Philosophy 167: Science Before Newton's PRINCIPIA

Assignment for October 7

Galileo's Two New Sciences: Local Motion

Reading:

Galileo, Two New Sciences, "The First Day," p. [105, bottom] to p. [116, bottom] (i.e. pp. 64-76 in Drake edition); pp. [127] to [132, middle] (i.e. pp. 86-91 in Drake edition).

----"The Third Day," p. [190] through p. [225] (i.e. pp. 147-175 in Drake edition).

Questions to Focus On:

1. **Galileo makes various claims about the local motion of heavy bodies falling to the earth in the absence of resistance from air or any other medium. Assuming that no one had a means of effecting a sufficient vacuum at the time to test such claims directly, in what sense were these claims empirical at all?**

2. **The Treatise from which Salviati reads is a work in mathematics, proceeding from definitions to geometrically proved theorems. What evidence authorizes the further step of concluding that actual objects satisfy the definitions, so that the theorems can be taken to apply to motion in the world?**

3. **A key postulate in the Treatise is that the velocity acquired by an object moving on an inclined plane depends only on the height from which it starts, and not on the inclination of the plane. What grounds are offered for accepting this postulate? Are the grounds adequate?**

4. **What exactly does the legendary inclined plane experiment described on pages [212] to [214] show? In particular, what background assumptions have to be adopted to draw Galileo's conclusion from the stated observed results?**

5. **Galileo insists in the "First Day" that circular pendula of the same length are isochronous -- the time it takes for the pendulum to reach the bottom when started from 60 degrees is exactly the same as the time it takes when started from e.g. 10 degrees. How can he tell this? Why would it be of value in the design of clocks?**