

THAUMATA IN ARISTOTLE'S METAPHYSICS A*

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ABSTRACT

In *Metaphysics A*, Aristotle makes a curious reference to 'automatic marionettes' (τῶν θαυμάτων ταυτόματα) as things that inspire metaphysical curiosity. In this article I argue that the reference is an allusion to the difference between his understanding of metaphysical mimesis and that of Plato's. Aristotle's reference to 'self-moving' *thaumata*, when read contrastively with Plato's static *thaumata* in the cave allegory, implies that whereas Plato's mimesis is static, Aristotle's is kinetic. Aristotle's claim that puppets are an impetus to metaphysical inquiry becomes less strange when one sees that Plato had suggested something similar. Some of Plato's writings and those of his contemporaries offer evidence that the *thaumata* in Plato's cave are static, supporting the idea that Aristotle's kinetic *thaumata* stand in meaningful contrastive allusion to them. I conclude by offering a brief sketch of Aristotle's theory of kinetic mimesis, in which all things manifest principles of circularity, including, significantly, the automatic marionettes that Aristotle mentions in *Metaphysics A*.

Introduction

At *Metaphysics A* 983a14, Aristotle makes a curious reference to 'automatic marionettes' (τῶν θαυμάτων ταυτόματα) as things that inspire metaphysical curiosity. In this article I argue that the reference is an allusion to the difference between his understanding of metaphysical mimesis and that of Plato's. Aristotle's reference to 'self-moving' *thaumata*, when read contrastively with Plato's static *thaumata* imagery in the cave allegory (514b5-6), implies that whereas Plato's mimesis is static, Aristotle's is kinetic. Section 1 looks at the passage in question, Alexander of Aphrodisias' remarks on it in his *Commentary on the Metaphysics* (18.17-19), as

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well as other Aristotelian texts that clarify the meaning of the phrase τῶν θαυμάτων ταῦτόματα. Section 2 considers Plato's reference to *thaumata* in the context of metaphysical inquiry in his famous cave allegory. I offer textual support to connect Aristotle's *thaumata* to those in the cave allegory. Aristotle's claim that puppets are an impetus to metaphysical inquiry becomes less odd when one sees that Plato had suggested something similar. This similarity does more than explain Aristotle's reference to puppets; the difference between Aristotle's puppets and Plato's alludes to the fact that Plato's mimesis is static, whereas his is kinetic. Section 3 looks elsewhere in Plato's writings and those of his contemporaries, evincing that the *thaumata* in Plato's cave are static, supporting the idea that Aristotle's kinetic *thaumata* stand in meaningful contrastive allusion to them. Section 4 offers a brief outline of Aristotle's theory of kinetic mimesis, in which all things manifest principles of circularity, including, significantly, the automatic marionettes to which Aristotle alludes.

1. The *thaumata* passage

Aristotle's *Metaphysics* A2 offers us an explanation of and orientation to the nature of metaphysical knowledge.¹ At *Metaph.* 983a20-21 he claims to have stated 'the nature of the science which we are seeking, and ... the object which our search and our whole investigation must attain.'² Aristotle says that metaphysics begins with the wonder that occurs when we are ignorant of the causes of things. Below are two passages that express this. I will call the first passage 'the myth passage':

διὰ γὰρ τὸ θαυμάζειν οἱ ἄνθρωποι καὶ νῦν καὶ τὸ πρῶτον ἤρξαντο φιλοσοφεῖν, ἔξ ἀρχῆς μὲν τὰ πρόχειρα τῶν ἀτόπων θαυμάσαντες, εἶτα κατὰ μικρὸν οὕτω προϊόντες καὶ περὶ τῶν μειζόνων διαπορήσαντες, οἷον περὶ τε τῶν τῆς σελήνης παθημάτων καὶ τῶν περὶ τὸν ἥλιον καὶ ἄστρα καὶ περὶ τῆς τοῦ παντὸς γενέσεως. ὁ δ' ἀπορῶν καὶ θαυμάζων οἴεται ἀγνοεῖν (διὸ καὶ ὁ φιλόμυθος φιλόσοφος πῶς ἔστιν ὁ γὰρ μῦθος σύγκειται ἐκ θαυμασίων): ὥστ' εἶπερ διὰ τὸ φεύγειν τὴν ἀγνοίαν ἐφιλοσόφησαν, φανερὸν ὅτι διὰ τὸ εἰδέναι τὸ ἐπίστασθαι ἐδίωκον καὶ οὐ χρήσεώς τινος ἔνεκεν. μαρτυρεῖ δὲ αὐτὸ τὸ συμβεβηκός· σχεδὸν γὰρ πάντων ὑπαρχόντων τῶν ἀναγκαίων καὶ πρὸς ῥαστώνην καὶ διαγωγὴν ἢ τοιαύτη φρόνησις ἤρξατο ζητεῖσθαι.

¹ On *Metaphysics* A as an introduction to the *Metaphysics* as a whole, see Broadie 2012.

² English translations of Aristotle are from Barnes 1995, unless stated otherwise.

For it is owing to their wonder that men both now begin and at first began to philosophize; they wondered originally at the obvious difficulties, then advanced little by little and stated difficulties about the greater matters, e.g. about the phenomena of the moon and those of the sun and the stars, and about the genesis of the universe. And a man who is puzzled and wonders thinks himself ignorant (whence even the lover of myth is in a sense a lover of wisdom, for myth is composed of wonders); therefore since they philosophized in order to escape from ignorance, evidently they were pursuing science in order to know, and not for any utilitarian end. And this is confirmed by the facts; for it was when almost all the necessities of life and the things that make for comfort and recreation were present, that such knowledge began to be sought. (*Metaph.* 982b12-24; tr. Ross 1975)

A little later, Aristotle repeats the point about philosophy beginning in wonder; he mentions celestial phenomena as an impetus to metaphysical inquiry, in addition to ‘automatic marionettes’ (τῶν θαυμάτων αὐτόματα).³

