

ARCHETYPAL IMAGES IN ANAXIMANDER'S PHENOMENOLOGICAL COSMOLOGY

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NB. Several images will be added after my power-point presentation (surprise!).

Introduction

Anaximander's cosmology is often described as a bizarre concoction of strange images that has nothing to do with observational data. One example, out of many, with which I fundamentally disagree, is Dicks, who writes: "The tertiary sources (...) attribute to him a fantastic theory (...). The unsatisfactory nature of the evidence, which is garbled and contradictory (...) makes it highly doubtful whether it has any historical worth".² I also disagree fundamentally with Daniel Graham, who writes: "Anaximander's imaginative model accounts for the apparently circular orbits of the heavenly bodies at the cost of making them radically different from their manifestations".³

In this paper I would like to make two different but intertwined points. In the first place, I will show that Anaximander's images are not the result of a bizarre fantasy, but that they are never arbitrarily chosen. They refer to things from daily life, but at the same time they reflect deeply rooted archetypes. Secondly, I will show that Anaximander's account of the astronomical phenomena remains as close as possible to what we can observe directly in the heavens. This is why I would call it a phenomenological astronomy. More specifically, I will show that his explanation of the phases of the Moon and solar and lunar eclipses is not weird but purely rational and describes precisely what we see happen in the heavens.

1. *images*

Let us start with Anaximander's images.

At the coming to be of this cosmos that which since days of old is generative of hot and cold was secreted, whereupon out of this germ a sphere of fire grew around the air that surrounds the earth, like the bark around a tree.

Pseudo-Plutarch, *Miscellanies* 2 = DK 12A10.⁴

1.1. *the tree*

In the discussion of the main text of Anaximander's cosmogony almost always only the word 'bark' (φλοιός) is mentioned because it returns in his account of the generation of animals. The main image, however, is that of a tree.

In several cultures the archetypal world-tree is thought to somehow support the heavens and is associated with the axis of the heavens. This tree is usually thought to stand upright in the center of the Earth, where it spreads its leaves that represent the heavens. In the cosmology of Anaximenes, the stars as leaves⁵ also refer to the world tree. In the doxography on Pherecydes it appears as "(...) the winged oak and the embroidered robe

¹ This study has been written with the support of grant project GA ČR GA15-08890S.

² D.R. Dicks, *Early Greek Astronomy*. Ithaca N.Y.: Thames and Hudson 1970, 45-46.

³ D.W. Graham, *Science Before Socrates*, Oxford: Oxford UP 2013, 60.

⁴ I translate ἐκ τοῦ ἀδίου with "since days of old", following a suggestion of W.A. Heidel, "On Anaximander". *Classical Philology* 7 (1912), 212-234, at 229, n. 2. See also G.S. Kirk, J.E. Raven, and M. Schofield, *The Presocratic Philosophers*. Cambridge: Cambridge UP 2009, 132, n. 1, and G. Wöhrle, *Die Milesier: Anaximander und Anaximenes*. Berlin: Walter de Gruyter GmbH & Co. 2012, 85 n. 2. Since it does not play a role in observational astronomy, I leave aside here the biological image of a germ, which clearly goes back to that of the world-egg that plays a role in many ancient cosmogonies.

⁵ Cf. Aëtius in Pseudo-Plutarch, *Opinions* 2.14.3-4 = DK 13A14.

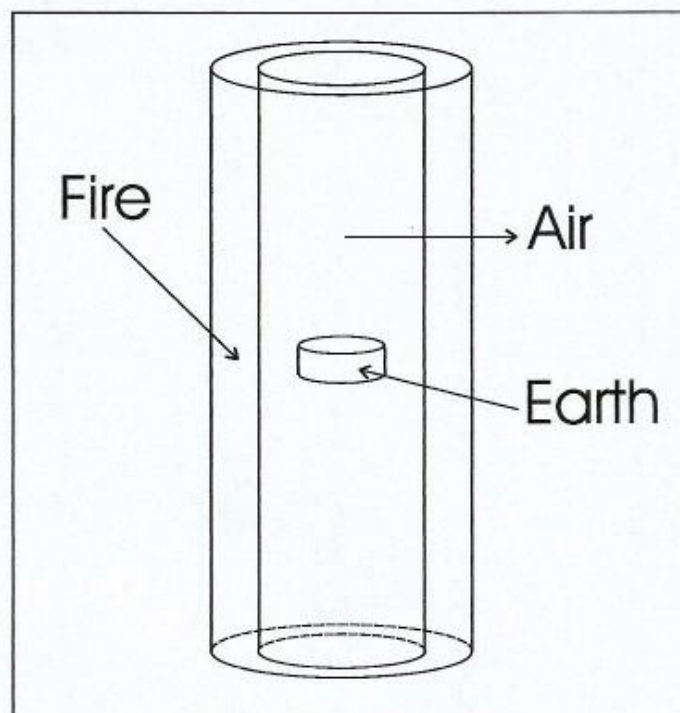
upon it”.⁶ Anaximander did not use the image of the tree in the ancient mythological way but in a profane context in which he intends to develop a cosmogony in natural terms.

