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HEAVEN AS THE OUTERMOST PERIPHERY OF THE EARTH IN ARCHAIC IONIAN COSMOLOGIES*

In current interpretations, the Homeric conception of heaven is usually described as featuring a vault stretching over a flat earth surrounded by Okeanos. In this image, the heavenly vault is hemispherical and made of solid metal. This hemisphere of heaven encloses the universe from above and thus defines its upper limit, while the rest of the space of the universe is linked to the underworld. On the heavenly vault, we then usually find stars circulating around a celestial pole.[1]

The conception of heaven and the entire universe within the epic tradition is closely linked to our understanding of the image of the world in archaic Ionian cosmologies, which belong to the oldest Presocratic conceptions known to us. In particular, one could ask whether, in these latter conceptions, the heaven similarly functioned as the upper limit of the universe with a particular composition and shape. Questions after the conception of heaven are directly relevant to the issue of boundaries and structure of the universe as such in archaic Ionian cosmologies.

In the following, we therefore focus on the conception of heaven one finds in the work of thinkers belonging to the Ionian – as opposed to Italian – school of philosophy, to use a distinction posited by Diogenes Laertius (1. 13). We will, for the moment, put aside any events in the universe and the meteorological background of the archaic Ionian conception and focus solely on heaven in the sense of the outermost periphery of the earth. We will try to argue that heaven was indeed thought to be a basic constituent of the universe, one that defined its upper limit. The universe was thus usually thought to be closed, stretching only between a flat earth and heaven. It will also be noted that the traditional image of heaven as a hemisphere need not be authentic.

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[1] Cf. Couprie 2011, 3; 2015, 10; Furley 1987, 27; Hahn 2001, 169–178, 195–196; Heath 1913, 7; McKirahan 1994, 13.

The Conception of Heaven in the Epic Tradition

The term οὐρανός can take many meanings, including 'heaven' or 'sky' but also 'vault or firmament of heaven', eventually a 'seat of the gods'.[2] It can thus refer to a number of spheres whose common denominator is designation of a location above earth's surface. Given this polysemy, the particular meaning of this expression is usually determined by the context of use. In the Classical era, Aristotle distinguished among three meanings of the term οὐρανός (*Cael*. 278 b 8–21). First of all, it can refer to the sphere of fixed stars which defines the outer limit of the universe. Secondly, it can denote the sphere of the moon, the sun, and the planets. And finally, it can mean the entire 'world', i.e., the universe. As noted above, however, in the following we focus on its meaning in the sense of the outer limit or boundary of the universe. Before turning to archaic Ionian thinkers, however, we should first have a brief look at the image of heaven in the epic tradition.

Based on various locations in Homer's work, Kirk, Raven, and Schofield draw a clear and unequivocal conclusion that in this conception, "[t]he sky is a solid hemisphere like a bowl ... It covers the round flat earth".[3] The area which stretches low over earth's surface and includes the clouds is then denoted by the term ἀήρ, which is akin to fog and moisture, while the celestial heights, αἰθήρ, are linked to clarity, transparency, and fire (e.g., *Il*. 15. 686; 17. 649–650; 19. 379; *Od.* 5. 50). The description of heaven as a 'solid hemisphere' is based on Homer's descriptions, especially those passages where he speaks of heaven of 'bronze' (χάλκεον οὐρανόν, *Il*. 17. 425)[4] or 'iron' (σιδήρεον οὐρανόν, *Od.* 15. 329; 17. 565). Later, the lyricist Pindar likewise claims that 'for the gods the bronze sky endures as a secure home forever' (χάλκεος ... οὐρανός, *Nem.* 6. 3–4) and Theognis of Megara, too, also speaks of a heaven of bronze (οὐρανὸς ... χάλκεος, *El.* 1. 869–870). We can thus see that within this tradition, heaven is repeatedly linked to solid metals, mostly bronze but also iron. Interestingly, these metals also play an important role in descriptions of the underworld, where Homer situates the 'iron gates and brazen threshold' (σιδήρειαί τε πύλαι καὶ χάλκεος οὐδός, *Il.* 8. 15),[5] while Hesiod speaks of a bronze wall, bronze door, and a floor of bronze (*Theog.* 726, 732, 811). Kirk, Raven, and Schofield suggest that this link between heaven

[2] LSJ s.v. οὐρανός.

[3] Cf. Kirk–Raven–Schofield 2007, 9.

[4] Similarly πολύχαλκος in *Il*. 5. 504; *Od*. 3. 2.

[5] Translation by Kirk–Raven–Schofield 2007. Unless stated otherwise, translations are adapted from Graham 2010.

and these two important metals accentuates both heaven's solidity and its bright shine, which could in turn indicate that heaven was thought to be both the firm upper limit of the universe and the source of its brightness. A heaven made of copper or bronze (*caelum aeneum*) is moreover attested even in the Biblical tradition (*DT* 28. 23).[6]

It remains to be seen whether such poetic language is to be interpreted literally. We shall see, however, that in later tradition heaven was indeed thought to be a firm substance. For instance, both Lactantius (*De op. Dei* 17. 6) and Arnobius (*Adv. nat.* 3. 17) mention in their lists a heaven of bronze or iron. The situation is different regarding its shape because that is not described explicitly, and the abovementioned 'hemisphere' is thus merely the result of interpretation.

When we look at Hesiod's account of the birth of heaven, we find that Ouranos, the Heaven, is the first offspring of the Earth: "Earth first of all bore starry Sky, equal to herself, to cover her on every side, so that she would be the ever immovable seat for the blessed gods" (*Theog.* 126–128).[7] We can, meanwhile, suppose that the conception of heaven as the god Ouranos implies that heaven was not only thought to be a definite area but also a separate power and physical constituent of the universe. Ouranos was moreover supposed to be "equal" to Earth. It covered it "on every side": what is unclear, though, is whether it means it as if embraced or enveloped the Earth, reaching also under it, or merely covered it from above. In the latter case, Ouranos would only be found above the Earth. This is no trivial issue because it determines the very structure of the space of the universe. According to one reading, the Earth was located in free space made of Ouranos, which was all around it, while according to the other reading, Ouranos only covered it on top. From further description of the separation of the Heaven and the Earth, we can, however, conclude that it is the latter reading that is meant.

Subsequent separation of the Heaven and the Earth is a key event not only in the formation of the universe but also a confirmation of Hesiod's belief that the heaven is a concrete physical structure. To wit, the birth of Ouranos does not establish stratification of the entire world: that takes place only after separation of the Heaven and the Earth. The "covering" of the Earth by Ouranos originally had a sexual context because Ouranos is not only Earth's first offspring but also her husband, whereby the first offspring born of their union is Okeanos (*Theog.* 133). The Heaven

[6] Cf. Kahn 1960, 140–145; Kirk–Raven–Schofield 2007, 9; Mansfeld–Runia 2009, 439–440 n. 258.

