

Phil. 401: Discussion Questions

Boyle's Air Pump and the Barometer

February 2nd, 2017

Readings:

- Pascal. Excerpt from "Story of the Great Experiment on the Equilibrium of Fluids." In M. Oster. *Science in Europe, 1500-1800: a primary sources reader*. Palgrave, 2002. Pages 133-135.
- James Conant. "Robert Boyle's Experiments in Pneumatics." In J. B. Conant. *Harvard case histories in experimental science*. Vol. 1. Harvard University Press, 1957. Pages 1-22, 38-42, and 57-62.

Experimental Details

Briefly summarize Pascals experiment and Boyles first experiment. To do so, answer the following questions:

1. Which hypotheses did Boyle and Pascal wish to test/confirm?
2. Describe the instrument and procedures used in both experiments.
3. For each hypothesis under consideration, explain what the expected outcome of the experiment would be if the hypothesis were true.
4. What were the outcomes of the two experiments?
5. How did the outcomes of the experiments provide evidence for or against the hypotheses under investigation?

Epistemological Questions

1. Who helped and/or witnessed Boyle and Pascal respectively conduct their experiments? Were those individuals necessary for the success of the experiment? If so, why? If not, why were the individuals included?
2. Compare and contrast Boyle's original diagram of his air pump on page 18 with Conants diagram on page 17. What purposes might the diagrams respectively serve? Is Boyles diagram superior in any respects? What about Conants?

3. Aristotle distinguished “natural” motions (e.g., a rock moving towards the center of the universe) from “unnatural” ones (e.g., a rock being lifted by a lever). An object moves naturally when its motion is a result of its nature/essence, whereas an object moves unnaturally when its motion is caused by some other object. Brainstorm reasons that one who accepts Aristotles distinction between natural and unnatural/artificial events might find Boyles experiment untrustworthy.
4. Boyle reports that his second experiment, in which he tried to detect the existence of a fluid “more subtle” than air, was unsuccessful. Why did he report it?

Scientific Practice

1. How were Boyles results disseminated? For example, were Boyles experiments described in journal articles? Explain.
2. How does Conant explain the accuracy of Perriers observations in Pascals experiment?