

Aristotle's Accounts of Motion in *Physics II* and *VIII*

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In the second book of the *Physics*, Aristotle distinguishes between natural objects and others. Speaking of natural things, he says:

Each of them has within itself a principle of motion and of stationariness.... On the other hand, a bed and a coat and anything else of that sort, *qua* receiving these designations—i.e. insofar as they are products of art—have no innate impulse to change. (*Phys.* II.1.192b14-19)

The discussion takes quite a different turn in Book Eight. Speaking of animal motion, Aristotle tells us:

... they are unmoved at one time and then again they are in motion, as it seems. We must grasp the fact, therefore, that animals move themselves only with one kind of motion (locomotion), and that this is not strictly originated by them. *The cause of it is not derived from the animal itself*.... (*Phys.* VIII.6.259b6-8; emphasis added)

What are we to make of these accounts? In the first, Aristotle seems simply to equate nature with “self-change” and he explicitly lists “animals, and their parts... and plants and the simple bodies” (earth, fire, air, water) as examples (see *Phys.* II.1.192b8-10). But the second passage apparently confuses the picture. In Charlton’s words, “It is a central thesis of *Phys.* VIII that nothing changes itself, that whatever is subject to change is changed by something else” (Charlton, p. 91).

Does the apparent inconsistency of these two passages make a strong case for taking them to reveal two incommensurable hypotheses? Or can they, on the other hand, be read together as merely different (possibly progressive) accounts of motion that are fundamentally consistent? In this paper, I wish to suggest that Aristotle’s different theories of natural motion are grounded in attempts to answer separate questions and that they can only be made fully intelligible by recognizing their place in distinct developmental systems.

The *De Caelo*, regarded by most scholars as one of Aristotle’s earliest physical treatises, further draws out the definition of natural motion as “self-change” that we saw in *Physics II*. The second chapter of the *De Caelo* contains this discussion of the principle of movement of natural bodies:

Let us take this as our starting point. All natural bodies and magnitudes we hold to be, as such, capable of locomotion; for nature, we say, is their principle of movement.... Bodies are either simple or compounded of such; and by simple bodies I mean those which possess a principle of movement in their own nature. (*De Caelo* 1.2.268b15-28)

Natural bodies, on this view, are those which are able to move themselves under their own power. Motion is not further analyzed down into more basic terms. Such a view squares nicely with much of the doctrine that characterizes the *Organon* and (what are generally assumed to be) Aristotle's earlier works in general. Compare this account with the following discussion of substance in the *Categories*: "Substance, in the truest and most definite sense of the word, is that which is neither predicable of a subject nor present in a subject; for instance, the individual man or horse" (*Cat.* 5.2a11-13). This view of substance as an "organic unity" (e.g. a particular man or horse) lends itself nicely to such a straightforward account of motion. No reference to the exterior movers or the hylomorphism that characterize his more mature physical works is required.

Further passages in the *De Caelo* bear out this view. Later in that same chapter, Aristotle shows that

... there must naturally be some simple body which revolves naturally and in virtue of its own nature with a circular movement. By constraint, of course, it may be brought to move with the motion of something else different from itself, but it cannot so move naturally, since *there is one sort of movement natural to each of the simple bodies.* (*De Caelo* 1.2.269a6-9; emphasis added)

Although Aristotle is concerned with showing in the first book of the *De Caelo* that the "fifth element" has a principle of motion within itself, he also implicitly shows motion to be the natural power of a thing to change itself. No hint of his form/matter distinction nor any sort of reference to any unmoved mover as he envisions it in Book Eight of the *Physics* is needed to round out his account. W.K.C. Guthrie sums up von Arnim's appraisal of the situation in this way:

The idea is that, as described in *De Caelo*, the revolving sphere of aether has the principle of its motion entirely within itself, that it is impossible that A. could have described it as he does there if he had already worked out in his mind the doctrine of an unmoved mover as the ultimate source of motion. (Guthrie, p. 164)

Now, Guthrie disagrees with von Arnim about the commensurability of the unmoved mover hypothesis with a model of motion like the one Aristotle describes in the first book of the *De Caelo*. On Guthrie's view, Aristotle's accounts of motion can, in fact, be read on a developmental continuum and he denies that they are self-contradictory in any meaningful way. This is an important question but one which I shall have to return to. At any rate, it is important to note that for both, the unmoved mover of Book Eight had no sort of essential role to play in the physics of motion of *De Caelo*.