[7] Translation by Most 2006.

and the Earth are thus in extremely close contact, severed only by their separation and Heaven's subsequent relocation above the Earth. This separation in effect creates a free space of the Universe, defined by the surface of the earth below and the heaven at its upper limit. Leaving aside the interpretation according to which this split took place with the birth of Chaos in the sense of a 'gap' between the Heaven and the Earth,[8] the separation is explicitly linked to Ouranos' castration after which it can no longer unite with the Earth (*Theog.* 154–206). Atlas was then put in charge of holding the Heaven above the Earth, thus maintaining the main framework of the space of the universe (*Theog.* 517–520, 746–748). But while according to Hesiod, Atlas carries the Heaven on his head and shoulders, Homer speaks of pillars which Atlas was in charge of (*Od.* 1. 52–54). Aristotle mentions this ancient explanation of maintenance of the Heaven in its place and criticises it (*DC* 284 a 19–24).[9]

If the heaven is thought of as a god who is separate from the earth, one can assume it was not conceived of as merely a wide area above earth's surface but, like earth, considered a concrete part of the structure of the world with a particular physical shape. If, moreover, the earth was supposed to have its limits (e.g., Hom. *Il.* 8. 478–479), one could assume that the heaven, too, had its borders. Together with the earth, it thus formed a physical and spatially delimited constituent of the world. When Hesiod thus speaks of the "starry heaven", we could image the heaven as a limited area in which stars are located, since their mutual positions seem to be fixed. And if the earth represented the lower limit of the universe, the heaven may have been the thought of as the upper one. The heaven and the earth would have thus jointly represented two key areas in-between which there stretched the space of the world, which then also included the underworld.[10]

Accounts of the Heaven in the Texts of Archaic Ionian Thinkers

Moving now on to the conception of the heaven attested in the texts of archaic Ionian cosmologies, right at the outset we can note that while Aristotle later divided the entire universe to the sublunary and supralunary sphere – which were fundamentally different both with respect to their

[8] Cf. Cornford 1965, 194–195.
[9] Cf. Kahn 1960, 139 n. 1; Kirk–Raven–Schofield 2007, 45.
[10] Cf. Kahn 1960, 138–139.

'physical' composition and in terms of what took place in them – archaic Ionian cosmologies viewed the entire universe as one continuum. The heaven was the location of not only all meteorological events but also heavenly bodies. Air filled the space above earth's surface but also reached all the way to heavenly bodies, which were usually described as closely related to meteorological phenomena. Their formation was often explained in terms of ignition of evaporations of moisture (e.g., Aet. *Plac.* 2. 20. 3 = DK 21 A 40; Diog. Laert. 9. 9 = DK 22 A 1; Hippol. *Ref.* 1. 7. 4–5 = DK 13 A 7) and moisture played a role also in their movement, because they were supposed to follow it as their source of nourishment, therefore moving only above earth's surface (Arist. *Meteor.* 354 b 33 = DK 22 A 11). When Aristotle ascribes the notion of movement of the sun only above the earth to "many of the ancient cosmologists" (*Meteor.* 354 a 28 = DK 13 A 14), we can suppose that what he has in mind is especially the archaic Ionian cosmological tradition, for which such close link between cosmology and meteorology was characteristic.[11]

As noted above, however, in this study we leave aside of particular meteorological subjects linked to events in the heaven and the heavenly bodies. We focus on the heaven only in the sense of one of the basic components of the universe representing its outer limit.

a) Thales

Various sources contain reports regarding Thales's conception of the earth but for his thoughts on the heaven as such, we have as good as no evidence. Still, in Aetius (*Plac.* 2. 12. 1 Mansfeld–Runia = DK 11 A 13 c) and in Pseudo-Galen's epitome of Ps.-Plutarch's Placita (*Hist. phil.* 55. 1–2 = TP 1 Th 397) as well as in an Arabic translation of Ps.-Plutarch (Qusṭā Ibn Lūqā, *Plac.* 2. 12), we find evidence of the term οὐρανός in Thales's thought (Aet. *Plac.* 2. 12. 1 Mansfeld–Runia = DK 11 A 13 c):

> Thales, Pythagoras and his followers (declare that) the sphere of the entire heaven has been divided into five circles, to which they give the name 'zones'. Of these (the first) is called 'the arctic and always appearing', (the second) 'the summer tropic', (the third) 'the equatorial', (the fourth) 'the winter tropic', and (the last) 'the antarctic and invisible'. In relation to the three middle (circles), the so-called zodiac (circle) has been placed diagonally, touching the three middle (circles). But the meridian cuts all of them at right angles from the arctic (regions) to its opposite.[12]

[11] Cf. Graham 2013, 78–84.

[12] Translation by Mansfeld–Runia 2009.

According to this testimony, heaven was imagined as an entire sphere. One can thus suppose that the term οὐρανός is used here in the sense of limit or border of the entire universe, which has the shape of a sphere. The passage describes five zones and their relation to the tilt of the zodiac and the meridian. The discovery of the tilt of the zodiac is then in subsequent text (*Plac.* 2. 12. 2 Mansfeld–Runia) ascribed to Pythagoras with a critical reference to Oenopides, to whom this discovery was ascribed by Eudemus of Rhodes (in Theon of Smyrna, *Expos.* 198. 14 Hiller = DK 41 A 7). Pythagoras, moreover, is said to have divided the earth in five zones (*Plac.* 3. 14. 1). Mansfeld and Runia point out, though, that the analogy between a division of the heaven in five circles and the earth in five zones became customary within the Platonic–Aristotelian cosmological model, which was based on the notion of spherical earth and spherical heaven/universe.[13]

The testimony quoted above should thus perhaps be viewed as an anachronism. Still, as we shall see below, while for the Pythagoreans we have other, independent sources according to which they believed the heaven, and thereby the entire universe, to be spherical, for Thales this is the one and only source.

In Thales's thought, however, a sphere also appears in connection with his conception of the shape of the earth (Aet. *Plac.* 3. 10. 1 = TP 1 Th 161). Unfortunately, this is supported only in Pseudo-Plutarch's version of Aetius and in later versions of Pseudo-Plutarch – Eusebius (*Praep. evan.* 15. 56. 1 = TP 1 Th 279), Pseudo-Galen (*Hist. phil.* 82. 1–3 = TP 1 Th 402), and in the Arabic translation (Qusṭā Ibn Lūqā, *Plac.* 3. 10. 1 = TP 1 Th 490). Nevertheless, according to this source, the earth should be located at the centre of the universe (*Plac.* 3. 11. 1 = DK 11 A 15). If we accepted these reports, it would mean that Thales proposed a form of the universe which is with certainty attested in the writings of Plato and especially Aristotle. Although O'Grady argued that Thales indeed proposed a spherical conception of earth, it seems that Couprie is right to claim that this ascription is erroneous. Already in antiquity, thinkers argued whether Thales left any treatise at all, whereby even Aristotle apparently supported his claims regarding Thales only on the basis of second-hand testimonies (Diog. Laert. 1. 23 = DK 11 A 1). It seems therefore that reports on Thales's cosmology are anachronistic because they depend on later interpretations.[14]

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[13] Cf. Mansfeld–Runia 2009, 449.

[14] Cf. Couprie 2011, 65–67, 105; O'Grady 2002, 95–100.

Nevertheless, there is some further indirect evidence pointing to a spherical notion of the universe in Thales's thought: the passage in question includes the term ἡμισφαίριον, i.e., hemisphere. John Philoponus uses it in his commentary on Aristotle's *Categories* (*In Arist. cat. comm.* 118. 15–18. = TP 1 Th 434) at a point where he explains the distinction between knowledge and what is knowable using the example of explanation of full lunar eclipse that had been ascribed to Thales. This eclipse is supposed to take place during full moon, when the moon enters earth's shadow while the sun is located 'in the hemisphere under the earth' (ὑπὸ γῆν ἡμισφαιρίῳ), so its light cannot shine on the moon.[15] Michael Psellos later uses some of the same expressions to describe this phenomenon (*Op.* 51. 829–837 = TP 1 Th 515). Still, the former of the scholars lived in the sixth century and the latter in the eleventh.

