

## The Heavens are Alive: Aristotle's Strategies in Explaining the Motions of the Heavenly Bodies

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For Aristotle, the heavenly bodies and the spheres in which they are carried are *physical* bodies (*Cael* II 12, 293a7-8) and not mere mathematical points and constructs, which is how they are represented by many of his predecessors and contemporaries (see e.g. the theories of concentric spheres reportedly put forward by Eudoxus and revised by Callippus). Hence, Aristotle is adamant that the study of their attributes and motions is part of his natural science (*Cael* I 1, 268a1 and *Meteor* I 1, 338a20-5) and he sets out to explain their motions and attributes in book II of his *On the Heavens*.

However, providing causal explanations for why the heavenly bodies move the way they do is not an easy task, especially because – as Aristotle makes clear repeatedly – there is very little empirical evidence to start from. The fact that all heavenly bodies and their spheres are made out of aether provides a material causal explanation for why they engage in circular motion for eternity, but it cannot explain – for instance – why there is a plurality of motions, why the different heavenly bodies move in the directions they do (i.e. the fixed stars moving in one direction, while the planets move in the other direction), and why different heavenly bodies require different amounts of spheres to enable their particular motions. As it turns out, Aristotle believes that these questions can only be answered by thinking of the heavens as a whole as a living organism and of the individual heavenly bodies as celestial animals.

In this paper, I discuss the various strategies Aristotle uses in trying to explain the particular motions of the heavenly bodies that all center around the main heuristic assumption that the heavens should be thought of as being alive, which are (1) drawing analogies between different heavenly bodies and different kinds of sublunary living beings; (2) appealing to teleological principles developed in his biology with regard to sublunary animals; and (3) appealing to ‘what can reasonably be expected to be the case’<sup>1</sup> if we grant that the heavenly bodies are alive. I will argue that by using these strategies Aristotle succeeds in offering natural scientific explanations of the motions of the heavenly bodies that help to reduce our puzzlement about these phenomena, but that this comes at the cost of stretching his explanatory strategies to the maximum: the explanations yield ‘convictions suitable for humankind’ (*Cael* II 5, 287b28-288a3), but not knowledge without qualification.

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<sup>1</sup> The ideas presented in this section of the paper dealing with Aristotle's appeals to what is *eulogos* in *Cael* II were developed in cooperation with Andrea Falcon (see Falcon & Leunissen, forthcoming).