Philosophy of Biology

Philosophy 551
Spring Term 2010 – Purdue University
Instructors: Martin Curd & Daniel Kelly

Syllabus

1. Course Description

In celebration of the 201st anniversary of the birth of Charles Darwin and the 151st anniversary of the first publication of *On the Origin of Species*, this course will examine issues in philosophy of biology in the light of Darwin's theory. The first third of the course will focus on Darwin's initial formulation of the theory: its underlying concepts, the logic of Darwin's "long argument," the evidence supporting the theory (then and now), Darwin's replies to objections, how Darwin's theory contrasts with competing accounts of speciation such as Lamarckianism and special creationism. We will then examine the reception of Darwin's theory by his contemporaries and critics, and the incorporation of Mendelian genetics into evolutionary biology that culminated in the Modern Synthesis. We will also discuss the recent debate about creationism and intelligent design.

The second third of the course will examine a number of key concepts and issues against the backdrop of the Modern Synthesis. These will probably include adaptationism and its critics, species, fitness, units and levels of selection, laws and explanation, reductionism, functions, and taxonomical issues (systematics, cladistics, etc.)

The final third of the course will examine attempts at applying the approach and conceptual repertoire of biology and evolutionary theory to human beings. Topics we may look at in this section of the course include sociobiology, evolutionary psychology, culture and gene-culture co-evolutionary theory, evolutionary epistemology, ethics and altruism, and human nature.

2. Class Meetings

Class lectures meet Wednesday from 2:30pm – 5:20pm in Room 1248 of Beering Hall.

3. Office Hours and Contact Information

Professor Curd:
Office: 7129 Beering Hall
Email: curd@purdue.edu
Fall Term Office Hours: Monday,1-3 pm and by appointment

Professor Kelly:
Office: 7126 Beering Hall
Office Phone: 732-932-9861 ext. 114
Email: drkelly@purdue.edu

Fall Term Office Hours: Wednesday, 10:00am – 12:00 pm and by appointment

4. Course Requirements and Grading

Each student registered for the course is required to do the following:

Each week you may write a critical discussion note on some interesting aspect of the assigned readings. You might, for example, criticize an argument or explain why you think the author is confused on some point. These will be no more than 2 to 3 pages, and you can turn in no more than one submission per week. Over the course of the semester, you are required to submit six of these notes, which should be handed in at the beginning of class on Wednesday. You can submit more than six if you wish, but you must write at least six. These will be given a √, √+, or √-. Your six best will count 1/3 towards your grade.

Give one seminar report. See the syllabus for the (tentative!) schedule of topics and readings. Each report should be accompanied by a typed summary. Topics will be doled out on a first come, first serve basis. Your report and summary will be evaluated, but they will not count towards your grade.

Write two research papers (about 15 pages each) on issues central to the course.

We will simply assign letter grades to papers (reflecting the standard 0-100 point grading scale):

100-93:	A
92-90:	A-
89-87:	B+
86-83:	B
82-80:	B-
79-77:	C+
76-73:	C
72-70:	C-
69-60:	D
59-0:	F

Final grades will be determined as follows:

6 Best Critical Discussions	33%
Two Papers	33% each (66% total)
Participation	1%

EMAILED AND ELECTRONICALLY SUBMITTED PAPERS WILL NOT BE ACCEPTED. Papers not turned in by the end of class the day they are due are LATE. For each day late, 7 points will be deducted.

5. Course Policies

Emergencies: In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a

revised semester calendar or other circumstances. Information about emergencies changes in the course can be gotten by contacting either instructor via email or phone, or by consulting the course website. Purdue's Emergency Procedures Handbook and other important emergency planning information is available online at

http://www.purdue.edu/emergency_preparedness/

Plagiarism: With the advent of the internet, plagiarism has become an increasingly serious problem at universities around the country, particularly in classes like this one, where papers determine a substantial part of the grade.

In order to avoid plagiarizing from a source, both direct quotations *and paraphrases or summaries* of material found in traditional print media or on the internet must be acknowledged. If you have any questions about how this definition will be interpreted, please do not hesitate to discuss the matter with me.