³ There is considerable difference regarding how to parse the phrase τῶν θαυμάτων αὐτόματα *Metaph.* 983a12-13. Aquinas (*In metaph.* 66), under the influence of Moerbeke’s Latin, takes Aristotle to mean ‘*automata mirabilia ... things which seem to happen mysteriously by chance (idest quae videntur mirabiliter a casu accidere)*’, consistent with Lawson-Tancred’s 1998 ‘spontaneous natural wonders’; Aquinas’ reading is refuted by Ross 1975:123-24 on philological grounds, and corresponds with Alexander’s commentary and *Gen an.* 734b10, 741b8; cf. Primavesi’s 2012 emendations. Irwin and Fine’s 1995 ‘toys that move spontaneously’ refers to the concept of ‘chance’ without elaborating. Sedley 2010:20 n. 29, following Sharples 1983, understands Aristotle’s ‘αὐτόματων’ as ‘fortuitous’ (cf. Johnson 2005:95). In *Physics* the word αὐτόματων is, as it is in many Greek texts, something that happens automatically, or with no apparent purpose; cf. Preus 2007:66; an extensive list in Johnson 2005:104-5. Bessarion 1883 translates: *praestigiosis, quae per se ipsa moventur* (‘deceptive things that appear to be self-moving’). Cousin 1839 translates: ‘et comme on s’émerveille en présence des automates, quand on n’en connaît pas les ressorts’; levers or springs indicate something mechanical. Pierron and Zevort 1840 differ: ‘pour parler des merveilles qui s’offrent à nous d’elles-mêmes, l’étonnement qu’inspirent.’ Saint-Hilaire 1879 offers: ‘on s’étonne devant le spectacle des automates, tant qu’on n’a pas pénétré la cause de leurs mouvements,’ citing Alexander’s *In metaph.* 18.17-19 and *Gen. An.* 734b10-16. Sachs 1999 gives: ‘self-moving marvels’, noting *Mechanics* 848a35-37. Tredennick 1933 gives: ‘marionettes’ without comment or indication of self-motion. Αὐτόματα can mean ‘unexplained coincidences’ and τῶν θαυμάτων αὐτόματα might indicate ‘unexplained coincidences at which one wonders or marvels’, excising all reference to automatic mechanisms from the *thaumata* passage. However, a self-moving marionette is certainly what Aristotle

I call this second passage, quoted at length below, ‘the *thaumata* passage’. I do not think that scholars have fully investigated the implications of what is being said here:

δεῖ μέντοι πως καταστῆναι τὴν κτῆσιν αὐτῆς εἰς τοῦναντίον ἡμῖν τῶν ἐξ ἀρχῆς ζητήσεων. ἄρχονται μὲν γάρ, ὡσπερ εἵπομεν, ἀπὸ τοῦ θαυμάζειν πάντες εἰ οὕτως ἔχει, καθάπερ περὶ τῶν θαυμάτων ταῦτόματα τοῖς μήπω τεθεωρηκόσι τὴν αἰτίαν ἢ περὶ τὰς τοῦ ἡλίου τροπὰς ἢ τὴν τῆς διαμέτρου ἀσυμμετρίαν (θαυμαστὸν γὰρ εἶναι δοκεῖ πᾶσι τοῖς μήπω τεθεωρηκόσι τὴν αἰτίαν εἴ τι τῷ ἐλαχίστῳ μὴ μετρεῖται): δεῖ δὲ εἰς τοῦναντίον καὶ τὸ ἄμεινον κατὰ τὴν παροιμίαν ἀποτελευτηῆσαι, καθάπερ καὶ ἐν τούτοις ὅταν μάθωσιν: οὐθὲν γὰρ ἂν οὕτως θαυμάσειεν ἀνὴρ γεωμετρικὸς ὡς εἰ γένοιτο ἢ διάμετρος μετρητή.

Yet the acquisition of [metaphysical knowledge] must in a sense end in something which is the opposite of our original inquiries. For all men begin, as we said, by wondering that the matter is so (as in the case of automatic marionettes or the solstices or the incommensurability of the diagonal of a square with the side; for it seems wonderful to all men who have not yet perceived the explanation that there is a thing which cannot be measured even by the smallest unit). But we must end in the contrary and, according to the proverb, the better state, as is the case in these instances when men learn the cause; for there is nothing which would surprise a geometer so much as if the diagonal turned out to be commensurable.

(*Metaph.* 983a11-21; tr. Ross 1975)

Why are ‘automatic marionettes’ mentioned in this introductory passage, the purpose of which is to explain the nature and scope of metaphysics? The example simply seems odd. Perhaps the word θαυμάζειν (‘wonder’), with which Aristotle is here concerned as a starting point of metaphysical inquiry, suggested to him the word θαύματα – wonders about which we wonder. Aristotle has just finished telling us that philosophy is born of luxury and wonder in the myth passage.⁴ The primary purpose of θαύματα was to astonish, amaze and inspire wonder in observers due to a hidden mechanical device,⁵ and most of the technological devices at the time were playthings and toys; from Ctesebius and Archimedes onward we see

means by τὰ αὐτόματα τῶν θαυμάτων at *Gen. An.* 734b10, and the considerations in this article suggest that it is not accurate to so excise.

⁴ *Metaph.* 982b24.

⁵ Vernant 2006:304.

biological and cosmic phenomena represented in automata, but only later are they employed in practical devices.⁶ Perhaps mechanical *thaumata* suggested themselves to him as something that we enjoy when we have leisure. According to Schiefsky, ‘the idea that mechanics imitates nature is associated with two branches of ancient mechanics in particular: the building of automata and of armillary spheres to represent the motions of the heavenly bodies.’⁷ Given that the earliest uses of automata or *thaumata* were toys like puppets, or devices representing cosmological phenomena, perhaps it is not strange that Aristotle mentions toys, leisure and cosmological phenomena in the context of metaphysical thinking.

Alexander’s commentary on the *thaumata* passage clarifies that Aristotle is indeed referring to mechanical devices:

πρὸ μὲν γὰρ τοῦ εἰδέναι ἐθαύμαζον εἰ δύναται οὕτως ἔχειν, γνόντες δὲ θαυμάζουσιν εἰ δύναται μὴ ἔχειν οὕτως. <θαύματα> δὲ εἶπε τὰ ὑπὸ τῶν θαυματοποιῶν δεικνύμενα παίγνια, ἃ ἔξ αὐτῶν δοκεῖ καὶ αὐτομάτως κινεῖσθαι. <ἡλίου> δὲ <τροπᾶς,> καθ’ ἃς χειμῶν καὶ θέρος.

For prior to their knowing, they wondered that things could be as they are, but once they had come to know they wondered that things can fail to be as they are. [As examples of] wonders he mentions the toys, exhibited by the creators of [such] marvels, that seem to move by their own power, and the solstices, which bring winter and summer.

(*In metaph.* 18.15-19)⁸

A passage from the pseudo-Aristotelian *Mechanics* explains how the wonder of a *thauma* is preserved by concealing its mechanism, one that employs principles of moving circles, the implication being that once we divine the mechanism, we no longer wonder at its motion.⁹ While removing ignorance of causes is the primary point of the *thaumata* passage, Alexander’s elaboration on the mechanical devices allows us to realise the kinetic element of Aristotle’s *thaumata*.

Aristotle uses words like αὐτόματα and θαυμάτια to describe moving mechanical puppets in *De generatione animalium* and *De motu animalium*.

⁶ De Solla Price 1964.

⁷ Schiefsky 2007:87.

⁸ Dooley 1989. I note that Alexander mentions *thaumatapoiōi*, which are not mentioned in the *thaumata* passage, but they are mentioned in Plato’s cave allegory, of which I say more later.