This allegedly Thales's explanation of lunar eclipse also appears in Stobaeus's version of Aetius (*Plac.* 2. 29. 6 = *Dox*. 360). The whole train of thought is based on realisation that the moon is lit by the sun and although Aetius credits Thales with this discovery (*Plac.* 2. 28. 5 = DK 11 A 17 b), the ascription is tendentious and based probably on similarly problematic reports which ascribe to Thales an explanation of solar eclipse, which likewise assumes that the moon does not produce its own light. The overall nature of archaic Ionian cosmology clearly indicates that this ascription is an anachronism: it would make Thales the sole thinker within archaic Ionian philosophical tradition to realise that the moon merely reflects the light of the sun. We can thus conclude that for Thales, we have reliable evidence neither regarding his conception of the shape of the earth nor regarding his conception of heaven.[16]

b) Anaximander

For Anaximander, the other famous native of Miletus, the textual situation is better. With reference to him, we find the term οὐρανός in several texts that deal with the nature of the beginning (ἀρχή). These texts repeatedly refer about the origins of 'the heavens and the world-orders' (οὐρανοὺς καὶ κόσμους) from the boundless (τὸ ἄπειρον): e.g., Hippol. *Ref.* 1. 6. 1 = DK 12 A 11; Ps.-Plut. *Strom.* 2, In: Euseb. *Praep. evan.* 1. 8. 2 = DK 12 A 10; Simpl. *In Arist. Phys.* 24. 13 = DK 12 A 9. Such passages later gave rise to speculations as to whether Anaximander assumed infinite

[15] Translation by McKirahan 1994.
[16] Cf. Graham 2013, 51–55.

worlds in the sense of innumerable ones.[17] Nevertheless, none of these sources tells us anything about Anaximander's thoughts on heaven: they all merely generally speak of its origins.[18]

Still, the term οὐρανός later also appears in Aetius, in a chapter on the nature of heaven (*Plac.* 2. 11. 3 Mansfeld–Runia = DK 12 A 17 a):

> On the heaven (περὶ οὐρανοῦ), what is its substance. Anaximander (declares that the heaven consists) of a hot and a cold mixture.[19]

This wording is preserved in Stobaeus (*Ecl.* 1. 23. 1 = TP 2 Ar 147). Pseudo-Plutarch's version includes a reference to a "hot and cold mixture" but no reference to Anaximander. Achilles Tatius later erroneously links this pair of opposites with Aristotle (*Isag.* 35, 1–2 Maass).[20]

As Mansfeld and Runia point out, the subject of the chapter is not quite clear and therefore neither is the actual meaning of the term οὐρανός. Still, one can assume that it does not denote the world as such because that was treated in preceding chapters and the term used to refer to it was κόσμος. What remains unclear is whether we should understand the term οὐρανός in the sense of the outer limit of the universe or as referring to the entire area of heaven. Later, when dealing with Anaximenes's thoughts on the subject, we shall see that since already in the introduction to this chapter there appears a formulation about the 'outer periphery', one can deduce that what is meant is heaven in the sense of the limit or border of the universe. This finds support in the following report on Empedocles, where a distinction is made between the heaven's outer limit and its contents (Aet. *Plac.* 2. 11. 2 Mansfeld–Runia = DK 31 A 51):[21]

> Empedocles (declares that) the heaven (τὸν οὐρανὸν) is solid, consisting of air that has been compacted together by fire in crystalline fashion, (and) containing the fiery (element) and the airy (element) in each of the hemispheres.[22]

Even so, it seems possible that the report on Anaximander – which immediately follows after this statement on Empedocles's thoughts – relates to heaven as such, because the two opposites, hot and cold, are

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[17] Cf. Kočandrle 2019a.

[18] On the subject of development of the meaning of terms κόσμος and οὐρανός see Finkelberg 1998.

[19] Translation by Mansfeld–Runia 2009.

[20] Cf. Mansfeld–Runia 2009, 437.

[21] Cf. Mansfeld–Runia 2009, 440–441.

[22] Translation by Mansfeld–Runia 2009.

listed as key components of the structure of the universe already during the first stage of its formation. This passage could thus speak about remnants from this earliest stage or describe the environment of the universe, which was after its formation filled with air that reached all the way to the fire of heavenly bodies to whose formation it had contributed. The subject of this passage thus need not have been the "composition" of the limits of heaven which enclosed the universe. And since other references to Anaximander's cosmology do not use the term οὐρανός, we should focus on his concept of the universe in general and try to see whether that could aid our search for his conception of the heaven.

Anaximander's cosmology differs significantly from the views of his contemporaries. He claims that in the course of cosmogony, 'that which is generative' (τὸ γόνιμον) separated the heat and the cold. It then produced around the air, which surrounds the earth, a fiery sphere that subsequently broke apart (Ps.-Plut. *Strom.* 2 = DK 12 A 10). Its remnants formed heavenly bodies in the shape of fiery circles surrounded by air/fog. Heavenly bodies we see in the heaven are just vents on the surface of these foggy circles which radiate the innjzer fire (e.g., Hippol. *Ref.* 1. 6. 4 = DK 12 A 11). Based on several passages to the effect that the earth is located "in the middle" or equally distant from everything, we can then suppose that according to Anaximander, the universe consists of circles of heavenly bodies at whose centre is the earth. The earth itself is then usually described as flat and shaped like a low cylinder (e.g., Arist. *DC* 295 b 10 = DK 12 A 26; Diog. Laert. 2. 1 = DK 12 A 1; Hippol. *Ref.* 1. 6. 3 = DK 12 A 11).

What is important, meanwhile, is the tilt of these circles, which is attested for the moon and the sun (Aet. *Plac.* 2. 25. 1 Mansfeld–Runia = DK 12 A 22). It seems to indicate that heavenly bodies passed also under the earth. Of key significance is also the sequence of heavenly bodies: Anaximander believed that closest to the earth were the stars, followed by the circle of the moon, while the circle of the sun was the furthest (Aet. *Plac.* 2. 15. 6 Mansfeld–Runia = DK 12 A 18; Hippol. *Ref.* 1. 6. 5 = DK 12 A 11). Still, if the stars were assumed to be the closest to the earth, it is clear that Anaximander cannot have thought the universe has a firm, solid edge on which they would have rested. However, when Leucippus later positioned the sun in a similar place, he assumed a membrane enclosing the entire universe (Aet. *Plac.* 2. 7. 2 = DK 67 A 22; Diog. Laert. 9. 32–33 = DK 67 A 1).

In surviving testimonies pertinent to Anaximander's cosmology, we have no explicit evidence to the effect that he assumed a universe that has a border. The only somewhat relevant evidence comes from Aetius's report quoted above based on which we could consider the possibility that

since heavenly bodies were thought to be circles of fire surrounded by air/fog, an eventual border of the universe could have a similar composition. Still, as noted above, given the brevity and poor preservation of the entire passage, we can just as well assume that this detail is based on a description of the basic elements of the universe in general. Heaven would have thus been conceived of as a free space with heavenly bodies without any border enclosing it all. It seems therefore that Anaximander did not posit any borders or limits of the universe. In fact, various scholars in this context note that his position was unique and differed from the original archaic conception of a single "starry heaven".[23]

Nonetheless, we shall see below that it would be erroneous to assume that Anaximander's universe was 'limitless' or 'open', because such conclusion could well be due simply to lack of textual evidence. Some experts, such as Panchenko or Gregory, for instance believe that Anaximander's universe was spherical.[24] These claims, however, have no support in textual evidence and although we do find the notion of a sphere already in his description of cosmogony, it was supposed to later break up (Ps.-Plut. *Strom.* 2 = DK 12 A 10). Along similar lines, an interpretation of the boundless as an endless space stretching around our structured world is also just a speculation.[25] Similarly unattested are suggestions that the universe was ovoid, spheroid, or barrel-shaped: these proposals merely draw on shapes of various phenomena described by Anaximander without any further evidence justifying this extrapolation.[26] West's attempt to determine, based on so-called Anaximander's numbers, the radius of the universe is similarly doomed to failure.[27]

For the moment being, we can thus conclude that although we have no textual evidence in support of assumption that Anaximander believed the universe to have a border, we also have no evidence refuting it.

c) Anaximenes

Regarding Anaximenes, while the texts are not quite explicit, we have several clues to his conception of the heaven. The first hint to Anaximenes' belief in heaven being a firm limit of the universe is found in the abovementioned Aetius's chapter on the substance of heaven, which opens

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[23] Cf. Cornford 1934, 10; Couprie 2011, 99.

