

Aristotle's Critique of Timaeian Psychology¹

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Jason W. Carter*

Abstract: Of all the criticisms that Aristotle gives of his predecessors' theories of soul in *De anima* I.3–5, none seems more unmotivated than the ones directed against the world soul of Plato's *Timaeus*. Against the current scholarly consensus, I claim that the status of Aristotle's criticisms is philosophical rather than eristical, and that they provide important philosophical reasons, independent of *Phys.* VIII.10 and *Metaph.* Λ.6, for believing that νοῦς is without spatial extension, and that its thinking is not a physical motion.

Keywords: *Timaeus*, world soul, soul, nous, intellect, thought, *De anima*, extension, Plato, early Academy, myth

* **Corresponding author: Jason W. Carter**, Exeter College, University of Oxford, United Kingdom. Email: jason.carter@exeter.ox.ac.uk.

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Introduction

Aristotle did not believe in a world soul.² For this reason, of all the criticisms that he gives of his predecessors' psychological theories in *DA* I.3–5, none seems more unmotivated, or more out of place, than those directed against its depiction in Plato's *Timaeus*. In part because of Aristotle's literal approach to Plato's masterwork, and in part because scholars such as Harold Cherniss have forcefully argued that his arguments against it are eristical in nature, modern scholarship has tended to accept either the view that Aristotle's treatment of the *Timaeus* in *De anima* is deeply misguided, or that it is philosophically superficial.³

In what follows, I shall argue that this common view is almost certainly mistaken. Instead, I defend the claim that, read in their proper historical and philosophical context, Aristotle's criticisms of the world soul are more plausibly a series of short, but serious philosophical investigations into the structure and nature of human and divine νοῦς. Aristotle pursues these investigations, I argue, to provide philosophical reasons—independent of *Phys.* VIII.10 and *Metaph.* Λ.6—for thinking that the nature of νοῦς does not properly belong to Aristotelian physics.⁴

² However, he did believe that heavenly entities composed of the material αἰθήρ are animate, including the heavenly bodies and the outermost heavenly sphere of the stars. See Johansen (2009).

³ Ross (1961), p. 19 for instance, blithely remarks that *DA* I 'is marked in parts by a certain amount of captiousness [...]'.
⁴ See Mansion (1961), p. 44.

To show this, I first defend the legitimacy of Aristotle’s demythologizing treatment of the *Timaeus* by situating his critique within the context of early Academic exegetical practice (sections 1–2). I go on to show that the most important of these criticisms provide philosophical justifications for two distinctively philosophical views about νοῦς: that it is not extended in space, and that its episodes of thinking are not physical motions (sections 3–7). I conclude with a summary of what these results tell us about Aristotle’s doctrine of thought (section 8).

1 Mythos and Logos

In contrast to the ancient commentators, who unanimously took Aristotle to have offered in *DA* I.3 a strong refutation of a literal interpretation of a mythological *Timaeus* (and not a refutation of Plato’s own views),⁵ in modern times, he has more

⁵ See Themist. *Paraphrasis in de anima*, 19.23–24, Philop. *In De anima*, 116.26–28, ps.-Simpl. *In De anima*, 40.20–24, Soph. *Paraphrasis in De anima*, 20.13–15. Philop. *In De anima*, 124.26–27, has the most justification for this interpretation, since he read βούλονται for βούλεται at 407^a4. If correct, this would confirm the Neo-Platonic view that Aristotle’s criticism is directed at a particular interpretation of the *Timaeus* (e.g. by the Academy under Speusippus or Xenocrates) rather than the text itself. The evidence is uncertain for what Ps.-Simplicius read, but Themistius and Sophonias read βούλεται. The ancient view is defensible on two grounds. First, Aristotle appears to deal with the Timaeian thesis gently, calling it ‘οὐ καλῶς’, as opposed to a stronger description, like ‘ψεῦδος’ (*DA* I.3 405^b32), ‘ἀδύνατον’ (*DA* I.3 406^a2, *DA* I.5 409^b14, 410^a20), or ‘ἄτοπον’ (*DA* I.5 409^b1). Second, Aristotle initially attributes the account of the soul *not* to Plato, but to Timaeus (either the character, or the dialogue) at *DA* I.3 407^a26. This interpretation hinges on the subject of βούλεται in 407^a4, which has no grammatical antecedent other than ὁ Τίμαιος at 407^a26. Modern interpreters

often been charged with offering a weak refutation of a mythological *Timaeus* because he interprets it literally.⁶ Whilst the view of the ancient commentators can be faulted for attempting too strenuously to make Aristotle and Plato agree on fundamental doctrine, the modern view can be faulted for making Aristotle's criticisms appear unusually shallow.⁷

typically take the subject to refer implicitly to the author of this dialogue (i.e. Plato), whilst the ancient commentators took it to refer to the character or historical figure of the dialogue. See Hicks (1907), p. 254. It has also been suggested that Aristotle may be reporting Speusippus' interpretation of the *Timaeus*, since a fragment from Iamblichus' *De anima* (preserved by Stobaeus) reports Speusippus' definition of the soul as ἰδέα τοῦ πάντη διαστατοῦ. See Tarán (1981), fr. 54a. However, given that Speusippus rejected Plato's Ideas, Tarán (p. 370) has persuasively argued that if fr. 54a is really from Speusippus, it is best understood as an attempt to refute Aristotle's criticism of Plato in *DA* I.3, and 'would amount to saying that for Plato [in the *Timaeus*] the soul is the form (ἰδέα) of the extended body in the same way as it is an εἶδος for Aristotle himself', in agreement with Cherniss (1962), p. 511.

⁶ For example, Nuyens (1973), p. 230 n. 34: 'Aristote, dans sa critique de Platon, prend le texte du Timée dans un sens certainement trop littéral'; Taylor (1928), p. 154: 'The whole criticism, if it really is intended as serious censure of Plato, and not as a series of many verbal "scores", turns, as Aristotle must have known, on taking poetical fancies literally and confusing "likely tales" with science'. See also Claghorn (1954), p. 122, who claims that Aristotle's criticisms are based upon, 'misunderstanding, or on mere verbalisms'.

⁷ Cherniss (1962), pp. 410–11, for example, argues: 'Aristotle's disregard of this "intermediacy" of the soul [between divisible and indivisible Sameness, Otherness, and Being] has resulted in a fundamental misunderstanding or misrepresentation of Plato's theory, with the inevitable consequence that his criticism of the theory is largely irrelevant.'

However, both the ancient and modern views tend towards the assumption that, since the *Timaeus* presents the account of the ordering of the cosmos as only a ‘likely story’ (εἰκὼς μῦθος),⁸ we are not justified in taking any of its doctrines literally. The problem with such an assumption, of course, is that even if Plato intended many elements of the *Timaeus* to be mythological, it is certain that he did not intend all of them to be. Indeed, there are both textual and historical reasons for rejecting this all-or-nothing view.

Within the *Timaeus* itself, there are strong indications that the ‘likelihood’ of Timaeus’ story of the creation of the cosmos is not to be understood in terms of allegory, but in terms of a philosophically plausible account as contrasted with an account that is absolutely certain.⁹ The *Timaeus* is relatively clear that such an account is not only worthy of belief, but also invites interpretation, refutation, and improvement of its details.¹⁰

This invitation to offer plausible philosophical interpretations of the mythological aspects of the *Timaeus* is born out historically in the exegetical practices of the early Academy. Plato’s successors, Speusippus and Xenocrates, were in fact already attempting to provide what John Dillon calls a ‘deconstruction’ of the mythical elements of the *Timaeus*.¹¹ Plutarch of Chaeronea, who gives us our best information about earlier Academic interpretations of the *Timaeus*, provides no indication that these or any other Platonists ever claimed that the most important structures within the Timaeian universe, such as the harmonic ratios in the world soul, or the geometrical

⁸ *Tim.* 29D1. See *Tim.* 30B7.

⁹ *Tim.* 29C3. See Burnyeat (2005). See also Betegh (2009), pp. 213–224, and Broadie (2012).

¹⁰ *Tim* 54B1–2, *Tim.* 55D4–6.

