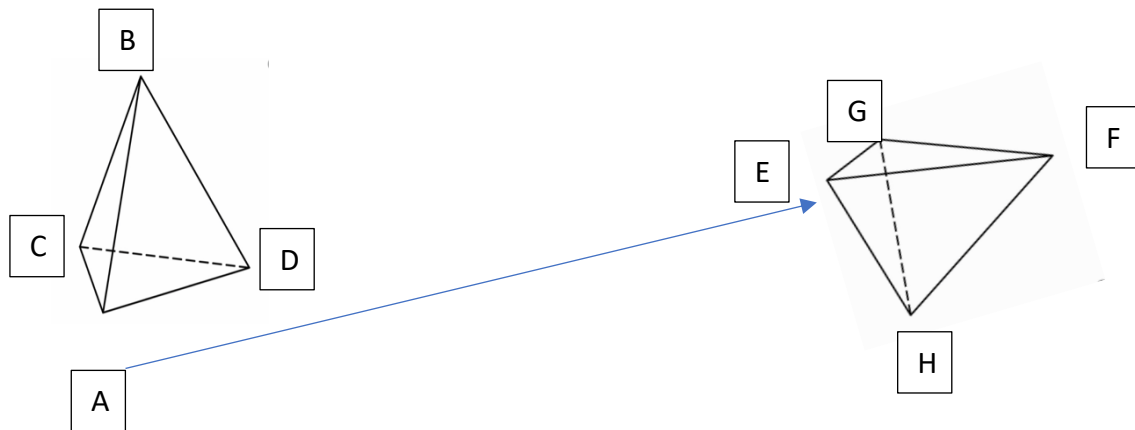


Diagram 6



The simplest 3-dimensional polyhedron (leaving aside a cone, of which more later, and focusing on figures that have flat surfaces) is a triangular pyramid, which has four distinctive points. A triangle, with 3 points, is obviously only planar or 2-dimensional. For the sake of brevity, Aristotle might intentionally be speaking synecdochally at times when he says something goes from point A to point E, and readers deduce that if (one point of) the triangular pyramid goes from A to E, the rest of the angles and the alignment of the figure stay the same relative to the universe (or in this case to the page), which in some cases might be warranted. The problem is, especially with the (short) description being *only* A to E, that sometimes the alignment does not stay the same, and the movement could be as follows: The same object after moving could have a different alignment or system of x-y-z axes, which the reader would never know, given a synecdochal description. This can be seen in the following Diagram 7:

Diagram 7



A ball or sphere *in some respects* is simpler, which is one reason both Plato and Aristotle prefer it (see *Timaeus* 33-41 and *De Caelo* II 4-11). Assume now that the center of the ball is, like the earth, point A; then we can note the finishing location as point B and, because of the perfect symmetry of the ball, not worry about the *solid sphere* being different relative to, say, a floor. However, there is still a potential problem: The ball might have rotated and so the north-south axis of its original position may be different from the north-south axis when the ball reaches its terminus, as would be seen easily if we painted markings on the surface.

What, then, about the “cylindrical helix,” to use Falcon’s term? How do we explain (i) movement of a cylinder when there is no clear-cut position on the cylinder, contrary to the clear-cut positions in the above figures? If the movement of the cylinder *itself* is irrelevant, how do we explain (ii) possible helical lines and associated possible movements that cut across and go down a cylinder? (i) and (ii) are obviously two different considerations. Let us start with the movement of a cylinder itself. The moving polyhedron in Diagrams 6 & 7 even in the real, visible world has clear-cut points as “locations without magnitudes, namely, the “ends of lines” or two intersecting lines (the corners of the solids) whereas a cylinder (and a sphere) has a uniformity that belies determination of a point for (easy) reference. Consider Diagram 8:

Diagram 8

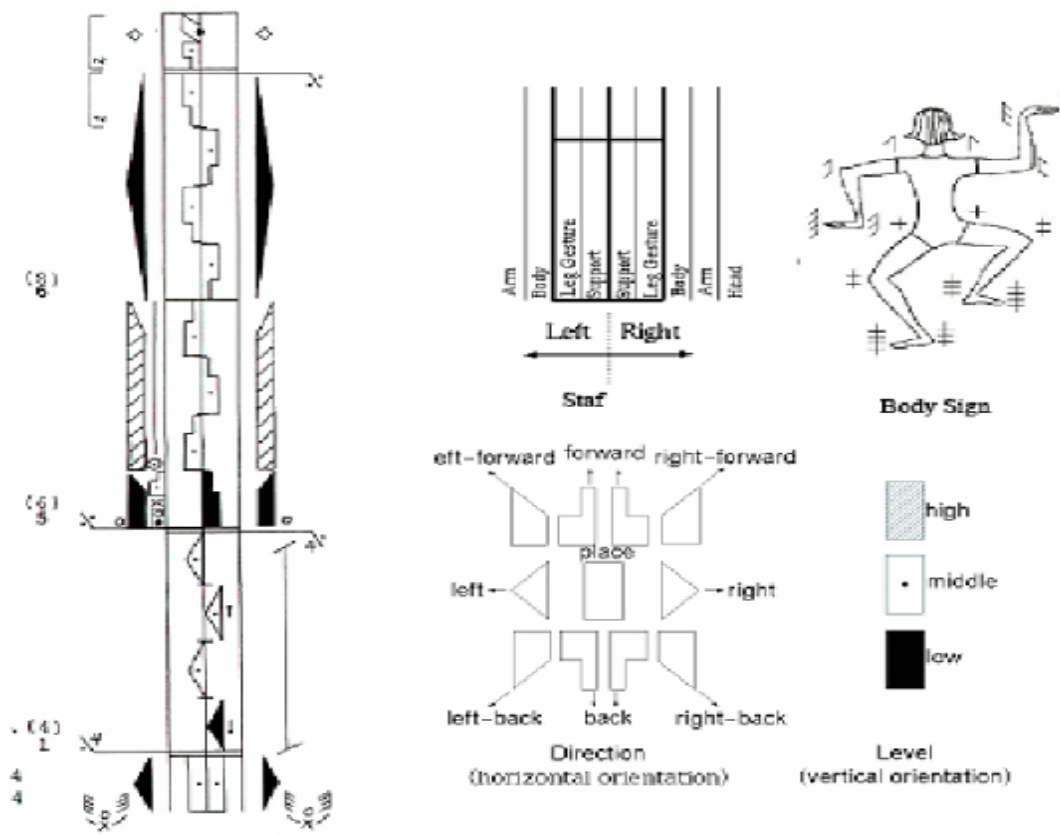


It becomes much more difficult, although not impossible, to specify the exact points for the beginning and ending locations of the cylinders, notwithstanding that each circular aspect has infinitely *possible* points. Thus, we have to specify some important points relative to some external reference, e.g., positing that point A in the exact center of the top circular plane (in the left figure) is, say, 5 inches from the top of the page and 2 inches from the left margin. However,

we cannot just say that the ending position of an equivalent Point B *for the right figure* is 5 inches from the top margin and 6 inches from the left margin, because the x-y-z axes on the right might be different from what is shown, similar to the difference of the axes in the two figures of Diagram 7. Thus, for the cylinders we would have to specify a number of parameters to indicate clearly where the beginning and ending locations of the whole solid are. This holds also in Labanotation or its computerized version LabanWriter, which is a system of notation for movement of the human body that Rudolph von Laban devised.

One very short example with rudimentary information is in the following Diagram 9.

Diagram 9



Certain ambiguities necessarily exist because Laban uses 2-dimensional notation to capture a 3-dimensional form (the human body) and its related possible movements, and he must add supplementary notes of explanation, which is to say, the “number of parameters” indicated in the paragraph above, to explain a variety of factors, including changes of directions and velocities (the above example has no supplementary notes). Suffice it to say that mastering this notation is as difficult, or almost as difficult, as mastering ancient Greek, which is why sometimes notators capture human movement instead with cameras, of which more below, or “mo-cap,” motion capture, using tiny devices that are attached to body parts and traced electronically with recording equipment.