Plagiarism and cheating on exams undermines the integrity of the academic community. When undetected, it gives the perpetrator an unfair advantage over students who are graded on the basis of their own work. In this class we will do our best to detect plagiarism and cheating. Students who are aware of violations by others should bring this to my attention. This is the right thing to do. It is also in your own self-interest.

There will be zero tolerance for plagiarism in this course. Plagiarized papers will receive a 0, the student will automatically fail the course, and their name will be handed given to the university authorities. For more on the Purdue University policy on plagiarism, see the following websites:

http://www.purdue.edu/univregs/pages/stu_conduct/stu_regulations.html

http://www.purdue.edu/odos/osrr/academicintegritybrochure.php

With each paper assignment, a handful of students may be selected at random to submit their papers to TurnItIn, an online service that maintains an enormous database of papers that it uses to check for instances of plagiarism.

External Sources: Using sources not listed on the syllabus in researching and writing your papers is fine, as long as they are both to the point, and are properly cited. And at all times, when in doubt, ***cite your sources***! It is the best way to avoid being accused of plagiarism.

This is probably the best place to make this point, too: Wikipedia can be valuable for getting a very broad grasp of positions and debates, but when it gets into details, especially on philosophic topics, it is very often horrible – sketchy, convoluted, misinformed, and often simply wrong. If you wish to consult online resources, I suggest you use some of the other, much better sites. Most prominent is the Stanford Encyclopedia of Philosophy, but others are useful as well:

Stanford Encyclopedia of Philosophy http://plato.stanford.edu/
The Internet Encyclopedia of Philosophy http://www.iep.utm.edu/
Episteme Links http://www.epistemelinks.com/Main/MainEncy.aspx

6. Website

Information, comments, and some readings and lecture notes will be posted on the course website, which can be reached via Professor Kelly's homepage:

http://web.ics.purdue.edu/~drkelly/

The course website itself can be found here:

http://web.ics.purdue.edu/~drkelly/PhilBioSpring2010.html

7. Texts

The following four books will be required for this course:

Darwin, C. *On the Origin of Species* (1st edition, 1859)
Sober, E. *Philosophy of Biology* (2nd edition, Westview Press, 2000)
Hull, D. and Ruse, M. (eds.) *The Philosophy of Biology* (OUP, 1998)
Richerson, P and Boyd, R. *Not by Genes Alone* (The University of Chicago Press, 2004)

Other useful resources include the following:

Dennett, D. *Darwin's Dangerous Idea* (Penguin 1995)
Lewens, T. *Darwin* (The Routledge Philosophers, 2006)
Hodge, J. and Radick G. (eds.) *The Cambridge Companion to Darwin* (2nd edition, Cambridge University press 2009)
Michael Ruse, *The Darwinian Revolution* (2nd edition, The University of Chicago Press 1999)
Tim Lewens website: http://www.hps.cam.ac.uk/research/philofbio.html

Supplemental readings will be posted on the course website as the semester progresses.

8. Topics and Readings

Here is a tentative schedule of topics and readings. Amendments and alterations will be announced in class as we go, both in class and on the webpage. Since reminders and other information will frequently be posted on the course website, *make sure you check the website on a fairly regular basis.*

Week 1: January 13th

Before the *Origin* (and after)
Darwin and Wallace

Required:
- Books
  - Darwin, *On the Origin of Species* (OS), Introduction
- Online readings

- Wallace's "Sarawak" (1855) and "Ternate" (1858) papers. Available on the Wallace web site <http://web2.wku.edu/~smithch/index1.htm> and on the course website.
    - A. R. Wallace, On the Law Which Has Regulated the Introduction of New Species (S20: 1855)
    - A. R. Wallace, On the Tendency of Varieties to Depart Indefinitely From the Original Type (S43: 1858)
- Lennox, James, "Darwinism", *The Stanford Encyclopedia of Philosophy (Fall 2008 Edition)*, Edward N. Zalta (ed.), URL = <http://plato.stanford.edu/archives/fall2008/entries/darwinism/>

Recommended/Useful/Interesting:

- Online readings
    - U. Kutschera, "A Comparative Analysis of the Darwin-Wallace Papers and the Development of the Concept of Natural Selection," *Theory in Biosciences* (2003) 122: 343-359.
    - Malcolm Jay Kottler, "Charles Darwin and Alfred Russel Wallace: Two Decades of Debate over Natural Selection,'" in *The Darwinian Heritage*, ed. David Kohn (Princeton University Press, 1985) 367-432.

