

Phil 420 Philosophy of Science Winter Term 2006

Syllabus and Readings

Professor: Jamie Tappenden 2228 Angell Hall

Email: tappen@umich.edu

Time: 2:30 - 4:00

Room: 3451 Mason Hall

Requirements: Three short papers, each worth 1/3 of the grade

Class participation and improvement over the course of the term may be taken into consideration on close calls and "round up or down" decisions.

A webpage for posting additional materials, paper topics, etc. is at:

<http://www-personal.umich.edu/~tappen/Phil420.htm>

Unless indicated otherwise, the readings below are from the collection:

Philosophy of Science: The Central Issues, edited by M. Curd and J. Cover.

Curd and Cover's editors notes on the readings and topics are often lucid and helpful; you should read those notes along with the readings themselves.

The only other required books are *The Philosophy of Biology* 2nd. Ed. by Elliot Sober and *Intelligent Design: The Bridge Between Science and Theology* by William Dembski

You can order the books online from amazon.com or similar stores.

Readings Marked **Tanner** will be on reserve in the Tanner philosophy library, 1171 Angell Hall.

Readings Marked **Jstor** are available on JSTOR.

Do the readings before the lecture in which they are to be discussed.

Weekly readings

Jan. 5

Introductory overview lecture (no readings)

Part I: Science and Pseudo-Science: the "Problem of Demarcation"

Jan. 10 and Jan 12

Karl Popper "Science: Conjectures and Refutations"

Available online at:

http://www.stephenjaygould.org/ctrl/popper_falsification.html

Thomas Kuhn: "Logic of Discovery or Psychology of Research?"

Imre Lakatos: "Science and Pseudo-Science"

This is available online at:

<http://www.lse.ac.uk/collections/lakatos/scienceAndPseudoscience.htm>

As an added bonus at this site you can hear the lecture as delivered by Lakatos on the radio.

Michael Ruse "Creation Science is not Science"

Part II: Good Thinking in Science I - Induction, Prediction etc.

For this and the next section, a clear introductory resource is the book Choice and Chance (4th ed.) by Brian Skyrms. (**Tanner**)

I would have made this a required text, but the price of over \$40 for such a slender paperback is outrageous, and such extortion by textbook publishers shouldn't be encouraged.

Jan. 17 and Jan. 19

The Problems(s) - ravens, emeralds, the uniformity of nature, etc

Karl Popper: "The Problem of Induction"

Nelson Goodman *Fact, Fiction, Forecast* Chapters III and IV:

"The New Riddle of Induction" and "Prospects for a Theory of Projection" **Tanner**

The chapters are also currently online (I don't know how long this link will last) at:

<http://www-unix.oit.umass.edu/uril/phil382/files/goodman.pdf>

Jan. 24

Some Footholds for Some Answers: Prediction, theoretical virtues

Wesley Salmon: "Rational Prediction"

Carl Hempel: "Criteria of Confirmation"

Part III: Good Thinking in Science II - Bayesian Theories of Rational Belief

Jan. 26 and Jan. 31

Alan Hájek's online article on probability theory:
<http://plato.stanford.edu/entries/probability-interpret/>
(Pay special attention to section 3.5)

James Joyce: "Bayes' Theorem" online at:
<http://plato.stanford.edu/entries/bayes-theorem/>
Clark Glymour "Why I am not a Bayesian"

Part IV: "Theory-Ladenness" of Observation and Holism

Feb. 2, Feb. 7

Pierre Duhem: "Physical Theory and Experiment"
Ian Hacking: "Do We See through a Microscope?" *Pacific Philosophical Quarterly* 1981 **Tanner**
Norbert Hanson: "Observation" from *Patterns of Discovery* **Tanner**

***** **First paper due** ***** **Feb 9**

Part IV: Explanation

Feb. 9, Feb. 14

C.Hempel "Two Basic Types of Explanation"
C.Hempel "The Thesis of Structural Identity"
D.Ruben "Arguments, Laws and Explanations"
Phillip Kitcher "Explanatory Unification" **Jstor**
Michael Friedman "Explanation and Understanding" **Jstor**
See also the Stanford Encyclopedia article by James Woodward:
<http://plato.stanford.edu/entries/scientific-explanation/>

