NS 280: Week #3 Handout, 2002.02.11
by Douglas Leonard

Announcements

• The official class list is now given at the Course Web Site:
  http://helios.hampshire.edu/~dlNS/inventingreality/
  If your name is NOT on the list and you think it should be, see me.
• Buy the Reader. If you haven’t already done so, please purchase the Course Reader from Collective Copies in downtown Amherst (71 South Pleasant St. 256-6425). It costs about $50.00.

Assignment for Wed., Feb. 13

• Reader: p. 82 - 89. The Dome of Heaven from Coming of Age in the Milky Way, by Timothy Ferris. This is the first chapter from a great little book. Here, Ferris eloquently sketches out the “problem of the planets”, introducing us to the vexing dilemma of retrograde motion, and how humans sought to explain it. He covers a lot of historical ground, providing along the way memorable descriptions of both Plato and Aristotle. This reading will be the starting point for the class on Wed. evening.

Assignment for Monday, Feb. 17

• Reader: p. 14 - 22. Socrates from Theaetetus, as told by Plato. Almost all of the work that has come down to us from Plato is in the form of dialogues, many of which feature his teacher and friend, Socrates. Socrates (470-399 BC) was an engaging and infuriating figure in ancient Greece, known for his ruthless questioning of others’ knowledge. Since Socrates never wrote any of his dialogues down, we are beholden to Plato’s works for insight, of which Theaetetus is one of the most famous. Historians and philosophers have long debated the influence of Socrates’ thinking on Plato, and, indeed, the extent to which “Socrates’” words in Plato’s dialogues actually bear resemblance to what the man himself might have said. Ultimately, it is probably an unanswerable question. For our purposes, though, what Socrates said is less important than the method he used to ruthlessly inquire into so many of the cherished beliefs held by his fellow Athenians, and the results he extracted. Here, we eavesdrop on a conversation among a group of people, the only notable one being Socrates (note that ‘Euclid’ is not the famous geometer who lived later). As you read this, I want you to ask yourself: What is Socrates’ point? Why is he putting this youth through such a grilling inquisition?

• Reader: p. 23 - 24. Euclid. It’s hard to overstate the importance of Euclid’s axiomatic method in the development of science and logical thought. In this excerpt, some of the definitions, postulates (accepted, fundamental truths) and axioms (self-evident truths) that open his masterwork, The Elements, are given, followed by a typical problem: in this case, to describe an equilateral triangle upon a given line. Note how it all follows elegantly from the previously defined terms. Remember not to get too mired in the mathematics; keep your focus on the overarching philosophical principle: If one agrees with stated postulates and axioms, and the proof is solidly built, then one must believe in the results of a Euclidean proof. This powerful idea transcends mathematics and pervades human thought.

• Reader: p. 25 - 26. Plato, from The Republic. Here Plato discusses the purposes for, and methods of, astronomy in the ideal educational syllabus (believed to be followed in Plato’s Academy). Although Plato speaks through the character of Socrates, the words and many of the ideas are generally thought to be Plato’s own. In this excerpt, the characters (Glaucon is actually Plato’s brother’s name) agree that one must certainly learn a good deal of mathematics – in particular, plane geometry. Then Socrates raises the question of astronomy. Note how he belittles the role of observation of the heavens as a means of arriving at truth.

• Reader: p. 27 - 30. Plato, from The Republic. This is the famous Simile of the Caves passage, from The Republic, in which Plato reveals his theory of knowledge. In this passage, men are imprisoned within a deep cave, chained so as to be incapable of moving their heads. Behind them is a wall, and beyond that
a fire. People walk back and forth beneath the wall, holding above it various objects, including statues of humans and animals, which cast shadows on the wall of the cave visible to the prisoners. The prisoners see only the shadows cast by these statues and other objects; having lived in the cave from childhood, they no longer recall any other reality. They do not suspect that these shadows are but imperfect images of objects that they cannot see, and so they mistake the shadows for real things. The analogy here, as discussed on the first day of class, is to humans’ everyday experience with the physical world of objects, which are shown to be shadowy, imperfect replicas of the perfect objects that exist in the “world of forms”. We are all souls imprisoned in bodies. The shadows of the allegory represent the world of sense experience. The soul, peering out from its prison, is able to perceive only these flickering shadows, and the ignorant claim that this is all there is to reality.

- *Optional Reading:* Kuhn, The Copernican Revolution. Chapters 1 and 2. Covers in great detail (more than given in class) the “2-sphere universe”, and the “problem of the planets”, retrograde motion. Includes a hefty dose of philosophy and history of science as well.

*Weekly Thought Question*

Imagine that you suddenly given eyes that can perceive things that are 200 million times fainter than your present eyes can (for example, from Amherst you would be able to see the headlights on a car driving in California). Now imagine that you focus these powerful eyes on a “blank” patch of sky (blank to normal humans’ eyes) with an area only as big as a grain of sand held at arm’s length (i.e., a very tiny patch of sky). *Draw* or *describe* what you think you would see.