The big picture: the two strands of Darwin's theory in OS and why it matters
Malthus, Lamarck, Lyell, Chambers
Wallace's route to NS
Darwin's route to NS
The Darwin-Wallace debate: Wallace's panselectionism; Darwin's pluralism (artificial selection, sexual selection, correlation of growth, inherited effects of use and disuse, direct action of environment: acclimatization)

Week 2: January 20th

Darwin's "long argument" in OS

Required:

- Books
    - Darwin, OS, Ch. 14; Chs. 1-5, 8, 10-13
    - D. Hull, "Darwin's Science and Victorian philosophy of science," in J. Hodge and G. Radick, eds, *The Cambridge Companion to Darwin*, 2nd edn (CUP, 2009) 173-196.
    - Excerpts from Wallace, *Darwinism* (London and New York: Macmillan, 1889), Ch. 7.

Recommended/Useful/Interesting:

- Online readings
    - Malcolm Jay Kottler, "Darwin, Wallace, and the Origin of Sexual Dimorphism," *Proceedings of the American Philosophical Society* (1980) 124: 203-226.
    - Malcolm Jay Kottler, "Alfred Russel Wallace, the Origin of Man, and Spiritualism," *Isis* (1974) 65: 144-192.

Victorian philosophy of science: Herschel, Whewell, Mill; the *vera causa* principle
Darwin's argument for NS

The explanatory scope and power of Darwin's theory
Darwin's case against special creationism
The Darwin-Wallace debate: sexual dimorphism, interspecific sterility and speciation, group selection
The descent of man

Week 3: January 27th

"Difficulties on theory."

Required:
- Books
  - Darwin, *OS*, Ch. 6, 7, 9

Recommended/Useful/Interesting:
- Online readings
  - D. Haig, "Weismann Rules! OK? Epigenetics and the Lamarckian temptation," *Biology and Philosophy* (2007) 22: 415-428.
  - Darwin, excerpt from 6th edn of OS, reply to Mivart

The reception of OS.
Absence or rarity of transitional varieties
Origins of peculiar habits and structures
Organs of extreme perfection and complication
Organs of little apparent importance
Fleeming Jenkins and blending inheritance; Darwin's theory of pangenesis, Weismannism
Lord Kelvin and the age of the earth

Week 4: February 3rd

The new synthesis

*E. Sober, PB, Ch. 1
M. Ruse, *The Philosophy of Biology* (London: Hutchinson & Co., 1973), Chs. 1 & 2.
Okasha, Samir, "Population Genetics", *The Stanford Encyclopedia of Philosophy (Fall 2008 Edition)*, Edward N. Zalta (ed.), URL = <http://plato.stanford.edu/archives/fall2008/entries/population-genetics/>.
D. M. Walsh, T. Lewens, and André Ariew, "The Trials of Life: Natural Selection and Random Drift," *Philosophy of Science* 69 (September 2002) 452-473.

The rediscovery of Mendel in 1900
Dispute between Mendelians and biometricians
The Hardy-Weinberg Law (1908)
Fisher, Haldane, Wright (1920s and 30s): population genetics; evolution as changes in gene frequencies
Natural selection, mutation, migration, drift, meiotic drive
Is NS a force or cause?