[24] Cf. Gregory 2016, 91–92, 151, 225; Panchenko 1994/1995, 51; Rescher 1958, 724.

[25] Cf. Kahn 1960, 233; Graham 2006, 31.

[26] Cf. Furley 1987, 27–28.

[27] Cf. West 1971, 92.

with a characterisation of his position. As in the case of Anaximander, the Diels and Kranz edition quotes from a version contained in Stobaeus, *Ecl.* 1. 23. 1 = TP 2 As 123 (Aet. *Plac.* 2. 11. 1 = DK 13 A 13):

> Anaximenes and Parmenides say that the outer periphery of the earth is the heaven (τὴν περιφορὰν τὴν ἐξωτάτω τῆς γῆς εἶναι τὸν οὐρανόν).[28]

We noted above that reference to the 'outer periphery' helps us understand the subject of the chapter in relation to heaven as the outer edge of the universe. Both Diels in his *Doxography Graeci* and the *Traditio Praesocratica* amend Pseudo-Plutarch's version in this sense as well. Mansfeld and Runia's edition in principle follows Stobaeus's reading when reconstructing this chapter in Aetius, but in the case of Anaximenes, the authors adopt the Pseudo-Plutarch's original, unamended version (Aet. *Plac.* 2. 11. 1 Mansfeld–Runia):

> On the heaven, what is its substance. Anaximenes (declares that) the outermost periphery is earthy (γηίνην).[29]

Moreover, Pseudo-Galen's version accents directly the earth as the outermost periphery (*Hist. phil.* 54. 1 = TP 2 As 179). According to reconstruction adopted in Mansfeld and Runia's edition, the chapter deals with views on the composition of heaven while progressing from the view that it is solid – this view being expressed by Anaximenes and his claim that it is earthy – all the way to Aristotle's fifth element. Mansfeld and Runia in this context note that in late antiquity, especially these two extremes were the subject of various debates. Anaximander's abovementioned mixture of the hot and the cold can be explained as a compromise view. In contrast to Pseudo-Plutarch's reading, in Stobaeus we thus find a significant change of Anaximenes's opinion regarding the location of heaven.[30]

If heaven was thought to form the 'outer periphery', we could understand these testimonies to mean that, from the perspective of the earth, it represents not only the area of the sky but also the uppermost limit of the world, i.e., the universe. Pseudo-Plutarch then adds that its nature is earthy, but it is yet to be seen to what extent this claim should be taken literally. To wit, in texts reporting on Anaximenes's views, we find references to

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[28] Translation by Couprie 2008, 122.
[29] Translation by Mansfeld–Runia 2009.
[30] Cf. Mansfeld–Runia 2009, 434–446.

earth as a substance also in the case of so-called ‘earthy bodies’ or ‘earthy natures’ (Aet. *Plac.* 2. 13. 9 Mansfeld–Runia = DK 13 A 14; Hippol. *Ref.* 1. 7. 4–5 = DK 13 A 7), but, as we argued elsewhere, these are most likely anachronisms based on analogies with Anaxagoras’s views.[31] We could, however, consider the option that felt may have played a similar role, i.e. serve as the foundation of a firm structure, because the motif of felting appears in the thoughts of Anaximenes in various contexts related to the constitution of a number of phenomena, including the formation of clouds or even the earth (Hippol. *Ref.* 1. 7. 3–6 = DK 13 A 7; Ps.-Plut. *Strom.* 3 = DK 13 A 6).

The supposition that Anaximenes believed in the existence of heaven in the sense of the upper limit of the universe may find support in fragments of his text which pertain to the stars. In particular, if stars maintain their mutual position without any change, the assumption of their placement on a shared plane would be quite natural. For Anaximenes, we have no concrete reports regarding the ordering of heavenly bodies, but one can suppose he believed that stars are the furthest from the earth. One can infer as much from Hippolytus’s claim that stars ‘do not heat us because of their great distance’ (*Ref.* 1. 7. 6 = DK 13 A 7).[32]

Shared location of stars in heaven is then a supposition that finds direct support in Aetius’s text (*Plac.* 2. 14. 3–4 Mansfeld–Runia = DK 13 A 14):

> On the shapes of the stars. Anaximenes (declares that they) have been affixed in the manner of studs to the crystalline (heaven) (κρυσταλλοειδεῖ). But some (ἔνιοι) (philosophers declare that they) are fiery leaves, like pictures.[33]

It must, however, be taken into consideration that this full version of the passage is found only in Pseudo-Plutarch.[34] Stobaeus’s version of Aetius (*Ecl.* 1. 24. 1k = TP 2 As 124) omits the second sentence, which is however attested in Eusebius (*Praep. evang.* 15. 31. 2) and in Pseudo-Galen (*Hist. phil.* 56 a 2–3).[35] It deserves noting that both Eusebius and Pseudo-Galen depend on Pseudo-Plutarch and thus cannot serve as evidence for

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[31] Cf. Kočandrle 2019b, 113.

[32] Cf. Dührsen 2013, 332; Heath 1913, 43. O’Brien (1968, 116–117) on the other hand suggests that Anaximenes, may have – like Anaximander – placed stars closer to the earth than either the moon or the sun is.

[33] Translation by Mansfeld–Runia 2009.

[34] Cf. *Dox*. 1879, 344. Edition TP (TP 2 As 37) omits the second sentence.

[35] Edition TP in the case of Eusebius and Pseudo-Galen also omits the second sentence (TP 2 As 89; TP 2 As 180).

what stood in Aetius. In fact, the whole text is highly problematic. It is, for instance, unclear who the 'some' philosophers ought to be. The pronoun might refer to authors who did not ascribe to Anaximenes a belief in fixed stars but in stars in the shape of fiery leaves, but it could just as well denote the entire group of thinkers who, unlike Anaximenes, did believe that stars are fiery leaves. Some scholars also argued that the phrase "like pictures" in fact belongs to the previous sentence and expresses constellations while the sentence "some (philosophers declare that they) are fiery leaves" might be merely an insertion pertaining to freely moving heavenly bodies.[36]

Moreover, one can doubt the authenticity of the passage as a whole. For instance, while for Anaximenes, the motif of "crystalline" heaven has no other parallel, we do find it in the writings of Empedocles, who makes a distinction between planets and stars placed on a "crystalline" heaven (Aet. *Plac.* 2. 13. 11 = DK 31 A 54). Moreover, the term κρυσταλλοειδής is for Empedocles attested repeatedly, including the mention in Aetius's chapter on the substance of heaven quoted above (Aet. *Plac.* 2. 11. 2 = DK 31 A 51; 2. 20. 13 = DK 31 A 56; Achill. Tat. *Isag*. 5 = DK 31 A 51; Diog. Laert. 8. 77 = DK 31 A 1; *Schol. in Bas. Magn.* 22 = DK 31 A 51).[37] One might therefore surmise that Anaximenes is mentioned here erroneously instead of Empedocles.[38]

When reading Aetius's chapter pertaining to the shape of stars as a whole, we can note that it presents various concepts one by one. Belief in spherical stars is ascribed to the Stoics, while Cleanthes was supposed to hold that they have a conical shape. The idea of stars shaped like three-dimensional studs was then according to Mansfeld and Runia, ascribed to Anaximenes. "Some thinkers", who are in this version not listed by name, then allegedly thought that stars were akin to two-dimensional fiery leaves.[39]

If, however, as proposed above, we suppose that Anaximenes was in this text named instead of Empedocles, we could place him in this last group of "some" thinkers.[40] This hypothesis finds indirect support in the fact that according to Aetius, he was supposed to liken even the sun to a leaf (*Plac.* 2. 22. 1 Mansfeld–Runia = DK 13 A 15 = DK 13 B 2 a). This emphasis on flatness of heavenly bodies is, moreover, attested also

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[36] Cf. Bicknell 1969, 53–56; Graham 2013, 64 n. 78; id. 2010, 82–83; Heath 1913, 42; Hölscher 1953, 413–414; Schwabl 1966, 33–38; West 1971, 102; Wöhrle 1993, 27, 72.