In any event, assume we specify the parameters for making clear where a (finite) cylinder precisely starts and ends. Now, given the above explanations, the cylinder could be the object that itself moves either in a straight line, a circle, a *helical path*, or some very irregular pattern, like a fly buzzing around the room. Alternatively, the cylinder could stay stationary and a helical line could be drawn down and around it; this could be represented by Diagram 1. Or a paint brush could be used to paint a planar pattern down and around the cylinder; this could be represented by Diagram 2. Or a solid, like rope or fiber-optic cable, could be wrapped down and around the cylinder; this could be represented by Diagram 3. Yet these are just the geometrical patterns that form a potential path for any motion (as the edge of a box forms the potential path that your finger can take, but the edge-path is not the same as the motion that occurs along it). To explain motion well in this context, we have to specify not only clearly *the real-world solid but the associated motion* including its speed and its path, which, with respect to Xenarchus, is the helical path: electron (or Democritean atom), ball, bead of moisture, triangular pyramid, helical-sculpture, or human body.

As alluded to, Aristotle (following Plato in the *Timaeus* 34-41) emphasizes that the sphere is best (of the "solids") because it is simplest, *having only one surface*. The Stagirite focusses, especially in *De Caelo* II 4-8, on how solids, including the sphere and planes and their related movement, are to be understood while discussing the heavens, and I trust I need not emphasize further that there is no mention in these discussions of the Unmoved Mover of Lambda causing the relevant movement, e.g., why the heavens always move one way *rather than the opposite* (that is, clockwise versus counter-clockwise). If the Unmoved Mover was indeed responsible for the motion, Aristotle should, and presumably would, have discussed why "love" on the part of the outermost spheres causes the direction they always take, rather than the reverse, just as he discusses (with mild disdain) in II 5 (287b25-26) why the Pythagoreans are wrong about applying right and left in the celestial realm (in II 2). If we subscribe to Lambda, we might as well claim that atmospheric "love" (rather than national law) causes driving on the right, like in the USA and Europe, rather than on the left, as in the UK and Japan.

We might also ask why in these discussions in II 4-8 Aristotle ignores the cone, which his older contemporary (and perhaps colleague), Eudoxus of Cnidus, had "discovered," presumably at the latest during Eudoxus' stay in Athens when Aristotle was also there.¹¹² After the sphere, the cone is simplest of the solids, having obviously only two surfaces, the rounded one going from the apex to the circular "base" along with that circular base plane. In the context of discussions of the helix and associated helical movement in the following generations, at least as reported by the scholars cited in this article, the absence of the cone is odd. Why focus on the more complex cylinder, which has three surfaces (two circular flat planes and the rounded tubular plane connecting them), when the cone is simpler? Again, recall the emphasis on simple movement and simple bodies for both Plato and Aristotle. Perhaps the absence can be explained because a helical line and the associated movement starting from the apex and going around the cone to the base is not

¹¹² For why Eudoxus may have been just a respected visitor who had his own school in Athens rather than a member of the Academy *per se*, see Carlo Natali, *Aristotle: His Life and School*, edited by D.S. Hutchinson (Princeton: Princeton University Press), 2013, especially pp. 157, note 35. Also, "discovered" is a very Platonic term and suggests mathematical objects exist already, whereas for Aristotle, as we saw in part before and will see more later, they are *constructed*.

"congruent," getting increasingly larger as the helical line approaches the base. Thus, this kind of line and its associated motion may not be appropriate for a "simple" movement that must be the same everywhere and that was crucial for Xenarchus' argument. In any event, the cylinder and corresponding cylindrical helical movement, if finite, are very important for Xenarchus, with, again, the cylinder having three surfaces. Although the tubular plane is consistently of the same diameter, and arguably permits the congruence of any inscribed helical line (and associated motion), does not the additional plane complicate the matter of the helix and the various issues of *De Caelo* II 4-8, which, of all treatises, Xenarchus apparently knew for sure? I offer more on this topic below, with another example of seemingly simple movement, from the Antikythera Mechanism, that is neither a straight line nor a pure circle nor a cylindrical helix.