The *De Caelo* passages I have mentioned serve to illustrate a point upon which there is widespread convergence among commentators. Harold Cherniss reports that Moreau and W.D. Ross (as well as Guthrie and von Arnim) fail to see the necessity of a transcendent mover in Aristotle's *De Caelo* account.

W.D. Ross also holds that at the time of writing the *De Caelo* account Aristotle still believed in self-motion but a self-motion of immanent star-souls, not of the fifth essence itself... Moreau, who takes the *De Caelo* to be "animistic" in conception, asserts that the unmoved mover does not appear in this work and apparently ascribes self-motion to the principle which he says is here immanent in the universe (Cherniss, p. 584).

What is more, certain passages in the *De Caelo* seem to exclude the possibility of an unmoved mover altogether. The following discussion of "divinity," for example, depends upon the idea that natural motion is essentially simple and self-imposed:

... whatever is divine, whatever is primary and supreme, is necessarily unchangeable.... For there is nothing stronger than it to move it—since that would mean more divine—and it has no defect and lacks none of the proper excellences. *Its unceasing movement, then, is also reasonable, since everything ceases to move when it comes to its proper place....* (*De Caelo* I.9.279a32-b2; emphasis added)

The following passage, from *De Caelo* III, seems to indicate that there was still something left of "natural motion" even after the introduction of a prime mover: "For the prime mover must cause motion in virtue of its own natural movement, and the other bodies, moving without constraint, as they came to rest in their proper places, would fall into the order in which they now stand" (*De Caelo* III.2.300b21-22).

Aristotle's developing theology in the *De Caelo* seems to consistently come back to the idea that motion is fundamentally self-determined. This is not to say that there are not passages in the *De Caelo* that explicitly mention an unmoved mover of the same stock as the one developed in *Physics* VIII and *Metaphysics* XII. Fairly explicit references are made to such a mover at (for example) 288a27-b7; 311a9-12; and 277b9-10. But such references seem to be anomalies when compared with the general direction that the arguments in the *De Caelo* are headed. Certainly they bear more of a resemblance to the more fully-developed views of Aristotle's later physical works. Cherniss points out that von Arnim, Ross, Moreau, and Guthrie all take these references to be later additions (Cherniss p. 584). At any rate, it cannot be denied that the systematic backdrop that these passages depend on is not fully present in *De Caelo*. That alone gives us a *prima facie* reason to regard the passages as suspiciously late.

I have relied heavily upon *De Caelo* up to this point to give a picture of Aristotle's earliest explanations of motion. The reason is simply that references in other early works to the problem are practically non-existent. There is, however, a brief passage in the *Analytica Posteriora* that is worth considering. In the context of showing that nature often acts for both material and final causes, Aristotle says:

Necessity too is of two kinds. It may work in accordance with a thing's natural tendency, or by constraint and in opposition to it; as, for instance, by necessity a stone is borne both upwards and downwards, but not by the same necessity. (*AnPo.* II.11.95a1-3)

What makes this passage particularly relevant is not the fact that Aristotle refers to the "natural tendency" of a thing without mentioning any sort of external source; we have already seen many such examples in *De Caelo*. What is striking is simply its occurrence in the *Organon*. The fact that he is not concerned with motion *per se* in the passage gives us a glimpse of the direction in which Aristotle's earlier thought was naturally inclined: such an intuitive view would surely have informed the more full-blooded theory he offers in *De Caelo*.

Charlton notes that the Greek word Aristotle uses here, *horme*, means something like "active striving." After citing other passages in which the same word appears, Charlton observes:

In every case... the nature involved seems to be the material element of a thing.... This strongly suggests that he thinks that the material of a thing can be a source of change because it has an active tendency to change independent of any external cause (Charlton, p. 92).

The simplicity of the account given the *De Caelo* and the *Analytica Posteriora* must have been appealing to Aristotle from a common-sense perspective. We *do* tend to contrast natural things with others by talking about their origins. It makes perfect sense to say that natural things are characterized by an innate capacity for change, whereas artificial products (*qua* artificial) are only changed by external forces (see *Physics* II.1.192b12-26). To paraphrase Aristotle's example, a tree is a natural object because it has the power of growth within itself whereas a bed or chair does not.

