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### PHIL 411.01: Philosophy of Science

Burke A. Townsend

*University of Montana - Missoula*

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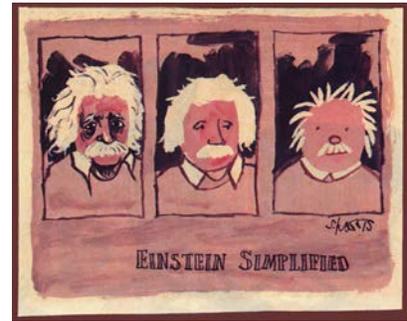
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# PHILOSOPHY OF SCIENCE

PHILOSOPHY 411

Fall, 2005



## BACKGROUND

If one pulls from the shelves of the library and peruses a volume of the *Transactions of the American Philosophical Society*, one may well think, “This isn’t philosophy—it’s science.” If one enrolls in a class taught by any of several university professors holding a Chair of Natural Philosophy, one may be surprised to find that the subject matter of the class is physics, astronomy, biology, or even mathematics. The fact of the matter is that, prior to the twentieth century, the fields we now think of as those of the natural sciences were thought of as constituting *natural philosophy*. Though names have been changed in most venues, the label ‘natural philosophy’ is still employed for the sciences in many applications around the world.

And the label should not be surprising. Philosophy, after all, has traditionally been the search for knowledge of the nature of the world. *Moral* philosophy was concerned with the particular nature of humankind, while *natural* philosophy was concerned with the rest of the world. Thus Newton’s famed treatise on the motions of earthly and heavenly bodies was entitled (in translation from the Latin) *Mathematical Principles of Natural Philosophy* and was understood as continuing investigations into the nature of the world in the tradition of Descartes and Leibniz (who were, indeed, the main philosophical “opponents” or alternatives to Newton in his time).

Understood simply as the effort to understand the general principles underlying the natural order—by means of independent and logically disciplined critical inquiry rather than by the teachings of authority or tradition—modern science simply *is* natural philosophy. And hence the philosophy of science must appear a rather odd kind of inquiry: the philosophy of natural philosophy. Indeed, like philosophy more generally, the philosophy of science in contemporary times does constitute a field uncertain of its bearings. In many important areas, the central work that at one time was that of philosophy is now done by others, leaving philosophers to an ill-defined level of “meta” inquiry—the philosophy of philosophy—the contents and methods of which are unclear and much debated.

One inviting retreat is to relegate to philosophy the so-called epistemological concerns—those of the methods of science, of the “ways of knowing” characteristic of science. While it is far from clear that there is an area of inquiry here distinct from both the natural sciences themselves and from the social sciences—the areas of moral philosophy—energy to sustain a philosophy of science concerned primarily with the epistemology of natural science has been provided by the long-standing belief that natural science does employ a special method to generate its results, by the traditional concern of philosophy with logic and the methods of reasoning, and by the absence of an obviously successful competing field in psychology or sociology.

Most introductory courses in the philosophy of science, indeed, focus on such epistemological issues: scientific method and science versus pseudoscience, objectivity in science, the logic of

empirical support, the logic of explanation in science, truth and realism in scientific theory. Such a focus, however, limits one to “metascientific” efforts of uncertain status and productivity and excludes all attention to the exciting core of what was once natural philosophy: what is the nature of the world?

Accordingly, this course will shift attention more toward the great tradition of natural philosophy itself. There are important and legitimate questions, to be sure, about the epistemology of science, and we will encounter and discuss them—as they arise in the consideration of the tradition of natural philosophy, however, rather than as abstracted issues of the philosophy of science. We will consider the origins of science and philosophy in ancient Greece, the rise of modern science in the 16th and 17th centuries, the changes in science arising in 19th-century developments, and the truly mind-boggling character of contemporary physical theories. We will reflect not only on the kinds of epistemological issues which were lively concerns at various junctures in the development of natural philosophy, but on the “big issues” concerning the nature of the world explored: the space-time setting in which the world occurs and the fundamental character of its constitution and operation.

There is, rather obviously, much more here than can be adequately treated in any one semester course, and we may well need to do some adapting of our reflections along the way. We are going to try, however, to shape an introduction to the philosophy of science rather more akin to familiar historical introductions to philosophy than is the typical philosophy of science course.

## READINGS

DeWitt, *Worldviews: An Introduction to the History and Philosophy of Science*  
Various selections posted on electronic reserve at the Mansfield Library

## REQUIREMENTS

Evaluation for the course will be based upon performance in three areas: oral summaries in class (20%), a series of take-home writing questions (40%), and a term paper project (40%). The nature of the project will be discussed further in class. A brief outline of your proposal for the project will be due on or before Monday, October 28.

Instructor: Burke Townsend  
Office: LA 101  
Office hours: Daily 1-2, & by appt.  
Phone: campus 243-6233; home 549-9083  
E-mail: burke.townsend@umontana.edu