¹¹ See Dillon (2003), pp. 80–94. See also Brisson (1994), pp. 275–312.

triangles that compose the four elements, should be construed as mythical images of a deeper reality.¹² According to him, the only literalist versus mythological issue that the early Academy debated with any great vehemence was whether the world soul's creation in time was an image of an eternal truth.¹³

There is also no evidence that these Platonists, unlike later Neoplatonists like Plotinus and Proclus, ever thought that the *Timaeus*' description of the world soul itself, such as its ingredients—Being, Sameness, and Difference—were only a mythical image of its real structure.¹⁴ Instead, what they debated was the literal identity of these ingredients, along with the purpose for which the Demiurge used them. Xenocrates, for instance, argued that the Demiurge chose them to facilitate the soul's motion, whilst Crantor, his pupil, argued that he chose them to facilitate the soul's cognition.¹⁵

2 Aristotle's exegetical practice

¹² See Sedley (1999), p. 317, and Lee (1976), p. 99 n. 29.

¹³ For this reason, it is misleading at best to claim without qualification, as Hicks (1907, p. 253) does, that we learn from Plutarch that 'contemporary Platonists maintained that the story of creation was not to be taken literally.' See Plutarch, *De an. procr.* 1012D–1013B. Aristotle gives arguments against Xenocrates' metaphorical reading of the temporal account of creation at *DC* I.10 279^b32–280^a1. On the Neoplatonic reception of this debate, see Phillips (1997).

¹⁴ See Proclus, *In Tim.* II, 278.24–279.16, who responds to Aristotle's claim that thought is a circle. He refers us to a previous work of his (unfortunately lost) devoted to refuting all of Aristotle's criticisms of the *Timaeus* within *DA* 1.3.

¹⁵ See Plutarch, *De an. procr.* 1012D9–1013A1. On the status of the lacuna in Plato's philosophy about how the soul moves the body, see Dillon (2009).

Since it was an early Academic practise to provide a philosophical exegesis of (at least some of) the mythological elements of the *Timaeus*, we should not fault Aristotle if he is engaged in this same practise when he comes to criticise the doctrines of this work in *DA* I.3. Instead, we should fault him only if we find evidence that he has acted irresponsibly in reporting its doctrines, or in deliberately misrepresenting them. In respect of the former possibility, Aristotle’s report of the Timaeian *psychogonia* runs as follows:¹⁶

But in the same manner [*sc.* as Democritus], the *Timaeus* gives a natural scientific account (φυσιολογεῖ)¹⁷ of how the soul moves the body; for in that

¹⁶ It is beyond the scope of this essay to discuss Aristotle’s treatment of the *Timaeus* at *DA* I.2, 404^b16–18, and its relationship to the ‘αὐτὸ τὸ ζῶον’ doctrine apparently discussed in the *Περὶ φιλοσοφίας* which he refers to at 404^b18–30. However, see von Perger (1997), pp. 175–199, for an especially clear set of arguments for separating these two doctrines.

¹⁷ Cherniss (1962, p. 392 n. 314) argues that the term φυσιολογεῖ implies a mechanical view of the soul’s interaction with the body, in contrast to Vlastos (1939, p. 73 n.8), who thinks that the term implies opposition to the *Timaeus*’s conception of μυθολογεῖ (see *Tim.* 22B1). Vlastos cites Epicurus (*Epist. ad Pyth.* II, 87.5–8), who states that one falls away from φυσιολογήματος and back into μῦθον by accepting too quickly a theory that harmonises just as well with the phenomena as another theory does. While Cherniss is right to see Aristotle as drawing attention to the mechanistic similarity of Plato’s conception of soul being συμπεπλέχθαι with the body and Democritus’ conception of body being συνεφέλκειν by the soul, Vlastos is also right that φυσιολογεῖ implicitly contrasts with poetic description. See *Poet.* 1 1447^b17–20, οὐδὲν δὲ κοινόν ἐστιν Ὅμηρῳ καὶ Ἐμπεδοκλεῖ πλὴν τὸ μέτρον, διὸ τὸν μὲν ποιητὴν δίκαιον καλεῖν, τὸν δὲ φυσιολόγον μᾶλλον ἢ ποιητὴν. I take it that Aristotle means that the Timaeian account explains the nature of soul and thought by making it an object of second philosophy, or physics.

account, the soul moves the body by being moved itself, on account of its having been woven to it [*sc.* by the Demiurge]. For, having constituted soul from the elements and having divided it according to the harmonic numbers in order for it to have an inborn perception of harmony and the whole [heaven] to be carried about with concordant (συμφώνους) motions, the Demiurge bent the straight ribbon into a circle; and after dividing the one circle into two circles, he attached them at two points, and again, he divided one of these circles into seven circles, under the assumption that the local motions of the heavens *are* the movements of the soul. (*DA* I.3 406^b26–407^a1)¹⁸

There is little evidence in this concise summary of the creation of the world soul to suggest that Aristotle is being careless in his treatment of the *Timaeus*, other than the fact that he reports that the bending of the ribbon-mixture occurs first, and the splitting of the ribbons into circles second, whereas *Tim.* 36B6–C1 reverses this order. His literal identification of motion of the world soul with the motions of the heavenly bodies is also justified, insofar as the *Timaeus* implies that the heavenly bodies enter into motion in virtue of their placement inside the world soul’s orbits.¹⁹ If there is deliberate unfairness on Aristotle’s part, it is not in his doxography.

¹⁸ All translations are my own, unless otherwise noted.

¹⁹ *Tim.* 38C7–D1: σώματα δὲ αὐτῶν ἐκάστων ποιήσας ὁ θεὸς ἔθηκεν εἰς τὰς περιφορὰς ἃς ἡ θατέρου περιόδου ἦεν, ἑπτὰ οὐσας ὄντα ἑπτὰ. Compare *Tim.* 40A4–5. Johansen (2004), p. 140, argues: ‘[...] unless we take the circular motions of the soul literally we have no way of understanding how the soul moves round with the planets.’ Similarly, D. Frede (1996), p. 37: ‘Even if the soul is not literally made out of “stuff”, it must have extension and motion,

A stronger reason to think that there is deliberate misrepresentation of Timaeian psychology can be found in Aristotle's striking attempt to treat the world soul as the exemplar of νοῦς, rather than the more obvious candidate for this title, the Demiurge.²⁰ Although this is a controversial claim, even here Aristotle can be exculpated from the charge of unfairness.

Importantly, the *Timaeus* nowhere explicitly christens the Demiurge with the exclusive title of νοῦς. Instead, throughout the dialogue, Plato uses this term more often to describe a way of cognising, rather than a substantial entity in its own right.²¹ It is for this reason, in fact, that the *Timaeus* can both implicitly and explicitly affirm that the Demiurge can perceive the world κατὰ νοῦν,²² and at the same time, claim that νοῦς is a general kind of cognition that belongs equally to *all* the gods (and to some humans).²³

otherwise it could not function as the self-moving motor of the visible world [...].’ See also von Perger (1997), p. 174, Cornford (1937), p. 78 n. 1, and Johansen (2000), p. 90.

²⁰ von Perger (1997), p. 212, suggests that his choice was based upon not distinguishing between what is necessary for the cosmos to have νοῦς, and what is necessary for pure νοῦς to exist. In agreement, Karfik (2004), p. 246 n. 133, suggests ‘Die eigentliche Frage, die Aristoteles zu stellen wäre, ob die Seele im Timaios tatsächlich dasselbe ist wie der νοῦς.’

²¹ See *Tim.* 26B5–7, *Tim.* 47E4. See M. Frede (2008), who points out that νοῦς is often better translated in English as ‘sense’, with the practical meaning of ‘having sense’ or ‘being sensible’. Despite this, I have opted for ‘thought’ as the translation here, since there are stronger epistemic concerns than ‘being sensible’ at play here. In any case, the above interpretation is consistent with Plato’s identification of νοῦς as a γένος of cognition, distinct from true belief, at *Tim.* 51D3–4.

²² *Tim.* 36D8.

²³ *Tim.* 51E5–6.

Thus, Aristotle is at least not overtly contradicting the *Timaeus* in identifying the world soul with thought.

