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“For Every Time there is a Season: John Philoponus on Plato’s and Aristotle’s Conception of Time”

ABSTRACT

The originality of John Philoponus' temporal theory has been underestimated. The paper emphasizes Philoponus' creativity, especially in his reconciliation of Plato's and Aristotle's temporal theories (or at least one possible interpretation of Aristotle's account of time). To this end, the paper sketches both Plato's (and later Neoplatonic interpretations of Plato) and suggests an interpretation of Aristotle's accounts of time, which is at odds with the Platonic and Neoplatonic view of time. It next presents Philoponus' reconstruction of Aristotle's account along Platonic lines and concludes with the relevance of these ancient theories to contemporary temporal discussions.

The commentary of Aristotle's *Physics* by the late Neoplatonist John Philoponus had an enormous influence on the later Aristotelian commentary tradition. Of the great Hellenistic commentators such as Alexander of Aphrodisias, Simplicius and of course Philoponus, only the latter's commentary on the *Physics* was known in its entirety, more or less, to later Arabic Aristotelians, who were deeply influenced by it.¹ In turn the commentaries and exegeses of these Muslim philosophers, significantly indebted to Philoponus' reading of the *Physics*, were passed on to the Latin West and so influenced the scholastics'

reading of the *Physics*. And indeed the views of the medieval schoolmen have, too varying degrees, impacted our own views of Aristotle's *Physics*. Thus it is reasonable to suggest that even today Philoponus' commentary is either directly or indirectly still shaping our understanding of Aristotle's *Physics*.

This influence is perhaps nowhere more evident than in Philoponus' interpretation of Aristotle's theory of time.² Yet I am unaware of any systematic study of Philoponus' account of time.³ The reason no doubt is that Philoponus' temporal theory appears to be nothing more than a close reading of Aristotle's own theory of time. But as David Bostock has observed "Of all the discussions in the *Physics*, the treatment of time in Chapters 10-14 is the least well organized."⁴ As one might expect, then, Aristotle's account of time has been interpreted in numerous, often mutually exclusive, ways and there still is no consensus among scholars about what the correct interpretation of Aristotle's theory of time is. Given Philoponus' significant influence on the subsequent commentary tradition's understanding of Aristotle, then, it might well be the case that Philoponus' commentary only appears to be a close reading of Aristotle simply because our contemporary understanding of Aristotle is just Philoponus'. Of course, Philoponus might actually have gotten at the historical Aristotle's meaning, in which case we are still indebted to him for clarifying and simplifying Aristotle's opaque text.

In the following study, however, I want to suggest reasons for thinking that Philoponus' commentary is more than just a "cleaned up" reading of Aristotle's text. Rather, it might be viewed as an attempt to grapple with two disparate positions concerning the nature of time. One view is that any adequate account of time must include some reference to temporal becoming. The other view is that one can fully explain the nature of time without appealing to temporal becoming. Very roughly speaking the former position imagines that time is a type of motion or flow. Thus, one might say it is a "kinetic" account of time. The latter, in contrast, treats time as a measure of motion, and although time measures motion or flow, it itself neither moves nor flows. Thus, one might say that it is a "static" conception of time. The first view, I shall argue, was espoused by Plato in the *Timaeus* and subsequently articulated more fully by a number of Neoplatonists, while the second view might be found in Aristotle's *Physics* IV 10-14, based upon one possible interpretation of that

text.⁵ At least part of Philoponus' project, then, can be viewed as an attempt to provide an alternative interpretation of Aristotle that is committed to temporal becoming and thus to show the agreement between Plato and Aristotle.

Philoponus' reconciliation is ingenious and although one must not overemphasize Philoponus' syncretism, bearing it in mind can provide insight into understanding his own commentary project (as well as perhaps other Neoplatonists such as Simplicius). He effects his reconciliation by interpreting key Aristotelian terms along Platonic lines and reworking an Aristotelian analogy between time and a line. The end result is a theory of time that employs all of Aristotle's temporal vocabulary and much of his argumentation, and yet is fundamentally Platonic in nature.

Philoponus' commentary, so I claim then, is more than just a mere restatement of Aristotle's text. It is also an attempt to show that Aristotle was committed to temporal becoming and that at a fundamental level Plato and Aristotle were in agreement about the nature of time. I argue for this thesis in three stages. First, I briefly sketch Plato's "kinetic" account of time as a moving image of eternity found in the *Timaeus*. In this first section I also include why both Aristotle and later Neoplatonists would likewise have considered Plato's account of time kinetic, that is to say, committed to temporal becoming. Second, I outline a possible interpretation of Aristotle's text, which suggests that time, contrary to Plato's position, might well be "static," or non-flowing. I also consider two critiques of a kinetic theory of time suggested by Aristotle. Third, I turn to Philoponus' reconstruction of Aristotle's temporal theory along Platonic lines, with an extended discussion of certain difficulties Philoponus' interpretation of Aristotle must face. In this section I also consider Philoponus' treatment of Aristotle's objections against a kinetic account of time and the Platonic resources at his disposal. I conclude with the relevance of these various ancient accounts of time to contemporary temporal discussions.

I

I limit my discussion of Plato's temporal theory to comments he makes in a small but well known passage from the *Timaeus*, namely, 37C8-D7.⁶ I begin with a free paraphrase of the passage and then offer commentary.

Plato tells us that the Father, who had begotten, took thought to form the world more like its paradigm. Since the living creature, which is the paradigm of the world, is eternal the Father attempted to form the all in the same way insofar as it was in his power. Now the nature of the living creature is to be eternal; however, it is impossible to confer eternity upon that which is generated. Thus the Father made the all a certain moving (κινητόν) image or semblance (εικόνα) of eternity; and with the ordering of the heavens he made an everlasting image proceeding according to number (κατ' ἀριθμὸν ἰοῦσαν αἰώνιον εἰκόνα), abiding an eternity in unity. Truly, concludes Timaeus, this is that which we call time.

Setting aside the mythological nature of the account, Plato attempts to explain the temporal in terms of the eternal, becoming in terms of being. Such a move is not surprising, since for Plato all real explanations must appeal to the unchanging, eternal Forms. Thus, I gloss Plato's theory of time as follows. Since the paradigm of our universe is eternal, Plato argues that it has all of its being complete and perfect. This quality of the ever complete and perfect possession of being the demiurge cannot confer upon the universe. For that which comes to be cannot have always been complete and perfect. Although the demiurge cannot communicate complete and perfect being on the universe, it can bestow successive being, that is, becoming, on the universe. I call this "successive being" since for the universe "that which is" is imperfect or constantly changing (as opposed to the complete and perfect being of the paradigm). In other words, for the realm of becoming, that is, the sensible cosmos, that which is at any moment passes away into non-being, while that which will be comes out of non-being into being. For example, the moment that initiated reading this paper no longer is, whereas the currently present moment now is, although at the time when one began reading, it was future and so was not. The universe, then, does not have being as the paradigm does, namely as something complete and perfect; rather, it has its being piecemeal. "That which is" in the sensible world is only the immediately present and it is the coming into being and passing away, that is, the motion or flow of that which the universe presently is, that is time. More picturesquely one may think of Plato's conception of time, even if Plato did not use these terms, as the flow of the now. A.E. Taylor puts the point this way: "by 'time' Timaeus here means what is often called 'Newtonian' time, the 'absolute, true, or mathematical time', which, in the famous words of the *Principia*, 'flows equably'."

For Plato, then, the flow of the now provides an unconditional and independent framework by which all natural processes can be assigned a time. Contemporary philosophers would say that Plato's account of time is committed to temporal becoming.

