

Reading Guide: Aristotelian Dynamics

We begin our reading into the history of scientific ideas this week by looking at Aristotle's dynamics, or science of motion and change. Give yourself a LOT of time to do the primary source reading (the reading directly from Aristotle). Aristotle is possibly the greatest philosopher of all time, not to mention a plausible candidate for the first great scientist! Aristotle was brilliant; this is not easy reading, but it is rewarding to those who put the time and effort in.

Recommended order of reading

1. Dewitt, ch. 9 (required, as a basic introduction to Aristotle's theories of nature, science, and scientific explanation. Read this first to get a general impression of Aristotle's beliefs on these subjects before reading from Aristotle himself.)
2. PS, pp. 5-8, pp. 13-18 (highly recommended; this is very nice and more in-depth introduction to Aristotle's place in the history of scientific thought as well as his contribution to the philosophy of science. This reading also gives you a bit more of the larger intellectual background and context surrounding Aristotle.)
3. PS, 1.6 – Excerpts from Aristotle's *Physics* (required; see reading guide questions below.)

Aristotle's *Physics* (PS 1.6).

1. Aristotle begins with the distinction between natural things (things that “exist by nature” or “are constituted by nature”) and unnatural things. How does Aristotle distinguish these two classes in more detail? I.e., what sorts of things are true of natural things that are not true of unnatural things?
2. What does it mean for things to “have a nature” for Aristotle?
3. Aristotle considers two important theories here: first, he investigates the theory that the nature of a natural thing is to be identified with its material – i.e., “the immediate constituent of it which taken by itself is without arrangement. Second, he looks at the theory that a natural thing's nature is to be identified with its form – i.e., the shape of the thing specified in its definition. Make sure that you understand Antiphon's argument for the first theory, and then understand how Aristotle turns this argument into an argument for the second theory. Which theory does Aristotle side with?

NOTE: When Aristotle uses the term “art,” he means something broader than what we typically mean by that word. When you read Aristotle, don't think “art” as in “artists,” “visual arts,” “performing arts,” and the like. Rather, think of skills and trades by which we construct various **artifacts**.

4. In section 2, Aristotle sets mathematics apart from the study of nature. Explain the difference. Do your best to understand what Aristotle thinks we must focus on to study nature *qua* (“as”, or “in the capacity of”) nature.
5. Section 3 begins Aristotle's discussion of the four causes. (Incidentally, Aristotle's theory of causes – along with the implications that he draws out from that theory – is one of the most important and discussed features of his thought. Really focus on working carefully through this material especially.) What are the four causes and what are some of the examples that Aristotle gives of these?

think through this statement to remember that the Greek word "telos" means "end".]

8. Aristotle next turns from the number and types of causation to the "modes of causation". Think of this section (which goes to the end of section 3) as Aristotle giving practical advice on how actually to apply his four causes when studying nature.
9. Sections 4, 5, and 6 are especially difficult. Here, Aristotle is trying to fit the notions of chance and spontaneity into his categories / taxonomy of causation. Don't fight too hard with this part of the reading – just try to get the general ideas (does Aristotle think there are such things as chance and spontaneity? What is chance and what does chance have to do with human choice?)
10. Why cannot an inanimate thing or beast do anything by chance, according to Aristotle?
11. What does causation have to do with explanation (answers to 'why?' questions) for Aristotle?
12. Which causes "often coincide"? Do your best to understand what Aristotle means by this along with his example(s).
13. Section 8 is interesting because, in it, Aristotle considers and rejects a theory (put forward by the pre-Socratic Empedocles) that is a clear foreshadowing of evolutionary theory. How is the theory described (use the teeth example to exemplify the theory)? And why doesn't Aristotle like it?
14. Note this **very** important passage on p. 42: "Further, where there is an end [telos], all the preceding steps are for the sake of that. Now surely as in action, so in nature; and as in nature, so it is in each action, if nothing interferes. Now action is for the sake of an end; therefore the nature of things also is so." Try to paraphrase what Aristotle is saying / arguing here.
15. In our other reading, Dewitt emphasizes the centrality of essentialism and teleology in Aristotle's worldview. Sections 8 and 9 of this reading are where we really see this come out. Sections 8 and 9 are certainly among the most important parts of this reading then. Read them slowly and repeatedly until you have a relatively firm grasp of Aristotle's meaning and how it connects with Dewitt's summarizing chapter.
16. In the final two paragraphs of our reading, Aristotle says that there is one cause (amongst the four) that is primary and thus is most important for the student of nature to grasp. Which is it? And can you reconstruct Aristotle's reasoning for saying this?