The word ‘tree’, suggests a column, which is, in cosmological terms, the celestial axis. Originally, the columns of the early Greek temples were made of trees, which were replaced by stone columns since the seventh century B.C. And, as Hahn writes: “the column has cosmic significance; it symbolically separates, joins, or interpenetrates the cosmos as its axis”.⁷

So we may interpret Anaximander’s image of a tree as the column of the axis of the heavens. The flame is said to have “grown around the air like the bark around a tree”. Just as the bark and the trunk belong intrinsically to the normal tree, so the fire and air make the heavenly tree.

The flame is said to have “grown around the air that was around the Earth”. Anaximander’s Earth was shaped like a column-drum. Usually, a column drum is part of a column.

Accordingly, at the origin of the cosmos the Earth as a column drum was part of the heavenly tree or column.



The usual idea of the ancient Greek cosmologists was that originally the celestial axis stood perpendicular to the surface of the flat Earth, but that somehow during the process of cosmogony the heavens had tilted.⁸ The idea of the tilted celestial axis goes as far

⁶ Clemens, *Miscellanies* VI.6 = DK 7B2. And similarly: “But consider also the man of Syros (...) and the tree and the robe” (Maximus Tyrius, *Dissertations* IV.4 = DK7 A11). The robe is described thus: “Pherecydes of Samos says: Zas makes a mantle large and beautiful and decorates on it Ge and Ogenus and the houses of Ogenus” (Clemens, *Miscellanies* and Grenfell-Hunt, *Greek Papyri*, Ser. II. N.11, p. 23 = DK 7B2). According to Eisler’s intriguing interpretation, this mantle is the mantle of the heavens, Ogenos is the celestial river (the Milky Way), and the houses of Ogenos are the twelve signs of the Zodiac. See R. Eisler, *Weltenmantel und Himmelzelt*. München: Beck 1910, 203-209, 566, 596.

⁷ R. Hahn, *Anaximander and the Architects*. New York: SUNY 2001, 87.

⁸ Cf. Anaxagoras (Aëtius in Plutarch, *Opinions* 2.8.1 = DK 59A67 – tilt of the κόσμος; Diogenes Laërtius, *Lives* 2.9 = DK59A1(9) – tilt of the ἄστρα and the πόλος), Anaxagoras and Diogenes (Aëtius in Pseudo-Plutarch, *Opinions* 2.8 = DK 59A61 – tilt of the κόσμος), Archelaus (Hippolytus, *Refutation* 1.9.4 = DK

back as to Anaximander. In his cosmogony this tilt of the heavens is expressed by saying that the cosmic tree of fire and air is broken off.⁹

What remained upright is the Earth in the shape of a column drum.

1.2. *fire*

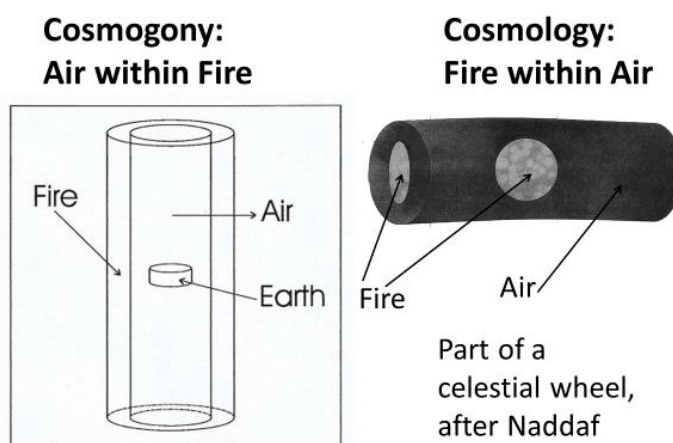
The natural behavior of fire is to spread out and devour everything in its neighborhood, unless it is either extinguished or confined and thus tamed. From daily life Anaximander knew that the only way fire can be tamed and made useful is to somehow contain it, for instance in a candle or lamp, or in a fireplace, or in an oven.

