

EVOLUTION AND INTELLECTUAL REVOLUTION

Professors Anna Martini and Patrick Williamson

Readings

The following books are available for purchase at the Jeffery Amherst Bookshop. Multiple copies of these books are also available in the reserve room at Frost Library.

**Charles Darwin, On the Origin of Species, ed. Joseph Carroll (Broadview Press, 2003)**

**Richard Dawkins, The Selfish Gene (Oxford University Press, 2006)**

**Stephen Jay Gould, Wonderful Life: The Burgess Shale and the Nature of History (W.W. Norton, 1989)**

This last book must be ordered on line. For example, it can be purchased from Amazon.com at [http://www.amazon.com/Darwins-Century-Evolution-Men-Discovered/dp/B002C3UDSW/ref=sr\\_1\\_1?s=books&ie=UTF8&qid=1313283224&sr=1-1](http://www.amazon.com/Darwins-Century-Evolution-Men-Discovered/dp/B002C3UDSW/ref=sr_1_1?s=books&ie=UTF8&qid=1313283224&sr=1-1)

**Loren Eiseley, Darwin's Century: Evolution and the men who discovered it (Doubleday Anchor, 1961)**

All other readings are available in electronic form on the course website.

For those of you who come to love Darwin, going to <http://darwin-online.org.uk/> is like going to heaven. It's possible to wile away a pleasant hour or several listening to a reading of Darwin's diary written on the Beagle.

Schedule of Classes

*PART I DARWIN AND HIS PREDECESSORS*

Tu 9/6            Introductory Meeting

Th 9/8            Darwin on Darwin

Charles Darwin, selections from Autobiography (1876) in On the Origin of Species, pp. 425-444.

Eiseley, Darwin's Century: chapter 1.

Questions for discussion: How does Darwin explain his 'discovery' of the theory of evolution by natural selection? What influences does he credit as having contributed to his development as a naturalist?

Tu 9/13            Design and Transformation

Eiseley, Darwin's Century: Chapters 2

William Paley, selections from Natural Theology (1802) in On the Origin of Species, pp. 565-573.

Jean-Baptiste Lamarck, selections from Zoological Philosophy (1809) in On the Origin of Species, pp. 573-580.

**Two page paper due.** Paley saw divine design in nature; Lamarck did not. Consider the evidence and reasoning by which they supported their views. Which argument do you find more persuasive? Why? Do not refer in your response to any evidence or ideas that postdate these texts.

Th 9/15

Catastrophism and Uniformitarianism

Eiseley, Darwin's Century: Chapters 3 and 4.

Georges Cuvier, selections from Essay on the Theory of the Earth, trans. Robert Jameson (1812), excerpt.

Charles Lyell, selections from The Principles of Geology (1830-1833) in On the Origin of Species, pp. 605-608.

Lyell, selections from The Principles of Geology (1830-1833) excerpt.

**Two page paper due.** Lyell maintained that naturalists ought to assume that the past was like the present when trying to interpret the earth's history. What are the main arguments for and against this contention?

Tu 9/20

Lyell and Chambers on the 'Mystery of Mysteries'

Lyell, selections from The Principles of Geology excerpt.

Robert Chambers, Vestiges of the Natural History of Creation (1844), selections excerpt.

Questions for discussion: How did Chambers think that evolution worked? How might Lyell have responded to Chambers' argument?

Th 9/22

Darwin, Geologist

Eiseley, Darwin's Century: Chapter 6

Charles Darwin, selection from The Voyage of the Beagle (1839) in On the Origin of Species, pp. 446-450.

Darwin, Voyage of the Beagle (1839), pp. 166-172 (another copy of pp 446-450 above), pp. 460-476 (excerpt).

Note that the map that Darwin discusses on pp. 473ff may be viewed at:  
<http://pages.britishlibrary.net/charles.darwin4/coral/plates2and3.html>

**Two page paper due.** What is the most important evidence that Darwin adduces in support of his theory for the formation of the three great classes of coral reefs (i.e., atolls, barrier reefs, and

fringing reefs)? What did his theory accomplish that others did not?

Tu 9/27 Competition and Progress in Human Society

Eiseley, Darwin's Century: Chapter 7

Thomas R. Malthus, selections from An Essay on the Principle of Population 6<sup>th</sup> ed. (1825) in On the Origin of Species, pp. 595-604.

Adam Smith, An Inquiry into the Nature and Causes of the Wealth of Nations (1776; Modern Library Edition, 1937), pp. 348-352 (excerpt).