More important in respect of judging Aristotle's fairness is that, when he identifies the world soul with thought, he provides not one but *two* arguments to justify his interpretation. The first of these runs as follows:

[...] for it is clear that he intends the soul of the whole to be like that which is called 'thought' (νοῦς),²⁴ for it is certain at least that the soul of the whole is not a perceptive soul, nor an appetitive one, since the movement of each of these is not circular locomotion. (*DA* 1.3 407^a4–6)

The fairness of this argument is first evidenced by the fact that the soul-types Aristotle mentions correspond not to his own division of soul into nutritive, perceptive, and rational soul kinds, but to the Timaeian scheme: intellectual, perceptive, and appetitive souls. Furthermore, there are good grounds for placing the world soul in the first category, since perception and appetite, as Aristotle points out, are associated by the *Timaeus* not with the uniform circular motion of the world soul, but with the turbulent motions that occur when this motion is knocked off course.²⁵ Aristotle's

²⁴ See *DA* III.4 429^a22, *DA* III.9 432^b26. The phrase καλούμενος νοῦς should not be taken to mean 'incorrectly called thought', but probably, 'what is commonly called thought', i.e. the capacity to think and reason. On the neutrality of the participle καλούμενος, see Crowley (2008), pp. 223–242. Since νοῦς can also refer to 'god' quite generally as a divine principle, I translate it as 'divine thought' where appropriate. See Menn (1992), pp. 543–573.

²⁵ Perception and appetite are explicitly claimed by the *Timaeus* to be turbulent rectilinear motions—moving up, down, left, and right. See *Tim.* 42A3–B1, 43A4–C4. The assumption that

intepretation is, moreover, thoroughly in line with the *Timaeus*' most explicit claim about the relationship between thought and soul, which is that the former cannot come to exist in anything apart from the latter (νοῦν δ' αὖ χωρὶς ψυχῆς ἀδύνατον παραγενέσθαι τῷ).²⁶

As if this were not persuasive enough for Aristotle's audience, a little later, he opts to give a second argument for the identification of thought with the circular world soul. Here, he even draws upon the modal language of necessity to prove his point. He writes:

But necessarily, thought is that circle; for the movement of thought is thinking, but the movement of that circle is rotation; so if thinking is rotation, thought must be the circle to which this sort of rotation belongs. (*DA* I.3 407^a19–22)²⁷

Although Aristotle's argument ignores the number of soul ribbons that actually figure in the Timaeian account of the world soul, this fact does not affect the validity of the argument, which, as ps.-Simplicius notes, hinges upon the principle that 'things which have the same activities have the same substance'.²⁸ This is a principle that Aristotle relies upon elsewhere in *De anima*, such as when he claims, 'if the soul by nature moves

Aristotle is not paying close attention to the *Timaeus* influences Ross (1961), p.190, to claim incorrectly that, '[Aristotle] presumably means that perception moves in a straight line from one perceived object to the next, and that desire also moves in a straight line, desiring first object *a*, then *b*, for the sake of *a* and so on.'

²⁶ *Tim.* 30B3. See *Tim.* 46D5–6.

²⁷ I here bracket νόησις with Sophonias, following Torstrik and Hicks.

²⁸ Ps.-Simpl. *In De anima*, 46.9–10.

up, it will be fire, and if down, earth'.²⁹ With this principle in mind, we can see that Aristotle is giving some version of the following argument in support of his identification of thought with the circular world soul:

1. Things that by nature have the same motions have the same substance.
2. The motion that belongs to thought (insofar as it is thought) is thinking.
3. The motion that belongs to that circle (insofar as the world soul is a circle) is revolution.
4. But thinking is revolution.
5. Therefore, thought must be that circle.³⁰

²⁹ *DA* I.3 406^a28. See also *Top.* II.1 109^a13–14.

³⁰ Cherniss (1962, p. 411) argues that Aristotle assumes the principle of *Phys.* VIII.6 258^b24–26, that anything self-moving *must* be a magnitude. Three points count against his reading. First, the principle that motion can only occur in a magnitude is not simply stipulated, as he implies. Aristotle argues for the legitimacy of this principle by trying to prove that it is *logically impossible* to conceive of something quantitatively ἀμερές as moving in general. See *Phys.* VI.10 240^b8–41^a5, *Phys.* V.4–5. Secondly, given that the *Timaeus* describes the soul-mixture as divided according to particular numerical ratios (see *Tim.* 35B4: ἤρχετο δε διαίρεϊν ὧδε), soul-stuff does have quantitatively divisible parts, and for this reason soul-stuff would count for Aristotle as a magnitude, regardless of whether such a magnitude was moving. Finally, and most importantly, the above argument is a proof that thought in the *Timaeus* is a circle, and this proof has nothing to do with *self*-motion, but with *circular* motion.

When we probe the *Timaeus* a bit deeper on the details of its description of thinking, they seem to show just what Aristotle says: thinking is a form of circular rotation without which nothing could be ‘thinking the same thoughts about the same things’.³¹

Given this double justification of his exegesis, we are warranted in assuming that Aristotle is offering a serious (even if defeasible) interpretation of the *Timaeus*, comparable to other interpretations of it given by the early Academy. It also implies

³¹ *Tim.* 40A7–B1: κινήσεις δὲ δύο προσήψεν ἐκάστω, τὴν μὲν ἐν ταῦτῳ κατὰ ταῦτά, περὶ τῶν αὐτῶν ἀεὶ τὰ αὐτὰ ἑαυτῷ διανοουμένῳ. This motion is axial rotation, one of the seven types of motion referred to in the *Timaeus*. See *Tim.* 34A1–4. However, Cherniss (1962), pp. 404–405 claims that, since *Leg.* X 897D–898C relegates the axial rotation of a circle to a likeness of the motion of thought (which he interprets as an ‘unseen spiritual motion’ that ‘produces the perceptible rotation of the heavens’) it follows that Aristotle’s analysis of the motion of Timaeian thought in *De anima* rests upon a systematic misunderstanding of Plato’s symbolism. However, a few things can be said in response. First, to say that Aristotle misunderstood the *Laws* (if he did) is not to say he misunderstood the *Timaeus*. Indeed, it is plausible to read *Leg.* X 898A8–B3 as Plato’s response to Aristotle’s criticisms of his depiction of the motion of the world soul in the *Timaeus*, which were probably first formulated in the latter’s lost work, *On Philosophy*. See Chroust (1966). Secondly, Aristotle’s criticisms, as I noted above, are levelled against Timaeus (not Plato), which suggests that he intentionally excluded the doctrine of the *Laws* from the scope of his critique. Thirdly, the fact that the *Laws* lends support to the idea that the revolution of thought is distinct from physical circular rotation is not sufficient, on its own, to refute the idea that Plato thought that the thinking of the *world soul*—insofar as it is *not* identical to thought—is identical to its physical circular rotation. See von Perger (1997) pp. 209–10.

that we should understand his primary purpose in criticising this dialogue to be philosophical, instead of merely doxographical or eristical.³²

3 The structural unity of thought

Aristotle's philosophical intent is consistent with the fact that he portrays the project of *De anima* as an inquiry (ἱστορία) into the nature of the soul,³³ and that he includes within this inquiry an investigation of the soul's parts or powers,³⁴ amongst which is νοῦς.³⁵ This programmatic claim, taken with his pronouncement in *DA* I.2 that it is necessary to investigate the psychological theories of his predecessors in order to adopt what they stated well (καλῶς), and to avoid anything not stated well (μὴ καλῶς),³⁶ implies that he thinks that there is something to be gained from this procedure. What is to be gained in respect of the investigation of Timaeian psychology, I shall argue, is the understanding that the ascription of magnitude and physical movement to divine and human νοῦς is philosophically untenable.³⁷

Aristotle's arguments for these claims are a watershed in the history of the philosophy of mind. In contrast to the infamous argument of Descartes, who claimed that we can have a clear and distinct idea of soul *without* conceiving of it as an extended substance, Aristotle argues that we *cannot* conceive of the soul as an extended thing,

³² See Viano (1996a), p. 72.

³³ *DA* I.1 402^a1–8.

³⁴ *DA* I.1 402^b9–10.

³⁵ *DA* I.1 402^b10–13.

³⁶ *DA* I.2 403^b23–24.

³⁷ On this subject, see especially Bodéüs (1996), pp. 81–88.

nor its thinking as physical motion, once we clearly grasp the properties of extension and motion.³⁸

After giving a short synopsis of the creation of the world soul, he begins to argue for this view by criticising the attribution of extension to it. He writes:

First, however, it is not right to speak of the soul as something extended (μέγεθος) [...] but thought is one and continuous (συνεχής) in the same way that an act of thinking is; and thinking is identical to thoughts (ἢ δὲ νόησις τὰ νοήματα); however, thoughts are unified by succeeding one another in a serial order (ἐφεξῆς), like numbers do, and not unified like what is extended. For this reason, thought does not have the same type of continuity as what is extended, but it has a continuity that is either indivisible (ἀμερής), or is not like that of extension. (*DA* I.3 407^a2–10)

What are we to make of this argument? It is true that, in *DA* III.4, Aristotle argues that νοῦς is potentially all the forms that it thinks, and that this doctrine seems to be related to what is stated here.³⁹ However, what is at stake in this passage is not *how* thought becomes unified with its cognitive object, which is a doctrine that relies upon the metaphysical distinction (absent in *DA* I.2–5) between potentiality and fulfilment, but rather the essential *structure* of the activity of thinking (νόησις).

