Lecture 4: Spread of Iron-Working. Greek Cultural Attitudes and Early Scientific Philosophy

Trojan War, “Dorian invasion”, ca. 1200.
Sea Peoples trouble Egypt ca. 1190-1160 BC. “Shardana” among them.
Greek *basileus* (“king”) replaces Mycenaean *wanax*. (“king”)
Hittites
Greek attitudes: Humanistic, rational, analytical.
Herodotus (Gk historian, 5C BC), Xerxes (Persian King, 5C BC)
Mesopotamian and Egyptian sciences: mathematics, astronomy, medicine

- based on collection of information without much analysis,
- involved deep mythological and magical roots,
- focused on immediate practical social objectives

Goal of Greek science:

- Rational, critical, secular, non-mythological tone.
- Embodies concept of generalized science, distinct from set of empirical rules.
- Founded on strict methodology of reason, i.e. logic, dialectic.
- Developed idea of institutions for scientific investigation.

Themes of early science:

- From chaos to order.
- Nature of reality.
- Classification.

Thales of Miletus (624-547): Everything is based on water. Observation of the world.
Anaximander (610-540). Everything derived from "The Unlimited." Observation and search for origins.
Anaximenes (flor. c. 546). Everything based on air, rarefaction & condensation. Observation & process.
Heraclitus of Ephesus (flor. c. 500). All is flux.
Parmenides of Elea (c. 515-440). All is stasis.
Pythagoras of Rhegium (flor. c. 500). Number is form and matter of the Universe.
Empedocles of Acragas (493-433). Four elements--fire, air, water, earth—all affected by "love" and "strife." Proposal of elements and process.
Anaxagoras (c. 500-428). All objects contain "seeds" of everything else.
Democritus of Abdera (c. 460-400). "Atomic" theory.
Plato (c. 429-347). Theory of universal "Ideas" that create "appearances" in this world.
Aristotle (384-322). Form and matter are inseparable, and form guides growth. Classification of plants, animals, minerals.
Fundamental contributions of Greek Science:

1) Fundamental material of Nature indestructible.
2) Change of phase of this material brings change of properties.
3) Rarefaction and condensation cause change of phase.
4) Activating forces cause change and movement.
5) Infinitude of space and matter.