This leads us to our final sub-theme, of Plato's need for a "visible model," because of the difficulties he obviously apperceived when he tries to explain in the *Timaeus* not only the shapes of the planets and stars, the "dancing gods" of the heaven, as he calls them, but their juxtapositions and orderings, especially when they appear in front or behind one another. If that were not enough, he tries to explain, or at least refers to, their movements, including their "back-turnings." These "back-turnings" are the retrograde motions that the planets appear to use to have during certain periods of the year. As he says: "to tell all this *without the use of visible models would be labor spent in vain.*"¹¹³ Perhaps Plato yearns for one of the models that Eudoxus is credited with creating to explain the relevant planetary movement or at least their (static) configurations, which are *presupposed* by any movement: perhaps a 3-dimensional mechanism depicting planetary positions (whether or not the individual parts could move) or a 2-dimensional map or both.

Aristotle may or may not have heeded Plato's caution—consider the Stagirite's merely verbal description of the motions of the moving spheres of Lambda 8, which is almost impossible to understand without a diagram. At least I myself cannot comprehend how a 3-dimensional "whole" would be exactly constructed merely from the description itself but maybe a professional astronomer could. Alternatively, the Northern Greek might have employed a diagram or 3-dimensional model in conjunction with Lambda 8 while teaching or would have assumed that any interested readers or listeners would subsequently avail themselves of "visible models" in a study room of the Lyceum. Aristotle also provides other descriptions of 3-dimensional tableaux that are very perplexing without a diagram, e.g., throughout *Meteorology* III 3 & 5. To finish with just two examples, he speaks of "moving along a circle, from A to B or from A to C" (*De Caelo* II 5, 287b22-23). This seems to be him focusing on 1-dimensional circular movement to explicate the matter, analogous, for instance, to you using a pixel on your computer screen to explain lunar (3-dimensional) motion, even though the pixel is constrained to the one plane of your monitor (captured by Diagram 1 above). Similarly, he reduces a solid to a plane (*De Caelo* II 4, 287a32-b2). Again, note the difficulties in explaining the 3-dimensional movement without suitable "visible models."

¹¹³ 40d; my italics; transl. by Donald J. Zeyl, in *Plato: Complete Works*, *op. cit.*

Some "visible models," like the Antikythera Mechanism or the astrolabe,¹¹⁴ were built after the 4th century BCE and might have been known by Xenarchus, but I submit none impact the issue of helical movement undercutting the fifth element, although they might help us better understand 3-dimensional movement versus 2-dimensional and 1-dimensional cylindrical helical movement. *The reason is that Aristotle would politely laugh, if not deride, the whole discussion of a cylindrical helix, the possible related movements and the implication for the fifth element.* It is very clear from *De Caelo* II 4 that he would *not* allow a cylinder itself to be a relevant heavenly body that moves in *any* manner, much less a helical one. The rotating heaven can only be spherical, not a cylinder, and must revolve within the outermost boundary. Otherwise, for the Stagirite there would be rectilinear areas that are non-existent during the revolutions (287a16-17). Hence, because the heaven cannot be a cylinder, any motion "around" the heaven, at its outer limit, or within its outermost "ball-shaped boundary" would not be moving in a helical path, at least one based on a cylindrical shape, and it is far from clear whether a simple helical movement can result in any other way, especially around the surface of a sphere, of which more below.