Whether one accepts all the details of my interpretation of the *Timaeus* passage is not as important as noticing that Plato describes time in kinematic terms or as a type of motion, a *moving* image. Aristotle certainly thought that Plato equated time with motion or at least a type of motion. In his list of *endoxa* concerning the nature of time, Aristotle includes three earlier temporal theories: (1) time is the heavenly sphere, (2) time is the motion of the whole and (3) time is a certain motion and change (κίνησις καὶ μεταβολή τις). That Aristotle would fail to include Plato's account of time among the *endoxa* is highly unlikely, even if he does not mention Plato by name. The first suggestion in the list hardly seems to be Plato's. Aristotle tells us that it was maintained on the fallacious grounds that everything is both in time and in the sphere and thus time is the sphere. Nothing resembles this argument in the *Timaeus* and so we can disqualify it as a candidate for what Aristotle took to be Plato's temporal theory. Thus, Aristotle must have identified Plato's theory of time with either the second or third option, but both equate time with a type of motion, either specifically the motion of the heavens or more generally some type of motion.

Although certain ancient and modern commentators identify Plato's account with Aristotle's second opinion, that is, time is the motion of the whole or heavens, the suggestion is problematic.⁸ First, this identification is most likely due to Plato's rather incautious comment at *Timaeus* 39D, where he claims that time is the wandering of the planets, which would include the motion of the sun and moon. The context for this passage, however, concerns how we measure time. The motion of the sun and moon, Plato tells us, is the standard measure by which we measure all other processes. Time considered independent of the human act of measuring, however, need not, and probably was not for Plato, the movement of the planets, but the flow of the now, as I have suggested. Thus, the identification of Plato's view of time with the motion of the heavens might be due to mistaking "measured time" for "metaphysical time," that is, time considered as what is measured, which is at least ontologically prior to the measuring.

Second, if Aristotle in fact identified Plato's theory of time with the motion of the heavens, then we have difficulty understanding one of Aristotle's objections to this account. Aristotle claims that if time were the motion of the heavens and there were more than one heaven, then there would be more than one time (218b3-5). At *Timaeus* 30C-31A Plato flatly denies that there are multiple worlds and thus Aristotle's criticism would fail to show any internal inconsistency in Plato's thought. Moreover, Aristotle himself denies a plurality of worlds at *De Caelo* I 8 and so he is not arguing that Plato's theory is inconsistent with the "philosophical facts." A more likely suggestion is Simplicius' that Democritus is the intended target.⁹ If Democritus is the author of the second opinion, then it would nicely explain Aristotle's introduction of the multiple heavens premise in his critique and thus that Democritus' account of time was internally inconsistent with other elements of his philosophy.

Thus we are left with the third opinion - time is a certain motion or change - as Aristotle's most likely understanding of his teacher's temporal theory. This suggestion is fitting given Plato's stature, since the theory that time is a type of motion receives Aristotle's most attention and the most detailed philosophical criticism, which we shall consider later.

Not only did Aristotle understand Plato's time as a type of motion, but also various later Neoplatonists thought that Plato identified time, at least in one of its manifestations, with a type of motion. Later Neoplatonists saw Plato's theory of time as considerably more complicated than I have presented it.¹⁰ Still, with respect to the theory of time that was the concern of the physicists, of whom we must include Aristotle, something like I have suggested is how the Neoplatonists understood Plato. Thus Iamblichus says of the time considered by the physicists in his commentary of the *Timaeus* that:

The paradigm is for all eternity, whereas time comes to be throughout all [time], as both is and will be. Moreover, that which is as a paradigm in the intelligible [world], is as an image in the generated [world]. And also that which is there according to eternity, is here according to time. And that which in the intelligible world is already now present according to being, in this world is in continuity throughout its coming to be (*παράγινεται*). And in like manner, that which is (*τὸ ὄν*), is manifested as coming to be in itself and as what is and what will be (*τὸ ἐν αὐτῷ γεγόνος τε καὶ ὄν καὶ*

ἐσόμενον) in these regions. And what is not extended there is seen as divided here. And now the intermediate dual nature of time becomes clear: on the one hand, it is intermediate between both eternity and heaven, but on the other hand, it is dual insofar as it exists together with the cosmos, while it is ordered in relation to eternity; and it is set over one, while made like the other.¹¹

At least one important point to note is that according to Iamblichus' reading of Plato that which is (τὸ ὄν) reveals itself through its becoming what is and what will be. Time here in the generated world, then one might say, is a progressive unfolding of being. This is Iamblichus' reading of Plato, which Proclus approvingly relates in his own commentary of the *Timaeus*:¹² "[The motion of time (ἡ τοῦ χρόνου κίνησις) is] from the temporal monad (χρονικῆς μονάδος) alone, which its procession is said to unfold (ἀνελίττειν), and earlier from both the demiurge and from its eternity, of which it is indeed also said to be an image, in relation to which it was brought to completion as moving" (Proclus, In *Tim.*, III, 31, 7-10).

Neoplatonists most vividly captured this conception of time as the unfolding of what is with the imagery of "flowing time" or the "river of time." Damascius offers, perhaps, the clearest statement of this metaphor.

For each river is a static form (εἶδος ἐσθηκός), from which the flow of the river is sustained, receiving the form in flow. And if you made the river stand [and not flow], the river will no longer be. Also in this way the present, past and future according to form are put together in the one form of time, while they are unfolded in becoming; that which is always proceeding to being is called the present,¹³ while that which has perished is the past and that which is not yet is the future. And thus the whole of time is constantly flowing just like motion.¹⁴

In both Plato and the later Neoplatonic commentators there are at least three temporal kinematic propositions, which may or may not be making the same claim. These are: (1) time flows, (2) time is a kind of movement and (3) the now flows. If these three propositions are not roughly making the same claim, then I am at a loss as to how to understand the first two. If time itself were to flow, then supposedly one means that a certain extended duration, which is time, is changing; however, an extended temporal duration can be divided

into what has been, what is (present) and what will be. Since what has been no longer is and what will be is not yet and so is not, it seems that only that which is (present) is changing, but this claim just is that the now flows. Similarly, if time were a type of motion, then there must be the thing that is moving of which time is that thing's motion. And again, the most likely candidate for the moving thing seems to be the now. I shall not insist that these propositions are identical, but it is the most simple reading and so I shall assume it in what follows.

In this all too short summary of later Neoplatonic conceptions of time, Plato, in at least one respect, was seen as adopting a kinetic account of time. Mundane time, that is to say, the time investigated by the natural philosopher, was understood as a type of flow or the unfolding of being. Today we would use the phrase "temporal becoming." This kinetic conception of time and its accompanying vocabulary provided the background for Philoponus' own understanding of time and consequently his interpretation of Aristotle.

II

Aristotle clearly thought that there were philosophical difficulties with identifying time with (a type of) motion or change, and thus by extension making time the flow of the now. Whether Aristotle thought these difficulties were insurmountable is another question. Still, any adequate account of time for Aristotle must take these difficulties into consideration. Thus to introduce Aristotle's temporal theory I begin with his criticisms of time as a type of motion or flow. Aristotle tells us:

But since time seems most to be a certain motion or change, this [account of time] ought to be investigated. On the one hand, the change and motion of each thing is only in the very thing changed, or where the moving or changing thing happens to be, whereas time is both equally everywhere and with all [things] (καὶ πανταχοῦ καὶ παρὰ πᾶσιν).