[37] Lactantius (*De op. Dei* 17. 6 = DK 31 A 51) then analogically describes heaven as "frozen air".

[38] Cf. Kirk–Raven–Schofield 2007, 155; Longrigg 1965, 249–251.

[39] Cf. Mansfeld–Runia 2009, 474–475.

[40] Cf. Kočandrle 2019b, 114.

by Hippolytus, who explicitly claims that Anaximenes believed heavenly bodies to be 'flat' (*Ref.* 1. 7. 4 = DK 13 A 7). In fact, this stress on flatness and lightness of heavenly bodies is a characteristic feature of Anaximenes's cosmology in general.

If we accept this reading, we lose one of the main pieces of textual support for the conjecture of a firm boundary of the heaven in Anaximenes's thought. Nevertheless, it is also possible that the Milesian may have been listed here erroneously based on his use of another authentic term which evoked the notion of "crystalline" heaven and moreover, the conception of stars as fiery leaves and heaven in the sense of a firm border are mutually compatible.

Another indication which supports the claim that Anaximenes proposed a conception of firm, solid heaven is found in the following passage from Hippolytus, which deals with the movement of heavenly bodies in Anaximenes's thought (*Ref.* 1. 7. 6 = DK 13 A 7):

> He denies that the heavenly bodies move under the earth, as others suppose, but he says they turn around the earth like a felt cap (τὸ πιλίον) around our head.

It is this motif of "felt hat" that evokes the impression of heaven as a concrete structure. In this text, a hat is introduced to demonstrate how we should imagine the movement of stars and although it is a vivid image, it is not clear what kind of head covering we should imagine. Over time, various alternatives have been proposed. It could be, for instance, a hemispherical cap made of felt but also a hat with a broad rim and some scholars even proposed rather exotic alternatives, such as head coverings from wrapped cloth or a turban.[41] We could even consider a conical hat such as is depicted in the red-figure painting kept in the Louvre.[42]

Couprie believes that this motif originally came from Hippolytus, not Anaximenes,[43] but one could object that the material from which the head covering is supposed to be made is rather indicative. To wit, felt appears in Anaximenean fragments in a number of locations and one could thus view it as an indication of authenticity of the whole image (Hippol. *Ref.* 1. 7. 3–6 = DK 13 A 7; Ps.-Plut. *Strom.* 3 = DK 13 A 6).

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[41] Cf. Bicknell 1966, 17–18; Lloyd 1966, 318–319.

[42] Man wearing the *pilos* (conical hat). MNE 1330, Louvre. Available at https://commons.wikimedia.org/wiki/file:man_pilos_louvre_mne1330.jpg (accessed on 5 May 2020).

[43] Cf. Couprie 2018, 124.

However, it quickly becomes clear that unless we know what kind of head covering we should imagine and how it was supposed to be placed on the figurative head, the whole example adds little to our understanding of Anaximenean thoughts. Various scholars proposed different interpretations, including a reading according to which the whole "hat" is tilted. The most natural reading seems to be one where a hemispherical cap is placed on the head straight, following its contours, along the lines proposed by Graham. The hat would then represent the hemisphere of the heaven on which would be affixed the stars. Still, Couprie had shown that this image, too, has a number of problematic consequences.[44]

Nevertheless, we can see that although we have no texts that would clearly and explicitly ascribe to Anaximenes a belief in heavenly vault, we can still conclude that in his view, the heaven was an area whose outer limit formed the upper border of the entire universe.

d) Xenophanes

In surviving fragments of Xenophanes we find only two references to heaven which feature the term οὐρανός. The first is found in Aristotle (*Met.* 986 b 18 = DK 21 A 30):

> Parmenides seems to deal with the one in definition, Melissus the one in matter; that is why the former says it is limited, the latter unlimited. But Xenophanes, who was the first to posit a unity (for Parmenides is supposed to have been his student) did not make anything clear, nor did he seem to touch on the nature of either of these things, but with a view to the whole heaven he says the one is god (ἀλλ᾽ εἰς τὸν ὅλον οὐρανὸν ἀποβλέψας τὸ ἓν εἶναί φησι τὸν θεόν).

Aristotle's remark to the effect that Xenophanes "did not make anything clear" is rather eloquent. If already Aristotle thought that Xenophanes failed to explain his position, how could we hope to reconstruct them adequately so many centuries later? Aristotle's remark about "the whole heaven" and its direct link to a god is extraordinarily interesting but we find no parallel in the work of Xenophanes.

Nevertheless, Aristotle seems to use here the term οὐρανός in one of the abovementioned senses: to mean 'the world'. This reading finds further support in the context of the whole phrase, τὸν ὅλον οὐρανὸν, it is also the most likely reading of the phrase in the commentary of Alexander of Aphrodisias (*In Arist. Met.* 43. 10–44. 12 = TP 3 Xen 130),

[44] Cf. Couprie 2018, 102–103; Graham 2013, 65; McKirahan 1994, 57.

and Asclepius of Tralles (*In Arist. Met.* 6. 2; 41. 17–42. 4 = TP 3 Xen 253) clearly interprets it in this sense as well.[45]

Still, while we have extremely little other evidence regarding Xenophanes's views on the world or the heaven, several sources inform us about his conception of the god mentioned in the quotation above: e.g., Clem. of Alex. *Strom.* 5. 109 = DK 21 B 23; Hippol. *Ref.* 1. 14. 2 = DK 21 A 33; Sext. Emp. *Adv. math.* 9. 144 = DK 21 B 24; Simpl. *In Arist. Phys.* 22. 22 = DK 21 A 31 (DK 21 B 25, DK 21 B 26). Although the conception as a whole is not clear, it is evident that this god was supposed to differ substantively from common human preconceptions and Aristotle moreover seems to indicate that Xenophanes posited a direct analogy between the conception of god and the world.

World represents a unity, while the One is said to be a god. At the same time, god was supposed to be an expression of the all-embracing One which was described as bounded and spherical (e.g., Simpl. *In Arist. Phys.* 22. 22 = DK 21 A 31; Theod. *Graec. affect. cur.* 4. 5 = DK 21 A 36). The round shape was also one of god's epithets (e.g., Cic. *Ac. pr.* 2. 118 = DK 21 A 34; Hippol. *Ref.* 1. 14. 2 = DK 21 A 33). If god is thus an expression of unity that is at the same time identical to all there is, we could interpret such claims as meaning that what Xenophanes means by god is the world and its shape is spherical.

Still, it is highly problematic to try and argue for any concrete conclusions regarding the shape of the world which Xenophanes posited, among other things because testimonies regarding his thoughts are contaminated by later, Eleatic arguments. One can thus assume that the abovementioned spherical shape is actually influenced by or reflects a description of Parmenides's One. After all, even Asclepius claims that Aristotle ascribes the link between the world and god to Xenophanes by mistake.[46]

The term οὐρανός, this time fully in the sense of 'heaven', then also appears in Hippolytus, who, however, uses it just casually when describing the earth (*Ref.* 1. 14. 3 = DK 21 A 33):

> The sun comes to be every day from tiny flares gathered together, the earth is boundless and surrounded neither by air nor by heaven, and there are numberless suns and moons and everything is from earth.