Darwin, Voyage of the Beagle, pp. 200-212, 225-226, and 367-396 (excerpt).  
(the first of these sections is also found in On the Origin of Species, pp. 450-453)

Questions for discussion: Malthus and Darwin were both interested in questions about the behavior of human beings in 'the natural state,' about the interplay of individual appetites and constraints on those appetites, and about 'progress' in human society. Where did they agree and disagree?

#### *PART II THE ORIGIN*

Th 9/29 Variation

Charles Darwin, On the Origin of Species, pp. 95-131 (Introduction, Chapters 1 and 2).

**Two page paper due.** Imagine that you are a naturalist reading these chapters in 1859. Does Darwin's evidence for gradual change in the form of domesticated species constitute a strong argument for evolution? What evidence does Darwin provide for variation among wild organisms? How strong is that evidence?

Tu 10/4 Natural Selection

Darwin, Origin, pp. 132-177 (Chapters 3-4).

Questions for discussion: Most modern readers find Darwin's account of natural selection very persuasive, yet naturalists in the 19<sup>th</sup> century found his argument shaky and speculative. How do you explain this difference?

Th 10/6 Natural Selection (cont.)

Darwin, Origin, pp. 178-201 (Chapter 5).

Questions for discussion: Darwin provides us with a number of 'tests' of his theory of natural selection. A test is usually understood to have two possible outcomes: pass or fail. What, if any, evidence might lead us to give natural selection a failing grade as a theory of evolutionary change? Did Darwin propose such tests? How genuine were they?

Tu 10/11 Mid-semester break

Th 10/13 Defending and Extending the Theory

Darwin, Origin, pp. 202-247 (Chapters 6-7).

**Two page paper due.** Darwin believed that his explanation of the development of neuter insects was a triumph of his theory of natural selection. Explain the nature of the problem and Darwin's solution.

Tu 10/18 The Geological Record

Darwin, Origin, pp. 269-309 (Chapters 9-10).

Questions for discussion: Darwin, following Lyell, compares the geological record to a book from which pages and entire chapters have been torn. How were those pages and chapters lost?

Th 10/20 Geographical Distribution

Darwin, Origin, pp. 310-349 (Chapters 11-12).

**Two page paper due.** Darwin provided an ingenious account of how certain arctic plants have come to find homes atop mountain tops in Europe and North America without leaving evidence of having occupied intervening spaces. Explain how his explanation works and why he had to address this subject as part of a general theory of evolution.

Tu 10/25 Morphology and Recapitulation

Darwin, Origin, pp. 350-398 (Chapters 13-14).

Questions for discussion: Having finished the Origin, look back and think about where Darwin's argument was strongest and weakest. How does the strength of his evidence for evolution compare with the strength of his evidence for natural selection?

Th 10/27 Darwin on Man

Charles Darwin, selections from The Descent of Man (1871) in On the Origin of Species, pp. 495-561.

**Two page paper due.** Darwin sought to establish continuities between humankind and animals and did so by discussing such behaviors as tool-making and communication by speech. Write a critical review of Darwin's efforts to link human and animal behavior.

Tu 11/1 Another Path to the Theory of Evolution by Natural Selection

Alfred Russel Wallace, My Life (1905), selections.

Alfred Russel Wallace, "On the Tendency of Varieties to Depart Indefinitely from the Original Type" (1858) in On the Origin of Species, pp. 610-618.

Charles Darwin, Review of Contributions to an Insect Fauna of the Amazon Valley by Henry Walter Bates, in Natural History Review 3 (1863): 219-224.

Questions for discussion: Compare Wallace's theory of evolution and Darwin's. Why has Wallace received so much less credit for the theory of evolution by natural selection than Darwin?

*PART III RESPONSES: SCIENTIFIC, SOCIAL, AND RELIGIOUS*

Th 11/3 Theological Responses

Genesis, chapters 1-2 in On the Origin of Species, pp. 562-565.

Charles Hodge, selections from Systematic Theology (1872-1873) excerpt.

James McCosh, selections from Christianity and Positivism (1871) excerpt.

William Provine, "Evolution and the Foundation of Ethics" (1988), excerpt.

Questions for discussion: Do you agree with Provine that to be a Darwinian evolutionist we must 'check our brains at the church door'?

Tu 11/8 The Debate over Human Origins

Eiseley, Darwin's Century: Chapter 11

A. R. Wallace, Darwinism (1889), pp. 310-322 (excerpt).

St. George Jackson Mivart, "Darwin's Descent of Man" (1871) in Darwin and His Critics, pp. 351-384 (excerpt).