Moreover, change is faster and slower, while time is not; for the slow and the fast are defined by time. "Fast" is to move much in a little [time] and "slow" is to move little in much [time]; however, time is not defined by time, either by some quantity or quality [of time]. Therefore, because of the foregoing, it is seen that [time] is not motion (218b9-18).

The arguments are quick but telling. In the first argument Aristotle observes that there is no motion over and above moving things.¹⁵ That is to say that there is no such thing as abstract or “free floating” motion; rather, motion is only found in determinate moving objects. Thus if time were a type of motion, then it would only be present in the moving thing of which time is that thing’s motion. Time, however, is present everywhere and can be found accompanying all things that move. Therefore, if time were a type of motion, it would be difficult to explain its “universally present” (*πανταχοῦ*) nature.

Such an objection is immediately applicable to the view that identifies time with the motion of the planets, a view, as we saw above, that has been ascribed, probably erroneously, to Plato. For if time simply were the motion of the sun and moon (or any other heavenly body), then time would be localized at just these celestial bodies. Such a suggestion gives rise to the paradoxical conclusion that time does not belong inherently to the various natural processes found on the Earth, although these processes could be accidentally assigned a time. The argument, however, need not apply to time considered as the flow of the now, where the now is a derivative notion taken from all that presently is, and so the cosmos taken in toto. For what is the moving thing just is the world, which clearly is “universally present.” Still, such a suggestion would need to be fleshed out for Aristotle.

Even if there are means for a kinetic account of time to avoid this first objection, another is waiting. For Aristotle observes that it does seem to be a fact that each and every motion involves some rate of change, that is, so much change occurs over so much time; or to say roughly the same thing, motion occurs at some speed. Consequently, if time flowed, that is, were a type of motion, then it too should have a rate of change; however, it is meaningless to ask “how fast is time flowing?” Moreover, since all motions occur at some speed and speed is a function of distance over time, to say that time is a type of motion would in effect be to define time in terms of time. The lesson that one should take from these arguments is that time cannot simply be identified with a type of motion, or at least not without significant philosophical development and qualification. Indeed, it is an open question whether time involves temporal becoming at all.

So what then is time for Aristotle? The question is a vexed one. Certain commentators claim that despite the above mentioned difficulties as well as other

puzzles Aristotle raises concerning the reality of time Aristotle himself is committed to temporal becoming and so by extension that the various difficulties are all part of his general dialectic.¹⁶ Thus, for these interpreters these issues might be seen as presenting a challenge that Aristotle must address and resolve in his own positive account of time. Others, however, argue that in light of the previous arguments and problems mentioned by Aristotle concerning a kinetic temporal theory that time for him simply cannot involve temporal becoming.¹⁷ These puzzles are all the more damning since with one exception Aristotle does not resolve them in his own positive account of the nature of time. Consequently, for these interpreters Aristotle does not have a kinetic account of time but a “static” account. In what follows I want to sketch out in a very rough way a static interpretation of Aristotle’s text. My claims are modest. I am not here arguing that this interpretation is necessarily the correct way to understand Aristotle, but only a possible way to read him and as such it would present a philosophical challenge to such Neoplatonic commentators as Philoponus, who takes Aristotle to be committed to temporal becoming.

Aristotle offers an initial tentative (even nominal) definition of time. “Let us hypothesise (ὑποκείσθω) that time is whatever is bounded by the now (ὀριζόμενον τῷ νῦν)” (219a29-30). Given this tentative definition, one might next think of him as asking whether anything in the world corresponds with this account and if so, then what is its nature? Although for Aristotle time cannot just be simply identified with motion, it, nonetheless, is closely related to motion (218b21). Aristotle evinces this relation by the fact that if one does not perceive motion, one likewise does not perceive time; and if one is aware of time, one is also aware of some change (whether external or only mental) (218b21-219a2).

To this point both the kinetic and static interpreters of Aristotle agree. Their differences arise in considering how time and motion are related, which will be clearer if one considers the nature of motion. Motion for Aristotle is the actuality of potential *qua* potential (*Phys.* III 1, 201a10-11, a27-29, b4-5). When motion occurs, three things are involved. First, something is initially in one state of actuality, but potentially in a different state. Call this initial state the “before” (πρότερον) state. Second, the thing is in a new state of actuality that corresponds with the potentiality of the before state. Call this new state the

“after” (ὕστερον) state. Third, the moving object occupies the interval bounded by the before and after states (201b5-7). An example may clarify these points. Consider the motion of a ball. The ball is in one spatial location, *x*, and then in a different location, *y*. The ball’s actually being at *x* is for it to be in a state of potentially being at *y*. The ball’s being in the interval bounded or marked off by the spatial locations *x* and *y* - in other words, the ball’s going from potentially being at *y* to its actually being at *y* - is the ball’s motion.

Based upon this analysis of motion, the static interpreters of Aristotle can explain how time, though not identical with motion, is related to motion. Again consider the ball example. When one perceives a ball spatially located at *x* and then at *y*, one is aware of two conceptually distinct nows. One now corresponds with one’s perception that the ball is at *x* and the other now corresponds with one’s perception that the ball is at *y*. Consequently, one can mark off two distinct nows that correspond with one’s different perceptions and these perceptions follow upon (ἀκολουθεῖ) the different before and after states of a moving object. When one perceives the motion of the ball between these two extremes, that is, the motion’s before and after states, one also recognizes an interval that extends between or is bounded by two conceptually distinct nows. But Aristotle posited that whatever is marked off or bounded by the now is time. Time, then, follows upon motion, but is not identical with motion. For time is according to Aristotle whatever is marked off by a before and after now, and the varying states of a moving object are the cause of the soul’s marking off conceptually distinct nows.¹⁸ Aristotle makes the point in his usual terse manner:

Therefore, it seems that no time has elapsed whenever we perceive the now as one, or [we do not perceive the now] as the before and after in the motion or [we do not perceive the now] as the same thing [belonging to] some before and after, because [in these cases] neither is there motion. But whenever [there is] before and after, then we say that there is time; for this is time the number (ἀριθμός) of motion according to before and after (219a30-219b2).

The time keeper adopts a certain standard motion and then imposes upon it a conventional metric. The time keeper thereby renders the adopted motion into a measure or number by which other motions can be numbered or measured. For instance, one might choose the regular circular motion of the sun

and then impose certain divisions upon it like those that the mathematician imposes upon a circle, for example, degrees, minutes or seconds. Subsequently, this standard motion is used to measure other motions and assign them a time. One chooses the initial standard motion that is to be the measure of other motions by convention. In principle any regular motion, whether the movement of the heavenly spheres or the hands of a clock or the pulsation of a cesium atom, could work as the standard measure.¹⁹ Other motions are then compared to this standard measure. The number of units marked off in the magnitude of the second motion as it is measured against the standard measure is that second motion's time. Thus time is according to Aristotle an ἀριθμός, or numerable aspect, of motion insofar as it measures "how long" a motion is.²⁰

Insofar as time, then, is a measure or number, an ἀριθμός, Aristotle claims that there is an analogy (ἀνάλογον) between time and magnitude, or to be more exact between time and the magnitude of a line (219a16-18). How one understands this analogy fundamentally effects the way one interprets Aristotle's theory of time. For the static interpreters, the key to understanding Aristotle's analogy is to consider his definition of a line at both *Physics* VI 1 and *Metaphysics* V 13. In the latter passage he tells us that "length (μῆκος) is magnitude continuous in one [direction]" (1020a11-12); and "a line is limited length (πεπερασμένον μῆκος)" (1020a13-14). Πεπερασμένον, limited, is related to the term πέρας, limit, which in the case of a line is a point. Thus Aristotle provides at least one definition of a line as that which extends between two points, or to be more exact, what is limited by two points.²¹ For the static interpreters of Aristotle, this is the intended analogy between line and point and time and the now, namely, just as the line is what is limited by two points, so time is what is limited by two nows. Indeed, here one finds oneself confronted with Aristotle's definition of time hypothesized at the beginning. In the sequel we shall see that this interpretation of the analogy is not the only one.