The drift vs selection controversy: gene polymorphism and the neutral theory of evolution

Week 5: February 10th

Creationism and intelligent design

*Plantinga and McMullin, H&R, 671-754
*E. Sober, PB, Ch. 2
Several papers by Sober available on his web site in the section "On Intelligent Design and Naturalism v. Supernaturalism" at
<http://philosophy.wisc.edu/sober/recent.html>
For his latest thinking, see, especially, "Why Methodological Naturalism?" and "Evolution without Naturalism"

The demarcation principle saga
US constitutional law
Recent cases: McClean (1982), Dover (2005); some unhappy philosophers (Laudan, Monton)
Sober's criticisms of ID; the likelihood principle
Naturalism

Week 6: February 17th

Topic: Adaptationism and its Critics

Required:
- Book:
  - *Philosophy of Biology*, Chapter 5 'Adaptationism'
    - Sober, 121 – 145
  - In Hull & Ruse's *The Philosophy of Biology*, 'The Leibnizian Paradigm'
    - Dennett, 38-51
- Online:
  - Reeve & Sherman, 'Adaptations: Meanings'
  - Gould and Lewontin, 'The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme'

Recommended/Useful/Interesting:
- Books:
  - *The Philosophy of Biology*, PART II: Adaptationism
    - Papers in Hull & Ruse, 3 – 86
  - *Darwin's Dangerous Idea*, Chapters 9 & 10 'Searching for Quality' and 'Bully for Brontosaurus'
    - Dennett, 229 – 312
- Online:
  - J. M. Smith, 'Optimization Theory in Evolution'

Topic: Functions

Required:
- Online:
  - Larry Wright "Functions"
  - Robert Cummins "Functional Analysis"

Recommended/Useful/Interesting:

- Books:
  - *The Philosophy of Biology*, PART IV: Function
    - Papers in Hull & Ruse, 221 – 292
  - *Darwin's Dangerous Idea*, Chapters 8 'Biology is Engineering'
    - Dennett, 187 – 228
- Online:
  - J. Bigelow and R. Pargetter, "Functions," J. Phil. 84 (1987) 181-196.
  - S. Mitchell, "Etiologies or Dispositions: A comment on Bigelow and Pargetter," J. Phil., 90 (1993) 249-259.

Week 7: February 24th

Topic: Fitness

The tautology problem
Definitions and interpretations of fitness

*E. Sober, Ch. 3

S. K. Mills and J. H. Beatty, "The Propensity Interpretation of Fitness," *Phil. Sci.* 46 (1979) 263-286.

Topic: Reduction and reductionism

Models of theoretical reduction
Does classical genetics reduce to molecular biology? The "many-many" problem
Are there laws in biology?

P. Kitcher, "1953 and All That: A Tale of Two Sciences," *Phil. Review* 93 (1984) 335-373.
K. C. Waters, "Why the Antireductionist Consensus Won't Survive the Case of Classical Mendelian Genetics", *PSA 1990* Volume 1, 125-139.
J. Fodor, "Special Sciences," *Synthese* 28 (1974) 97-115.
E. Sober, "The Multiple Realizability Argument against Reductionism," *Phil. Sci*. 66 (1999) 542-64.
E. Sober, "Two Outbreaks of Lawlessness in Recent Philosophy of Biology," *PSA 1996*, Part II, Phil. Sci. 64 (Proceedings) S458-S467.

Week 8: March 3rd

Species and Systematics (taxonomy)

*E. Sober, Ch. 6
*B. Mishler and R. Brandon, "Individuality, Pluralism and The Phylogenetic Species Concept". H&R 300-318
* M. Ereshefsky "Eliminative Pluralism". H&R 348-368

D. Hull, "A Matter of Individuality Philosophy of Science 47 (1978) 335-360.

E. Sober. "Evolution, Population Thinking, and Essentialism," Philosophy of Science 47 (1980)350-383.

A good resource here is Robert A. Wilson, ed., Species: New Interdisciplinary Essays (MIT Press, 1999): twelve specially commissioned essays.