The taming of fire lies at the cradle of human civilization. The taming of the cosmological fire by getting contained within air marks the origin of the regulated cosmos. Cosmogony can be seen as a process similar to civilization.

Originally, the air was surrounded by fire.

But after the fall of the heavenly tree, when the heavenly bodies were formed, the relation has become the other way round: the fire is now enclosed within air. When the column of fire and air was broken off, the circles of Sun, Moon and stars originated.¹⁰

The tables are turned:



Unfortunately, our sources only tell that this conversion took place, but not why and how it took place. We may conclude, though, that at the end of the cosmogony, somehow the tables are turned: the original all-embracing fire has become tamed or disciplined by being enclosed within circular shapes of air. Just like the earthly fire is tamed by the ingenuity of men, in Anaximander's story the heavenly fire is tamed by the power of nature.

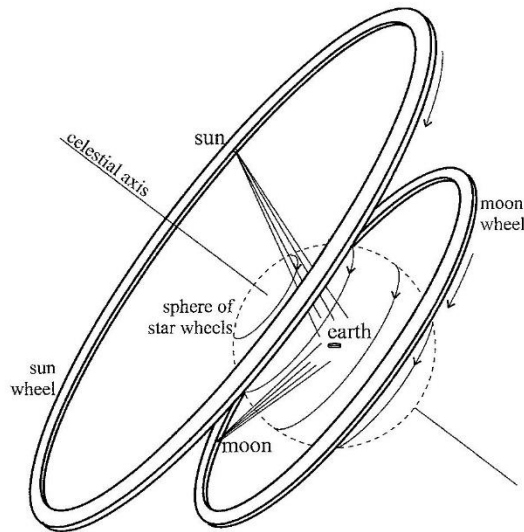
60A4(4) – tilt of the οὐρανός). Empedocles (Aëtius in Pseudo-Plutarch, *Opinions* 2.8.2 = DK 31A58 – tilt of τὰ ἄρκτα and the κόσμος). Elsewhere I have argued that the same holds for Anaximenes and the atomists Leucippus and Democritus. For Anaximenes, see: D.L. Couprie, “The Paths of the Celestial Bodies According to Anaximenes”. *Hyperboreus* 21 (2015), 5-32. For Leucippus and Democritus, see also: D.L. Couprie, *Heaven and Earth in Ancient Greek Cosmology*. New York: Springer 2011, 74-76.

⁹ Pseudo-Plutarch, *Miscellanies* 2 = DK 12A10: “This subsequently broke off”. I take it that the word this (ἡστινος) refers back to the whole foregoing clause “the sphere of flame that grew around the air that was around the Earth like bark around a tree”. The word ‘sphere’ (σφαῖρα) here obviously means the cylindrical shape of the bark of the tree.

¹⁰ Pseudo-Plutarch, *Miscellanies* 2 = DK 12A10: “This (sphere of flame that grew around the air that was around the Earth) subsequently broke off and was closed into individual circles to form the Sun, the Moon and the stars”. Hippolytus, *Refutation* 1.6.4 = DK 12A11: “The heavenly bodies came to be as circles of fire, separated from the cosmic fire, surrounded by air”.

1.3. wheels

As a result of his cosmogony the containers of the heavenly fire took the shapes of the rims of gigantic wheels of air that hide the fire inside.¹¹



Obviously, the very reason why we do not perceive these wheels in the heavens is that they are made of – compressed – air.¹²

In the heavenly wheels not only the fire is tamed, being confined within air, but also the movement is tamed and forced into circular motion. The celestial wheels of condensed air are, so to speak, the materialization of the way the heavenly fire is disciplined into steady circular movements.

