Phil. 401: Discussion Questions

January 12th, 2017

Readings: T. S. Kuhn. *The Copernican revolution: Planetary astronomy in the development of Western thought.* Harvard University Press, 1957, Chapter 3.

Goals: By the end of the class, students should be able to

- Summarize in what ways Aristotles theories of elements and motion supported his theory of planetary motion, and vice versa.
- Justify their views about whether a realist or anti-realist's interpretation of science better explains the role of Ptolemaic astronomy during periods in which Aristotelian physics dominated.

1 Aristotle's Worldview

1. According to post-Copernican astronomy, the universe has the following three features:

   (a) The earth is moving.

   (b) The earth is not at the center of the universe.

   (c) There may be other planets that are like the Earth.

   Using Aristotle's theory of the elements and theory of motions, explain why we should expect all three of these claims to be false.

2. Aristotle argued that the a vacuum understood as completely empty space could not exist. This is the origin of the principle that "nature abhors a vacuum," which was widely believed from Aristotle's time through the Middle Ages. Aristotle argued that a vacuum is a conceptual impossibility, and so his arguments employed exclusively logic, rather than experiments or observation.

   (a) According to Kuhn, what terrestrial phenomena can be explained (in part) by the principle that "nature abhors a vacuum?"

(b) What celestial phenomena can be explained (in part) by the principle? For example, in what ways was the principle related to Aristotle's theory of concentric spheres?

3. Using your answers to the previous two questions, try to explain why Kuhn claims, "There is a fundamental unity in [Aristotle's] view of man and the universe" (p. 78).

2 Ptolemaic Astronomy and Aristotelian Physics

1. Open Ended Discussion: Is Ptolemy's explanation of the motion of planets consistent with Aristotle's theories of the elements and motion? Explain why or why not.

3 Aristotelian Physics vs. Newtonian

Find a group in which someone has taken an introductory physics class.

1. According to Aristotle, "the natural motion of a stone is governed by space alone, not by the stone's relation to other bodies." Contrast this view with Newton's.

2. According to Aristotle, how do objects move unless they are pushed by another body? Contrast this view with Newton's.