Similarly, for reasons given in *De Caelo* II 4-11, and especially Chapter 8 (290a7), the stars and planets are also spherical and cannot move helically, for Platonic-type reasons (288a9-11). Even leaving aside the Platonism, we *see* them moving in a circle and Aristotle denies that they could move in any other way. The only possible cylindrical helical *path* and corresponding movement must be from creations on, or close to, the earth, were Aristotle to have predicted the future and anticipated helical movement. I do not mean only man-made creations that are solid cylinders, whether bronze or wax, because I have seen on very rare occasions during sunsets very short-lasting helix-like clouds that have 2-3 troughs and peaks, most closely captured by Diagram 2 above (although presumably the clouds have some depth and so, leaving aside appearances, are actually more like one of the helical strands of Diagram 3). Yet *any* kind of associated helical movement would not undercut the fifth element, for reasons already given: just as the "direction" of the formal causation for animals and breathing is crucial, so circular movement of the 5th element, the outer spheres, *results because of the nature of the outer spheres*, not vice-versa. Without the empirical or deductive proof of an equivalent, eternal sixth element, from which helical movement *derives*, merely positing geometrically abstract helical movement and a *resulting* sixth *element* assumes what one must demonstrate.

In short, Xenarchus has not undercut the theory of the fifth element, just as he would not undercut it if the helical movement is complex (rather than simple). Imagining that he might even appeal to a visible model like the Antikythera Mechanism in no way helps him, as the model is neutral regarding the arguments of helical movement. Unless an accurate model could be constructed that truly captures the existence of a sixth element and its helical movement of the outer regions, Xenarchus has to rely on his feeble assumption that abstract mathematics should be considered causing real objects (say, a sixth element) and associated motion, which, we have seen here and in previous publications, Aristotle vehemently denies (vis-à-vis Forms and Ideal Numbers). To my knowledge, no such helical celestial model exists, which might be one of the most devastating

¹¹⁴ Various sources credit the astrolabe to Hipparchus in the 2nd century BCE or to the aforementioned Apollonius of Perga in the 3rd century BCE.

considerations of all in this context vis-à-vis Xenarchus. These issues relate to astronomy and solids *per se*, not mere (abstract) mathematics and geometry, even leaving aside theology.

We have covered helical movement enough now, and I add a few final thoughts on 3-dimensional movement in general, which may be of use in not only the related but different arenas. These considerations are too often not well recognized, in the same way that in the *Rhetoric* Aristotle asserts that the method of delivery for speaking had not been well recognized until he attempts to redress the issue (III 1, 1403b22). As we have begun to see, to understand most clearly the kinds of issues pertaining to helical movement in particular and 3-dimensional movement in general, one must be clear about (i) *what* exactly is doing the movement and *how* it is shaped (while distinguishing the mathematical representation from the ontological body); (ii) *how* it is moving; and (iii) *how one is describing it* (e.g., using synecdoche to refer to movement along a body's edge for the sake of simplicity while potentially causing ambiguity).

2-dimensional maps obviously give only one slice of the 3-dimensional reality, as we saw in the diagrams above, and confusion can result, especially if motion is then added to the mix. One can use a hologram or camera/motion picture instead, but it is extremely hard to carry relevant holograms, and only a few exist in the world, of very restricted objects. Even nowadays a video is sometimes useless if a group of individuals (or objects) is being filmed and if some individuals are blocked by others closer to a (one and only) camera. We need a system of cameras in this case, spread around and at least above the group, to capture much more fully the complex figures and corresponding movements, as in a televised football game or with groupings of dancers on stage, allowing replays. *Even without a visual impediment, sometimes habit causes viewers to focus on the simpler, 1-dimensional or 2-dimensional aspect of a 3-dimensional movement.* Take the case of the aforementioned cone, as traced by an arm, with the arm-hinge at the shoulder being the apex of the "traced" cone. Almost always, if not always, I have discovered, viewers will describe it as a "mere" circle (which can be abstracted planar or 1-dimensional), rather than a "volume," that is, a (dynamic) cone.¹¹⁵