For Aristotle's argument to make any sense, he must be appealing to introspection here: if we think about the structure of our thinking, he argues, we can

³⁸ Descartes (1984), p. 54.

³⁹ *DA* III.4 429^b29–430^a9.

identify this activity as having the structure of a series of specific items. Whilst this might seem to be a trivial observation, for Aristotle, it suggests that the type of unity that characterises a train of thought, and the type of unity that characterises extended physical objects and motions, are not the same. What, however, is the salient difference between a unity of succession that numbers have, and a unity of continuity that extended objects and motions have, in respect of characterizing the activity of thought?

Some interpreters have thought that Aristotle is drawing an opposition between the temporal continuity of thinking, and the spatial continuity of extended objects.⁴⁰ However, this cannot be exactly what he has in mind here, for Aristotle thinks that time is just as continuous as physically extended objects and motions are.⁴¹

Other interpreters argue that he is claiming that our thoughts are discrete and do not ‘flow’ into one another.⁴² Whilst it is true that Aristotle considers thoughts to be discrete, he does not generally characterise continuity as a type of flowing. Instead, he tends to distinguish items unified by succession and items unified by continuity by the different ways they can be divided.⁴³ The most important feature of continuous items, however, in contrast to items in succession, is that every continuous item is (potentially) divisible *ad infinitum*.⁴⁴

⁴⁰ For example, Witt (1992), p. 176.

⁴¹ *Cat.* 6 4^b23–25, *Phys.* IV.11 220^a24–26.

⁴² For example, Polansky (2007), p. 96: ‘The conceptions of X, Y, and Z, if distinct concepts, hardly flow continuously into each other.’

⁴³ *Phys.* V.3 226^b34–227^a1, *Phys.* V.3 227^a2–3, *Phys.* V.3 227^a10–12, *Phys.* V.3 227^a13–17.

⁴⁴ *DC* I.1 268^a5–6, *Phys.* III.7 207^b10–12, *Phys* IV.12 220^a29–30. See *Phys.* III.8 208^a21–22, *Metaph.* Z.4 1030^b9–10.

For Aristotle, if a given stretch of thinking were a continuous physical motion, as a circular rotation is, its most essential feature would be that it could be divided *ad infinitum* into smaller stretches of thinking. For example, start with a significant expression, such as, ‘All men are mortal’. Since such expressions are, according to Aristotle, only symbols (σύμβολα) of affections or concepts existing in the soul,⁴⁵ we can view this particular expression as referring to the stretch of propositional thought, ‘All men are mortal’. We might ‘divide’ this train of thought into its significant ‘successive’ conceptual parts (‘All’, ‘men’, ‘are’, etc.).⁴⁶ However, where does such a division stop?⁴⁷

Whatever our answer is, according to the theory of knowledge set forth in the *Posterior Analytics*, this sort of conceptual division—unlike the division of continuous objects and stretches of motion—cannot be continued *ad infinitum*. There, Aristotle argues that any conceptual universal, unlike an extended object, can only be divided or analysed finitely many times, because the species-concepts that figure in the

⁴⁵ *De int.* 1 16^a3–4: Ἔστι μὲν οὖν τὰ ἐν τῇ φωνῇ τῶν ἐν τῇ ψυχῇ παθημάτων σύμβολα, καὶ τὰ γραφόμενα τῶν ἐν τῇ φωνῇ.

⁴⁶ *De int.* 1 16^a19–21: Ὄνομα μὲν οὖν ἐστὶ φωνὴ σημαντικὴ κατὰ συνθήκην ἄνευ χρόνου, ἧς μηδὲν μέρος ἐστὶ σημαντικὸν κεχωρισμένον. The claim that the separated parts of nouns are non-signifying applies to verbs as well (see *De int.* 3 16^b6–7). See *Poet.* 21 1457^a31–^b1.

⁴⁷ Aristotle expresses a similar puzzle in respect of whether or not perceptible qualities (which reside in extended magnitudes) are divisible *ad infinitum*, at *Sens.* 6 445^b3ff.

propositions that form syllogisms are *atomic*.⁴⁸ In other words, the parts of any train of thought have a finite number of conceptual divisions.⁴⁹

For this reason, we should understand Aristotle's first criticism of the *Timaeus* to express the idea that, since every physically extended thing—including continuous motions extended in time—exhibits a potentiality for unlimited division, and the circular rotational thinking of Timaeian νοῦς is purported to be such a motion, then the concepts that 'compose' each stretch of thinking for this νοῦς will also be divisible *ad infinitum*. However, such a potential for division, according to Aristotle, is *not* shared by thinking. This is because thinking consists in an awareness of successive, atomically simple concepts that, by virtue of being in succession, have no further atomic simples in between them.

The implication is that, if the structure of thought (here, probably human thought), occurs in indivisible 'jumps' from concept to concept (what I have called a 'train of thought'),⁵⁰ then the activity of thinking *simpliciter*, including the thinking performed by the world soul, cannot be a continuous physical motion, as the *Timaeus* suggests. For this reason, the nature of thought's activity, whatever it may be, doesn't fall under a species of physical motion, since all motions, according to Aristotle's physics, are continuous and infinitely divisible.

4 Extension, contact, and understanding

⁴⁸ *APo* II.13 96^b15–25.

⁴⁹ Moreover, this principle grounds the possibility of demonstration from first principles, since these cannot be deduced from further principles, upon pain of contradiction. See *APo* I.2 71^b20–25, *APo* I.22 83^b6–7, 84^b37–85^a1. Compare *Metaph.* H.6 1045^a36f.

⁵⁰ See *DA* III.6 430^b14–15.

Another challenge to the ‘physicality’ of thought comes into play in Aristotle’s prodding of the *Timaeus*’ explanation of how the world soul, *qua* extended, comes to cognise its objects. He argues:

For how indeed will thought understand (νοήσει) something, being something extended? Will it understand with any part (μορίων) whatsoever of its extension? If so, will this part be a segment of its extension (κατὰ μέγεθος), or a point on it (στικμὴν), assuming it to be necessary to say that a point is a part (μόριον)? On the one hand, if it understands by virtue of a point on its extension, given that there are an infinite number of these on any given extended object, then it is clear that the thought will never be able to go through (διέξεισιν) them all. But if thought understands by virtue of a segment of itself, either it will understand the same thing many times, or, the same thing an infinite number of times. But thought is evidently capable of understanding something once and for all. (*DA* I.3 407^a10–15)

Aristotle’s criticisms are based upon his analysis of *Tim.* 37A2–B3, where Timaeus narrates the creation of the world soul.⁵¹ Within this narrative, Timaeus explains how, on the basis of its ingredients, its harmonic divisions, and its two-dimensional ribbons,⁵² the world soul can rotate to encounter various intelligible items in the universe. Plato writes:

⁵¹ See Grube (1932), pp. 80–82.

⁵² On the two-dimensionality of the ribbons, see Johansen (2000), pp. 91–92.

Because the soul is a mixture of the Same, the Different and Being (the three components we've described), and because it was divided up and bound together in various proportions, and because it circles round upon itself, then, whenever it comes into contact (ἐφάπτηται) with something whose being is scatterable (οὐσίαν σκεδαστήν) or else with something whose being is indivisible (ἀμέριστον), it is moved through its whole self (κινουμένη διὰ πάσης ἑαυτῆς). It then declares what exactly that thing is the same as, and what it is different from, and [it declares this] most of all in relation to what respect, in what manner, and when, they turn out to be each thing and to be affected—both in respect of the things that come to be, and in relation to those things that are always changeless. (*Tim.* 37A2–B3 [trans. D. Zeyl with modifications])⁵³

Plato's description of the world soul's thought process, although difficult to interpret, at least allows us to understand Aristotle's philosophical queries a bit better. Aristotle's worry is that, if the world soul revolves so as to come into contact (ἐφάπτηται) with divisible and indivisible beings,⁵⁴ then it seems that, *qua* extended,

⁵³ See D. Frede (1996), who offers a plausible interpretation and defence of this account of knowledge in terms of Plato's account of common concepts.

