



Theokritos Kouremenos

Aristotle's *de Caelo* Γ

Introduction, Translation
and Commentary

Klassische Philologie

Palingenesia – Band 100

Franz Steiner Verlag

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μὴ εἰκὴ περὶ τῶν μεγίστων συμβαλλόμεθα

Heraclitus, DK 22 B 47

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INTRODUCTION

In *Mete.* A 2, 339a11–27, Aristotle asserts that there are five principles of material things, five kinds of matter, or body, continuous in all three dimensions and unanalyzable into material constituents. Of these five simple bodies, one makes up the celestial objects, whereas the other four, which exist because of four, here unspecified, principles, make up the realm of the cosmos near the Earth. They are the “traditional” elements Empedocles of Acragas introduced into physics in the fifth century BC: fire, air, water and earth. The opening of *Cael.* Γ announces that these simple bodies are the topic of the book. In it, however, we do not find the theory of the bodies at issue, though it is certainly presupposed. The following account is based, often almost verbatim, on Kouremenos (2010) ch. 1.

1. ARISTOTLE’S COSMOS

The near-Earth realm of the cosmos as conceived by Aristotle is circumscribed in effect by the circular orbit of the Moon around the Earth: it is a sphere whose great circle is the lunar orbit (see *Mete.* A 3, 340b6–10). The interior of this sphere is stratified into an outermost spherical shell of fire, which is a highly flammable and extremely subtle gas (the fire of everyday experience is elemental fire undergoing combustion; see *Mete.* A 3, 340b19–23, and 4, 341b6–22). Next comes a spherical shell of air, and then a spherical shell of water blanketing almost all the surface of the Earth, a globular clump of the homonymous simple body which is homocentric with the spherical cosmos. Beyond the near-Earth, or sublunary, realm of the cosmos are the heavens: apart from the Moon, they contain the Sun, the five planets known in antiquity (Mercury, Venus, Mars, Jupiter and Saturn) and, finally, the fixed stars. Beyond them is the outermost boundary of the cosmos, a spherical surface analogous to the celestial sphere of astronomy (Aristotle demonstrates the stratification of the cosmos into concentric spherical layers in *Cael.* B 4). According to *GC* B 8, all objects in our close surroundings are ultimately made up of all four Empedoclean simple bodies, bound together in insignificant amounts by comparison to how much of each exists in the cosmos. As it is, though always neatly stratified on the cosmological scale, the four traditional simple bodies are not separated at any given time on much smaller scales. But the simple body which is the sole constituent of the celestial objects is completely separated from the other four simple bodies. It is called “the first element” in *Mete.* A 3, 339b16–19, where it is made clear that it not only makes up the celestial objects but also fills up the heavens. These lines are actually a note to an earlier discussion, in the *de Caelo*, of the nature of this simple body and its role as filler of the heavens.¹ The introduction of a fifth element by Aristotle is one of his most notable contributions to physics.

1 For the priority of the *de Caelo* see Kouremenos (2010) 77 n. 53.

2. THE FIRST SIMPLE BODY

The existence of a fifth element, which in *Cael.* B 7, 289a11–19, is said to be the filler of the heavens and the sole constituent of the celestial objects, is demonstrated in *Cael.* A 2. Its properties are derived in *Cael.* A 3, where it is called “the first simple body” (270b2–3) because its circular natural motion is prior to the rectilinear natural motion of any Empedoclean simple body.² A mass of e.g. earth outside its “natural place”, where most of this element is agglomerated at any given time, tends to accrete to the clump—it will move there spontaneously if nothing prevents it. This “natural motion” of the four traditional simple bodies follows radii of the spherical cosmos. Two of these simple bodies, earth and water, move towards the center of the cosmos; insofar as they have the potentiality to do so, they are heavy. But the other two, air and fire, shoot up away from the center and towards the periphery of the cosmos; insofar as they have the potentiality to do so, they are light. Hence there must be another element, the first, any quantity of which has a natural motion which is not radial, towards the center of the cosmos or away from it, but circular, about the center of the cosmos or a point on an axis through it: the whole existing mass of the first simple body cannot rotate like a flat disk about a single point since only one shape, the spherical shell, is appropriate for it. This important detail is not even hinted at in *Cael.* A 2–3, where Aristotle focuses only on circularity, alluding in passing even to the connection of the first simple body with heavenly objects. But it is obvious from *Cael.* B 4, 286b10–287a5, the beginning of an argument for the articulation of the cosmos into concentric spherical strata.³

The spherical shell is the only appropriate shape for the whole existing mass of the first simple body because, as this simple body is first in that it is prior to all other bodies, the shape at issue is prior to all three-dimensional shapes, for exactly the same reason that, according to *Cael.* A 2, 269a18–23, the circle is prior to the straight line, hence circular natural motion to rectilinear. Moreover, since it is circular, the natural motion of the first simple body cannot but be eternal. Assumed quite unambiguously in *Cael.* A 2, 269b6–9, and 3, 270b20–24, its eternity is explained in *Cael.* B 1, 284a3–6, on the ground that it is such, i.e. circular, that it lacks an end, unlike rectilinear motion. A quantity of the first simple body moves of its own accord in a circle, just as a stone falls spontaneously. The path of a falling stone is a straight line joining the center of the Earth, near which the stone will

2 The natural motion of the first simple body is shown in *Cael.* B 6 to be uniform, in contrast to the non-uniform zodiacal motions of the planets, the Sun and the Moon (see 288a13–18). For some reason this crucial fact about the first simple body is not even hinted at in *Cael.* A 2–3. It entails that this simple body makes up only the stars and a diurnally rotating shell whose fixed parts they are: not it but fire must make up the seven remaining celestial objects and fill up the lower part of the heavens in which these celestial objects undergo their zodiacal motions. I argue in Kouremenos (2010) ch. 2 that this must be Aristotle's view on the cosmological role of the first element in the *de Caelo*, with the exception of B 7 which agrees with his revised view on this issue in *Mete.* A 2–3; see also commentary on 298a25–26 and Introduction, 6.

3 On whether Aristotle thinks that the theory of homocentric spheres provides an even approximately true description of the structure of the heavens, be they wholly or partially made up of the first simple body (cf. previous n.), see Kouremenos (2010) ch. 3.