Pseudo-Plutarch does not mention heaven but similarly claims that Xenophanes believed that "the earth is boundless and not surrounded everywhere by air" (*Strom.* 4 = DK 21 A 32). Mourelatos interprets

[45] Cf. Kirk–Raven–Schofield 2007, 172.
[46] Cf. Graham 2010, 131.

the various statements on the boundlessness of the earth as emphasis on its extent regarding depth and breadth, while Couprie believes that, according to Xenophanes, the earth was not literally boundless but merely "unfathomable" as to its size.[47] As noted elsewhere, we could interpret the existing sources in the sense that Xenophanes did not view the earth as a body within the space of the universe but rather as the lower limit of the world, from which the heaven stretched upwards.[48]

Still, we might also consider the option that Xenophanes believed the universe to be both final and spherical. Its lower hemisphere would be filled with earth, while the upper one would consist of heaven, as proposed by Couprie. Such hemispherical heaven would thus be only part of the entire sphere of the universe, a sphere which represents unity. It is, however, likely that this image is indeed influenced by later, Eleatic interpretations, and one can moreover suppose that within this context, the only texts which are authentic are those which speak of Xenophanes's belief in the boundlessness of the earth (Achill. Tat. *Isag.* 4, P. 34,11 Maass = DK 21 B 28). In any case, we can see that Xenophanes is the first of the ancient thinkers mentioned here in whose thought we can find a reference to a concrete shape.[49]

e) Heraclitus

When investigating the thoughts of Heraclites of Ephesus, we quickly note that his texts contain almost no concrete references to heaven and similarly, he also said nothing about the earth (Diog. Laert. 9. 11 = DK 22 A 1). Heraclitus is, however, mentioned in Aetius's chapter on the substance of heaven which we dealt with above. In particular, it is claimed there that (*Plac.* 2. 11. 4 Mansfeld–Runia = DK 22 A 10):

> Parmenides, Heraclitus, Strato and Zeno (declare that the heaven is) fiery.[50]

This is Stobaeus's version of Aetius because Pseudo-Plutarch omits this passage. Still, although the fiery nature should probably be ascribed to heaven as the upper limit of the universe, it is also possible – similarly to Anaximander's case – that this is merely a description of the area of heaven. In that case, it would be its upper part, because Heraclitus made a distinction between zones of heaven along similar lines as we find in the

[47] Cf. Couprie 2018, 159–160; Mourelatos 2008, 138.
[48] Cf. Kočandrle 2018, 479–480; 2019b, 110–111.
[49] Cf. Couprie 2018, 160–161, image 8.6.
[50] Translation by Mansfeld–Runia 2009.

works of epic poets. In particular, the difference between the brightness of the sun and the moon is explained by supposition that the sun moves in cleaner air, while the moon moves in a muddier or murkier one (Aet. *Plac.* 2. 28. 7. Mansfeld–Runia = DK 22 A 12; Diog. Laert. 9. 9–10 = DK 22 A 1; Hippol. *Ref.* 1. 4. 3 = DK 22 A 12). If, however, Diogenes explicitly claims (9. 9 = DK 22 A 1) that Heraclitus presented no account of 'the nature of the surrounding', we have a good reason to assume that he did not speak of the heaven in any more detail.

The Conception of the Universe and Heaven

Heaven is an exclusive, usually unreachable area, so high it eventually disappears from our view. As such, it was for many generations inaccessible to human experience. This is also what various authors, including Philo of Alexandria (*De somn.* 1. 21), Lactantius (*De op. Dei* 17. 6), or Gregory of Nissa (*C. Eunom.* 1. 435), note about it, adding that its nature is in principle unknowable.[51]

It is therefore not surprising that the texts introduced above give us few clues to the conception of heaven in archaic Ionian cosmologies. After all, we have meagre evidence regarding the conception of earth during this era as well. Yet although one could claim that even the very notion of heaven as a concrete part of the universe is uncertain, heaven was already in the epic tradition expressed by a concrete figure: the god Ouranos. And although as an area above earth's surface, it may have in the sense of the sky represented merely a wide open space, we saw that, to the contrary, it represented the 'outermost periphery'. This has momentous implications: if heaven had no border and did not form the outer limit of the universe, it would have been an infinite universe. This could be contrasted with what Furley calls a 'closed world', and in fact, archaic Ionian cosmologies did assume such 'closed world'. After all, as Furley notes, even during the classical era, the typical view was that of a finite, closed type of world, and not of a boundless universe.[52]

Being the outer limit, heaven had to be composed of something. While in Anaximander's thought it is characterised as a mixture of the hot and the cold, in Anaximenean fragments we encounter references to its "earthy" nature and "crystalline" heaven, which we, however, analysed as mistaken and belonging most likely to Empedocles. According to Heraclitus, on the

[51] Cf. Mansfeld–Runia 2009, 438–442.
[52] Cf. Furley 1987, 2, 136; 1989, 2.

other hand, heaven was supposed to be "fiery". Unless these are merely descriptions of the contents of the entire area of heaven, what we see here is a new emphasis on the physical, concrete nature of heaven as the border of the world, which was in the epic tradition said to be composed of bronze or iron.

One could expect that heaven, being a physical, spatial constituent of the universe that defines its outer limit, also has a particular shape. We noted above that current interpretations of heaven during the Archaic Era usually conclude that in the epic tradition, the heavenly vault was supposed to be hemispherical. This shape is also often encountered in reconstructions of Anaximenes's universe.

On the other hand, already Kahn noted that the relatively widespread notion of heaven as a hemisphere rests on extremely meagre textual evidence. Neither of the terms καμάρα and ἀψίς, which could describe such a vault, are attested in Homer's writings in this sense.[53] We also learn little about the shape of heaven from a comparison with the 'ground plan' of the earth, because its often assumed circular shape (corresponding to the lower edge of the hemisphere of heaven) is, within archaic Ionian cosmologies, attested only in the thoughts of Anaximander (Hippol. *Ref.* 1. 6. 3 = DK 12 A 11; Ps.-Plut. *Strom.* 2 = DK 12 A 10).[54]

Kahn in this context correctly points out that in Greece, roofs tend to be flat or pitched. If heaven were thought of as a "roof of the world", it would have been most likely visualised as flat, but although this conjecture might seem supported by the fact that heaven was often considered the seat of the gods (Hes. *Theog.* 373), which could evoke a firm, flat shape, the gods were believed to live on the top of Mount Olympus. However, even passages where gods in their chariots ride between lands and the starry heaven could evoke an image of heaven as a plane parallel to the earth (Hom. *Il.* 5. 770; 8. 46). The idea of a vertical stratification of the world finds further support in Hesiod's passage which mentions the fall of a bronze anvil from the heaven to the earth, where it seems clear that the various areas of the world were arranged in a symmetric way (*Theog.* 720–725). Fehling, too, was quite convinced that during the Archaic Era, heaven was believed to be flat, though unfortunately he did not support his claim with the necessary arguments.[55]

Given the extreme paucity of evidence for Greek conceptions of heaven during the Archaic Era, it might help to take a brief look at other traditions

[53] Cf. LSJ s.v. ἀψίς; κᾰμάρα.
[54] Cf. Kahn 1960, 138 n. 2, 3.
[55] Cf. Fehling 1985, 206–208, 215; Kahn 1960, 138–139 n. 2, 3.

where heaven was visualised. For instance, the Egyptian hieroglyphs for 'heaven' are similarly ambivalent because we find both a curved sign (perhaps for a hemisphere) and a flat one,[56] which could indicate that even in Egypt, the conception of heaven was not quite clear. We also have various depictions of Nut, the goddess of the heaven, who is usually depicted as arching over the earth, supporting herself on hands and feet. In other depictions, however, she is held up by her father Shu, the god of air and wind who thus played the same role as Atlas. In both cases, though, the shape of the heaven is determined by the arching body of Nut. Although we must take into account that Egyptian paintings do not use three-dimensionality, it can be argued that the body of Nut does not represent a three-dimensional hemisphere. If we were to take it literally, we could suppose that her body as such represents a flat plane, eventually a rectangular plane slightly curved to form in profile a sort of compressed arch. The dimensions of this plane are so enormous that it covers the entire surface of the earth. We could speculate whether in the imagination of Greek poets the heaven could not likewise have a shape analogical with the shape of the body of Ouranos. In that case, it would not be a hemisphere but a flat plane or a plane slightly curved to form of a compressed arch reflecting the god's body.[57]

There is another source which seems to run counter the idea of heaven as a hemisphere: a depiction of the world attested in the work of Cosmas Indicopleustes from the sixth century CE. This much later source shows the earth as flat and rectangular. The area above earth surface, and thereby also the universe, is enclosed from the top by heaven in the shape of barrel vault, arched so deep it encompasses almost one half of a cylinder (*Top. chrét.* 2. 34; 4. 12).