⁵⁴ On the notion of 'contact' here, see Brisson (1994), p. 342. As von Perger (1997), p. 200, notes, Aristotle's problem is not with Plato's claim that the world soul comes into *contact* with items of thought, but that it does so in virtue of its motion and extension. Even so, Aristotle may hint that there is a disagreement with Plato on what is required for a geometrical extension—which is what the world soul appears to be—to be able to touch something, when he argues at *DA* I.1 403^a11–15 that a geometrical line separated from body will *not* touch (ἄψεται) a brazen sphere at a point. For a defence of the claim that the world soul is a

there are only two ways for it to do so: either a *part* of its extension will need to touch a divisible or indivisible being, or *the whole* of its extension will need to do so.

In respect of both horns of the dilemma, Aristotle initially appears to grant that the circular ribbons of the world soul already contain the requisite elements—Sameness, Difference, and Being—to know any divisible or indivisible being in the cosmos (given the principle that ‘like knows like’). The problem, as Aristotle sees it, is that the *Timaeus* adds a further criterion for the world soul’s coming to know objects in either class, which is that it must *touch* such objects during its rotation.

Aristotle pictures the world soul as needing to sweep through an item of knowledge in order to know it, reading *Tim.* 37A2–B3 as implying that being in contact with an object during such a sweep is necessary for the soul to undergo a motion within itself that becomes a true thought. He first examines this sweeping process from the outside, so to speak. He worries that if νοῦς gains knowledge by making contact with an object at a point (στιγμή) on its extension,⁵⁵ using every point on its extension, P_1 ,

geometrical, and not a bodily, extension, see Karfik (2004), p. 246, Tricot (2010), p. 54, and Hicks (1907), p. 254. For arguments against this identification, see Tarán (1981), p. 368 n. 180. Cornford (1937), p. 64, n. 2, insists that the issue is ‘too speculative’ to determine.

⁵⁵ Aristotle’s own theory of extension does not allow that points are parts of an extension. Points, for him, are the non-extended indivisible ‘place’ where the division of a magnitude into multiple magnitudes occurs. See *GC* I.2 317^a1–15, *Phys.* V.3 227^a25–33. This criticism bears an interesting resemblance to the claim in *DA* III.2 427^a9–11, that the inner faculty by which we judge differences between categorically distinct perceptible qualities (e.g. that black is different from sweet) *is* analogous to a point. He claims: ἀλλ’ ὥσπερ ἦν καλοῦσί τινες στιγμήν, ἢ μία καὶ δύο, ταύτη <καὶ ἀδιαίρετος> καὶ διαιρετή. Aristotle’s reason is that a point, unlike a magnitude, just like that which judges, *can* in a way be affected by opposites at the same time,

P_2, \dots, P_n , one point at a time, it will never finish its rotation, because it is impossible to traverse an infinite series.⁵⁶

However, he argues that if $\nu\omicron\zeta$ gains knowledge by touching an object with a segment of itself, this knowledge will not be able to last.⁵⁷ His argument appears to be that, for each rotation the world soul accomplishes, thought will: (1) sweep through an epistemic object, (2) come to know that object by touching it with a particular segment of itself, then (3) immediately *lose* its knowledge once it is clear of the object that generated its internal motion of thought. Moreover, Aristotle claims, if contact is necessary and sufficient for cognising something, then on the world soul's next rotation, it will meet that same object *again*, know it *again*, and then lose that knowledge *again*.⁵⁸

Aristotle infers from this that, because the world soul is always rotating, this gain and loss of knowledge will either recur many times (presumably, when its rotation meets natural beings, which exist only for a certain amount of time), or an infinite

insofar as it belongs to it by nature to be the limit of *two* 'opposite' lines. Even so, when he comes to consider thought's ability to discriminate between sensible objects and the essences of those objects at *DA* III.4 429^b14–18, he compares thought to a line in the state of being straight and a line that is in the state of being bent. On this difficult passage, see Hicks (1907), p. 490.

⁵⁶ Compare *Phys.* III.8 208^a21–22.

⁵⁷ *Tim.* 37A5–C5 is ambiguous about whether a *state* of knowledge or opinion results from coming into contact with an object, or, an *episode* of thinking or opining. Here, I intend 'losing knowledge' to be broad enough to encompass both possibilities, i.e. that thought, once out of contact with its objects, either (temporarily) loses its knowledge about an object it has come to know (i.e. an *episode* of cognition ceases), or, it completely loses its *state* of knowledge.

⁵⁸ Assuming that *actual* contact is at least a necessary condition of knowledge.

number of times (presumably, when it meets eternal beings). These arguments highlight what seems to be a fundamental tension in Timaeian psychology: namely, that the *Timaeus* seems to advocate both (a) being in circular motion and (b) being in contact, as conditions for thinking, despite the fact that the dynamic nature of the former seems to disrupt the stability of the latter.⁵⁹

5 Are motion and extension necessary for thought?

It is this worry about epistemic instability that seems to produce Aristotle's next and most interesting criticism of the *Timaeus*, found in a few lines that gesture at his own theory of νοῦς. He writes:

But if it is sufficient for thought to touch (θιγῆναι) an object with any part of itself whatsoever in order to understand, why is it necessary for thought to be moved in a circle, or to have extension at all? (*DA* I.3 407^a15–17)

Commentators have often taken these criticisms to presuppose the correctness of Aristotle's own theory of νοῦς as a non-extended unmoved mover. However, a close analysis of the assumptions at play here shows that they are in fact independent of the reasons he gives in *Physics* VIII.10 and *Metaphysics* Λ.6 that help to establish these doctrines.

⁵⁹ Compare *Metaph.* Θ.10 1051^b22–25, where Aristotle claims that one can either be or not be in contact with simple objects of thought, but does not say whether one's knowledge of this simple concept is lost when one stops being in contact with it.

Aristotle's first claim only suggests that, if the world soul's touching some object is necessary and sufficient for it to think, then it could theoretically move in whatever fashion it likes—up, down, left, right, etc.—in order to facilitate this touching. In this case, the circularity of the motion that brings the world soul into contact with its objects seems arbitrary. Importantly, this criticism does not presuppose that thought is an 'unmoved mover', but simply queries what circular motion adds to the explanation of how thought acquires its knowledge.

The second criticism, which asks after the need for thought to be extended, makes no purely Aristotelian assumptions either. Although certainly Aristotle himself believes $\nu\omicron\tilde{\nu}\varsigma$ to be without extension,⁶⁰ the arguments that he gives in *Physics* VIII.10 and *Metaphysics* Λ.6 for believing this thesis rely upon an entirely different principle, namely, that no finite extended object can possess the infinite amount of power required to sustain the eternal motion of the cosmos. Aristotle uses this principle to argue that, since thought, *qua* unmoved mover, does possess an infinite amount of power to move the cosmos, it cannot have extension (because there are no objects of infinite extension).⁶¹

In contrast, Aristotle's arguments for the non-extended nature of thought here make no appeal to this infinite power principle. Instead, he bases his criticism on the claim discussed above, that thinking consists in the intellectual awareness of a series of indivisible cognitive items. His claim is that the explanation of how we cognise these items is not rendered more perspicuous by the notion of the soul coming into spatial contact with cognitive items, but less.

⁶⁰ *Metaph.* Λ.7 1073^a3–11.

⁶¹ *Phys.* VIII.10 266^a23–24, *Phys.* VIII.10 266^b25–27, *Metaph.* Λ.6 1073^a5–11.