But how does this explanation square with the development of Aristotle's later views in the *Physics*? Recall, for example, the analysis of animal motion that I quoted at the outset. In Book VIII, Aristotle claims that animal motion is *not* strictly self-motion and that "the cause of it is not derived from the animal itself" (*Phys.* VIII.4.256a2-3). Indeed, it is a general thesis of *Physics* VIII that "all things in motion must be moved by something" (*Phys.* VIII.4.256a2-3). Richard Sorabji sees that dilemma like this:

In *Physics* 2.1, his task is to distinguish natural objects from artificial ones, and he does so by saying that natural objects have an internal source of change, their nature.... Aristotle concludes that nature is an internal (*en*) source and cause (*arkhe* and *aitia*) of motion (*kineisthai*) or rest (*eremein*).... But in *Physics* 8.4, Aristotle is constrained by an opposite consideration. In order to make room for God as that by which the heavens are moved, he has to support Plato's principle that whatever is in motion is moved by something (Sorabji, p. 219).

Sorabji points out (rightly, I think) that Aristotle seems to have different purposes in giving his distinct accounts. Sarah Waterflow expands on this idea:

... the concept of living things as self-changers figures in *Physics* VIII not as an item of interest in itself, but purely as a step in an argument concerned with other issues. [The discussion of] 'self-change' [in the *Physics*] tells us nothing about organic substance.... It is intended to uphold a certain conclusion concerning

the ultimate source of change in the universe as a whole, and Aristotle has accordingly invested 'self-change' with no more meaning than is necessary for the discharge of this ulterior function (Waterlow, p. 216).

The point that Sorabji and Waterlow are making is significant. Aristotle's discussion of self-change in the *Physics* is always informed by a greater enterprise: he wants to give an account of an eternal, unmoved source of motion. "It looks as if in the *Physics* he already knew the conclusion he thought right, that God, and not any celestial soul, is the prime mover, but that the tools for securing this conclusion were not available to him until he had written the *de Anima* and *Metaphysics* Book 12" (Sorabji p. 225).

With this in mind, we can piece together Aristotle's strategy by looking at the interpretation that he tried to place on his own earlier works. In *Physics* VIII.4, Aristotle makes the claim that whatever is changed must be changed "by something"; he draws this point out by making a distinction between the agent and patient of motion:

The fact that a thing that is in motion derives its motion from something is most evident in things that are in motion unnaturally, because in such cases it is clear that the motion is derived from something other than the thing itself. Next to things that are in motion unnaturally those whose motion while natural is derived from themselves—e.g. animals—make this fact clear: for here the uncertainty is not as to whether the motion is derived from something but as to how we ought to distinguish in the thing between the movent and the thing moved. It would seem that in animals, just as in ships and things not naturally organized, that which causes motion is separate from that which suffers motion, and that it is only in this sense that the animal as a whole causes its own motion. (*Physics* VIII.4.254b24-33)

W.D. Ross claims that Aristotle's VIII.4 account of motion is simply a filling-out of the earlier, *De Caelo* view. On Ross's interpretation, Aristotle's initial, simple equation of motion with an inherent capacity to change is not sufficient to demonstrate *how* the capacity for motion becomes fully realized. He says, "The answer which Aristotle finally reached is that capacity is realized always by the action on the potential of that which is already actual. And this he came to see to be incompatible with self-movement" (Ross, pp. 98-9).

Aristotle's strategy becomes more meaningful if we recall that he has by this time introduced his form/matter distinction. By replacing the simple unity of substance of the *Organon* with the complex version of his mature physical works, he has allowed himself to creatively redescribe motion and self-change on a new paradigm. Rather than interpret self-change as a simple function of organic unities (e.g. "man," "horse," "tree") he is able to further analyze the motion of even these unities into more fundamental parts. Thus, he is able to analyze the motion of, say, an animal, into a "movent" and a "thing moved." Clearly, he is playing on the ambiguity of the phrase "changed by something other" to try to find a "something other" within what he formerly took to be a simple substance. This is related to the point Waterlow makes when she says, "Aristotle's deliberately indiscriminate use of 'changed by something other' puts him at a strategic advantage vis-a-vis the question of what exactly we are to suppose should be meant by something's being changed 'by itself'" (Waterlow, p. 207).

What, then, are we to make of this ambiguity? Should we take Aristotle to be—as Waterlow puts it—at a "strategic advantage," one that allows him to further develop an old doctrine in response to new challenges? Or ought we to read him as making a radical break from his earlier views and attempting to combine elements of two incommensurable systems?

Waterlow argues that Aristotle is successful in his attempt. But she recognizes that she faces an immediate difficulty in trying to bring the two views together into one coherent theory. She asks:

... how can the self-change "whole" be itself a substance, if it consists in a substance plus something else? But perhaps this ought to be dismissed as a spurious paradox generated by gratuitously introducing terms like 'in addition to' and 'plus.' Aristotle does not state, nor does he necessarily imply, that the difference must be such that the two are *addible*. Presumably he means that in self-change the changer and changed are not numerically different individuals. Resorting to handy words, let us say that he has in mind different aspects of the same individual (Waterlow, p. 212).

