
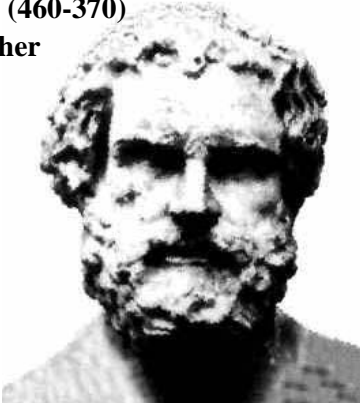


Atomism

- All reality consists of minimal sized bits of matter—“atoms”—separated by empty space—“void”.
- All things are made of various combinations of atoms.
- Greek “a-tom” = not cut.
- Tonsillectomy, appendectomy, lobotomy.
- How can scientists split the atom?



Democritus (460-370)
Greek philosopher

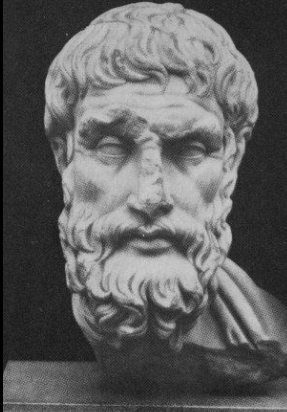


Carl Sagen’s Top 5 Most Influential Scientists

- **Democritus:** Atomism
- **Johannes Kepler:** Planetary motion
- **Isaac Newton:** Universal gravitation
- **Charles Darwin:** Theory of evolution
- **Albert Einstein:** General relativity

Ithaca Journal, October 8, 1994

Epicurus
(342-270 BC)
Greek Philosopher
Modifies ideas
Extends application



Lucretius

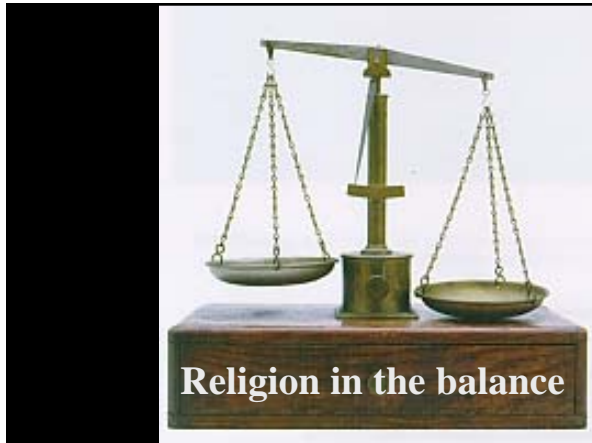
- (99-55 BC)
- Roman Poet
- Records ideas of Epicurus in poetic form
- “On the Nature of Things”
- Went mad from love potion?
- Committed suicide?
- Counteract influence of religion.

Bad Effects of Religion?

- Leads people to do terrible things
 - Agammemnon sacrifices Iphigenia
 - Abraham almost sacrifices Isaac
- Religious campaigns
 - Crusades, Inquisition, Northern Ireland, Middle East, 9/11, etc.
- Repression of desires (Freud)
- Fear of gods and *fear of death*.

Good Effects of Religion?

- Better human behavior?
 - Treat others better – **Golden Rule**
 - Women, slaves, infidels?
- Humans are happier?
 - Loved by god
 - Community
 - Promise of better future/life after death



Lucretius

- Bad things in life mainly due to ignorance.
- Counter ignorance & irrationality with *knowledge*.
- Teach people truth about *the nature of things*.

“The Nature of Things”

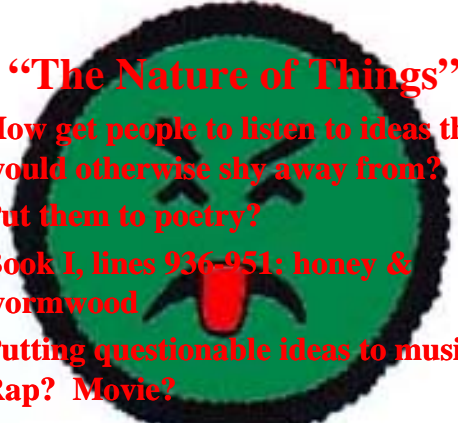
- Six books (chapters):
- *Books 1 & 2*: Basic principles of atomistic physics
- *Books 3 & 4*: The nature of the soul.
- *Books 5 & 6*: Explain the rest of the world—astronomy, meteorology, biology, geology, etc.
- Not need to bring in god to explain.

“The Nature of Things”

- Philosophy written as a poem. Why?
- Lucretius was a poet looking for a topic?
- Lucretius thought this philosophy could best be presented as poetry?
- All reality is atoms and void. No personal gods. No purpose. Empty existence?
- Problem of getting people to accept these strange and upsetting truths.

“The Nature of Things”


- How get people to listen to ideas they would otherwise shy away from?
- Put them to poetry?
- Book I, lines 936-951: honey & wormwood
- Putting questionable ideas to music? Rap? Movie?




Poetry

- Socrates sings charms (Phaedo 77e)
- Other values of poetry
- Translation loses its poetic value
- Its ideas aren't so strange to us.

“The Nature of Things”

- Basic Doctrines:
- Nothing comes to be out of nothing (I, 150)
 - No creation *ex nihilo*.
 - All “creation” is really just reorganization.
 - Creating a statue: 



“Nothing comes from nothing, nothing ever could.”

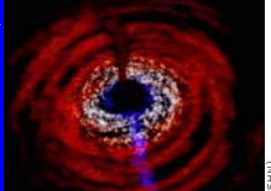
Creation in Judeo-Christian Tradition

Genesis 1: 1-2

- “In the beginning God created heaven and earth. Now the earth was a formless void, there was darkness over the deep, with a divine wind sweeping over the waters. God said...”
- “When God began creating heaven and earth, the earth being then a formless void, with darkness over the deep, and a divine wind sweeping over the waters, God said...”

“The Nature of Things”

- Basic Doctrines:
- Nothing comes to be out of nothing (I, 150)
- Nothing can be reduced to nothing (I, 216)
 - No literal annihilation
 - Destroying a statue.
 - Black holes?

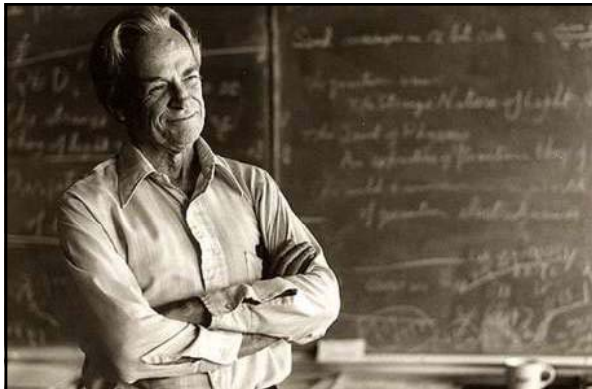


“The Nature of Things”

- Basic Doctrines:
- Nothing comes to be out of nothing (I, 150)
- Nothing can be reduced to nothing (I, 216)
- All sensation and all change is caused by the physical impact of one body on another (I, 304).
 - Wind, odor, evaporation, erosion.

“The Nature of Things”

- So there must be tiny particles that are too small to see, to account for these changes.
- Greek atomism is conceptual.
- *Not experimental.*
- Experimental evidence for atomism comes much later.



Richard Feynman (1918-1988): Nobel 1965

“Atomism is the most important and far-reaching hypothesis ever formulated about nature.”

Lecture at Cal Tech 1961.

