

Dijksterhuis

Notes

■

Parmenides: Nothing Ever changes:

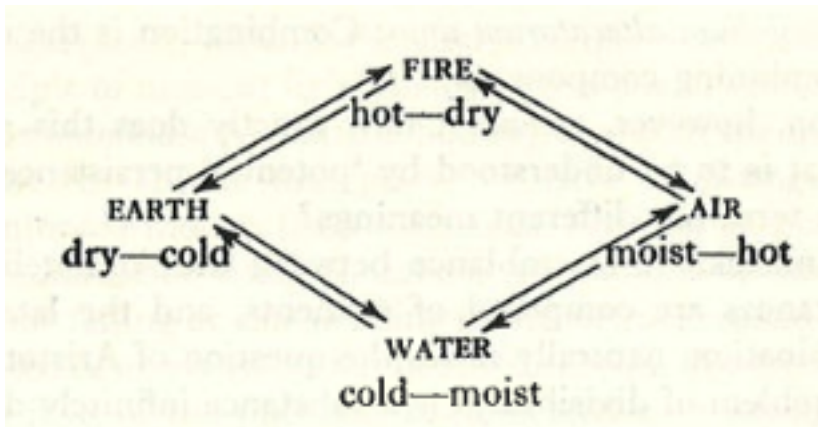
1. Things either exist or they don't (no third option)
2. Change involves the coming into being of something.
3. Something new can't come from something (it already exists)
4. It can't come from nothing (nothing isn't even a coherent idea).
5. Therefore, nothing ever changes.

a. Substance and Accidents, Matter and Form, Actuality and Potentiality

b. The Concept of Motion

c. The Doctrine of the Elements and the Concept of *Mixtio*

- Aristotle took the doctrine of the 4 elements from Empedocles
- Most substances are mixtures; earth has a high specific gravity. (i.e dense things contain more earth)
- Unlike in Atomism, the elements are mutable



d. Natural and enforced motions.

When something is dropped, there is a *motor accidentalis* (*removens impedimentum*), but there is also a *motor conjunctus*.

- *virtus movens*: the power to set the next element into motion. (a sort of precursor to momentum)
- Aristotle's law of motion for dragging objects along a surface is *not* an example of the law of falling bodies (the origin of the tendency of an object to fall is not external to the object - it is part of the objects' nature)
- "omne quod movetur ab alio movetur"

Classical mechanics:

$$F = ma$$

Aristotelian Mechanics:

$$v = f \frac{F}{R}$$

This formula immediately shows that a void leads to $v = \infty$.

“To this day every study of elementary physics has to struggle with the same errors and misconceptions which then had to be overcome, and on a reduced scale, in the teaching of this branch of knowledge in schools, history repeats itself every year.”

§39: The natural motion of the four elements is rectilinear. The *quintessence* has circular motion as its natural motion.

e. The General World-Picture

§42 - both Plato and Aristotle held to circular motion, which made it seem less likely to be false to people in the Middle Ages.

Commentary

The *reason* why Aristotle bothers to draw a distinction between *actuality* (actual being) and *potentiality* (potential being) is to dissolve the Eleatics dilemma, which states that change is impossible. This is best expressed in Aristotle’s Physics I.8:

“So they say that none of the things that are either comes to be or passes out of existence, because what comes to be must do so either from what is or from what is not, both of which are impossible. For what is cannot come to be (because it is already), and from what is not nothing could have come to be (because something must be present as a substratum). So too they exaggerated the consequence of this, and went so far as to deny even the existence of a plurality of things, maintaining that only Being itself is. Such then was their opinion, and such the reason for its adoption.”

p. 22: The elements must contain pairs of opposites because change is described as going from something to its opposite (i.e a man without musical ability changing to a man with musical ability)

“Our first presupposition must be that in nature nothing acts on, or is acted on by, any other thing at random, nor may anything come from anything else, unless we mean that it does so in virtue of a concomitant attribute. For how could ‘white’ come from ‘musical’, unless ‘musical’ happened to be an attribute of the not-white or of the black? No, ‘white’ comes from ‘not-white’-and not from any ‘not-white’, but from black or some intermediate colour. Similarly, ‘musical’ comes to be from ‘not-musical’, but not from any thing other than musical, but from ‘unmusical’ or any intermediate state there may be.”

something “cold” can turn into something “hot”, because the quality turns into its opposite. Therefore it is easier for earth (cold and dry) to turn into fire (hot and dry) or water (cold and moist), but not air (moist and hot). This is illustrated in the picture by Dijksterhuis (p. 23)

§30: the reason why Newton was so horrified by action at a distance may have to do with taking Aristotle seriously on this point¹

§30: In some sense, then, we can explain why Aristotle didn’t arrive at the concept of momentum from the fact that action at a distance was abhorrent (he would have seen it as a form of action at a distance).

¹<https://www.youtube.com/watch?v=chJEoC14bbk>

Questions

Did Aristotle actually believe that at the end of times the elements will settle in concentric rings? Or was there an active force preventing this?

Bibliography