One could also take into consideration the geographically distant Chinese conception of *gai tian*, the 'celestial cover', described mainly in treatise *Zhou bi suan jing* from the time of the Chan dynasty (206 BCE – 220 CE). In this conception, the earth and heaven are visualised as two parallel and separate planes which do not touch each other. The flat earth is square and immobile. Heaven is similarly flat but circular and turning at a constant speed. Heavenly bodies are then carried by the movement of heaven and their movement naturally never takes them under the earth. And while Panchenko speculated that this Chinese conception may have had Greek roots, what is important here is that it constitutes possible support for a hypothesis that heaven was, in archaic times, viewed as flat.[58]

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[56] Cf. Couprie 2011, 5, im. 1. 3.

[57] Cf. Couprie 2011, 8–9, im. 1. 7, 1. 9; Kahn 1960, 139.

[58] Cf. Cullen 1996, 1, 50, 60–61 n. 63, 174; Forke 1907, 261–262, 265–266; Panchenko 2015, 412–426; id. 2002, 251.

In the case of the Greek conception, the idea of heaven as a flat plane could find indirect support in the apparent two-dimensionality we find in descriptions of heavenly bodies, especially in the work of Anaximenes, who states that they are – like the earth – flat (Hippol. *Ref.* 1. 7. 4–5 = DK 13 A 7). The sun is then likened to a leaf, while stars are described as small leaves (Aet. *Plac.* 2. 14. 3–4 Mansfeld–Runia = DK 13 A 14; 2. 22. 1 Mansfeld–Runia = DK 13 A 15 = DK 13 B 2 a). Once we take into consideration also the meteorological nature of heavenly bodies, which were supposed to move only above the earth, it seems possible (and we argued for this elsewhere) that during the Archaic Era, the earth was not yet viewed as a body in the space of the universe but rather as the lower dimension and ultimately the lower boundary of the entire universe. In that case, if heaven represented the other key part of the universe, it would have been the opposite one, which could not have been too distant from the earth because the meteorological nature of this kind of cosmology seems to point to rather small dimensions of the universe. The entire space of the universe would have thus stretched between a flat earth and a heaven that was either flat or shaped like a compressed arch. If the earth was viewed as flat or concave, heaven may have had an analogical shape. The subject of limits of these finite areas of the universe need not have been considered in any detail at all.[59]

The shape of the heaven is closely connected with the shape of the universe as such but, unfortunately, we have no explicit sources for this subject in archaic Ionian cosmologies either. Aetius dedicated a brief chapter to the shape of the world (κόσμος) and in addition to the spherical conception (which he ascribes to the Stoics) he also, albeit anonymously, mentions a conical and ovoid shape (*Plac.* 2. 2. 1–3 Mansfeld–Runia). The idea of a conical shape – somewhat reminiscent of a hemisphere – appeared in the case of a conical hat from the red-figure painting we encountered above. A cone would moreover correspond with the organisation of universe during the Archaic Era outlined above, where the earth would function as a base capped by the cone of the heaven. But this red-figure painting comes from the fourth century BCE.

Even so, we could consider the possibility that in archaic Ionian cosmologies, the heaven, and with it the entire universe, was believed to be spherical, as was the case during the classical era. Couprie, for instance, assumes a spherical universe surrounding a flat earth already for Anaximenes and Bicknell earlier proposed a similar notion. Both use in their arguments contemporary notions regarding the movement of

[59] Cf. Kočandrle 2017, 275–278; 2018, 479–480; 2019b, 110–111.

heavenly bodies, which from the position of observers on earth seem to set under the horizon. Stars would thus be placed on a heavenly sphere which surrounds the earth, whereby the pole and celestial axis, around which heavenly bodies turn, would be tilted with respect to the surface of this flat earth. For Homer, however, Couprie accepts that he thought the heaven to be hemispherical although the movement of stars represents an analogical problem.[60]

Graham, on the other hand, viewed the movement of heavenly bodies only above the earth as one of the typical motifs of cosmologies of the sixth century BCE.[61] In fact, some surviving texts explicitly reject the idea of movement of heavenly bodies under the earth (e.g., Aet. *Plac.* 2. 16. 5 Mansfeld–Runia = DK 13 A 14; Hippol. *Ref.* 1. 7. 6 = DK 13 A 7) and even the tilt of the pole is mentioned only after the time of Parmenides. One can, moreover, suppose that archaic Ionian cosmologies built on the vision of the world of the epic tradition, whose culmination they in fact represent. In general, one can suppose that these cosmologies evolved within a linear conception of the universe, which Furley contrasts with a centrifocal universe characterised by a centre to which all movements are related.[62]

Even so, there is one Ionian thinker of the Archaic Era in whose case we could argue that he championed a spherical conception of the universe. It is Anaximander, who is in many ways an exception within the Ionian tradition. In his thought, we probably indeed encounter the notion of movement of heavenly bodies under the earth. Moreover, in his philosophy, heavenly bodies are objects with a concrete structure and not just ignited clouds, such as Xenophanes had proposed. His reference to the opposite side of the earth seems to aim in the same direction and thus contribute to the image of earth as a cosmic body located in the free space of the universe (Hippol. *Ref.* 1. 6. 3 = DK 12 A 11). And although we have no reports regarding some boundaries of this universe, we saw that some scholars, when analysing Anaximander's thoughts, work with the notion of a sphere which encloses it. Stars, however, being located closest to the earth, cannot have been placed on this sphere. Still, although a sphere would probably be the best shape to contain the entire structure of Anaximander's universe, there is no textual support showing that Anaximander actually entertained this thought. Even so, we should view his universe as closed: it is an assumption he most likely shared with

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60 Cf. Bicknell 1969, 77; Couprie 2011, 10–11; 2018, 126 im. 7. 14, 320.

61 Cf. Graham 2013, 79–80.

62 Cf. Furley 1987, 24–25, 53–54; Panchenko 2015, 415–416.

other thinkers of his era. It is well possible that available textual evidence describes only the functional organisation of the 'core' of his universe.

In this context, we should perhaps pay attention to his concept of 'surrounding' (περιέχειν), which features within Anaximander's work in his descriptions of constitution of heavenly bodies, meteorological phenomena, and even living beings (Aet. *Plac.* 3. 3. 1 = DK 12 A 23; 5. 19. 4 = DK 12 A 30; Hippol. *Ref.* 1. 6. 4 = DK 12 A 11; Ps.-Plut. *Strom.* 2 = DK 12 A 10). It is clearly connected to the constitution of objects which are formed in this way. Even so, the boundary of the universe seems to be a lost piece of this entire puzzle.

As we noted elsewhere, one can suppose that the spherical conception of heaven is linked to the development of cosmologies between the sixth and fifth century BCE.[63] At this time, we find thinkers whom Diogenes Laertius places into the 'Italian' school of philosophy (1. 13), and they entertain the notion of heaven, and analogically also the earth having the shape of a full sphere. It is first of all the Pythagoreans, who claim (Diog. Laert. 8. 25 = DK 58 B 1 a):

> [a universe] is spherical, with the earth at its centre, the earth itself too being spherical and inhabited round about,[64]

but also Parmenides, about whom it is claimed (Diog. Laert. 9. 21 = DK 28 A 1):

> He was the first to say the earth was spherical and situated in the middle.