⁹ [*Mech.*] 847a10-37; cf. Hero, *Aut.* 9.5; 17.1; 30.6; cf. Berryman 2003:361.

At *De motu an.* 701b2-13 he compares the movements of animals with those of automatic puppets (τὰ αὐτόματα) and toy wagons, in order to stress that animal parts undergo qualitative change when moving, whereas the parts of puppets and toy wagons do not.

At *Gen. an.* 734b10-16, Aristotle compares τὰ αὐτόματα τῶν θαυμάτων with the sequence of embryonic development in animals and plants, stating that automatic puppets (τὰ αὐτόματα τῶν θαυμάτων) have a potentiality for motion which is actualised by external forces, which is similar to how semen initiates motion in an embryo.

The obvious difference between the *De motu an.* and *Gen. an.* passages and the *thaumata* passage is their purpose. The former two employ *thaumata*/automata to analogise certain natural processes to, or distinguish them from, natural ones; the latter is discussing wonder about things of which we do not know the cause, inspiring metaphysical inquiry. The kinetic nature of these mechanical devices is significant. I shall argue that another case of *thaumata* in philosophical literature, that of *thaumata* casting shadows in Plato's cave allegory, helps to contextualise and deepen the significance of the *thaumata* passage, intimating the difference between Aristotle's metaphysics and that of his teacher.

2. Puppets and metaphysical enquiry

The automatic marionettes of the *thaumata* passage become less odd if Aristotle's moving puppets are employed in intentional contrast to the static *thaumata* in Plato's cave allegory (*Resp.* 514b5-6). Aristotle's *thaumata* move 'on their own', whereas Plato's do not. Aristotle's *thaumata* are understood not by recognising their relation to their shadows, but by recognising the hidden cause of their motion. While others have noted the philological correspondence between these two *thaumata* references, they offer scant elucidation. In what follows I explore the connections that they point to, and argue that Aristotle has Plato in mind when he writes the myth and *thaumata* passages. Aristotle implies that because Plato's puppets are solid and non-moving, their relationship to what they explain – their shadows – is static. Aristotle's moving puppets entail a different kind of metaphysical explanation, a kinetic one.

A number of scholars connect the *thaumata* passage not only to *De motu* and *Gen. an.*, but also to the *thaumata* in Plato's cave allegory. Many of these references are obscure. Ross simply cites the cave allegory.¹⁰ Nussbaum claims the use of the puppet example in the *thaumata* passage

¹⁰Ross 1975:123.

is different from that in the *De motu*, but does not elaborate.¹¹ Stating that the *automata* in the *De motu* were a popular curiosity whose most impressive feature was their apparent automatism, she cites the *thaumata* passage: ‘Aristotle mentions them as an example of how we marvel at that whose cause is unseen’, and Alexander’s commentary. She continues: ‘There are a number of other allusions to these puppets in authors from Plato to Michael [of Ephesus]’, citing *Resp.* 514b (the cave allegory), *Laws* 644b-45c and Ps.-Aristot. *De mundo* 398b, as if all of these *thaumata* or *automata* refer to the same kind of device.¹² Farquharson briefly notes the connection between the *automata* at *De motu* 701b2 and the *thaumata* of Plato’s cave allegory; Henry, noting that Plato uses *thaumata* differently, cites the cave allegory in discussing *De motu* 701b2, again without elaboration.¹³ In sum, scholarship points to the fact that the word *thaumata* occurs in Plato’s cave allegory as well as *De motu*, *Gen. an.* and the *thaumata* passage, but with little elaboration. The scholarship elicits an overlap sufficient to read Aristotle’s *thaumata* passage as situated against the backdrop of Plato’s cave allegory, but without exploring it.

Aristotle often situates himself against the backdrop of his predecessors, reaching a critical point regarding how he and Plato are both similar and different. Both Plato’s θαύματα and Aristotle’s τῶν θαυμάτων ταῦτόματα tell us something about what is required for metaphysical understanding. The similarity, accompanied by a crucial difference, indicates how Aristotle differs from his teacher. In what follows, I explain why Aristotle’s *thaumata*, understood as *moving* puppets, as opposed to Plato’s static ones, reflect that difference.¹⁴ The connection between the *thaumata* passage and the cave allegory is strengthened by considering De Groot’s recent remarks that Plato and Aristotle saw useful explanatory value in comparing the natural and the mechanical: ‘[Plato and Aristotle] were quick to see a link between the simplest device, like a wooden simulacrum on a stick, and more complex contrived phenomena, like automata.’¹⁵ These two ideas, ‘wooden simulacra’ and ‘more complex contrived phenomena like automata’, are precisely the two kinds of

¹¹ Nussbaum 1978:11.

¹² Nussbaum 1976:147; and 1978:347.

¹³ Farquharson 1912; Henry 2005:4.

¹⁴ This is not to say that the entirety of Aristotle’s metaphysical approach hangs on the *thaumata* passage. It is only to say that Aristotle is clever and witty enough to make the distinction between *thaumata* and *thaumata v’automata* in outlining his approach to metaphysics.

¹⁵ De Groot 2014:17. Thanks to Monte Johnson for suggesting this valuable resource to me.

puppets in Plato's cave allegory and the *thaumata* passage respectively. In Plato, static wooden simulacra help to illustrate a relationship between 'real' things and their shadows; we need to learn how a shadow of reality stands in relation to reality. In Aristotle, we need to learn how more complex, contrived phenomena like automata move. The θαύματα of Plato and Aristotle both create an illusion, but for Plato the illusion is resolved by grasping the relation between a shadow and its source, whereas for Aristotle the illusion is resolved by grasping the cause of its motion. While both Plato and Aristotle have hidden causes of phenomena, Plato's causes are obscured from us because they are 'behind or above us' whereas Aristotle's causes are obscured although they are 'in front of us' – the hidden mechanisms that require deeper analysis.