This would conclude the static interpretation of Aristotle's temporal theory if it were not for a certain passage in Aristotle's text that definitely favors a non static, that is, a kinetic, interpretation. "In one sense the now is the same and in another it is not the same. For *qua* in the other and other it is different (and this is what it is for it to be the now), while that which the now is

at any time (ὁ δὲ ποτε ὄν ἐστι τὸ νῦν) is the same" (219b12-15). This passage provides the "smoking gun" for those interpreters who see Aristotle committed to temporal becoming. For the passage clearly suggests that the now is a persisting transient thing. The static interpreters are not, however, without their response. The account of the now cited only represents the pre-philosophical intuitions about the nature of the now that a fully developed philosophical account of time must explain. When Aristotle explains this passage he says that the change of the now is like the accidental spatial changes that befall a man when he walks from the university to the market (219b18-33). In this case one describes the man with different spatial predicates, but this change in the man does not involve some persisting "where" changing its spatial predicates. Similarly, when some concrete thing changes one does not need to ascribe a persisting "when" or now changing its temporal predicates. All that is changing, so the static interpreters argue, is the concrete object and one's description of it. For the static temporal interpreters of Aristotle, only determinate physical objects change and in turn these changes can be measured by comparison with some standard motion upon which a (conventional) metric has been imposed. This non-changing metric, according to these interpreters, just is time for Aristotle.

Before quitting Aristotle, one should take note that on the suggested interpretation although time measures motion, it is not itself a type of motion. Just as distance is not a type of motion, neither is time a type of motion; rather, these are only measures of motion. What is in motion, that is, moving, is only the moving thing, not the measure of the moving thing's motion. If one adopts this interpretation of Aristotle, it should be clear that Plato's (as well as later Neoplatonists') account and Aristotle's would be fundamentally different, if not mutually exclusive.

III

We are now in a position to consider Philoponus' account of time and how it goes beyond a simple and straightforward restatement of Aristotle's text. Philoponus viewed it as part of his duty as a commentator to reconcile the differences (whether real or apparent) between Plato and Aristotle when at all possible. He affects his reconciliation of Plato's and Aristotle's temporal

theories by identifying what I have ascribed to Plato as “that which presently is” with Aristotle’s “the before and after in motion.” Philoponus begins his commentary of *Physics* IV 11 by following Aristotle closely. He reiterates that the before and after are primarily in place and that they are primarily in place on account of the position of the parts (719, 13-14). He continues, however, with an important aside. The before and after in (ἐπί) the motion are analogous to motion (719, 15-16). The before and after in the motion cannot be from the position of the parts of the motion. One part of the motion does not remain when another comes to be; rather, the before and after in the motion are flowing (ἐν ῥύσει) (719, 20). That is to say that according to Philoponus something in the motion must be before and after and that thing flows. Philoponus, then, continues that the before and after in magnitude are proportionate to the before and after in motion because the motion comes across a before part of the spatial magnitude, so that we call it “before,” and then over a second part, so that we call it “second,” that is, “after.”

In general, Philoponus’ comments are Aristotelian; however, his aside about the flowing before and after certainly goes beyond Aristotle’s text and is, I maintain, Platonic. He has introduced the notion that a moving or flowing before and after belongs to motion distinct from merely the moving thing itself. Of course, if Philoponus were simply to mean that insofar as an object, such as a ball, changes, its before and after states change, then his position would be similar to the Aristotelian position sketched above; for the flow of a now is not being invoked, but merely the change of an object. Philoponus, we shall see, intends more, namely, that something analogous to a point, that is, the now, is associated with motion and by this point’s flow it generates before and afters and consequently time.

At 721, 16-17 and 22, Philoponus, following Aristotle, tells us that the before and after are boundaries (ὀρίζοντες) in motion by which one recognizes time and also that time is bounded by the now. In this respect Philoponus’ interpretation is in line with the position limned earlier; the before and after are equated with the now that marks off the boundaries of time. Philoponus, then adds at 725, 13-14 that the now also is the generator of time and it generates time by its flow.

The now is the efficient cause (ποιητικὸν αἴτιον) of time; for the flow of this generates time. Therefore, just as the point (σημεῖον) is related to magni-

tude and the moving thing is related to motion, in the same way also is the now related to time. Thus a point, one and the same in being, generates magnitude; for the line is not generated by placing a plurality of points (στίγμῶν) side by side, but by a flow of a single [point]. And again the moving thing, one in being, generates motion. Clearly it follows that the now, one in being, generates time. Time is not generated by placing a plurality of nows side by side; nor would [time] be continuous from the nows [so placed]; rather [time is continuous] from the flow of a single [now]; for by the same now's being grasped as before and after does time have its being (727, 21-29).

In this passage Philoponus is arguing that Aristotle's temporal theory is in fact a kinetic account of time, much like what one sees in Plato. The now, which on the static interpretation of Aristotle only indicated the limit or boundary of time, has been at least roughly identified with Plato's moving present, generating time through its flow.

Philoponus' equation of Aristotle's account of time with the Platonic kinematic account turns on his understanding of Aristotle's analogy between a point and a line and time and the now. For Philoponus the point is related to the line, in one of its senses, as its generative cause; the line is the product of a flowing point. This definition of a line appears to have been current in the Academy in Aristotle's time (*De anima* I 4, 409a4-5) and Proclus mentions it approvingly in his commentary on the First Book of Euclid's Elements (97, 7). Proclus' comments on this account of the line are insightful:

Some define [the line] as the "flowing of a point," (ῥύσις σημείου) others as "magnitude extended in one direction." The latter definition indicates perfectly the nature of the line, but that which calls it the flowing of a point appears to explain it in terms of its generative cause and sets before us not line in general, but the material line. This line owes its being to the point, which, though without parts, is the cause of the existence of all divisible things; and the "flowing" indicates the forthgoing of the point and its generative power that extends to every dimension without diminution and, remaining itself the same, provides existence to the divisible thing.²²

Given the currency of this generative definition of the line it is no surprise that Philoponus would adopt it and argue that just as the point produces the

line through its flow, so the now produces time through its flow.²³ The definition allows Philoponus to identify Aristotle's account of time as the number of motion according to before and after with Plato's moving image of eternity; for the before and after in Aristotle's definition, which at least on one interpretation only indicate time's limits, become Plato's "that which presently is."

Although this generative definition of a line, and the subsequent account of the flowing now and time are attractive, they are not without their textual and philosophical difficulties as a straightforward interpretation of Aristotle's text. Indeed, there are a number of reasons, at least in the minds of the static interpreters, for thinking that Aristotle would have rejected both the proposed definition of a line and the account of time that follows from it. First, considering the textual evidence, Bonitz list only a handful of occasions where ῥύσις appears in the Aristotelian corpus and in every case it refers to something like rivers, winds, blood or the like, but never to the now or any other indivisible, such as a point.²⁴ Without doubt it is bad practice to move from the absence of a certain term or phrase in the corpus of a philosopher to the absence of the concept that underlies that term or phrase in the philosophy. Thus we should next consider what philosophical reasons the static interpreters of Aristotle might have for denying that Aristotle had the concept of a flowing now.