The spherical shape of the earth is, meanwhile, connected with the shape of the surrounding heaven and thereby also of the universe. When Aetius describes how Parmenides argued for earth's immobility in the universe, he mentions its symmetric position: it was supposed to be equidistant from everything (*Plac.* 3. 15. 7 = DK 28 A 44). This argument often appears in connection with Anaximander, to whom it was ascribed by Aristotle (*Caelo* 295 b 10 = DK 12 A 26). It also appears multiple times in Plato's writings, whereby Plato shows that its validity depends on identical – identically spherical – shape of the earth and the surrounding heaven/universe (*Phd.* 108 e – 109 a; *Tim.* 62 d – 63 a). It is interesting to note that in the *Phaedo*, Socrates claims that he learned of this conception from 'someone' – without specifying that person (*Phd.* 108 c). Still, it may have been Parmenides. Another indication that Parmenides believed

[63] Cf. Kočandrle 2018, 467–481; id. 2019b, 111–113, 115–116.
[64] Translation by Hicks 1980.

the heaven/universe to be spherical may be found in a literal reading of his poem, where Being is likened to a ball (Simpl. *In Arist. Phys.* 146. 15 = DK 28 B 8, 42–49). And while the identity of the real Being will remain the subject of debates, one could speculate that it may have denoted heaven/universe. Such reading moreover finds support in Simplicius, who in his commentary on Aristotle's *Physics* mentions that, according to Eudemus, Parmenides's Being was indeed interpreted in a cosmological sense as 'heaven' (οὐρανός, *In Arist. Phys.* 133. 21–29; 142. 28–143. 8 = Eudemus, Fr. 44, 45 Wehrli = Coxon 2009, Eudemus, test. 37, 38).[65]

Concerning the spherical earth, Panchenko formulated another argument in support of this notion in Parmenides. Strabo (*Geogr.* I. 94 = DK 28 A 44 a), with reference to Posidonius, ascribes the origin of the concept of division of the earth to Parmenides, while Aetius claims that 'Parmenides was the first to locate inhabitable parts of the earth on each side of the two tropical zones' (*Plac*. III. 11. 4 = *DK* 28 A 44 a).[66] Panchenko argues that the source of Parmenides' awareness of the southern inhabited zone may have been the reports of circumnavigation of Libya (i.e., Africa) by Phoenicians who, according to Herodotus, had "the sun on their right hand" (*Hist.* IV. 42–43). Panchenko believes that awareness of such reports "made Parmenides formulate his great theory of a spherical earth".[67] Although it can be argued that the conception of a spherical earth was based rather on metaphysical reasons, the empirical nature of this argument does not contradict what we know about Parmenides' cosmology.

Parmenides and the Pythagoreans represent the two directions of thought which had the greatest influence on Plato. The spherical conception of heaven we encounter in the writings of Plato and Aristotle could therefore represent merely a culmination of this tradition. It would then be rather natural that in the *Timaeus*, the demiurge forms a spherical world (*Tim.* 33 b–c). Although Aristotle subsequently argues in favour of a spherical shape of not only the earth but also the heaven/universe mainly on the basis of his physics and his theory of proper places, we could speculate to what extent his basic convictions were influenced by the abovementioned directions of thought.

Based on our conclusions, we should consider the possibility that the conception of heaven as a hemisphere, often used in interpreting the archaic image of the world, is just an anachronism. One could speculate that it might be based on a conception of spherical heaven, which was

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[65] Cf. Fehling 1985, 226–227; Furley 1987, 53–57; Graham 2013, 90–91, 96, 106–107 n. 44; Hladký 2018, 33 n. 62.

[66] Translation by Panchenko 2008, 189.

[67] Cf. Panchenko 2008, 192.

dominant since the beginning of the classical era. Scholars may have taken the spherical conception as their starting point and – erroneously – apply its elements to thinking of the Archaic Era. In that case, at least from their perspective, heaven would have represented just upper half of the entire sphere of heaven.

Conclusion

We have seen that surviving texts do not allow for sufficiently detailed and well-founded reconstruction of the conception of heaven in archaic Ionian cosmologies. Nevertheless, one can suppose that, much like earth, the heaven was considered a concrete part of the world with a particular composition. Given the meteorological nature of archaic Ionian cosmologies, where heavenly bodies were assumed to move only above the earth, one can hypothesise that the universe as a whole was thought to be closed and its space usually thought to stretch between a flat earth and heaven. Heaven was thus not only the area above the surface of the earth but also the upper limit of the universe. The commonly accepted notion of heaven as a hemisphere stretching above a flat earth, ascribed especially to the epic tradition, is not supported by textual evidence. On the contrary, it is possible that heaven was thought to be flat or shaped like a compressed arch. We do not have sufficient evidence to support a claim that the spherical conception of heaven was entertained either by Anaximander, who seems to have assumed space around the entire earth, or by Xenophanes. The notion of spherical heaven provably appears in cosmologies belonging to the so-called Italian school of philosophy, where it is usually connected with a spherical earth. This is also where Aristotle drew inspiration for his conception, where heaven is presented not only as the area where heavenly bodies are located but also as the limit of the universe, which ends with the sphere of the fixed stars.

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List of Abbreviations

DK – see Diels–Kranz 1951/1952
Dox. – see Diels 1879
TP 1 – see Wöhrle 2014
TP 2 – see Wöhrle 2012
TP 3 – see Strobel–Wöhrle 2018

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The conception of heaven in archaic Ionian cosmologies, which belong to the earliest Presocratic conceptions of the world, is due to meagre textual evidence hard to reconstruct. Current scholars, meanwhile, tend to agree that in the previous epic tradition, heaven was believed to form a firm hemisphere located above a flat earth. Although such interpretations are based on indirect evidence, one can suppose that during the Archaic Era, heaven was considered to be a concrete constituent of the universe with a particular composition. In the case of archaic Ionian cosmologies, one can assume – based on their meteorological nature and the assumption of movement of heavenly bodies only above the earth – that the space of the universe stretched only between a flat earth and the heaven. The entire universe was thus viewed as closed, with the heaven forming its upper limit. Still, the heaven need not have been imagined as hemispherical: it could have been thought flat or merely curved. To wit, one can argue that the hemispherical shape of heaven, which often features in current interpretations, anachronistically draws on later conceptions belonging to the Italian school of philosophy, where the universe and therefore also the heaven was believed to form a sphere.

Понимание неба в архаических космологиях Ионии представляет одну из древнейших досократических концепций, которая не была достаточно текстуально обоснована. Современные исследователи полагают, что предшествующая эпическая традиция рассматривала небо как неподвижное полушарие, расположенное над плоской Землей. Несмотря на то, что подобные интерпретации основаны на непрямом текстовом обосновании, можно полагать, что небеса в архаические времена действительно представляли составную часть строения Вселенной. В отношении архаических ионийских космологий, основанных на наблюдении метеорологических явлений и орбит небесных тел только над Землей, можно предположить, что пространство Вселенной в их понимании простиралось только между поверхностью Земли и небом. Поэтому вся Вселенная считалась закрытой, а небо составляло ее верхний край. Тогда небо не обязательно должно быть полусферой – наоборот, оно может быть плоским или только изогнутым. Можно полагать, что полусферическая форма неба, распространенная в современных интерпретациях, анахронистически основана на концепциях, которые принадлежат италийской ветви философии, где Вселенная и, следовательно, небо рассматриваются как сферические.

CONSPECTUS

Статьи сопровождаются резюме на русском и английском языке
Summary in Russian and English