Even the claim that thought can ‘touch’ cognitive items without being extended is not purely Aristotelian. It is certainly consistent with his claim in *GC* 1.6 that there are agents that can ‘touch’ without being touched in return.⁶² However, it is also consistent with Plato’s own view in the *Sophist*, that incorporeal beings (*contra* the ‘giants’) can exist just in virtue of having powers to affect something or be affected by something. Thus, even Plato need not invoke extensional contact in order to explain how the world soul can be affected in a way that results in cognition.⁶³

The total absence of any overt appeal to his own psychological doctrines here, taken in combination with the sophistication of his criticisms so far, already suggests a story about Aristotle’s method that runs counter to the consensus view of the eristical or overly literal nature of Aristotle’s criticisms of the *Timaeus*. Rather than a series of captious refutations, Aristotle’s objections to Timaeian psychology appear more plausibly to be a crystallisation of the reasons that led him towards his distinctive philosophical conception of νοῦς. Below, I shall argue that this interpretation is

⁶² Aristotle affirms that things can touch without being touched in return in *GC* I.6 323^a25–30. See Viano (1996a) p. 71, who argues that Aristotle is here contrasting what he takes to be the Timaeian model of physical contact with his own model of non-physical contact. See *Metaph.* A.7 1072^b20–21: [...] νοητὸς γὰρ γίγνεται θιγγάνων καὶ νοῶν, ὥστε ταῦτὸν νοῦς καὶ νοητόν. Compare *Metaph.* Θ.10 1051^b22–26. Aristotle also sometimes uses θιγεῖν to describe the vague understanding of a first principle, but without implying spatial contact, e.g. *Metaph.* A.1 988^a23–24: [...] ἀλλὰ πάντες ἀμυδρῶς μὲν ἐκείνων δέ πως φαίνονται θιγγάνοντες. In this latter text, it should be emphasised that Aristotle seems to admit that knowledge by intellectual contact admits of degrees, such that one might touch upon an item of cognition without coming to possess full knowledge of it.

⁶³ *Soph.* 247D8–E3.

evidenced further by another place in *De anima* wherein Aristotle deliberately tries to show that his own theory of thought is able to avoid the problems that he thinks beset Timaeian psychology.

6 To be or not to be divisible

Aristotle has now shown that, whether one affirms that the Timaeian world soul's thinking is a continuous physical motion, or that it thinks by making contact with objects with a part of its extension, or the whole of its extension, one will be hard pressed to see how these properties explain how it thinks. However, Aristotle believes there is an even more fundamental problem with the Timaeian world soul, which is a problem that concerns what class or classes of objects the world soul is able to think about. He writes:

Still, how will it understand that which is divisible (μεριστόν)⁶⁴ by means of what is indivisible (ἀμερεῖ), or⁶⁵ that which is indivisible (ἀμερέξ) by means of something that is divisible (μεριστῶ)? (*DA* I.3 407^a18–19)

⁶⁴ I take it that μεριστόν is Aristotle's interpretation of Plato's σκεδαστή, which is unobjectionable, given that the meanings of these terms are closely related, and that ἀμέριστον is used by Plato in opposition to σκεδαστήν at *Tim.* 37A5–7.

⁶⁵ There is a manuscript variant here that affects the argument. S^cSTUVWX read καί, whilst EΣP^p read ἢ. The former reading makes the argument to be about the world soul thinking *as a whole* with two distinct parts of itself (i.e. points and extension). The latter reading makes Aristotle's claim to be that, *either* the world soul thinks by an indivisible part, *or* by a divisible part, *but not both*. I here adopt the latter reading.

This argument, which brings Aristotle's criticism of the attribution of extension to the world soul to a close, is difficult to interpret.⁶⁶ What is clear, however, is that it must be based in part upon the idea that the soul uses a part of its own constitution that is 'like' the object to be known in order to think about it, in accordance with the principle that 'like knows like' ascribed to the *Timaeus* in *DA* I.1 404^b17–18.⁶⁷

If he is being careful, Aristotle claims here that the blend of indivisible and divisible elements making up the ribbons of the world soul—divisible and indivisible forms of Being, Sameness, and Difference—were correlated either by Plato, or by some members of the Academy, with specific parts on its extension, namely, its points and segments.⁶⁸ (He is not clear, however, on what he took the respective functions of the Circle of the Same and the Circle of the Difference to be.) Under this interpretation, the points on (any circle of) the world soul, *qua* being spatially indivisible, can be viewed as a blend of the above indivisible ingredients, in virtue of which the world soul

⁶⁶ Philop. (*In De anima*, 131.16–30), for instance, after giving his own interpretation of these lines, carefully spells out at least four other ways to interpret them, each of which he views as equally plausible.

⁶⁷ In respect of the 'like knows like' doctrine, it is clear that the importance of the 'intermediate nature' of the soul is *not* that the soul is 'neither the one nor the other' of the elements of Sameness, Difference, and Being, as Cherniss (1962, p. 410), claims. The importance lies in the fact that it is *both* the one *and* the others, as Proclus, *In Tim.* 2.298, Cornford (1937), p. 94, and Johansen (2004), p. 139, note.

⁶⁸ See Cherniss (1962, pp. 408–409), who convincingly argues that there are three portions that constitute the mixture in the world soul: (1) a portion of divisible and indivisible Being, (2) a portion of divisible and indivisible Sameness, and (3) a portion of divisible and indivisible Difference.

cognises indivisible things (e.g. atomic universals). In contrast, its segments, *qua* being spatially divisible, can be viewed as a blend of the above divisible ingredients, in virtue of which the world soul cognises divisible things (e.g. perceptible objects).

Although Aristotle's interpretation may be objectionable, it is consistent with the aforementioned Academic practice of demythologizing the ingredients within the world soul's mixture in order to obtain a more determinate picture of how it cognises. We are told by Plutarch (*De an. procr.* 1012D10–E2), for instance, that the divisible and indivisible forms of being going into the mixture of the world soul were identified with specific entities by the early Academy. Xenocrates, for instance, identified indivisible being as the 'one' (τὸ ἓν), and divisible being as 'multiplicity' (τὸ πλῆθος). We can see these entities as interpretive analogues of Aristotle's points and geometrical magnitude.⁶⁹

Although a Platonist might respond by arguing that thought, *qua* extended, could 'touch' one kind of object with a divisible part of itself, and another kind with an indivisible part of itself, it is unclear if this solution is genuinely Timaeian. It would seem, in effect, to create two epistemic world souls, each of which knows items that are unlike the items known by the other. In this scenario, in virtue of what principle could a divisible part of the world soul 'transfer' a piece of its divisible knowledge to an indivisible part of itself, or *vice versa*?

For my purposes, whether Plato could solve this problem is not as important as the fact that Aristotle took the *Timaeus*' lack of clarity on this point to be serious enough

⁶⁹ von Perger (1997, p. 216) goes too far when he claims that, under the assumption that the soul is a mixture of divisible and indivisible Being, Sameness, and Difference, Aristotle's question about which part of the circle it thinks with is 'schlechthin unsinnig'. See Dillon (2003), pp. 86–87.

to impact his own account of thought in *De anima*. This is because we find in *DA* III.6 the converse of the Timaeian problem applied to Aristotle's own account of thought: how can it, as something *non-extended*, grasp both divisible and indivisible kinds of being? His answer is as follows:

But since the undivided (ἀδιαίρετον) is twofold, either potentially or actually, nothing prevents one thinking of (νοεῖν) the undivided when one thinks of (νοῆ) a length (τὸ μήκος) (for this is actually undivided), and that in an undivided time; for the time is divided and undivided in a similar way to the length. It is not possible to say what one was thinking of in each half time; for these do not exist, except potentially, if the whole is not divided. But if one thinks of each of the halves separately, then one divides the time also simultaneously; and then it is as if they were lengths themselves. But if one thinks of the whole as made up of both halves, then one does so in the time made up of both halves (*DA* III.6 430^b6–14 [trans. Hamlyn]).

Why is Aristotle concerned here with the obscure problem of whether νοῦς can think of an extended length in an undivided time? Given what we have seen above, the most likely explanation is that he wants to show that his own account of νοῦς can avoid the explanatory problems that he raised for Timaeian psychology. To do so, he implies that there is a puzzle that a Timaeian psychologist might raise for his account: if the objects of νοῦς are *indivisible* beings or their combinations—as Aristotle asserts is the case at

DA III.6, 430a25–6—how then can it cognise any extended beings, which are all *divisible*?⁷⁰

Although Aristotle holds a version of the ‘like knows like’ principle that is more sophisticated than the one he charges the *Timaeus* to be advocating, namely, the principle that perceptive and intellectual faculties must be potentially like their respective objects before they perceive and cognise, but be made actually like them for perception and cognition to occur,⁷¹ his objection against the *Timaeus* is still relevant to his own account of thinking. This is because he is committed to the idea that thought has as its special objects indivisible beings, and it is unclear whether this faculty is potentially able to be made ‘like’ extended and divisible beings in actuality.