If we are working in the realm of ontology, solids or astronomy, rather than theoretical mathematics, then, as above, we can speak sensibly of a circular motion of a plane, and even of 1-dimensional motions, but only because they can be abstracted from the edge of a disc, like a CD/DVD that one throws through the air, like a flying saucer or a Frisbee, or from the moving circular plane of the CD that has a label on top, e.g., *Sibelius 2nd Symphony*, as it flies through the air. Clearly, the 3-dimensional CD itself, which might be as proportionally thin as the flat earth that the Northern Greek debates in *De Caelo* II 13 (294a1ff), like a boomerang, flies differently

¹¹⁵ See Demo #2 at <https://epspress.com/MelkineDemos.html>. Before filming, various viewers of the example, when asked what they were observing without me first explaining, always said they see a circle (of the fingertips, hand or arm). No one said they saw a cone being traced (which implies volume), and arguably *that* is the more crucial figure at times. Whether the viewers focus on the 1-dimensional circle because it is simpler, and easier to grasp, or because we are not trained to perceive volumes (rather than planes or 1-dimensional lines), is something I cannot answer yet. The question may need good experiments in cognitive science, and perhaps those working in robotics and engineering for aerodynamics would perceive the volumes primarily and the circles secondarily, which, from one perspective, would be the ideal Aristotelian way.

from a perfect sphere, even though all three solids usually revolve as they are flying. The top or bottom plane of the CD or top (or bottom) surface of the boomerang can obviously change its relation to a plane on the ground, sometimes being parallel and sometimes being perpendicular or at any angle in between.

It should not be surprising that the ancients, notwithstanding the initial headway they made on the related problems of geometry and of motion, could not solve fully the various problems. It is not until analytical (Cartesian) geometry, calculus, aerodynamics, computer vectors and the related programming, can we truly understand movement *in its full 3-dimensional perspective*. For example, the software package Lifeforms (aka DanceForms), which allows one to create movement of the human body and to examine it from a full 360-degree perspective, extends the 2-dimensional Labanotation displayed above. Without something similar, like in the domains just noted, I venture to say that thinkers focused on the experiential world will always, or at least usually, perceive cones as mere circles and often miss the best solutions for related issues. Scholars may also not see best how the ancients, and even modern commentators, help or hinder the examination of associated problems in kinetics, pertaining to natural physics and any related philosophical issue.

I conclude with a relevant passage from Cicero, that functions in a way as a summation of this whole digital extension and that helps me tie together the threads of this Appendix and of the earlier sections into a knot that may or may not have itself an ideological helical shape:

My friend Posidonius recently made a [model celestial] sphere, each revolution of which displays for the sun, moon and the five planets *the same movements as occur in the sky each day and night*. If someone were to take it to Scythia or Britain, who in that barbarian country would doubt that the sphere was a product of reason? But these people hesitate over whether the cosmos, which is the source and origin of all these things, is *a product of chance or some necessity or of a rational divine mind*; and they suppose that Archimedes was more important for having imitated the rotations of the heavenly sphere than nature is for *producing* them, especially considering that in many respects the works of nature are executed more cleverly than these imitations.¹¹⁶

Let us leave aside the notion of (theological) Intelligent Design occurring in this passage and focus only on the relevance for this article. Being a generation before Xenarchus, Posidonius' (model) sphere might have been known by the Seleucian Peripatetic. At any rate, it helps emphasize what kind of argument Xenarchus used and what he omitted. "[T]he same movements as occur in the sky each day and night" are clearly not helical because we observe them, but this in no way seems to undercut Xenarchus. He argues that there *should* be according to Aristotle a sixth element *because* (as geometry and cylinders tell us) there is a *simple* helical movement, *no matter what we see in the heavens*. However, in reply to this argument, I, following some ancients, noted that if the helical movement is *complex*, his argument does not hold; also, the allegedly helical movement has to be around a cylindrical shape, but no such shape for Aristotle exists in the outer

¹¹⁶ Cicero, *On the Nature of the Gods* 2.88 (T 86 E-K), transl. by Brad Inwood, in a work-in-progress; my italics.