In the *thaumata* passage, Aristotle discusses knowledge acquisition, and how metaphysical inquiry begins. Plato, too, implies this in the cave allegory. In Plato, recognition of the relationship between the puppets and their shadows would lead to further discoveries, until one eventually reaches the understanding that the sun governs all things, including the movements of the heavens and so on:

... καὶ πρῶτον μὲν τὰς σκιάς ἂν ῥᾶστα καθορῶ, καὶ μετὰ τοῦτο ἐν τοῖς ὕδασι τὰ τε τῶν ἀνθρώπων καὶ τὰ τῶν ἄλλων εἶδωλα, ὕστερον δὲ αὐτά· ἐκ δὲ τούτων τὰ ἐν τῷ οὐρανῷ καὶ αὐτὸν τὸν οὐρανὸν νύκτωρ ἂν ῥᾶον θεάσαιτο, προσβλέπων τὸ τῶν ἄστρον τε καὶ σελήνης φῶς, ἢ μεθ' ἡμέραν τὸν ἥλιόν τε καὶ τὸ τοῦ ἡλίου ... τελευταῖον δὲ οἶμαι τὸν ἥλιον, οὐκ ἐν ὕδασιν οὐδ' ἐν ἀλλοτρίᾳ ἔδρα φαντάσματα αὐτοῦ, ἀλλ' αὐτὸν καθ' αὐτὸν ἐν τῇ αὐτοῦ χώρᾳ δύναιτ' ἂν κατιδεῖν καὶ θεάσασθαι οἷός ἐστιν ... Καὶ μετὰ ταῦτ' ἂν ἤδη συλλογίζοιτο περὶ αὐτοῦ ὅτι οὗτος ὁ τὰς τε ὥρας παρέχων καὶ ἐνιαυτοῦς καὶ πάντα ἐπιτροπεύων τὰ ἐν τῷ ὀρωμένῳ τόπῳ, καὶ ἐκείνων ὧν σφεῖς ἐώρων τρόπον τινὰ πάντων αἴτιος.

... at first he would most easily discern the shadows and, after that, the likenesses or reflections in water of men and other things, and later, the things themselves, and from these he would go on to contemplate the appearances in the heavens and heaven itself more easily by night, looking at the light of the stars and the moon, than by day the sun and the sun's light ... so, finally, I suppose, he would be able to look upon the sun itself and see its true nature, not by reflections in water or phantasms of it in an alien setting, but in and by itself in its own place ... at this point he would infer and conclude that this it is that provides the seasons and the courses of the year and presides over all things in the visible region,

and is in some sort the cause of all these things that they had seen.
(*Resp.* 516a-516c)¹⁶

One gradually comes to understand the heavens, the moon and the sun, realising that the sun governs the seasons and solstices, accounting for everything that we encounter. The heavens and solstices are the very things that Aristotle says are causes of wonder alongside *thaumata* and geometrical principles.¹⁷ It is hardly strange for Aristotle to say that we begin metaphysics because we wonder about solstices, the heavens or geometry; it is strange to say that we begin metaphysical inquiry because we wonder about puppets, until we realise that his teacher had said something like this as well.

The cave allegory is preceded by the geometrical allegory of the line, and the allegory of the sun, in which Plato allegorically identifies the sun with the Good, which is responsible for the existence of all things and our knowledge of them: ‘the objects of knowledge not only receive from the presence of the good their being known, but their very existence and essence is derived to them from it ...’¹⁸ Here Aristotle differs from Plato, and the difference is about a very important idea – motion. Aristotle does not see the mimetic relationship of the physical world to Plato’s Good as the ultimate metaphysical explanation of things; he thinks that Plato’s mimetic explanation results in a second world that itself lacks explanation.¹⁹ For Aristotle, the relationship of moving things to the Unmoved Mover, the exemplar of being, which guarantees the motion of all things in the universe, is the ultimate metaphysical explanation. Aristotle’s auto-

¹⁶ Unless otherwise stated, English translations of Plato’s *Republic* are from Shorey 1937.

¹⁷ The myth passage, wherein Aristotle says that we wonder about small things and changes of the moon and the sun, the stars and the origin of the universe: ‘he who wonders and is perplexed feels that he is ignorant (and thus the myth-lover is in a sense a philosopher, since myths are composed of wonders).’ Aristotle (*Metaph.* 982b13) has early mythological thinking in mind here, but has said that people began to philosophise both then and in his time (οἱ ἄνθρωποι καὶ νῦν καὶ τὸ πρῶτον) out of wonder (τὸ θαυμάζειν). The greatest philosopher/myth maker known to Aristotle would have been, of course, Plato. This is not to suggest that what we sometimes call Plato’s myths, such as the ‘Myth of the Cave’, was referred to as such by Aristotle; however, he does say at *Metaph.* 1074b1 that a tradition ἐν μύθῳ about the divinity of the heavenly bodies has been handed down παρὰ τῶν ἀρχαίων, and that the philosopher is in some sense a φιλόμυθος (*Metaph.* 982b18).

¹⁸ *Resp.* 509b.

¹⁹ *Metaph.* 990b1-993a10.

matic marionettes, ones with hidden mechanisms, intimate how his own approach to metaphysics differs from Plato's. In Aristotle, metaphysical understanding requires an explanation of the motion of all being, that of the heavens, of the things below the moon, of natural motion, and even of artificial motion that appears natural. In Plato, metaphysical understanding calls upon the static imitation of or participation in being by particulars. The use of τῶν θαυμάτων ταυτόματα as a reference to the θαύματα in Plato's allegory of the cave would be a profound and brilliant, albeit an obscure and highly compacted allusion, indicating that for Aristotle, the motion of a puppet, not its shadow, inspires wonder.²⁰

3. Excursus: puppets in Plato and elsewhere

To support the claim that Aristotle intends to contrast his moving puppets in the *thaumata* passage with the static nature of Plato's puppets in the cave allegory, it is helpful to establish that Plato's *thaumata* are indeed static objects. Whereas Aristotle's reference to puppets in the *thaumata* passage is obscure and largely ignored, Plato's use of them in the cave allegory is one of the most commented-on passages in Western literature and philosophy. Here is how Plato employs *thaumata* there:

... ἐπάνω ὁδόν, παρ' ἣν ἰδὲ τευχίον παρωκοδομημένον, ὥσπερ τοῖς θαυματοποιοῖς πρὸ τῶν ἀνθρώπων πρόκειται τὰ παραφράγματα, ὑπὲρ ὧν τὰ θαύματα δεικνύασιν ... Ὅρα τοίνυν παρὰ τοῦτο τὸ τευχίον φέροντας ἀνθρώπους σκευὴ τε παντοδαπὰ ὑπερέχοντα τοῦ τευχίου καὶ ἀνδριάντας καὶ ἄλλα ζῶα λίθινά τε καὶ ξύλινα καὶ παντοῖα εἰργασμένα ...

... above them a road along which a low wall has been built, as the exhibitors of puppet-shows have partitions before the men themselves, above which they show the puppets ... See also, then, men carrying past the wall implements of all kinds that rise above the wall, and human images and shapes of animals as well, wrought in stone and wood and every material ...'

(*Resp.* 514a-515a)

²⁰ Aristotle frequently uses densely packed metaphors and allusions; cf. *De an.* 412b18-19: 'If, for instance the eye were an animal, sight would be its soul', or *Ph.* 199b30-31: 'when a doctor applies medical treatment to himself – that is what nature is like.' Unpacking the *thaumata* passage as such, a metaphor might tell us a great deal about Aristotle's approach to metaphysics.

