



The Scientific Revolution

with Dr. Ted Davis

Lesson 3.2: Science in Antiquity: Understanding the Earth

Outline:

Science in Antiquity: Understanding the Earth

- By the 4th century B.C. no Greek writer thought the Earth was anything other than a sphere. He argues for a spherical earth on the basis of the round shape of the Earth's shadow in a lunar eclipse.
- The sizes and distances of the sun and moon can be found. The method is perfect in principle, but difficult in practice.
- Knowledge of the Earth's spherical shape and approximate size was never lost in the Mediterranean world.
 - Thomas Jefferson made a claim about Galileo: "Galileo was sent to the Inquisition for affirming the earth was a sphere: the government had declared it to be as flat as a trencher [a round, flat, wooden, plate], and Galileo was obliged to abjure his error." – p. 266 in 1787 edition
 - This shows the extent to which mythology can be believed by anyone.
 - What Jefferson, Irving, and Draper had in common was an animosity towards Catholicism.
- Medieval students knew far more than the mythmakers realized.
 - The spherical shape of the earth was in the curriculum long before Columbus or Galileo.
 - Aristotle's arguments figured prominently near the beginning of John Sacrobosco book *De sphaera*.
 - Columbus's challenge was to convince skeptics that voyage from Spain west to Japan was feasible, given the vast distance.
 - One of his investors somehow convinced Queen Isabella to take a chance on the extremely risky venture.
 - One theological objection involved the idea that people might be living somewhere in the southern or western hemispheres.
 - Augustine and many others rejected this because it challenged the Christian doctrine of salvation. If human beings lived in places that could not be reached from the known world it was unclear how they descended from Adam and Eve, or how the gospel could be preached to them.
 - Greek conceptions of matter – 4 basic terrestrial elements mingled together in varying form:
 - Earth: solid
 - Water: liquid
 - Air: gaseous



- Fire: heat (energy today, a material body then)
- In the two sphere model the sphere of earth and water are not quite concentric. The sphere of water is moved from the center of the sphere of earth. If that were true, in theory, then there would be a region covered with water and another region of earth where the earth protrudes out from the water. Many people in the Middle Ages thought of this this way.
- After the voyages of Columbus and Magellan, however, the existence of other populated continents and islands had to be accepted. This presents an instance of science refuting a specific claim about the natural world that was based on Christian beliefs.
 - Today the possibility of extraterrestrial intelligence is potentially in the same category.
- The four Greek elements remained viable in some form until the late 18th century, when the first modern set of elements was proposed. Even then fire (Calorique) was considered an element. Light and fire did not disappear until the 19th century.
- The Greek picture of the universe was coherent, it made sense and seemed to agree with ordinary observations.