And again it was an analogy with observable facts of daily life that offered the appropriate picture. The word ‘wheels’, rather than the anachronistic word ‘circles’, indicates motion. Usually, moving objects like falling or thrown stones, or strolling animals, do not move in circles. The only kind of bodies that are forced to move accurately in circles are circular man-made objects like wheels.

The image of the wheel is another archetypal image, in addition to that of the captured fire. Just like in the course of human civilization people made wheels to get a circular turning motion, in Anaximander’s cosmogony the power of nature imposed a circular motion upon the heavenly bodies.

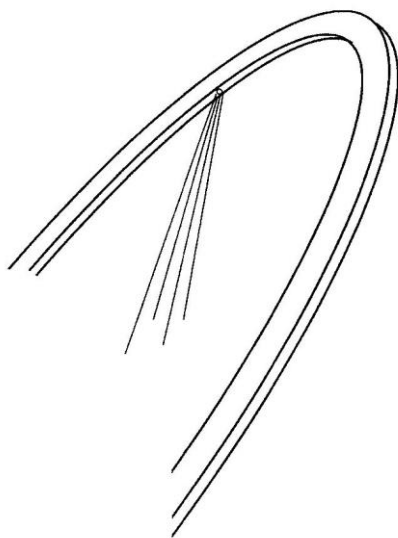
It is typical for Anaximander’s discourse that he does not take refuge to the metaphysical conception of the circle as the most perfect shape and the circular movement as the most perfect movement, as it is in later Greek cosmology, but to the mundane example of the man-made wheel. I consider Anaximander’s image of the heavenly wheels also as a kind of pun, directed against the current mythological explanation: it is not Helios who drives the chariot of the Sun across the sky, but the Sun itself is a chariot wheel.

1.4. escaping fire

¹¹ Aëtius in Pseudo-Plutarch, *Opinions* 2.20.1 = DK 12A21: “the Sun is a circle (...), similar to a chariot wheel (ἀρματείω τροχῷ παραπλήσιον), having its rim hollow, full of fire”. Idem 2.25.1 = DK 12A22: “the Moon is a circle (...) like a chariot wheel (ὄμοιον ἀρματείω <τροχῷ>) having a hollow rim full of fire”. Aëtius in Stobaeus, *Anthology* 1.24.1g = DK 12A18: “the stars are wheel-shaped (τροχοειδῆ)”.

¹² Aëtius in Stobaeus, *Anthology* 1.24.1g = DK 12A18: “the stars are wheel-shaped compressions of air (πιλήματα ἀέρος)” .

A final feature completes Anaximander's explanation of the heavenly bodies: we cannot see the fire that is trapped within the wheel, except at one aperture, and this is what we call the Sun, the Moon, or a star.¹³



To explain this, Anaximander seems to have made use of two different images. In one vivid image, the fire is said to escape permanently through these openings, as if they are mouths spitting fire.¹⁴ Perhaps in Anaximander's time there existed already human fire spitters, using what the ancients called *νάφθα*, a kind of petroleum.

Workman has put forward that the words *ἐκπνοή* (outbreathing) and *στόμιον* (mouth) were technical terms of bronze foundry.¹⁵ The mold has two holes, one to pour the melted metal into, and one 'mouth', through which the superfluous air is 'breathed out'.

Anaximander also used another image in this context. Ever since Hermann Diels wrote the ominous words "*immo πρηστήρ est follis fabrorum*",¹⁶ almost everyone slavishly followed this great scholar and translated "as (through) the nozzle of a bellows". However, as I showed elsewhere,¹⁷ there is not a scratch of evidence for this translation, neither in the contemporary literature, nor in the image as such. So I suggested that Anaximander meant to compare the light of the Sun, the Moon and the stars with that of lightning. Whereas lightning is a momentary flash of fire, the light of the heavenly bodies is like a permanent jet (*αὐλόξ*) of lightning fire (*πρηστήρ*).

With this image, Anaximander wanted to underline that we have to do with a completely natural process, a kind of meteorological phenomenon in which no gods played a role but only the power of nature.