Although Aristotle replaces the central terms of his earlier like-by-like dilemma, *μεριστόν* and *ἀμέριστον*, with his own preferred terms, *διαίρετόν* and *ἀδιαίρετον*, he is attempting to show here that his own account of thought can avoid the like-by-like dilemma he poses to the Timaeian psychologist. His solution to the dilemma as it applies to his own account is to assert that *νοῦς*, although it by nature apprehends indivisible beings, is not hindered from cognising divisible beings, because every divisible being—

⁷⁰ Although this passage has undergone considerable scrutiny in the literature, to my knowledge, it has not been recognised that its philosophical interpretation should be connected to Aristotle’s criticisms of how the world soul thinks. See Hamlyn (1993), pp. 142–143, on the translation of *ἀδιαίρετος* as ‘undivided’ rather than ‘indivisible’. See also Berti (1978), p. 144: ‘The indivisibles [...] are, in short, genuine entities, possessing unity and susceptible to intellectual knowledge. The term ‘indivisibles’ therefore should not be taken in the strict sense, as indicating things that *cannot* be divided, but simply as indicating things that *are not* divided.’ See also Berti (1996), Mignucci (1996), Fattal (1996).

⁷¹ DA II.5 417^a18–20.

such as a perceptible line—is an actually undivided whole that is only potentially divisible into parts.⁷² Since Aristotle holds that νοῦς is potentially any actually undivided being, he is thus able to account for the ability of νοῦς to perceive all beings in the cosmos without adopting the idea that thought is composed of both divisible and indivisible parts.

This argument also supports Aristotle’s earlier claim that the unity of thought and thinking is different from the unity of spatial extensions and continuous physical motions. This is because he claims here that it is impossible to ‘divide’ the contents of what was thought in a certain indivisible period of time (e.g. a thought that one had during one second of time) into further ‘half-thoughts’ occurring in half that indivisible time (e.g. the thought that one had during *half* of that one second of time). Instead, he claims that an act of thought itself serves to divide the time in which something is thought, and not *vice versa*.

If so, then Aristotle must hold that the activity of thought is something more unified than any continuous physical motion or extended object, and hence, it cannot be the same as either of these kinds of entities. In effect, this is a sophisticated argument for the essential immateriality of thought (or at least, ‘active’ thought). The argument

⁷² See Berti (1996), pp. 395–96, and De Corte (1934), pp. 239–240. This solution appears to be concordant with the one advocated in *Phys.* VII.3, where Aristotle explains that understanding occurs when νοῦς thinks a particular divisible object by perceiving in it an undivided universal. *Phys.* VII.3 247^b5–7: ὅταν γὰρ γένηται τὸ κατὰ μέρος, ἐπίσταται πως τὰ καθόλου τῷ ἐν μέρει. It also mirrors Aristotle’s prior discussions in *DA* III.2 426^b19–20 of how it is possible to have an ‘indivisible’ awareness of multiple perceptual contents at once.

is: Since all physical motions are continuous and temporally divisible *ad infinitum*, and thought thinks at indivisible moments of time, thought is not a physical motion.⁷³

7 The analogy between human and divine thought

A final place at which we find an important philosophical argument about the nature of thought within Aristotle's criticism of the *Timaeus* comes with his query about the intentional contents of the world soul's thinking. Since the world soul rotates eternally, and its rotation is, as we have seen, identical to the motion of thinking, Aristotle thinks that we should be able to ask about the conceptual contents of its thinking. He writes:

But what⁷⁴ indeed will thought always (ἀεὶ) be thinking of, since it is necessary for it to be thinking something, if its rotation is eternal? For all practical thoughts there are limits (πέρατα) (for all of them are for the sake of something else), but theoretical thoughts, as well, are determined, just like accounts given in speech; but every account is either a definition or a demonstration (ὁρισμὸς ἢ ἀπόδειξις); so, on the one hand, demonstrations are from a starting-premise

⁷³ See Geach (1969), who uses similar claims about thinking's discreteness and its inability to be measured by time as evidence for the immateriality of mind.

⁷⁴ Hicks (1907), p. 258, reviews the arguments for and against reading indefinite τῖ (as he does) with the MSS. and Sophonias, instead of interrogative τί, read by ps.-Simplicius (and restored by Torstrik). However, he fails to mention the strongest argument for reading the interrogative, which is that this reading brings *DA* I.3 into alignment with Aristotle's more sophisticated treatment of the same question in *Metaph* Λ.9 1074^b22: ἔτι δὲ εἴτε νοῦς ἢ οὐσία αὐτοῦ εἴτε νόησις ἐστὶ, τί νοεῖ; [...].

(ἀρχῆς), and in a way possess their end (τέλος), i.e. the syllogism or the conclusion (and if they do not reach a conclusion, even then, at least they do not go back to the starting-point again, but continue to take up another middle term and extreme term (μέσον καὶ ἄκρον) and move straight forward (εὐθυποροῦσιν); but on the other hand, a rotation (περιφορά) *does* bend back and return to the starting-point. But all definitions (ὀρίσμοί) are limited. Yet,⁷⁵

⁷⁵ Since Aristotle typically uses ἔτι to introduce a new line of thought, most commentators take this line to begin an entirely new argument. However, a close review of both ancient and modern commentaries shows that there is no intelligible way to understand this as an isolated argument without making Aristotle simply repeat the ‘disappearing knowledge problem’ from *DA* I.3 407^a14–15 in slightly different form. In fact, Sophon. *Paraphrasis in De anima*, 24.2–3, simply assimilates it to that problem. In contrast, Philop. *In De anima*, 135.32–136.3, offers two interpretations of the line, neither of which can be right. Similarly, ps.-Simplic. *In De anima*, 47.5–38, struggles to determine why Aristotle finds it absurd to think the same thing over again. Aquinas, *De an.* 1, lec. 8, n.16, sees that the argument, ‘pendet quodammodo ex praecedenti, et est quasi quoddam membrum eius’, despite treating it as an isolated criticism. The solution is that the line does not simply repeat the disappearing knowledge charge, because it attacks the thinking activity of the world soul from the vantage point of the nature of its circular *motion* (i.e. *that* its rotation will force it to think some cognitive item), as opposed to its *magnitude* (i.e. the condition that limits *when* it can think some cognitive item). The argument thus adds to what preceded. Aristotle is not worried that Timaeon thought *does* think the same thing ἀεί, but that, because it rotates in a circle, it will *also* have to think about the same thing πολλάκις, because its uniform rotation will force it to reason in a circle (by returning to the same starting point), rather than thinking a new extreme and middle term. Compare *Tim.* 40A7–B1, which speaks positively of circular motion as facilitating the ability to think the same things in virtue of the same rotation (περὶ τῶν αὐτῶν ἀεὶ τὰ αὐτὰ ἑαυτῷ διανοουμένῳ), which

if the same rotation occurs many times, it will be necessary for it to think the same thing many times over. (*DA* I.3 407^a21–32)

This criticism should not be read as arguing that, because human practical and theoretical thinking have limits at which they stop, therefore, the thinking of the world soul must also have a limit at which it stops. Indeed, it would be especially odd if this were Aristotle's argument here, since any competent student of the Lyceum would know that the first mover of the cosmos, νοῦς, *is* in fact eternally thinking, unlike human beings, who cannot remain in a contemplative state forever.⁷⁶ Instead, it should be read as saying that, given that the world soul's thinking is identical to its rotating and

may in fact refer to thinking about a single set of things for all time. Lee (1976), p. 76, argues that this description mirrors *Leg.* X 898A8–B3, and is meant to represent 'that the rotation goes on around the same one point, περὶ τὰ αὐτά'. However, this reading cannot be correct, since τὰ αὐτά is plural. Lee's further attempt to defend Plato's picture of the world soul circling by distinguishing between an 'accomplishment' sense of circling and an 'activity' sense of circling also falters, since the *Timaeus* clearly represents coming into contact with objects and making true proclamations about them during the course of its activity as accomplishments, and this is what Aristotle finds problematic.