Although translators have rendered θαύματα differently in this passage, as ‘puppets’, ‘marionettes’, or sometimes avoiding ‘puppets’ altogether, by translating θαύματα as ‘wonders’, or simply ‘tricks’,²¹ there exists some textual concordance for θαύματα as puppets or marionettes in other writings of Plato. Several scholars make a passing connection between the θαύματα of Plato’s cave allegory and the θαύματα to which Plato compares human beings in the *Laws*:

θαῦμα μὲν ἕκαστον ἡμῶν ἠγησώμεθα τῶν ζῶων θεῖον, εἴτε ὡς παίγιον ἐκείνων εἴτε ὡς σπουδῆ τι συνεστηκός· οὐ γὰρ δὴ τοῦτό γε γινώσκομεν, τόδε δὲ ἴσμεν, ὅτι ταῦτα τὰ πάθη ἐν ἡμῖν οἶον νεῦρα ἢ σμήρινθοί τινες ἐνοῦσαι σπῶσίν τε ἡμᾶς καὶ ἀλλήλαις ἀνθέλκουσιν ἐναντία οὔσαι ἐπ’ ἐναντίας πράξεις, οὗ δὴ διωρισμένη ἀρετὴ καὶ κακία κεῖται. μὴ γάρ φησιν ὁ λόγος δεῖν τῶν ἔλξεων συνεπόμενον ἀεὶ καὶ μηδαμῆ ἀπολειπόμενον ἐκείνης, ἀνθέλκειν τοῖς ἄλλοις νεύροις ἕκαστον, ταύτην δ’ εἶναι τὴν τοῦ λογισμοῦ ἀγωγὴν χρυσοῦν καὶ ἱεράν, τῆς πόλεως κοινὸν νόμον ἐπικαλουμένην, ἄλλας δὲ σκληρὰς καὶ σιδηρᾶς, τὴν δὲ μαλακὴν ἄτε χρυσοῦν οὔσαν, τὰς δὲ ἄλλας παντοδαποῖς εἴδεσιν ὁμοίας. δεῖν δὴ τῇ καλλίστῃ ἀγωγῇ τῇ τοῦ νόμου ἀεὶ συλλαμβάνειν: ἄτε γὰρ τοῦ λογισμοῦ καλοῦ μὲν ὄντος, πράου δὲ καὶ οὐ βιαίου, δεῖσθαι ὑψηροῦν αὐτοῦ τὴν ἀγωγὴν, ὅπως ἂν ἐν ἡμῖν τὸ χρυσοῦν γένος νικᾷ τὰ ἄλλα γένη.

Let us suppose that each of us living creatures is an ingenious puppet [θαῦμα] of the gods, whether contrived by way of a toy [παίγιον] of theirs or for some serious purpose – for as to that we know nothing; but this we do know, that these inward affections of ours, like sinews or cords, drag us along and, being opposed to each

²¹ Ficino 1588 translates: ... *sicut plerumque praestigatoribus* [τοῖς θαυματοποιοῖς] *septa quaedam, super quibus sua miranda demonstrant, coram spectantibus* [τὰ θαύματα] *opponuntur*. The common sense of *praestigatoribus* is ‘sorcerers’ or ‘magicians’, the former interpretation perhaps indicating a wariness of magic in ancient times and later; cf. *Laws* 933a; cf Moore 2014:113. Cousin 1840: ‘pareil aux cloisons que les montreurs de marionnettes dressent devant eux, et au-dessus desquelles ils font voir leurs merveilles.’ Here the ‘merveilles’ are ‘puppets’ or ‘marionettes’ presented by ‘les montreurs de marionnettes’. Davies and Vaughn 1888: ‘... like the screens which conjurors [τοῖς θαυματοποιοῖς] put up in front of their audience, and above which they show their wonders [τὰ θαύματα], indicating, like Ficino, not necessarily ‘puppets’, but certainly some trickery or ‘magical’ deception. Waterfield 1998 excises puppets: ‘... like the partition which conjurors [τοῖς θαυματοποιοῖς] place between themselves and their audiences and above which they show their tricks [τὰ θαύματα].’

other, pull one against the other to opposite actions; and herein lies the dividing line between goodness and badness. For, as our argument declares, there is one of these pulling forces which every man should always follow and nohow leave hold of, counteracting thereby the pull of the other sinews: it is the leading-string, golden and holy, of 'calculation,' entitled the public law of the State; and whereas the other cords are hard and steely and of every possible shape and semblance, this one is flexible and uniform, since it is of gold. With that most excellent leading-string of the law we must needs co-operate always; for since calculation is excellent, but gentle rather than forceful, its leading-string needs helpers to ensure that the golden kind within us may vanquish the other kinds.
(*Leg.* 644d-645a)

Frede claims that the puppets mentioned here are wind-up toys with internal mechanisms, claiming that although *thauma* is commonly translated as 'puppet', this can be misleading if we assume that the puppets are thought of as manipulated by the gods, and that Plato seems to have wind-up toys in mind.²²

Annas agrees with this assessment, claiming that it makes more sense to think of a self-moving wind-up puppet. Although there is no external evidence for this, she sees no reason not to extend the existence of such a device back to late Plato.²³

I disagree. I do not think Plato has wind-up toys in mind in *Laws* or the *Republic*. While one might portray psychic tension to the internal hidden mechanisms of an automaton, it is more obvious to read the passage as describing a marionette (νευρόσπαστα), guided by one main (golden) rod, with moving parts or limbs that may sway and be more difficult to control as the entire marionette moves.²⁴ Berryman says the following about the *thauma* in *Laws*:

Here the point seems to be that we are constructed and worked by an external power: our emotions pull us like strings (νεῦρα ἢ σμήρινθοί). The different powers of golden cords suggests that the transmission of effect is not merely by pulling.²⁵

Νευρόσπαστα with moving parts are discussed in Herodotus' account of Egyptian versions of Dionysian phallus dances:

²² Frede 2010:116.

²³ Annas 2011:8; cf. Berryman 2010.

²⁴ Cf. Moore 2014:114; Berryman 2003:354; *pace* Henry 2005:4; Bernardette 2001:46.

²⁵ Berryman 2003:354.

τὴν δὲ ἄλλην ἀνάγουσι ὀρθὴν τῷ Διονύσῳ οἱ Αἰγύπτιοι πλὴν χορῶν κατὰ ταῦτα σχεδὸν πάντα Ἕλλησι: ἀντὶ δὲ φαλλῶν ἄλλα σφι ἔστι ἐξευρημένα, ὅσον τε πηχυαῖα ἀγάλματα νευρόσπαστα, τὰ περιφορέουσι κατὰ κώμας γυναῖκες, νεῦον τὸ αἰδοῖον, οὐ πολλῶν τεῶν ἔλασσον ἔδον τοῦ ἄλλου σώματος: προηγέται δὲ αὐλός, αἱ δὲ ἔπονται ἀείδουσαι τὸν Διόνυσον. διότι δὲ μέζον τε ἔχει τὸ αἰδοῖον καὶ κινεῖ μόνον τοῦ σώματος, ἔστι λόγος περὶ αὐτοῦ ἱρὸς λεγόμενος.