There are at least three passages in Aristotle that can be interpreted as arguing against such a doctrine. These are *Physics* IV 10 (218a8-21), *De anima* I 4 (409a1-6) and *Physics* VI 3-4. In the *Physics* IV passage Aristotle presents an *aporia* that suggests that the now cannot be real. The puzzle takes the form of a dilemma, where the two horns are that either the now is other and other (ἄλλο καὶ ἄλλο), that is, something that changes, or it remains one and the same (ἓν καὶ τὰ αὐτὸν ἀεὶ διαμένει), that is, something that does not change. The argument against the now's being other and other is telling and runs as follows. If the now were something that changed, then the currently present now would have to cease to be, but when could it cease to be? There seem to be only three possibilities: it changes either (1) in the currently present now, (2) in the immediately adjacent now or (3) in some subsequent (non-adjacent) now. It could not cease to be when it currently is. At that very moment it is and has not yet ceased to be. The position that Aristotle appears

to be rejecting is that the now can change at an instant or more generally that there can be motion at an instant. At least for Aristotle motion at an instant is impossible.²⁵ As for possibility (2), since the now is analogous to a point and for Aristotle no two points can be immediately adjacent to one another, the now could not cease to be in any purportedly immediately adjacent now.²⁶ The suggestion is that motion has an atomic structure and so by extension time has an atomic structure, that is, time is a composite of discrete extended instants or nows, a position that Aristotle explicitly rejects at *Physics* VI 1 and 3. Concerning the last suggestion that the now changes in some subsequent (non-adjacent) now, since between any two points there is a line in which there is a potentially infinite number of other points, so too between any two nows there would be a potentially infinite number of nows. Consequently, if the currently present now were to cease to be in any subsequent now, it would have to be simultaneous with the infinite number of other nows in between the now when it was present and the now when it ceased to be, which is absurd. Here the suggested change of the now involves gradual change. In principle there is nothing objectionable to continuous or gradual change for Aristotle. The difficulty comes in ascribing such a change to the now. Since the *aporia* exhausts all the possible ways that the now might change, it provides one with philosophical reasons for denying that the now changes or flows at all.

Admittedly, the objection is an *aporia* and need not represent Aristotle's own considered opinion. It might be thought merely to present the temporal theorist with a challenge that an adequate account of time must address. Indeed, some commentators who believe that Aristotle is committed to temporal becoming have taken it just this way. They argue that Aristotle's claim that the now is in one sense the same and in another different (219b12-15), which was considered above, is the key to the puzzle. Thus, they maintain that insofar as the now is something persisting it never changes with respect to its essential nature, that is, its "nowness" or "presentness." Nonetheless, the various (accidental) states that befall it do change, that is, its being 12:00 A.M. January first 2000, or 4:00 P.M. July fourth, 2002, etc. This is the point one should take from Aristotle's example of the man in the market and then at the university, claim these interpreters. In fact, in the sequel we shall see that this is the very tack that Philoponus (as well as Philoponus' contemporary Simplicius) took. Still this is not the only interpretation of this passage

as we have seen. Such a reading involves a significant ontological commitment, namely, the reality of a transient persistent now, which those who adopt the static interpretation of Aristotle find too great to accept. In either case, how Aristotle would resolve this *aporia*, if at all, is not obvious. Indeed, one would only think that the *aporia* must be resolved, if one also thought that Aristotle's account of time is committed to temporal becoming, otherwise, one sees the puzzle as providing further evidence against temporal becoming. Thus, Philoponus' suggested solution to the puzzle cannot be brushed aside as just a simple reading off of Aristotle's text.

Another difficulty for the generative definition of a line adopted by Philoponus is the *De anima* I 4 passage, which we briefly mentioned earlier. The context of the passage concerns the theory that the soul is a number that moves itself. Aristotle rejects this account of the soul by first arguing that it is impossible for a unit (*μονάδα*) to move. "For how can one discern a moving unit, both by what and in what manner, since it is without parts and difference? For if it moves and is movable, it must differ" (409a1-3). The argument assumes that whatever lacks any internal differences cannot move or cause motion; however, since the now considered as an indivisible instant would lack any internal difference, then *mutatis mutandis*, the argument would apply to the now and thus the now would not move.

Aristotle continues the *De anima* I 4 passage with a second argument that shows that even if one assumes the position that a line is made by the motion of a point, the proposed theory of the soul is still incoherent. For if the soul were a self-moving unit, and the movement of the unit were to make a line, the movement of the soul's unit would be a line, a position that Aristotle considers gibberish. "Moreover, since *they say* that a moving line makes a plane, while a [moving] point makes a line, then the movements of the [soul's] units will be lines; for a point is a unit having position" (409a3-6). Thomas Heath suggests that Aristotle here adopts the doctrine of a flowing point in order to explain the origin of magnitude.²⁷ Heath has clearly missed the thrust of Aristotle's argument. Aristotle's first argument was in terms of his own doctrine that nothing indivisible can move. In this second argument, Aristotle goes on to add that even if one were to assume along with the proponents of this view that the line is produced by a moving point, the account of the soul as a self moving number is incoherent. There is nothing in the argument

that forces one to ascribe the doctrine of a moving point to Aristotle. He is merely positing this definition for the sake of argument, and indeed it seems that Aristotle himself would reject the definition on the basis of his arguments at *Physics* VI 4, where he explicitly claims that no indivisible thing moves or flows.

In fact, perhaps the strongest and clearest difficulty for those who propose a doctrine of a flowing or changing now comes in explaining Aristotle's position at *Physics* VI 3 and 4. Aristotle takes the whole of *Physics* VI 3 to argue that the now in its proper philosophical sense is indivisible.²⁸ He immediately precedes in the next chapter (*Phys.* VI 4, 234b10-20), however, to inform us that "everything that changes must be divisible."²⁹ The detailed arguments for these conclusions are subtle and difficult, but need not detain us since at least Aristotle's conclusions are clear enough. Whatever changes is divisible, but the now is not divisible. The subsequent inference is obvious and it is difficult to think that Aristotle would not have made it: the now does not change, and so does not flow.

All of this is to say that the doctrine of a flowing or moving now cannot simply be read out of Aristotle's text. Again, I am not claiming here that Aristotle did not have such a doctrine, only that any commentator who ascribes such a view to Aristotle will need to do some serious philosophical work to justify it. Consequently, Philoponus' account that the flowing now produces time is not merely a restatement of the historical Aristotle, but is a carefully crafted (Neo-)Platonic interpretation of Aristotle.

Returning to Philoponus, he requires one further stage to integrate Plato's kinetic and Aristotle's accounts of time. He must respond to Aristotle's criticisms against time's being a type of motion. One should first note that for Aristotle the opinion under consideration in his list of *endoxa* was whether time is a *certain type* of motion or change, κίνησις καὶ μεταβολή τις. When Philoponus glosses this passage (713, 15-17) the τις is dropped and replaced with the definite article, ἡ, thus making the opinion under consideration whether time is motion in general and not just a particular motion. Again, when he summarizes the whole of IV 10 at 708, 22-712, 20 he specifically says that the opinion is whether time is motion ἀπλῶς or absolutely (710, 21). Thus the *endoxon*, according to Philoponus, is not whether time can be any particular motion whatsoever, but whether time is motion absolutely speaking.

For time might, then, be a particular type of motion, while not being motion in general.