I think that Waterlow's reading of Aristotle is charitable—perhaps too much so. The very difficulty of reconciling the doctrines of the *Organon* and earlier physical works with the later physical works lies in Aristotle's waffling about what even the most basic terms (such as "substance") are to

mean. This indecision becomes particularly acute in the second book of the *Physics* where Aristotle tries to: on the one hand, (continue to) retain the common-sense idea that natural objects are those that move themselves; and, on the other hand, set up an argument designed to show (in the *Metaphysics* and in the later books of the *Physics*) that there must be a source of eternal motion and change which is independent of particular natural things.

Aristotle's reliance on his mature actuality/potentiality doctrine illustrates this very discrepancy. As I have already indicated, Ross notes that the capacity for change "is realized always by the action of the potential of that which is already actual." And, in order to realize movement, "the mover must already be in the state which is the terminus of the movement; in order to be moved, the moved must not yet be in that state" (Ross pp. 98-9; see *Physics* VIII.5.257a33-257b14). But, significantly, this view of actuality/potentiality differs markedly from earlier discussions in the *Organon*. Daniel Graham points out that *energia* (or "actuality") in the *Organon* is not explicitly connected with hylomorphism; in fact, Aristotle makes it a point to show that *energia* is an activity rather than a capacity (Graham, p. 99; see *Top.* IV.5.125b15-9).

The "spurious paradox" Waterlow refers to runs more deeply than she realizes. It goes to the very heart of Aristotle's philosophy. The problem, as Graham has pointed out, is that Aristotle himself sometimes treats form and matter as separate *entities*; it is precisely his avowal of hylomorphism in the later works that informs his conception of *energia* as "capacity" and facilitates a complex account of natural motion in Book Eight of the *Physics*. This is the very point Graham takes up in the following discussion of Aristotle's mature philosophical system—what Graham refers to as S2:

According to hylomorphism the concrete substance is divisible into form and matter. This is a fundamental fact of analysis of S2: the sensible substance is a composite, not a simple individual. The analysis seems to invite a question about the composite itself: which component makes the substantial compound substantial? It is form or matter? Since the sensible substance is analyzed into two components, one of them must be responsible for the substantiality of the whole.... Because Aristotle analyses the sensible substance into form and matter, he assumes that it must be *reduced* to form and matter (Graham, p. 278).

Aristotle's argument for complex natural motion, hinging as it does on his latter conception of *energia*, or actuality, is thus bound up intimately with the logical status of form and matter in his ontology. In these terms, then, Graham goes on to recommend the same line that Waterlow insists on: "How then should we view form and matter? It seems to me that we should take them not as components in the normal sense. . . . We should rather conceive of them as *aspects* of the sensible substance" (Graham, p. 279). However, Graham recognizes (as Waterlow does not) that such a recommendation can only stand as an *after-the-fact* suggestion to Aristotle. The fact remains that Aristotle *does* equivocate terms between the earlier works on the one hand and his more mature thought on the other. To deny this would be to affirm that the whole of the Aristotelian corpus is thoroughly consistent—surely an impossible hypothesis to defend.

So where does that leave us with respect to our original question? I want to recommend that we go back to an observation that I made earlier. Both the earlier and later accounts of self-change that Aristotle offers are targeted at answering different questions (or at least questions that arise in distinct contexts). The *De Caelo* (and other early works as well) tried to define natural motion in relatively simple terms; the paradigm that Aristotle worked from was the one exemplified in the *Organon* and referred to by Graham as S1—what Graham takes to be Aristotle's earlier philosophical system (see Graham 1987). The *Physics* account (after Book Two) tried to define motion against an entirely different backdrop and with an entirely different purpose in mind. Aristotle's discussions of self-change and natural change were subsequently brought out to demonstrate the logical necessity of an unmoved mover and to "uphold a certain conclusion concerning the ultimate, eternal source of change in the universe as a whole" (Waterlow, p. 216). The *Physics* II account, then, appears to mark an awkward shift between Aristotle's early conception of natural change and the adoption of hylomorphic principles (introduced in *Phys.* I) that would later provide the framework for his emerging complex agenda.

It seems, then, that attempts to reconcile Aristotle's theories of motion (either in terms of one coherent system or along loose developmental lines) are wrong-headed. We are better off sorting out his accounts of motion according to the paradigms he is working against and in terms of the specific questions he is trying to answer.

Works Cited

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