bodies, which are all spherical. Xenarchus' argument is apparently utterly independent of realistic "visible models" that depict what occurs "in the sky each day and night." What is at stake in the philosophical argument is what is *presupposed* by what we all see, and—although Xenarchus seems to have missed this—whether object or motion take priority, because for Aristotle it is indubitably the moving *object* that is primary, for without the object there is no motion. I cannot emphasize this enough. Recall that Aristotle criticizes Plato's Forms in Lambda and M 5 because they cause neither existence nor movement, e.g., "if the Forms or the numbers are to exist, *they will be causes of nothing*: or if not that, *at least not of movement*" (XII 10, 1075b27-8). I have argued that the same fatal problem holds regarding the Unmoved Mover, as opposed to enmattered unmoved movers that *do* have (eternal) causal efficacy. Had Xenarchus believed that the Unmoved Mover was *for Aristotle* the cause of eternal motion, he surely would have addressed this weakness and noted that *abstract (even 3-dimensional) geometry* will be causes of neither (full) reality nor motion. That insight, though, would undercut his own argument appealing to a sixth element: It does not matter whether a mathematician could posit in theoretical geometry some kind of *simple* helical shape, be it relevant to the most important body, the sphere, with one surface, to the 2-surfaced cone, to the 3-surfaced cylinder or to anything else; geometry itself *causes* no helical figure or associated helical motion in (full) reality.

Take another example: Is the following, from the Metonic dial, another kind of simple (path for) motion? If so, Xenarchus would say that for Aristotle there should be a *seventh* element, further undercutting the fifth element theory. We should not get distracted, however, by this example and considerations such as the following: The Metonic spiral gets progressively smaller (unlike the cylindrical helix), and, despite the 2-dimensional representation, may stem from a cone, especially if, analogous to the less simple (bronze) cylinder, the end point, on the inside in this diagram, terminates before getting to the center.

Diagram 10¹¹⁷

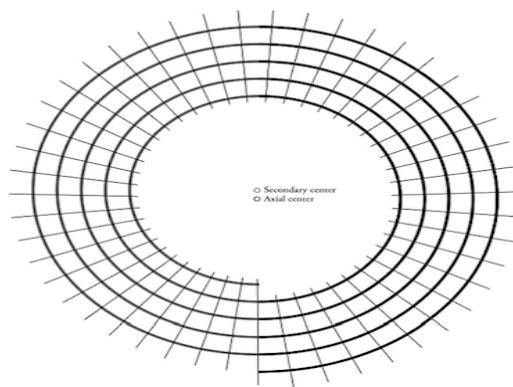


FIG. 3.2. The geometry of the Metonic dial. The black semicircles on the right have the axial center as their center; the center of the gray semicircles on the left is the secondary center, which is situated slightly above the axial center. All the scale divisions are along radii through the axial center.

¹¹⁷ From Jones, *A Portable Cosmos, op. cit.*, p. 50. The diagram represents part of the Antikythera Mechanism.

Rather, the crucial considerations are these: As stressed, Aristotle does not accept the Platonic ontological primacy of Forms, numbers and (abstract) geometry, like many 20th-century mathematicians (shockingly) still do; rather, he is more like an intuitionist mathematician of our time. Thus, merely concocting a geometrical shape and corresponding (theoretical) motion, whether helical or not, proves nothing in the ontological arena. Finally, even the existence of (man-made) brass cylinders or Metonic dials does not give Xenarchus what he needs, because eternal *elements* could not arise from finite, and finitely existing, *artefacts*.