2. phenomenological cosmology

¹³ Cf. Aëtius in Stobaeus, *Anthology* 1.24.1g = DK 12A18: "(...) at some part expelling flames from mouths (*ἀπὸ στομίων ἐκπνέοντα φλόγας*)";

¹⁴ Cf. Hippolyt, *Refutation* 1.6.4. = DK 12A11: "There are certain airy passages (*τόπους τινὰς ἀερώδεις*) for breathing holes (*ἐκπνοῶς*), through which the heavenly bodies appear"; Aëtius, in Pseudo-Plutarch, *Opinions* 2.24.2 = DK 12A21: "(On the eclipse of the Sun) (...) the mouth (*στόμιον*) through which the outpouring (*ἐκπνοή*) of fire occurs (...)"; Aëtius, in Pseudo-Plutarch, *Opinions* 2.29.1 = DK 12A22: "(On the eclipse of the Moon) (...) the mouth (*στόμιον*) on the wheel (...)". 2.25.1

¹⁵ See A. Workman, "La terminologie sculpturale dans la philosophie présocratique". *Actes du XIe Congrès International de Philosophie, Bruxelles 20-26 Août 1953, Vol. XII: Histoire de la philosophie: méthodologie Antiquité et Moyen Âge*. Louvain: Éditions E. Nauwelaerts 1953, 45-50, at 46.

¹⁶ H. Diels, *Doxographi Graeci*. Berlin: Walter de Gruyter & Co GmbH 1879 26-27.

¹⁷ See D.L. Couprie, "πρηστήρος αὐλόξ Revisited". *Apeiron* 34 (2001), 193-202.

When we look at the heavens, we see the air and the heavenly bodies within it: the more or less bright stars and the bigger lights of the Moon and the Sun. The heavenly bodies look like fire that is somehow contained within air on specific, and from day to day predictable, locations. The steadily moving heavenly bodies do not travel at random above our heads. This does not only hold for the stars, whose position relative to each other remains always the same, but also for the Sun and the Moon (and the planets), whose position in relation to the stars and to each other changes every day in a regular way. One of the main intentions of Anaximander's conception of the cosmos is to explain both the containment and the movements of the heavenly bodies. His picture amounts essentially to this: the heavenly bodies are just what we see: regularly orbiting fire contained within air.

2.1. *phases of the Moon*

At first sight, Anaximander's theory on the phases of the Moon and lunar and solar eclipses is the weirdest part of his conception of the heavenly bodies. According to the doxography, they result from the partially or totally closing of the apertures in the wheels of the Sun and the Moon.¹⁸ The generally adopted interpretation of these texts is that the aperture in the celestial wheel is closed by the airy envelope that surrounds and hides the fire inside. I will argue that Anaximander's explanation is at least as rational as the right interpretation, which is said to have been discovered by Parmenides and Anaxagoras.

They say that at the phases of the Moon, the light part is that which is illuminated by the Sun and the dark part is that which does not receive the Sun's light.¹⁹ There is, however, a problem with this theory, which they consciously or unconsciously neglect, but which Anaximander's explanation simply solves. The phenomena of the Moon's phases are incomparable with what we usually see when the Sun shines on an object. An object's side that is not lighted by the Sun does not disappear, but remains visible. Nowadays we know that this is due to the scattering of light being reflected by air molecules or other atmospheric particles, but this knowledge was not available to the ancients. The unlighted part of the Moon, however, becomes invisible. This phenomenon does not only happen at night, when the unlighted side of the Moon looks black like the night sky.

The Moon is often visible by day, and then its unlighted side looks blue, just like the surrounding air, which is not the case with any other object that is lighted by the Sun. Anaximander's solution was completely rational: the air of the wheel that hides the fire inside can also partially or totally cover the fire that shines through the opening in the wheel. And this airy cover has, just like the wheel itself, the color of the surrounding air.

Sometimes the unlighted part of the crescent Moon is vaguely visible. Anaximander could simply explain this by supposing that sometimes the slide is not fully opaque but of somewhat transparent air, like a cloud.

¹⁸ Cf. Hippolytus, *Refutation* 1.6.5 = DK 12A11: "The Moon appears to be waxing and waning according to whether the passages are being blocked or opened". Aëtius, in Pseudo-Plutarch, *Opinions* 2.24.2 = DK 12A21: "Anaximander says that the Sun is eclipsed when the mouth through which the outpouring of fire occurs is blocked". Aëtius, in Pseudo-Plutarch, *Opinions* 2.29.1 = DK 12A22: "Anaximander says that the moon is eclipsed when the mouth on the wheel is obstructed".