Concerning Aristotle's first concern that motion is only in the thing that moves, whereas time is present everywhere (*πανταχοῦ*), Philoponus acknowledges its full force. When Philoponus turns to the topic of time's being simultaneously the same (*ad* 219b10), however, he again introduces the issue of time's being everywhere and his comments there are telling.

All time is assumed to be simultaneous (*ἅμα*) everywhere (*πανταχοῦ*). In this respect it is one and the same; for it measures the before and after of every motion (not however that of alteration and augmentation), so the before and after of the moving things that come to be simultaneously are the same, so also the time is the same; however, this is no longer fitting to say concerning motion. For motions are not simultaneously the same; rather, on the one hand, they are not only different in number, but also in form, while on the other hand, even if they were the same in form, for example, multiple local motions, they would not be the same in number. Time, however, is one and the same everywhere in number; and so by this it is clear that time is not motion, but the number of motion. Thus [Aristotle] constructs an argument that time is one and the same everywhere from the now; for the now, he says, according to its nature is one everywhere, although different in account. (For in one way it is grasped as something understood as before and in another way as something understood as after; however, as before it is one and the same everywhere and also as after in the same manner). If then the now is the generator of time (*τὸ γεννητικὸν τοῦ χρόνου*), then this is one and the same everywhere and it is clear that time would also be one simultaneously everywhere, both in nature and number (724, 33-725, 15).

In many respects Philoponus' comments are faithful to Aristotle. Philoponus observes that insofar as events or things are simultaneous, they must be in a now that is one and the same everywhere. Since the now is one and the same everywhere, and time is related to the now, time will not be solely related to one spatially discrete moving thing. Thus Philoponus' account of the now avoids Aristotle's first criticism. What is novel in Philoponus' comments is the introduction of the now as *τὸ γεννητικὸν τοῦ χρόνου*, the generator of time; for in the next set of comments Philoponus develops this concept into the Neoplatonic flowing now, which we have seen above. Thus, while

appearing to be faithful to Aristotle's own argument that time cannot be motion, Philoponus has surreptitiously introduced the very concept that will allow him to make time the flow of the now.

Aristotle's second criticism, we recall, observed that every motion or flow occurs at some rate of change, which itself is defined in terms of time. Thus if time were a flow or type of motion, then time would be defined in terms of itself. Philoponus' treatment of this criticism is not so happy as his resolution of Aristotle's first criticism. Since Philoponus envisions time as the flow of the now, one may rightly ask, "how fast or slow is the generative now flowing?" Philoponus' response to this question is a philosophical bait and switch. He distinguishes two functions of the now. On the one hand, in agreement with the static interpretation of Aristotle, the now might designate the termini of time, namely, as that which bounds or limits time. On the other hand, following Plato, there is also a single now (one in being) that produces time through its flow. The issue of time's fastness or slowness concerns this latter understanding of the now. Philoponus' answer, however, invokes the former notion of the now. "Since time is something bounded by the number in the soul, and since fastness and slowness naturally do not belong to this [number], neither will that which we bound by it have [fastness and slowness]" (743, 28-30). For example, let us imagine that we have marked off the now that initiates the reading of this paper and the now that terminates the reading of this paper. Neither the time that is bounded by these nows nor these nows themselves move or change (even though we use them to measure a change). Consequently, since neither time nor the bounding nows move, but fastness and slowness only belong to what moves, then neither time nor the now is fast and slow. Aristotle himself provides this answer at *Physics* IV 12, 220a32-b5 and it is correct concerning the now *qua* limit. Whether the bounding or limiting now is fast or slow, however, is not at issue; rather, the issue is what is the rate of change of Philoponus' generative or flowing now. To this question, as far as I can see, Philoponus is silent.

IV

I want to end this study with a few brief comments about the relevance of these ancient theories and interpretation to contemporary discussions about

the nature of time. For those aware of contemporary discussions about the nature of time, the various ancient positions we have investigated should be of more than passing historical interest. For the positions have a strong family resemblance to various contemporary philosophical theses concerning the nature of time. Perhaps the most obvious similarity, though by no means the only one, is the debate between kinetic and static accounts of time, that is to say, the topic of temporal becoming. Plato and his Neoplatonic followers clearly appealed to a doctrine of temporal becoming, whereas Aristotle, under one interpretation, attempted to explain time solely in static terms and so avoid an appeal to temporal becoming.

On the contemporary front, McTaggart brought this issue to the fore in present philosophical discussions of time. McTaggart distinguished a so called A series and B series in time. The A series involves such terms of temporal becoming as “past,” “present” and “future” and the tenses “was,” “is” and “will be.” The application of such terms changes depending on when they are used. For example, at breakfast this morning it *was* true that I *will* work on this paper, but at the present I *am* working on it and at dinner I *was* working on it. This event with respect to the A series, then, changes. On the other hand, the B series involves such static temporal terms as “earlier” and “later” or “before” and “after”; and as such any event with respect to the B series always remains the same. Thus, for example, it was always and unchangingly true that I had breakfast *before* I worked on this paper. McTaggart, then, continues that “if there is no real A series, there is no real change. The B series, therefore, is not by itself sufficient to constitute time, since time involves change.”³⁰ McTaggart himself went on to argue that since there is an implicit contradiction in the use of A series terms, time, thus, could not be real. Not all who advocate temporal becoming and the essential need for it in order to explain time, however, have denied the reality of time.³¹

On the other hand, neither have all contemporary temporal theorists seen a need for temporal becoming. Detractors of temporal becoming include J. J. C. Smart and C. D. Broad. Smart argues similarly to the criticism proffered by Aristotle that if time flowed, one could reasonable ask “how fast does time flow,” a question that *prima facie* appears absurd.³² Less obviously Aristotelian, but still in the same spirit, is Broad’s argument that a flowing now would require a second time dimension in order to explain the acquisition or loss

of presentness of an event.³³ At the heart of both of these objections is Aristotle's intuition in his second critique of the thesis that time is change, namely, that one would have to assume time (or some meta-time) in order to define a kinetic account of time.

Since Aristotle's second objection to time's being a type of motion has been thoroughly exploited, I want to focus on his first objection, which I believe offers a yet untapped source for arguments against temporal becoming. The general intuition of the argument, we recall, was that motion is only located in the moving thing. Thus, if time were a type of motion, it would only be present in the moving thing of which time is that thing's motion. Consequently, time would not be universally present, if it were a type of motion. Philoponus, we saw, explained the universally present nature of time by appealing to a universally present flowing now. For if time is intimately linked to the now and the now is universally present, then so time will be universally present. Since the flowing now purportedly produces time by its flow, time is intimately linked to the now. Moreover, who could think that the present is limited to only a single spatial location? If anything is universally present, it is the now. Thus, concludes Philoponus, time must be universally present on account of the flowing now.

Even granting that the now or present moment is universally present, a modified version of Aristotle's objection still stands. For if the now moves, then the now itself is a moving thing and the static interpreters can ask about the nature of this moving thing called the now. Defenders of temporal becoming are quick to note that the nature of the now should not be conceived as an object, but as a point in time. Still what sort of moving thing is this moving point in time?³⁴ It cannot be nothing; for the "movement" of nothing is no movement at all. Plato and Neoplatonists might say that the now is the presentness of the totality of what is. If this suggestion is just that the now is the *present*, then it is vacuous. There is no difference in saying that the flowing now is the present and the flowing now is the now. It is the very nature of the now or present *qua* moving thing that we want explained. Thus, if this suggestion is not to be vacuous, it might mean that the moving thing that we identify with the now is the universe itself, or to be more exact, the universe's state of actuality as opposed to its potentiality. In this case, however, the now *per se* is not flowing or moving; rather, the universe as a whole is

changing. Hence time has been confused with motion or change and the flowing now with the universe itself. For the detractors of temporal becoming, then, there is no fact of temporal becoming that needs to be explained, but a confusion between motion and time that needs to be clarified.