The rest of the festival of Dionysus is observed by the Egyptians much as it is by the Greeks, except for the dances; they have invented the use of puppets two feet high moved by strings, the male member nodding and nearly as big as the rest of the body, which are carried about the villages by women; a flute-player goes ahead, the women follow behind singing of Dionysus. Why the male member is so large and is the only part of the body that moves, there is a sacred legend that explains. (Hdt. 2.48.2-3)²⁶

The phallic limb could cause the entire marionette to be off balance, such that only the main support rod of the puppet would give it some stability. Tension among moving parts, causing the puppets to be off balance could be what Plato has in mind in the *Laws*.²⁷ The *thaumata* of Plato's cave, however, are more like solid figurines. They are in the hands of 'men carrying past the wall implements of all kinds that rise above the wall, and human images and shapes of animals as well, wrought in stone and wood and every material.'²⁸ Moreover, all that Plato has said is that the wall outside the cave is *similar* to one used by magicians or puppeteers – he does not actually say that there are puppets outside the cave, although the imagery leads in this direction because of his use of words like θαύμα and θαυματοποιός. That there is only a *similarity* to puppet staging would validate translations that avoid puppetry altogether; perhaps we only have a wall similar to a puppet stage, behind which stone and wood figurines

²⁶ For an interpretation, see Preus 1981:85.

²⁷ Although Plato uses the word puppet (θαῦμα) instead of marionette (νευροσπαστός) in the *Laws* – Plato never uses the latter term – the fact that automatic puppets are implied by the term 'τὰ νευροσπαστούμενα' by Simplicius in his account of Alexander's commentary shows that we need to consider the descriptions carefully rather than fix too closely on the Greek word choice. Simplicius in *Phys.* 310, 319; cf. Henry 2005:11.

²⁸ *Resp.* 514b-515a.

that cast shadows are carried.²⁹ If Plato has no actual puppets in the cave allegory, does the idea of Aristotle referring to them in the *thaumata* passage fall flat? I don't think so. The enduring imagery of puppets in both ancient and contemporary commentary on the cave allegory is evidence enough that a reference to puppets in metaphysics invokes Plato's cave. Aristotle is thereby sure to hit his mark in mentioning puppets in the context of metaphysical inquiry.

The *thaumata* of Plato's *Republic* do not seem to be *self-moving* puppets. It is worth pointing out that in Xenophon's *Symposium* (4.55), the Syracusan entertainer crudely calls his dancing girl and flute player *neurospasta* – marionettes that he controls for the entertainment of others. Although marionettes were common enough in Xenophon and Plato's time to produce a wit of this kind, Plato never uses the word *neurospasta* – even in the *Laws* man is a *thau*ma of the gods. The cave allegory's puppets *could* be marionettes similar to the ones mentioned in Herodotus, and such puppets could fit the description of puppets described in the *Laws*,³⁰ but puppets with moving limbs are not necessary to the cave allegory, since its point is very different. The *Laws* allegory is about psychic tension, whereas the cave allegory discusses false assumptions about reality. The cave allegory does not require that puppets have moving parts, for the ontological and epistemological relationship between the 'more real' objects and their shadows is a static one; looking inside the objects is not the point. What is of essence to the cave allegory is that we begin to understand our experiences more clearly once we realise that the *thaumata* are 'truer' or 'more real' than the shadows that they cause. Another indication that *Republic's* *thaumata* are not self-moving is that they are carried – 'deceptive imitations, only apparently self-moving, in fact carried by people we can't see.'³¹ It is possible that *thaumatopoi*oi are

²⁹ Guthrie 1975:518 and Gocer 2000 speculate that the θαύματα of the cave resemble puppets like Turkish Karagöz and Hacivat puppets; the imagery of the cave allegory hardly suggests this. Guthrie qualifies, saying, 'The audience does not see this Turkish Punch and his fellow-puppets directly, but only their shadows thrown on a screen.' This observation is apt. In Karagöz shows, the audience looks at a screen reflecting coloured images cast by translucent puppets, and the screen is between the audience and the puppets. In the cave allegory, the audience's back is turned to the puppets and the stage; the images are projected from behind them. The staging is not the same as that of Plato's cave allegory – the prisoners' backs are turned to the source. Gocer's claim that a Karagöz puppet show implies some kind of crass entertainment assumes that Ottoman ideas about crassness were the same as ancient Greek conceptions of it. Cf. Strauss 1996.

³⁰ Cf. Berryman 2003:354.

³¹ Berryman 2003:354.

walking by the wall outside the cave carrying ‘self-moving-marvels’, but the imagery becomes unnecessarily complex and awkward at this point, and we have no clear textual evidence that Plato intended this. Moreover, such imagery is not required for the point he is making.³²

4. Aristotle’s kinetic theory of imitation

Plato’s cave employs what I call static mimesis – a physical object participates in or imitates a form, as a shadow imitates a physical object. That Aristotle frequently uses the vocabulary of participation and imitation in his own philosophy is often overlooked. However, Aristotle’s *methexis* and *mimesis* differ from Plato’s in that in Aristotle it is kinesis that is imitated and not Plato’s static forms. For Aristotle, imitation manifests through various kinds of circular motion, understood broadly to incorporate the thinking of the Unmoved Mover, the rotation of the planets, human self-thinking, life cycles in the sub-lunar region, and even principles of circular motion employed by mechanisms that imitate living things and celestial phenomena. The puppets that initiate metaphysical thinking in the *thaumata* passage invite us to wonder *how* mechanisms imitate the motion of living things, and lead to an understanding of how all things imitate the divine. The metaphysical aim is the same as Plato’s, but Plato’s static mimesis cannot account for how the imitation occurs.

What follows is an initial and cursory account of Aristotle’s kinetic theory of imitation. I argue that the moving puppets of the *thaumata* passage allude to this kind of imitation, to which I claim the *thaumata* passage alludes.

Plato’s static mimetic theory leaves Aristotle profoundly dissatisfied a few pages after the *thaumata* passage.³³ Calling Plato’s imitation an empty metaphor, he asks at *Metaphysics* 991a22-23: ‘what is it that works looking to the Forms’ (τί γάρ ἐστι τὸ ἐργαζόμενον πρὸς τὰς ἰδέας ἀποβλέπον). In Aristotle’s mind, Plato fails to explain the process that accounts for imitation or participation. Again, in *De generatione et corruptione* Aristotle says that the theory of Forms in the *Phaedo* cannot account for why there is only intermittent and not continuous generation of the participants in the Forms (335b18-20):

βέλτιον δὲ τὸ εἶναι ἢ τὸ μὴ εἶναι (τὸ δ’ εἶναι ποσαχῶς λέγομεν ἐν ἄλλοις εἴρηται), τοῦτο δ’ ἀδύνατον ἐν ἅπασιν ὑπάρχειν διὰ τὸ πόρρω τῆς ἀρχῆς ἀφίστασθαι, τῷ λειπομένῳ τρόπῳ συνεπλήρωσε

³² *Resp.* 514b.

