HPS 2501/PHIL 2600 Philosophy of Science (Core) Fall 2002

Requirements: At least one class presentation. *N* short (2-3 pages, typed, double spaced) papers, where *N* = (6 - (# of presentations - 1)). Final in-class exam, December 10.

Content: Roughly the first 2/3 of the course will be devoted to a survey of methodological problems in the philosophy of science while the last 1/3 will focus on foundations issues in particular sciences.

Overview

1. Machamer, "A Brief Historical Introduction to the Philosophy of Science," in Machamer (ed.), *The Blackwell Guide to the Philosophy of Science*, pp. 1-17.
2. Worrall, "Philosophy of Science: Classic Debates, Standard Problems, Future Prospects," *ibid.*, pp. 18-36.

Methodological issues

A. The demarcation problem

General issues:

1. Hempel, "Empiricist Criteria of Cognitive Significance," in *Aspects of Scientific Explanation*, pp. 101-122.
2. Laudan, "The Demise of the Demarcation Problem," in Cohen and Laudan (eds.), *Physics, Philosophy and Psychoanalysis*, pp. 111-127.

Two applications:

1. The Arkansas Creationism Act, the Overton decision in *McLean v. Arkansas*, and the philosophical aftermath.
   (a) "Act 590 of 1981"
   (b) Excerpts from the testimony of Michael Ruse
   (c) Excerpts from Overton's decision
   (d) Laudan, "Science at the Bar–Causes for Concern," *Science, Technology, and Human Values* **7** (1982): 16-19.
   (e) Ruse, "Pro Judice," *ibid.* **7** (1982): 19-23.
   (f) Laudan, "More on Creationism," *ibid.* **8** (1983): 36-38.
2. Astrology
   (a) Thagard, "Pseudoscience," from *Computational Philosophy*, pp. 157-173.
   (b) Thagard, "Why Astrology Is a Pseudoscience," *PSA 1978*, Vol. 1, 223-234.

B. Probability, induction, and confirmation

1. Hempel, "Studies in the Logic of Confirmation," in *Aspects of Scientific Explanation*, pp. 3-52.
2. Hájek and Hall, "Induction and Probability," in Machamer (ed.), *The Blackwell Guide to the Philosophy of Science*, pp. 149-172.
3. Earman and Salmon, "Hume's Problem of Induction," in Salmon et al., *Introduction to the Philosophy of Science*, pp. 55-66.

C. The structure of scientific theories (syntactical vs. semantic view, statement vs. models view, etc.)

1. Carnap, "The Methodological Character of Theoretical Concepts," sections 1-5, in Feigl and Scriven (eds.), *Minnesota Studies in the Philosophy of Science*, Vol. 1, pp. 38-76.
2. van Fraassen, "The Semantic Approach to Scientific Theories," in Nercessian (ed.), *The Process of Science,* pp. 105-123.
3. Giere, "Models and Hypotheses," in Explaining Science, pp. 78-91.
4. Craver, "Structures of Scientific Theories," in Machamer (ed.), *The Blackwell Guide to the Philosophy of Science*, pp. 55-79.

D. Scientific realism

Realism vs. instrumentalism

1. Hempel, "The Theoretician's Dilemma," in Feigl et al. (eds.), *Minnesota Studies in the Philosophy of Science*, Vol. 2, pp. 37-98.

Realism vs. constructive empiricism

1. van Fraassen, "Arguments Concerning Scientific Realism," in *The Scientific Image*, pp. 6-39.
2. Martin Carrier, "What Is Wrong with the Miracle Argument?" *Studies in the History and Philosophy of Science* **22** (1991): 23-36
3. Laudan, "A Confutation of Convergent Realism," in Leplin, (ed.), *Scientific Realism*, pp. 218-249.
4. Psillos, "Resisting the pessimistic induction," and "Historical illustrations," in *Scientific Realism*, pp. 101-145.

E. Laws of nature

1. Giere, "The Skeptical Perspective: Science Without Laws of Nature," in Weinert (ed.), *Laws of Nature. Essays on the Philosophical, Scientific and Historical Dimensions*, pp. 120-138.
2. Swartz, "The Neo-Humean Perspective: Laws as Regularities," in Weinert, pp. 67-91.
3. Ramsey, "Law and Causality,"in *Foundations: Essays in Philosophy, Logic, Mathematics and Economics*, pp. 129-151.
4. Lewis, *Counterfactuals*, pp. 72-77.
5. Armstrong, *What Is a Law of Nature?* Chs. 2-4.
6. Pitroski and Rey, "When Other Things Aren't Equal: Saving Ceteris Paribus Laws from Vacuity," *British Journal for the Philosophy of Science* **46** (1995): 81-110.
7. Earman and Roberts, "*Ceteris Paribus* There Are No Provisos," Synthese **118** (1999): 439-478

F. Explanation

1. Hempel, "Aspects of Scientific Explanation," in Aspects of Scientific Explanation, pp. 333-376.
2. Salmon, "Causal Connections" and "Conjunctive and Interactive Forks," in *Scientific Explanation and the Causal Structure of the World*, pp. 135-183.

3. Hitchcock, "Salmon on Explanatory Relevance," *Philosophy of Science* **62** (1995): 304-320.
4. Kitcher, "Explanatory Unification," *Philosophy of Science* **48** (1981): 507-531.
5. Barnes, " Explanatory Unification and the Problem of Asymmetry," *Philosophy of Science* **59** (1981): 558-571.
6. Woodward, "Explanation," in Machamer (ed.), *The Blackwell Guide to the Philosophy of Science*, pp. 37-54.

Foundations issues

A. The philosophy of biology

Sandy Mitchell, Paul Griffiths, and James Lennox will make guest appearances to share their expertise in this exciting field.

B. Laws, symmetries, and invariances

1. van Fraassen, "Symmetries Guiding Modern Science," in *Laws and Symmetry*, pp. 262-289.
2. Earman, "Laws, Symmetry, and Symmetry Breaking; Invariance, Conservation Principles, and Objectivity," ms.

C. Determinism

1. Earman, "Determinism in the Physical Sciences," in Salmon et al., *Introduction to the Philosophy of Science*, pp. 232-263.

D. The philosophy of space and time: time travel and time machines

1. Arntzenius and Maudlin, "Time Travel and Modern Physics," *Stanford Encyclopedia of Philosophy*, http://plato.stanford.edu/contents.html
2. Earman and Smeenk, "Take a Ride on a Time Machine," to appear in R. Jones (ed.), *Fine Fest.*

E. The measurement problem in quantum mechanics

1. Ruetsche, "Interpreting Quantum Theories," in Machamer (ed.), *The Blackwell Guide to the Philosophy of Science*, pp. 199-226.