Certain contemporary temporal theorists prefer to say that the now is a predicate or property that attaches to events, or event-particles, and explains their presentness. They often employ the much rehearsed metaphor of the now's sweeping over a series of events and making those that it hits upon present just like a spotlight's sweeping over a chorus line successively illuminates each dancer. I think here again the static interpreters' analysis is insightful in pointing out a confusion. First, in what meaningful sense can one say that a property or predicate "sweeps over," "flows," "changes" or in general "becomes" at all? Properties themselves do not change. Red, hot and the like do not change *qua* red or hot; rather, objects change with respect to their properties. Similarly, predicates themselves do not change; rather, the subjects change such that one ascribes different predicates to them. Consequently, when things change, one ascribes to them, on account of their state of actuality, the predicate being present. This ascription involves no fact of temporal becoming, but only the change of an object. Thus unlike McTaggart and others, who believe time is required for change, the static interpreters insists that the order of explanation is just the reverse, change is required for time.

Furthermore, even if one could make out a theory of properties themselves changing, one can still ask in what meaningful way does the property of being present or now change or flow? It certainly does not change with respect to its being present; for this is the very feature that the property is intended to convey upon events. Nor could this property of being present flow into either the past or future. It is absurd to say that the very property that makes something right now be present is either in the past or future. If it is past, then it no longer is present and so does not presently belong to an event so as to make the event present, and *mutatis mutandis* if it is future. The thing which changes again seem to be the totality of concrete things in the world, not the property of being present. Thus the metaphor should not be that the now is like a spot light that moves over a stationary line of dancers, but that dancers move into and out of a stationary spot of light. The original metaphor, our static interpreters would observe, confuses a flowing now with changing concrete things.

In conclusion, we have looked at Plato's kinetic account of time and one possible interpretation of Aristotle in terms of a static account of time, as well as Philoponus' attempt to harmonize a Platonic theory of time with Aristotle's own account. Despite Philoponus' failure to explain fully various key issues, it is his Platonic interpretation of Aristotle's theory of time that most captured the imagination of subsequent Aristotelian commentators. By arguing for a particular conception of the relation between a point and a line, Philoponus was able to alter fundamentally the way Aristotle was to be read for centuries to come. Indeed, Philoponus' innovations are so subtle that generations of commentators, including medieval philosophers such as Avicenna and Aquinas, as well as contemporary commentators such as Sir David Ross, take Philoponus' commentary as simply being a clearer, though not innovative, repetition of the historical Aristotle. Perhaps, then, this is Philoponus' legacy: not as a mere expositor, but as one who can capture our imagination, even if in the name of another.

Notes

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- ¹ The tenth century bibliophile an-Nadîm list in his *Fihrist* Porphyry's summary and Themistius' paraphrase of the *Physics*. Of the great Hellenistic commentaries of the *Physics* by Alexander of Aphrodisias, Simplicius and Philoponus only the first half of Alexander's commentary was available in Arabic and Simplicius' commentary was wholly unknown. In contrast virtually the whole of Philoponus' commentary was available, even if in only a paraphrastic form. For discussions and fragments of what is still extant of these authors in Arabic, see the following. For Porphyry see *Porphyrii Philosophi Fragmenta*, ed. A. Smith (Stuttgart: B. G. Teubner, 1933). An Arabic translation of Themistius' paraphrases can be found in M. Steinschneider, *Die arabischen Übersetzungen aus dem Griechischen* (reprinted Graz, 1960). What is available of Alexander's commentary can be found in E. Giannakis, "Fragments from Alexander's Lost Commentary on Aristotle's *Physics*," *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 10 (1995-1996): 157-87. For arguments that Simplicius' great commentary on the *Physics* was not available in Arabic see

H. Gätje, "Simplikios in der arabischen Überlieferung," *Der Islam* 59 (1982): 3-61. A "free" summary of Philoponus' commentary of books III-VII of the *Physics* (and to a very limited extent book VIII) were attached to Ishâq b. Hunayn's translation of this work under the name "Yahyâ" (MS Leyden Warner 583, which has been edited by A. Badawî, Aristûâtâlîs, *al-Tabîâ*. *Tarjamât Ishâq ibn Hunayn maâ shurûh Ibn as-Samh wa Ibn Adî wa Mattâ ibn Yûnus wa Abî l-Faraj ibn aûayyib*, 2 vols. (Cairo: The General Egyptian Book Organization, 1964-65)). G. Endress (The Works of Yahyâ b. âAdî: *An Analytical Inventory* (Wiesbaden: Reichert, 1977): 36-38) suggested that Yahya refers to John Philoponus and this suggestion has been systematically borne out by E. Giannakis (*Philoponus in the Arabic Tradition of Aristotle's Physics*, thesis University of Oxford, 1992) and P. Lettinck (*Aristotle's Physics and Its Reception in the Arabic World* (Leiden: Brill, 1994)). Lettinck has translated the Arabic Philoponus in *Philoponus on Aristotle's Physics 5-8* (with *Simplicius on Aristotle on the Void*, trans. J. O. Urmson) (Ithaca: Cornell University Press, 1994).

- ² In *Aristotelis Physicorum Libros Quinque Posteriores Commentaria*, ed. H. Vitelli (Berlin: Typis et Impensis Georgii Reimeri, 1888): 702-786.
- ³ Philoponus is conspicuously absent from S. Sambursky's and S. Pines' *The Concept of Time in Late Neoplatonism* (Jerusalem: The Israel Academy of Sciences and Humanities, 1987; henceforth, *CTLN*), which is a collection and translation of the more important later Neoplatonic texts concerning the nature of time. Also in the *Ancient Commentators on Aristotle* series, the volume dedicated to Philoponus' commentary of Book IV of the *Physics*, where Aristotle treats the subject of time, only includes Philoponus' discussion of place and void, not his discussion of time (*Place, Void and Eternity*, trans. D. Furley and C. Wildberg (Ithaca: Cornell University Press, 1991)). The section on "Eternity," where one might expect Philoponus' account of time, is in fact Simplicius' critique of Philoponus on the eternity of the world.
- ⁴ "Introduction §12" to the *Physics*, trans. R. Waterfield (Oxford: Oxford University Press, 1996): xliii.
- ⁵ I shall not argue here that the interpretation of Aristotle, which I suggest, is necessarily the correct interpretation, but only that it is a possible interpretation. And as such it provides a significant challenge to both Plato's and Philoponus' own preferred account of the nature of time.
- ⁶ G. E. L. Owen suggests a different account of Plato's theory of time based upon his reading of *Parmenides* 152A-E ("Aristotle on Time" in *Logic, Science and Dialectic: Collected Papers in Greek Philosophy* (Ithaca: Cornell University Press, 1986): 306-308). I am hesitant to draw any "positive" theories from the paradoxes of the *Parmenides* and so shall just consider the view put forth in the *Timaeus*, which arguably is Plato's own considered view about the nature of time.
- ⁷ A. E. Taylor, *A Commentary on Plato's Timaeus* (Oxford: Clarendon Press, 1928): 187.