¹⁹ Cf. Stobaeus, *Anthology* 1.26.2 = DK 28A42 and 59A77; Plutarch, *On the Face in the Moon* 16.6 = DK 28B15; Hippolytus, *Refutation* 1.8.8 and 10 = DK 59A42 (8 and 10).

2.2. eclipses of the Moon

Similarly with eclipses of the Moon: a part of the Moon becomes invisible and takes the color of the sky.²⁰ The right explanation of this phenomenon is that it is caused by the Earth's shadow. But normally, a shadow thrown on an object does not make that object invisible.

Again, it would be difficult for the ancient Greeks to explain why the shadow of the Earth adapts to the color of the air, whereas in Anaximander's theory it is evident: a part of the air of the Moon wheel slides partially or totally before the fire inside, and that is why it has the same color as the surrounding sky.

Sometimes, a reddish Moon remains visible although it is fully eclipsed. Nowadays, this is explained by the atmosphere that filters out the blue light of the Sun so that only the red parts of the spectrum can reach the Moon. This explanation was not available to the ancients. Anaximander's explanation could again simply have been that sometimes the airy slide is not fully opaque but semi-transparent, like a cloud.

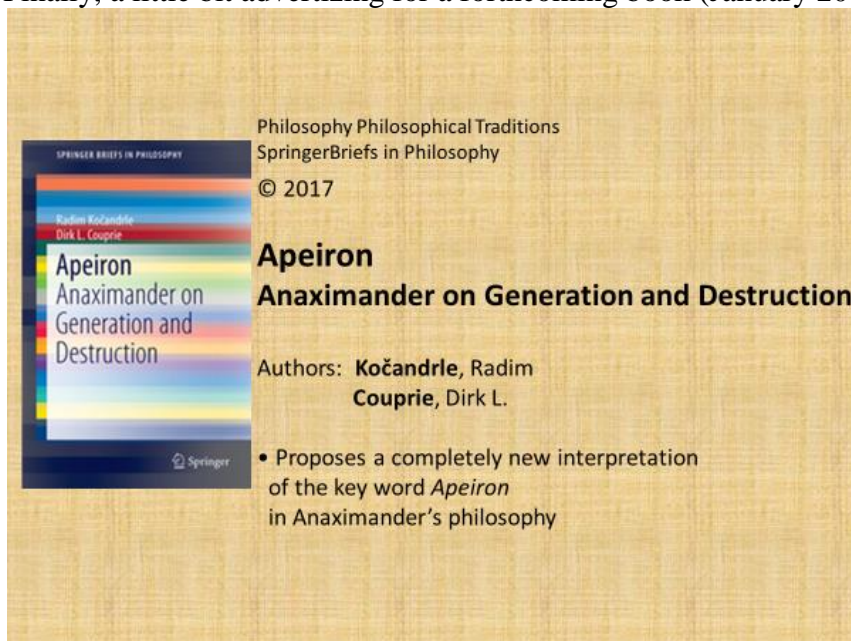
2.3. eclipses of the Sun

Anaximander's theory also holds for eclipses of the Sun:²¹ the missing part of the Sun has the same color as the surrounding air (usually blue; photographs of solar eclipses are often deceiving, showing a black sky).

Parmenides and Anaxagoras said that at a solar eclipse, the Moon blocks the Sun. But they were not able to explain, again, why the shadowed part of the Sun took the color of the sky. In Anaximander's explanation, everything is clear: a part of the surrounding air of the Sun wheel slides partially or totally before the fire inside, and that is why it has the same color as the surrounding sky. When the sky is blue, the slide is blue, and when the sky is red, the slide is red.

Given the available knowledge, Anaximander's explanation of the phases of the Moon and of eclipses was at least as rational as that of Parmenides and Anaxagoras.

Finally, a little bit advertizing for a forthcoming book (January 2017):



²⁰ Cf. Pseudo-Plutarch, *Opinions* 2.29.1 = DK 12A22: "Anaximander says the Moon is eclipsed when the mouth on the wheel is obstructed".

²¹ Cf. Pseudo-Plutarch, *Opinions* 2.24.2 = DK 12A21: "Anaximander says the Sun is eclipsed when the mouth through which the outpouring of fire occurs is blocked".