The Linnaean hierarchy
Evolution, natural kinds and essentialism
Cladism vs. pheneticism vs.evolutionary taxonomy
Pluralism vs. monism

Week 9: March 10th

Topic: Units and levels of selection

Required:
- Book:
  - *Philosophy of Biology*, Chapter 4 'The Units of Selection Problem'
    - Sober, 89 – 120
- Online:
  - Okasha, 'The Units and Levels of Selection', in S. Sarkar and A. Plutynski (eds.) *A Companion to the Philosophy of Biology*, Oxford: Blackwell, 2008

Recommended/Useful/Interesting:
- Books:
  - *The Philosophy of Biology*, PART III: Units of Selection
    - Papers in Hull & Ruse, 147 – 220
  - *Darwin's Dangerous Idea*, Chapters 11 'Controversies Contained'
    - Dennett, 313 – 334
- Online:
  - Lloyd, E., 'Units and Levels of Selection'
  - Wilson & Wilson, 'Rethinking the Theoretical Foundation of Sociobiology'

Catch up

FIRST PAPER DUE

No Class: Spring Break March 15-20

Week 10: March 24th

EVOLUTION AND HUMANS

Topic: Sociobiology and Evolutionary Psychology
- *Philosophy of Biology*, Chapter 7 'Sociobiology and the Extension of Evolutionary Theory'
  - Sober, 188 – 220
- Online readings
  - Griffiths, 'Ethology, Sociobiology, and Evolutionary Psychology'
  - Samuels, 'Evolutionary Psychology and the Massive Modularity Hypothesis'
  - Cosmides and Tooby, 'Evolutionary Psychology: A Primer'

    - Tooby and Cosmides, 'Evolutionary Psychology: Conceptual Foundations'
    - Pinker – chapters 1 & 2 of *How the Mind Works*
    - Dennett, 'The Mythical Threat of Genetic Determinism'
    - Wilson et al. 'Multilevel Selection Theory and Major Evolutionary Transitions: Implications for Psychological Science'

Week 11: March 31st

Topic: Gene-culture Coevolution

- *Not By Genes Alone: How Culture Transformed Human Evolution*, Chapters 1-3
    - Richerson & Boyd, 1 – 98

Week 12: April 7th

- *Not By Genes Alone: How Culture Transformed Human Evolution*, Chapters 4-6
    - Richerson & Boyd, 99 – 236

Week 13: April 14th

- *Not By Genes Alone: How Culture Transformed Human Evolution*, Chapters 7
    - Richerson & Boyd, 237 – 258
- Online readings
    - Machery, NDRB Review
    - Sterelny, 'The Evolution and Evolvability of Culture'
    - *Philosophy and Biology* Symposium on *Not By Genes Alone*
        - Mameli, 'Understanding culture: a commentary on Richerson and Boyd's *Not By Genes Alone'*
        - Sperber & Claidiere, 'Defining and explaining culture (comments on Richerson and Boyd, *Not by genes alone*)
        - Shennan, '*Not by Genes Alone: How Culture Transformed Human Evolution*, by Peter J. Richerson and Robert Boyd'
        - Richerson & Boyd, 'Response to our critics'

Week 14: April 21st

Topic: The Evolution of Language

- Online readings
    - Pinker & Bloom, 'Natural Language and Natural Selection'
    - Hauser, Chomksy & Fitch, 'The Faculty of Language: What is it, Who has it, and How did it Evolve?'
    - Richerson & Boyd, 'Why Possibly Language Evolved'
    - Kirby, 'The Evolution of Language'

Week 15: April 28th

Topic: Human Nature AND/OR The Evolution of Morality (and Catch-up)

- *The Philosophy of Biology*, PART IV: Human Nature
    - Papers in Hull & Ruse, 369 – 442
- *Darwin's Dangerous Idea*, Chapters 16 & 17
    - Dennett, 452 – 510
- Online readings

- Machery & Mallon, 'Evolution of Morality'
- *Philosophy and Phenomenological Research* Symposium on Richard Joyce's *The Evolution of Morality*
    - Joyce, 'Precis of *The Evolution of Morality'*
    - Stich, 'Some Questions About *The Evolution of Morality'*
    - Carruthers & James, 'Evolution and the Possibility of Moral Realism'
    - Prinz, 'Acquired Moral Truths'
    - Joyce, 'Replies'

SECOND PAPER DUE