- ⁸ Ancient commentators include Eudemus, Theophrastus and Alexander, as well as the doxographer Aetius. (See Ross, *Aristotle's Physics* (Oxford: Clarendon Press, 1998): 596 (ad 218a33-b1). Modern commentators include E. Hussey, *Aristotle's Physics, Books III and IV* (Oxford: Clarendon Press, 1993): 141 (ad 218a30) and J. F. Callahan, *Four Views of Time in Ancient Philosophy* (Cambridge: Harvard University Press, 1948): 22, n. 29.
- ⁹ In *Aristotelis Physicorum Libros Quattuor Priores Commentaria*, ed. H. Diels (Berlin: Typis et Impensis Georgii Reimeri, 1882): 701, 30ff.
- ¹⁰ Most notably, they found in Plato at least two temporal orders: unparticipated (ἀμέθεκτος) or supermundane (ὑπερκόσμιος) time, on the one hand, and participating (μετεχόμενον) or mundane (ἐγκόσμιος) time on the other. This distinction (or at least something like it) is found in Iamblichus, Proclus, Damascius and Simplicius. Cf. Iamblichus quoted in Simplicius, In *Cat.* 356, 1ff. (CTLN, 32, 13-17) and in Simplicius, In *Phys.* 787, 10-14 (CTLN, 34, 21-26); Proclus, In *Tim.* III, 26, 2 and 26, 25-30 (CTLN, 50, 21 and 52, 2-7); Damascius, cited in Simplicius, In *Phys.* 780, 1ff. (CTLN, 76, 4ff.); and Simplicius, In *Phys.* 783, 11-21 (CTLN, 94, 13-25). Very briefly, unparticipated time, or time within the supermundane order, is time that stands above any motion or change and abides as a whole in its totality everlastingly present in the demiurge. For a more detailed account of unparticipated time in Proclus see L. Siorvanes' *Proclus: Neo-Platonic Philosophy and Science* (New Haven: Yale University Press, 1996): 134-136.
- ¹¹ Quoted in Simplicius, In *Phys.* 794, 28-795, 1.
- ¹² Proclus endorses this reading under his own name also when he writes: "insofar as [time] is in the participated things, it is moving and with them, unfolding (ἐξάπλων) itself in them" (In *Tim.* III, 26, 30; CTLN, 52, 6-7).
- ¹³ Following J. O. Urmson [*Simplicius: Corollaries on Place and Time* (Ithaca: Cornell University Press, 1992): 121] and reading ἐνεστώς for the texts ὕφεστώς.
- ¹⁴ Quoted in Simplicius, In *Phys.* 798, 17-26 (CTLN, 82, 16-23).
- ¹⁵ Aristotle argues for this thesis at *Physics* III 1, 200b33-201a3.
- ¹⁶ See F. Miller, "Aristotle on the Reality of Time," *Archiv für Geschichte der Philosophie* 56 (1974): §V; J. Moreau, "Le temps et l'instant selon Aristote," *Naturphilosophie bei Aristoteles und Theophrast*, ed. I. Düring (Heidelberg: Lothar Stiehm Verlag: 1966): 152; W. D. Ross, *op. cit.*, 67-68; S. Waterlow, "Aristotle's Now," *The Philosophical Quarterly* 34 (1984): §V.
- ¹⁷ See W. Wieland's *Die aristotelische Physik* (Göttingen: Vandenhoeck & Ruprecht, 1970): §18 (316-334); N. Kretzmann's "Time Exists - But Hardly, or Obscurely," *The Aristotelian Society*, supplementary volume 50 (1976): 91-114; and to a lesser extent D. Bostock's "Aristotle's Account of Time," *Phronesis* 25 (1980): 148-169 and his introduction to Aristotle's *Physics*, trans. R. Waterfield, *op. cit.*, xliii-xlvii.

- ¹⁸ The interpretation is not suggesting a radically subjective view of time here; rather, only insofar as time is something counted or measured does it require someone to count or measure it. See J. Annas concerning the interrelation of time and the activity of counting (“Aristotle, Number and Time,” *The Philosophical Quarterly* 25 (April 1975): 101, 103-104).
- ¹⁹ See *Metaphys.* I(10) 1, 1052b31-1053a30 for a discussion of the criteria needed in choosing an adequate measure. These are that the standard motion must be uniform and the quickest.
- ²⁰ Cf. Waterlow, *op. cit.*, 110. Hussey complains that “the absence of a definite article [before ἀριθμός] is anomalous in a definition” (150) and so presents an “obvious difficulty” for Aristotle’s definition of time. Since there are multiple ways of numbering motion, for example, according to “how long” or “how far” or even “how fast,” it is only fitting that Aristotle indicates that time is *a* number of motion and not *the* number of motion.
- ²¹ Aristotle also offers other, not necessarily mutually incompatible, definitions of the line elsewhere. A line is the limit of a plane (*Topics* VI 4); and again a line is what is divisible in one dimension (*Metaphysics* V 6). Although Aristotle also mentions other definitions of a line, such as “length without breadth” (*Topics* VI 6) and the magnitude produced by a flowing point (*De anima* I 4), he ascribes these to others and they need not represent accounts of the line that he would endorse.
- ²² *A Commentary on the First Book of Euclid’s Elements*, trans. G. Morrow (Princeton: Princeton University Press, 1970): 79-80 (97, 8ff).
- ²³ Simplicius makes this same point in his commentary of the *Physics*, ad 219b10-33, especially 722, 30-34, as well as 726, 8.
- ²⁴ H. Bonitz, *Index Aristotelicus* (Graz: Akademische Druck- U. Verlagsanstalt, 1955) s.v., ῥύσις.
- ²⁵ Cf. his argument at *Physics* VI 6.
- ²⁶ Cf. *Physics* VI 1. Aristotle’s general argument for the thesis that points cannot be immediately adjacent is that if they were, then they would be in contact with one another. Being in contact, however, requires that those thing which are in contact have extremities. If a point had extremities, though, it would be potentially divisible into those extremities, but a point is indivisible, even *in potentia*.
- ²⁷ Thomas Heath, *Mathematics in Aristotle* (Bristol: Thoemmes Press, 1998): 90; *The Thirteen Books of The Elements*, vol. 1, trans. T. Heath (New York: Dover Publications, Inc., 1956): 156.
- ²⁸ Ἀνάγκη δὲ καὶ τὸ νῦν τὸ μὴ καθ’ ἕτρον ἀλλὰ καθ’ αὐτὸ καὶ πρῶτον λεγόμενον ἀδιαίρετον εἶναι, καὶ ἐν ἅπαντι τὸ τοιοῦτο χρόνον ἐνυπάρχειν (233b33-35).
- ²⁹ Τὸ δὲ μεταβάλλον ἅπαν ἀνάγκη διαίρετὸν εἶναι (234b10).

- ³⁰ "The Unreality of Time" in *The Philosophy of Time*, ed. R. Le Poidevin and M. MacBeath (Oxford: Oxford University Press, 1993): 26-27.
- ³¹ Cf. G. Schlesinger, "Temporal Becoming" and "How to Navigate the River of Time" both in *The New Theory of Time*, ed. L. N. Oaklander and Q. Smith (New Haven: Yale University Press, 1994): 214-220 and 229-231.
- ³² "The River of Time," *Mind* 58 (1949): 485.
- ³³ *Examination of McTaggart's Philosophy*, vol. II, part 1, 22 in *The Philosophy of Time*, ed. R. Gale (London: MacMillan, 1968): 125-128.
- ³⁴ Schlesinger, "Temporal Becoming," 214.

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