Metaphysics and Empiricism in Aristotle's Argument for Eternal Uniform Circular Motion in *Metaphysics* Λ

Aristotle's *Metaphysics* Λ is best known for its argument that an "unmoved mover" is required both for an ultimate explanation of changing substances and for a complete account of nature. But to arrive at the existence of the unmoved mover, Aristotle must first establish that there is everlasting change. He further maintains (in *Met.*Λ 1071b5-12) that this change must be eternal uniform circular motion, later identified as the motion of the outermost heaven of the fixed stars (1027a23). Scholars have criticized Aristotle's argument for the existence of eternal uniform circular motion on the grounds that it illicitly appeals to his theory of time and relies on contingent empirical assumptions about concrete physical features of the universe (e.g., Berti 2000, Laks 2000, Politis 2004). In this paper, I argue to the contrary that Aristotle offers a strictly philosophical argument for eternal uniform circular motion independent of any contingent empirical beliefs. Understanding the argument in this way yields a more adequate appreciation of Aristotle's philosophical method and the role of empirical considerations in his metaphysics.

I first examine Aristotle's appeal to time in his argument for *eternal continuous* change and some prominent recent interpretations of it. Aristotle states that "change, too, is continuous just as time is" (καὶ ἡ κίνησις ἄρα οὕτω συνεχὴς ὥσπερ καὶ ὁ χρόνος; 1071b9). Berti argues that Aristotle wrongly infers from the eternal and continuous character of time that change is continuous rather than merely contiguous. Against Berti, I follow Politis' observation that changing things "[provide] a measure for time" (Politis 270) and show that on any interpretation of how changing things provide a measure for time, continuous motion is *necessary* for continuous time. At no point does Aristotle claim that every change must be

continuous rather than contiguous; rather, since time is continuous and depends on change for its character, there must be at least one continuous change to secure this continuity independently of the existence of any other continuous or contiguous changes.

Following this consideration of the arguments for the eternity and continuity of time itself, I examine the final step of the argument for eternal uniform circular motion, that is, Aristotle's conclusion that eternal continuous change must be *circular* locomotion. I argue against both Berti and Politis that the claim that circular motion is the only continuous motion does *not* rest on empirical assumptions on Aristotle's part. While it does presuppose the universe's spatial finitude, Aristotle argues in *Phys.*3.5 204b5-206a8, that spatial infinity is impossible. Linear motion can be uniform and continuous in infinite space, but circular motion is the only candidate for continuous motion in a closed space.

At 1072a21-24, Aristotle identifies the eternal uniform circular motion that his previous argument entails with the motion of the outermost heaven. A closer look at the passage reveals that Aristotle does not appeal to empirical observations at this stage of the argument either, as Politis and Berti continue to argue. Nor does he suppose that the empirical "fact" of the outermost heaven's motion "corroborat[es], or rather mak[es] true" the a priori argument, as Laks holds (Laks 214). I show how Aristotle's view that the kosmos is spatially finite will, of course, result in a motion that coincides with the empirically grounded belief about the motion of the outermost heaven, but does not presuppose it. If we understand the argument for eternal continuous circular motion as independent of contingent empirical assumptions, as we have good reason to, Aristotle's metaphysics would certainly be better for it. Because the later argument in Λ 7 for the existence of the unmoved mover relies on the existence of an eternal

but changing substance, a more charitable interpretation of the argument in Λ 6 is preferable also in the greater context of *Metaphysics* Λ.

The paper ends by addressing the interplay between Aristotle's abstract argument and his relevant empirical beliefs about the physical universe. I argue that the empirical observation mentioned in Λ 7 neither follows nor concludes the philosophical argument (as Berti and Politis hold, respectively). Rather, it is an independent assumption that is compatible with the conclusion of the argument; the argument in turn offers philosophical support to the unproven (and unprovable because empirical) assumption about the motion of the fixed stars. Hence Aristotle's metaphysics does not rest on outdated empirical beliefs, but rather on entirely philosophical considerations about change and causation.

Bibliography

Berti, Enrico. 2000. "Metaphysics Λ 6". *Aristotle's 'Metaphysics' Lambda –Symposium Aristotelicum*. Frede and Charles (eds.). Oxford: OUP

Laks, André. 2000. "Metaphysics Λ 7". *Aristotle's 'Metaphysics' Lambda –Symposium Aristotelicum*. Frede and Charles (eds.). Oxford: OUP

Politis, Vasilis. 2004. *Aristotle and the Metaphysics.* Routledge

Ross, W.D. (ed.).1924. *Aristotle's Metaphysics.* Oxford: Clarendon Press.

Ross, W.D. (ed.). 1936. *Aristotle: Physic*s. Oxford: OUP