³³ *Metaph.* 990b1-993a10.

τὸ ὅλον ὁ θεός, ἐνδελεχῆ ποιήσας τὴν γένεσιν· οὕτω γὰρ ἂν μάλιστα συνείροίτο τὸ εἶναι διὰ τὸ ἐγγύτατα εἶναι τῆς οὐσίας τὸ γίνεσθαι αἰεὶ καὶ τὴν γένεσιν.

Τούτου δ' αἴτιον, ὡσπερ εἴρηται πολλάκις, ἡ κύκλω φορά· μόνη γὰρ συνεχῆς. Διὸ καὶ τᾶλλα ὅσα μεταβάλλει εἰς ἄλληλα κατὰ τὰ πάθη καὶ τὰς δυνάμεις, οἷον τὰ ἀπλᾶ σώματα, μιμεῖται τὴν κύκλω φοράν· ὅταν γὰρ ἐξ ὕδατος ἀήρ γένηται καὶ ἐξ ἀέρος πῦρ καὶ πάλιν ἐκ πυρὸς ὕδωρ, κύκλω φαμὲν περιεληλυθέναι τὴν γένεσιν διὰ τὸ πάλιν ἀνακάμπτειν. Ὡστε καὶ ἡ εὐθεία φορά μιμουμένη τὴν κύκλω συνεχῆς ἐστίν.

Now being (as we have explained elsewhere the variety of meanings we recognize in this term) is better than not-being; but not all things can possess being, since they are too far removed from the principle. God therefore adopted the remaining alternative, and fulfilled the perfection of the universe by making coming-to-be uninterrupted; for the greatest possible coherence would thus be secured to existence, because that coming-to-be should itself come-to-be perpetually is the closest approximation to eternal being.

The cause of this, as we have often said, is circular motion, for that is the only motion which is continuous. That, too, is why all the other things – the things I mean, which are reciprocally transformed in virtue of their qualities and their powers, e.g. the simple bodies – imitate circular motion.

(*Gen. corr.* 336b28-337a6)

Aristotle's dismissal of static mimesis does not entail dismissing mimesis altogether. Rather, he approaches the process of mimesis kinetically and mechanistically. While purely mechanistic accounts of natural phenomena might be thought to be at odds with Aristotelian teleology, Aristotle does use mechanistic models or analogies to explain natural processes that follow regular mechanistic patterns in the process of actualising an inherent *telos*.³⁴ The employment of automata in the discussion of embryological development in *Gen. an.* is discussed at length in recent articles by Henry and De Groot.³⁵ Schiefsky and Berryman argue convincingly against claims that the ancients believed that mechanics revealed nothing about nature and were conceived as somehow contrary to nature.³⁶ De Solla Price observes that the technological skill needed to represent living

³⁴ Berryman 2003:356.

³⁵ Henry 2005; De Groot 2008; see now De Groot 2014:17; cf. Balme 1987:18; Gotthelf 1987:219.

³⁶ Schiefsky 2007 *passim*; Berryman 2009 *passim*.

humans and animals (motion) emerges in relation to the development of mechanical astronomical models, emphasising an unexplained urge to represent the biological and cosmological mechanically.³⁷ The pseudo-Aristotelian *De mundo* shows a further Peripatetic connection between puppetry and cosmic motion:

Ὅμοίως δὲ καὶ οἱ νευροσπάσται μίαν μήρινθον ἐπισπασάμενοι ποιοῦσι καὶ αὐχένα κινεῖσθαι καὶ χεῖρα τοῦ ζώου καὶ ὦμον καὶ ὀφθαλμόν, ἔστι δὲ ὅτε πάντα τὰ μέρη, μετὰ τινος εὐρυθμίας. Οὕτως οὖν καὶ ἡ θεία φύσις ἀπὸ τινος ἀπλῆς κινήσεως τοῦ πρώτου τῆν δύναμιν εἰς τὰ συνεχῆ δίδωσι καὶ ἀπ' ἐκείνων πάλιν εἰς τὰ πορρωτέρω, μέχρις ἂν διὰ τοῦ παντὸς διεξέλθῃ.

Just as puppet-showmen by pulling a single string make the neck and the head and the shoulder and eye and sometimes all the parts of the figure move with a certain harmony, so, too, the divine nature, by simple movement of that which is nearest to it, imparts its power to that which next succeeds, and thence further and further until it extends over all things.
([*Mun.*] 398b16-22)

Pseudo-Aristotle's *Mechanics*, and later works like those of Hero, indicate that the mechanical workings of *thaumata* – which must remain hidden in order to achieve a wondrous effect – rely on principles of concentric circular motion. The *Mechanics*, a text clearly Aristotelian in its outlook whatever its provenance, states the following:

ταύτην οὖν λαβόντες ὑπάρχουσιν ἐν τῷ κύκλῳ τὴν φύσιν οἱ δημιουργοὶ κατασκευάζουσιν ὄργανον κρύπτοντες τὴν ἀρχὴν, ὅπως ἢ τοῦ μηχανήματος φανερόν μόνον τὸ θαυμαστόν, τὸ δ' αἴτιον ἄδηλον.

Mechanicians seizing on this inherent peculiarity of the circle, and hiding the principle, construct an instrument so as to exhibit the marvellous character of the device, while they obscure the cause of it.
([*Mech.*] 848a34-47)

Vernant observes:

Mechanics ... aims to provide a rational explanation for the effects produced by the 'simple machines' that are the basis for all com-

³⁷ De Solla Price 1964.

plex mechanical devices and whose properties are ... derived from the circle, which is their common principle.³⁸

De Groot, examining the principle of the moving radius at length, remarks on how that key principle of circular motion pertains to many things in Aristotle's universe, including heavenly motion and automata:

There are the requirements of rotation of a linear formation of soldiers or any other sort of parade, as well as all manner of theatrical devices, including automata that mimic the movements of animals and humans. It might be said that these are all craft items or applications and not natural artefacts, but ancient authors did carry the principle into nature. The author of *Physical Problems* XVI applies the principle to the revolving motion of projectiles of uneven weight distribution, the shape of shells and stones subject to continual buffeting, the phenomenon of falling backward due to a blow from behind, and relates it also to circular growth. Aristotle applies it to the movement of limbs, and from that base in animal motion, to emotional reactions in animals and to embryological development. The principle is also the foundational explanatory trope for differential speeds of heavenly bodies in *On the Heavens* II.³⁹