Special topics: probability and mathematical explanation

Feb. 16

Peter Railton "A Deductive-Nomological Model of Probabilistic Explanation"
Paolo Mancosu "Mathematical Explanation: Problems and Prospects", *Topoi* 20, 2001

Part V: Kuhn and the "Revolution" Revolution

Feb. 21, Feb. 23

T.Kuhn "The Nature and Necessity of Scientific Revolutions"

T.Kuhn "Objectivity, Value Judgement and Theory Change"

E. McMullen "Rationality and Paradigm Change in Science"

A. Bird "Thomas Kuhn" Stanford Encyclopedia of Philosophy entry at:

<http://plato.stanford.edu/entries/thomas-kuhn/>

***** Winter Break Feb. 25 - Mar. 6 *****

Part VI: Science as Social: some potential implications

Mar. 7, Mar. 9

H. Longino "Values and Objectivity"

K. Okruhlick "Gender and the Biological Sciences"

Part VII: "Inference to the best explanation and the realism debate:

Instrumentalism and Logical Positivism vs. Sellarsian Realism vs. Anti Realism

Mar. 14, Mar. 16

G. Maxwell "The Ontological Status of Theoretical Entities

B. van Fraassen "Arguments Concerning Scientific Realism"

Richard Boyd "Scientific Realism" article in the Stanford Encyclopedia:

<http://plato.stanford.edu/entries/scientific-realism/>

***** Second paper due ***** March 16

Part VIII: Philosophy of Biology

Evolution and Creation again; Adaptationism

Mar. 21, Mar. 23

E. Sober *Philosophy of Biology* chapters 1,2, and 5

The Intelligent Design Debate

Mar. 28, Mar. 30

David Hume “Of Miracles” chapter X of Hume’s *An Enquiry Concerning Human Understanding*

The full text is online at:

<http://eserver.org/18th/hume-enquiry.html>

W. Dembski *Intelligent Design: The Bridge Between Science and Theology*

Judge Jones’ Opinion in *Katzenmiller vs. Dover School District* (I will post the text online.)

Part IX: Other Things

The Role of Experiment

April 4

Allan Franklin “Experiment in Physics” online at:

<http://plato.stanford.edu/entries/physics-experiment/>

Simplicity: What is it and why do we want it?

April 6

Alan Baker “Simplicity” online at:

<http://plato.stanford.edu/entries/simplicity/>

A paper by Malcolm Forster called “The New Science of Simplicity” is interesting, but optional reading because it presupposes a bit more technical background and fluency than I want to presuppose. It is online at:

<http://philosophy.wisc.edu/forster/SciSimp.pdf>

Statistical Physics

April 11

Larry Sklar "Philosophy of Statistical Mechanics" online at:
<http://plato.stanford.edu/entries/statphys-statmech/>

The online article is an outline of some issues. For more detail, a good resource is:
Larry Sklar *Physics and Chance: Philosophical Issues in the Foundations of Statistical Mechanics*
Tanner (not required reading; just optional background)

Issues in Space and Time: Relationalism vs. Substantivalism; Time's Flow

April 13

Steven Savitt, "Being and Becoming in Modern Physics", online at:
<http://plato.stanford.edu/entries/spacetime-bebecome/>

Alan Janis, "Conventionality of Simultaneity" online at:
<http://plato.stanford.edu/entries/spacetime-convensimul/>

John Norton: "The Hole Argument" online at:
<http://plato.stanford.edu/entries/spacetime-holearg/>
(This paper presupposes some technical apparatus. Read as much as you can and don't worry if you only get an impressionistic sense of what is going on.)

Last Class: Special requests, extra day in case something goes overtime, etc.

April 18

***** **Final paper due** ***** **April 18**