To return to Cicero: I have argued that (ontological) necessity and eternality ultimately outweigh the "rational divine mind" for the mature Aristotle, and, as a remark in passing with respect to the attitude of the "barbarians," it appears that Cicero had not read the Stagirite's adage: "Generally art in some cases **completes** what nature cannot bring to a finish, and in others imitates nature" (*Physics* II 8, 199a15-17). At any rate, the ultimate issue for this extension, including this Appendix, is whether Aristotle held the Unmoved Mover in his final days. In the current Ciceronian context, this issue converts to the question whether the Stagirite held a (Platonic) "rational divine mind," of *no potentiality*, one which causes the eternal motion of the outer spheres because of *their* love for it. Appealing to the "thinking" of God of Lambda 7 is worthless because *that* thinking is only of itself, and that "thinking" and that entity itself does not move in any relevant way. I have discussed before how this entails that God could not even be aware that the physical universe and human beings exist and *a fortiori* could not have created them. On this point, I have also examined a related passage of Cicero in which he himself despairs because an (Aristotelian-type of) incorporeal God cannot have providence and can in no way be concerned with the affairs of humanity. This is no place to discuss whether humanist ethics without a god is better or worse than supernatural gods controlling our fates. Suffice it to say that, if my arguments are correct, we need only conclude what I require: The older and wiser Aristotle set the path himself for Theophrastus, Strato and Xenarchus themselves not appealing to "extra-natural," psychological causes of the ground of the universe.

For other Updates/Comments concerning Aristotle's "Not to Fear" Proof:

www.epspress.com/NotToFearUpdates.html

Previous "digital extensions":

1. www.epspress.com/NecessaryImplication.pdf
2. www.epspress.com/NTF/VariousVersionsOfThePrinciple.pdf
3. www.epspress.com/NTF/CantorAndTheAttemptToRefuteAristotle.pdf
4. www.epspress.com/NTF/AmbiguityLambda.pdf
5. www.epspress.com/NTF/3ObjectionsAndReplies.pdf

Upcoming 7th "digital extension" (anticipated by Summer/Autumn 2021):

Alcmaeon of Croton, *Phaedrus* 245c-e, and Aristotle

Aristotle wrote a book on the renowned medical expert Alcmaeon that is lost but the Stagirite recounts some of the physician-philosopher's doctrine in *De Anima*. This digital extension

hypothesizes that Alcmaeon's position greatly influenced Aristotle, either before or after he dropped the Unmoved Mover of Pure Actuality. That is, the extension reveals the Stagirite championing a more sophisticated version of the "divine eternality" as originally proposed by the Croton, who was naturally from the same profession as Aristotle's own father. This divine eternality needs no Unmoved Mover.

The extension also reveals Aristotle influencing in turn his Athenian mentor, who, surprisingly, has a similar doctrine in *Phaedrus* 245c-e that is very different from the earlier *Phaedo* regarding the doctrine of immortal human and divine souls. The doctrine in the passage of the *Phaedrus* reflects some of the same concerns as *De Caelo* and *Metaphysics*, notwithstanding that the passage is claimed by various scholars such as Jonathan Barnes to have been adopted by Plato *directly* from Alcmaeon. I propose that, more realistically, Plato received it indirectly, via his brilliant student who by 360-355 BCE was arguably as capable a philosopher as Plato and any other in history.

Additional evidence that Plato as a consequence drops the Divine Craftsman and relies on the doctrine of 245c-e, or something essentially the same, is shown by the *Laws*. Not only does this digital extension therefore help explain when and why Aristotle's "mature" primary ontology becomes a fifth element but it also seems to reveal Plato evolving himself in his final and presumably sager years to a doctrine of an *eternal* world soul or souls. That doctrine either diminishes, modifies or replaces the Craftsman.

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Edits:

2/12/2021, p. 4: "Proclus" -> "Plotinus"; p. 66: "need" -> "require"

3/31/2021, p. 54, footnote 110: Because of a misidentification on a Zoom session, Antonios Koropoulos was credited. The person bringing the Antikythera Mechanism to my awareness was actually Xenophon Moussas, Professor of Space Physics (ret.), Department of Astrophysics, Astronomy and Mechanics, National and Kapodistrian University of Athens.

5/21/2022, p. 3: "his unidentified Epicurean source" -> "his Epicurean source Velleius"; Footnote 9 added, as is David E. Hahm's article in the Bibliography. The above cited "footnote 110" therefore becomes "footnote 111."

8/7/2023, footnote 17: Added at its end the words: "Aristotle's theory of the 5th element, or at least a generic equivalent... by the "whirling aither" (*aitherios dinos*) (l. 380).