³⁸ Vernant 2006:303. In his commentary on *De motu*, Michael of Ephesus discusses Aristotle's use of automata to illustrate how animal motion starts. Aristotle says that a toy wagon is similar, although the passage is obscure – either the wagon has smaller inner wheels, or shifting one's weight causes the wheels' contact with the ground to be smaller on the inside than the outside. Preus 1981:86-87 envisions an ancestor on a modern skateboard. In explicating the passage, it is remarkable that Michael's explanation of the wagon proceeds, without any anchor in the text that he is commenting on, to celestial motion: '... clearly the movement of the larger [wheel] is more and faster, and that of the smaller is slower ... assume that as the pole is to the equator or simply to any of the circles described by the stars, so too the lesser wheels to the larger' (in *De motu an.* 117-18). As is said in the *Mechanics* (848a10-11), 'There is nothing strange in the circle being the first of all marvels [τῶν θαυμάτων].' Plato remarks on circular motion in the *Laws* (893d): 'This motion gives rise to all sorts of wonderful phenomena [τῶν θαυμασῶν] because these points simultaneously traverse circles of large and small circumference at proportionately high or low speeds – an effect one might have expected to be impossible.' On this passage and an extensive treatment of the mechanics of levers and circles applied to both the heavens and mechanical devices, see De Groot 2008 and 2014 *passim*, and Berryman 2003:362.

³⁹ De Groot 2014:9-10.

In Aristotle, both an automata's internal mechanisms and the eternal motion of the planets manifest principles of circular motion. Thus in the *thaumata* passage, both the automata he explicitly mentions and celestial motion he implicitly mentions (solstices) are ultimately explained in terms of a 'kinetic' appeal to the Unmoved Mover as the guarantor of all motion in the cosmos. The planets move in circles in a desire to express or imitate, so far as they can, the perfection of the self-reflecting circular thought of the Unmoved Mover – circular because it begins and ends with itself.⁴⁰ The circular motion of Aristotle's planets allows for sub-lunar life – plant, animal, and human.⁴¹ The nutritive soul of all living things manifests teleologically in life cycles or reproductive cycles.⁴²

... φυσικώτατον γὰρ τῶν ἔργων τοῖς ζῶσιν, ὅσα τέλεια καὶ μὴ πηρώματα ἢ τὴν γένεσιν αὐτομάτην ἔχει, τὸ ποιῆσαι ἕτερον οἶον αὐτό, ζῶον μὲν ζῶον, φυτὸν δὲ φυτόν, ἵνα τοῦ ἀεὶ καὶ τοῦ θείου μετέχωσιν ἢ δύνανται· πάντα γὰρ ἐκείνου ὀρέγεται, καὶ ἐκείνου ἕνεκα πράττει ὅσα πράττει κατὰ φύσιν.

... for any living thing that has reached its normal development and which is un mutilated, and whose mode of generation is not spontaneous, the most natural act is the production of another like itself, an animal producing an animal, a plant a plant, in order that, as far as its nature allows, it may partake in the eternal and the divine. That is the goal towards which all things strive, that for the sake of which they do whatsoever their nature renders possible.
(*De an.* 415a26-b2)

The word μετέχωσιν in the passage above indicates a kind of 'participation', which, unlike Plato's, is kinetic. At the same time, the human rational soul is capable of more closely imitating the Unmoved Mover by engaging in the 'circular' activity of self-thinking.

Aristotle's notion of kinetic mimesis can be observed elsewhere. In the *Meteorology*, Aristotle uses mimetic vocabulary to describe the *taxis* or cycles of condensation and rarefaction in weather depending on and reflecting the cycles of the sun:⁴³ Γίγνεται δὲ κύκλος οὗτος μιμούμενος τὸν τοῦ ἡλίου κύκλον (346b35-36). The regularity of sublunary examples of

⁴⁰ Indeed this 'circularity' is what causes Plotinus to complain that Aristotle's first principle is not properly unitary. See Bowe 2004:14.

⁴¹ *Gen. corr.* 336a.

⁴² Cf. Solmsen 1978:15; Sedley 2010:24.

⁴³ Solmsen 1978:15.

taxis is said to be limited ‘ὡς ἐνδέχεται τὰ ἐνταῦθα μετέχειν τάξεως’ (358a26) – to the degree that they can *participate* in order.

In these passages, Aristotle employs a kinetic theory of imitation, as opposed to a Platonic static/formal one. What is central to his kinetic theory of imitation is that all being expresses circular motion in one way or another. This is true of the perfect being, the planets, human beings, animals and plants. In self-thinking the Unmoved Mover expresses circularity, and all other beings stand in a mimetic or participatory relation to the exemplar of being. They express circularity through circular motion (planets), through circular self-thinking (humans) or through cycles of nutrition and reproduction (plants, animals and humans). An examination of the principles of circular motion employed in the mechanisms of automata is, in effect, an examination of the same principles of circular motion manifest in planetary motion. Understanding being as an expression of kinetic circularity, as opposed to understanding being as mimetic relationships of the Good, the Forms, and the physical world of becoming, reveals Aristotle’s metaphysics of kinetic imitation, in contrast to Plato’s descending privative hierarchy of unity, being and particulars,⁴⁴ a kinetic as opposed to a static theory of imitation.

Conclusion

It is easy to skim over or ignore the *thaumata* passage in the *Metaphysics*, chalking it up to a corrupt manuscript, or a remark whose meaning is simply lost in a broad introductory discussion, the meaning of which is, on the whole, quite clear. However, when we stop and consider that often Aristotle’s opening remarks on any subject represent a look back to Plato as both his chief inspiration and adversary, we should not be so quick to ignore the strange things. Often embedded in Aristotle’s text we find deep orientations in metaphors and allusions, as evocative as any cryptic remark to be found in the fragments of Heraclitus.⁴⁵ Aristotle’s use of τῶν θαυμάτων ταῦτόματα in the *Metaphysics* is a way of suggesting that metaphysical curiosity is inspired by how things move, suggesting that circularity and motion in their various manifestations are metaphysically significant in a way that Plato failed to appreciate. Understanding why τῶν θαυμάτων ταῦτόματα are apparently capable of self-motion suggests that inquiry into motion sets Aristotle’s metaphysics apart from Plato’s. Kinetic mimesis stands in contrast to the Platonic assumption that the key to metaphysical inquiry is understanding the static ontological relationship

⁴⁴ For an extended treatment, see Bowe 2004:13-23.

⁴⁵ See above, note 19.

between being and material particulars. This, of course, is not to hang the entirety of Aristotle's metaphysics on one introductory reference in *Metaphysics* A. It is, rather, to suggest that the reference to *thaumata* is indicative of the way in which Aristotle sees his metaphysical orientation in relation to Plato's.

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