⁷⁶ Cherniss (1962, p. 405 n. 332) suggests, quite implausibly, that Aristotle is simply unaware of how close his own position is to Plato's. Aristotle takes it for granted that human νοῦς does not always (μὴ ἀεὶ) think at *DA* III.4 430^a5–6, whilst at *DA* III.5 430^a22–23, he claims that divine νοῦς does not 'at one time think and at another time not think', which is equivalent to the idea that it is always thinking. Compare also *Metaph.* Λ.7 1072^b14–26, and Burnyeat (2008), pp. 42–43.

touching, the *Timaeus* provides no answer as to what cognitive object or objects would be necessary and sufficient for keeping the world soul forever intellectually occupied.⁷⁷

Evidence that this is not a mere jousting point for Aristotle, but part of a deeper theological debate going on between the Lyceum and the Academy concerning the nature of divine thought, can be found in the Aristotelian tract, *De lineis insecabilibus*. Here we find what seems to be an early Academic answer to Aristotle's question about what an eternal mind thinks. There, ps.-Aristotle argues against (what seems to be) a Platonic view that thought's (διάνοια) coming into contact (ἐφάπτεσθαι) with an infinite number of objects (or points on an object) is *counting* (ἀριθμεῖν).⁷⁸

If this latter view is genuinely Platonic, it suggests that some members of the Academy proposed that the world soul's eternal rotation could be guaranteed by making its contemplative activity primarily to consist in counting through the infinite series of natural numbers. Doubtlessly, this view was an inspired attempt to connect the world soul's eternal activity of thinking to the generation of time, which the *Timaeus* describes as a likeness of eternity 'progressing according to number' (κατ' ἀριθμον ἰοῦσαν).⁷⁹

However, Ps.-Aristotle criticises this possible answer by arguing that, if one allows thought to move over (or through) objects spatially (which again evokes the image of the world soul's motion in the *Timaeus*), then this continuous motion cannot

⁷⁷ It might be objected that the world soul is eternally occupied with eternal truths. However, it would seem that, in such a case, all of Aristotle's objections about the relationship between rotation and the extension of the world soul coming into contact with eternal truths will apply.

⁷⁸ *De lineis insec.* 969^a30–31.

⁷⁹ *Tim.* 37Dff.

be identified with counting, because counting is a motion combined with a *pause* between numbers.⁸⁰

In *De anima*, Aristotle uses a similar argument against the *Timaeus* when he alleges that the nature of thought is more like a resting (ἡρέμησις) and pausing (ἐπίστασις) rather than a motion, which feature is consistent with the serial form of continuity he ascribes to thinking.⁸¹ However, he also has another strategy to discover what divine thought could be thinking of, which is to ask about the basic kind of thinking it engages in. He argues that if we take divine νοῦς to be analogous to human νοῦς, there appear to be only two basic types of thinking that it could perform, neither of which guarantees the eternity of its rotation.

If divine νοῦς is a practical thinker, it will rotate if and only if it thinks about a desired end and the means to reach that end. However, Aristotle thinks that when practical thinking moves us to achieve a certain goal, such as building a house, or drinking a cup of water, once we achieve this goal, our practical thinking would cease. By analogy, once νοῦς has thought about all the means towards a given end, its rotation is in danger of ceasing.⁸²

⁸⁰ *De lineis insec.* 969^a30–^b3. At *De lineis insec.* 969^a33, and in line with Aristotle’s criticism here, the author tentatively suggests that it is ‘perhaps impossible’ (ἴσως ἀδύνατον) for the movement (κίνησις) of thought to take place in continuous things and substrates—an echo of Aristotle’s sentiment that thought might be peculiar to soul and not an affection shared in common with the body. See *DA* I.1 403^a8–10.

⁸¹ *DA* I.3 407^a32–33. See *Phys.* VII.3 247^b17–248^a4, and Menn (2002), p. 91.

⁸² Aristotle uses a similar strategy in *NE* X.8 1178^b7–23, when he argues that the blessedness of the gods cannot consist in practical activity. On the analogy between human and divine thought in ancient philosophy generally, see the recent collection of Wilson and Sedley (2010).

However, if divine νοῦς is a theoretical thinker, and it thinks of the definitions of a being that it touches, or scientific demonstrations that follows from such definitions, it will have a problem similar to that of practical thinking once it has thought *everything*: there will be nothing left to think about.

If, however, one allows νοῦς to think the same set of demonstrations and definitions again, Aristotle thinks a more unusual problem results. In order for the thought process of νοῦς to remain continuous and unbroken, if there are a finite number of items in the cosmos to be thought, the last item the world soul thought of would have to link syllogistically to the first item it thought of.⁸³

Aristotle's worry with this situation is that it would make the epistemic process of divine νοῦς violate the rule of thought laid out in *APo.* I.3, which is that demonstration in a circle (κύκλω) is impossible, because the same premise cannot be both prior and posterior (in the same sense) at the same time.⁸⁴ If the last thing that the world soul thinks of is demonstratively posterior to (i.e. proven by) the first thing it thinks of, that thing cannot at the same time be prior to the first thing νοῦς thinks of, because first principles cannot demonstratively prove themselves.

The implication is that, if we spell out what the structure of the world soul's motion of thinking is by analogy to human thinking, our picture will be of a divine

⁸³See Hicks (1907), p. 259. For example, if the world soul thinks one demonstration per rotation, e.g., 'All A is B, all B is C, thus all A is C', in order to remain continuous, in its next rotation, it would have to think, 'All C is B'. However, this premise would in fact serve as a demonstration of the first ἀρχή, 'All A is B'. Thus, Aristotle is alleging that the world soul will be thinking: [1] *All A is B*. [2] All B is C. [3] All A is C. [4] All C is B. [5] *All A is B*. Here, [1] and [5] are identical starting/ending points in a rotation of thought.

⁸⁴ *APo* I.3 73^b25–28.

being whose knowledge consists in eternally reasoning in a vicious demonstrative circle, which Aristotle finds absurd. He concludes that, given the finite nature of definitions, and the non-circular nature of demonstrative thought, there seems to be no set of practical or theoretical items that could explain why a divine νοῦς would think forever, unless it forever reasons in a way in which humans should not reason. So, whilst Aristotle thinks that the Timaeian account rightly seeks to ground the motion of the cosmos in an eternal intellectual activity, he also thinks that it fails to identify a cognitive item or basic kind of thinking that could keep the world soul thinking forever.

As is well known, Aristotle gives his own solution to this problem in *Metaph.* Λ.7 and Λ.9.⁸⁵ What divine νοῦς is eternally thinking of, according to him, is its own activity.⁸⁶ Although the proper interpretation of the claim that ‘thinking is a thinking of thinking’ (ἡ νόησις νοήσεως νόησις) is disputed, we can now see that Aristotle had philosophical reasons, related to his critique of the *Timaeus*, which led him to this answer.

The first of these reasons is that, in order for divine νοῦς to think forever, it must have no practical end outside of its own thinking, since practical thinking always ceases. The second is that, if divine thinking is like human thinking, it at least must not consist in working through syllogisms (or counting) as human thought does, since these accounts would bring its thinking to a halt (or pause). The third is that it must not consist in circular reasoning, since this would make every demonstrative item of knowledge, *per impossible*, both prior and posterior to every other demonstrative item of knowledge.⁸⁷ These three results imply already that the theoretical object of divine νοῦς

⁸⁵ See Frede and Charles (2000).

⁸⁶ *Metaph.* Λ.9 1074^b33–35.

⁸⁷ *Metaph.* Λ.9 1075^a5–10.

needs to be something that will explain both its achieved state of understanding, and its remaining in perpetual activity for eternity.

Aristotle's brilliant solution is to give divine thought its own activity as its exclusive intentional object. Whilst this solution may be theologically unsatisfactory, since it posits a god whose blessedness comes at the price of being ignorant of everything but its own formal activity, it does reveal that Aristotle took his criticisms of the Timaeon world soul seriously enough to pay this price.

8 Conclusion

Contrary to initial appearances then, Aristotle has good reason to criticise the Timaeon world soul in *De anima*. The world soul provided him with arguably the most sophisticated description of human and divine thought that his predecessors had formulated, and its investigation allowed him to work out the inconceivability of its bearing two attributes essential to physical substances—extension in space, and the ability to be in a natural motion that is subject to division *ad infinitum*. These properties, according to Aristotle, do not explain the nature of thinking as we experience it, nor do they make sense of how a divine being could eternally think.

Regardless of whether Aristotle really understood the deeper intentions of Plato, the *Timaeus'* geometrical world soul provided him with a model of νοῦς and thinking that was both powerful and provocative. Once the philosophical knots of the Timaeon world soul were unravelled by his critique, their ribbons seem to have led Aristotle towards his own distinctive view of thought as an extensionless power that cognises actually indivisible objects (whether extended or extensionless) without undergoing or

producing physical motion. For such reasons, it seems, Aristotle came to believe that the investigation of thought—both human and divine—belongs to metaphysics.⁸⁸

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⁸⁸ PA I.1 641^a32–^b10.

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