**Two page paper due.** Imagine that you are Charles Darwin. Write a brief response to either Wallace or Mivart

Th 11/10 Social Darwinism

Charles Darwin, The Descent of Man, pp. 167-180.

Charles B. Davenport, selections from Heredity in Relation to Eugenics (1915) excerpt.

Leonard Darwin, selections from Eugenic Reform (1926) excerpt.

Karl Pearson, "National Life from the Standpoint of Science," (1900) at <http://www.fordham.edu/halsall/mod/1900pearsonl.html>.

G. K. Chesterton, Eugenics and Other Evils, Chapter V, pp. 46-60.

Questions for discussion: What, if any, implications did Darwinian evolution have for social policy? Should we understand eugenics as a logical outgrowth of Darwin's work or as a terrible misunderstanding of it?

Tu 11/15 The Problems of Heredity and Time

Eiseley, Darwin's Century: Chapters 8 and 9.

Fleeming Jenkin, "The Origin of Species" (1867) in Darwin and His Critics, pp. 302-344 (excerpt).

Gregor Mendel, "Experiments in Plant Hybridization (1865), read carefully through pp. 335-347.

Questions for discussion: How much damage did Jenkin do to Darwin's theory of evolution? If you were Darwin, how might you respond to his critique? How would Mendel's paper have helped Darwin, had Darwin known of it?

#### *PART IV DARWINISM TODAY*

Th 11/17 Creationism

Robert T. Pennock, Intelligent Design Creationism and Its Critics (2001), pp. 59-97.

VIDEO: Inherit the Wind (1960, Stanley Kramer, with Spencer Tracy, Fredric March). For all things Scopes-trial related, visit <http://www.law.umkc.edu/faculty/projects/FTrials/scopes/scopes.htm>.

**Two page paper due.** In a review of "Inherit the Wind" quoted on the web site above, Carol Innanone says: "Inherit the Wind reveals a great deal about a mentality that demands open-mindedness and excoriates dogmatism, only to advance its own certainties more insistently.... A more historically accurate dramatization of the Scopes Trial might have been far richer and more interesting--and might also have given its audiences a genuine dramatic tragedy to watch. It would not have sent its audience home full of moral superiority and happy thoughts about the march of progress." Discuss this conclusion either positively or negatively - no in between.

#### THANKSGIVING RECESS

Tu 11/29 Animal Sociobiology

Richard Dawkins, The Selfish Gene, chapters 1, 5, 6, 9, 10,12.

E. O. Wilson, "Sociobiology: The New Synthesis" (1975) excerpt.

Sociobiology Study Group of Science for the People, "Sociobiology, Another Biological Determinism" (excerpt).

Questions for discussion: What is new and old in animal sociobiology? What would Darwin recognize as familiar? What might he see as novel? What do you believe is at stake in the debates between proponents and critics of sociobiology?

Th 12/1

Origins

Dawkins, Chapters 13.

Richard A. Richards, "Classification in Darwin's Origin," in The Cambridge Companion to the Origin of Species, ed. Michael Ruse and Robert J. Richards (2009), pp. 173-193

Mark Buchanan, "Evolution, but not as we know it," New Scientist (2010) 205: 34-37.

Ernst Mayr., "Two empires or three?" Proc Natl Acad Sci U S A, (1998). 95: p. 9720-3.

Carl R. Woese, "Default Taxonomy: Ernst Mayr's View of the Microbial World," Proceedings of the National Academy of Sciences(1998): 95: 11043-11046.

Questions for discussion: Dawkins and Woese are worlds apart in style in the focus of their interests. Might they agree about some ideas and what are they?

Tu 12/6

Cambria Revisited

Stephen Jay Gould, Wonderful Life, pp. 23-124.

Questions for discussion: In what ways is Gould's description of Cambrian life consistent with Darwin's understanding of evolution and in what ways does it deviate from Darwin's thinking? Are the differences important?

Th 12/8

Diversity

Gould, Wonderful Life, pp. 124-164, 207-239; 257-291

Questions for discussion: Should a skeptical person believe, on the basis of the evidence Gould describes, that the phylogenetic assignments are convincing? Why does Gould think that the description of these other organisms is as important as the description of the strange ones?

Tu 12/13

Contingency and the pattern of evolution

Gould, Wonderful Life, pp. 292-323.

VIDEO: It's a Wonderful Life (1946, Frank Capra, with James Stewart, Donna Reed, Lionel Barrymore).

Questions for discussion: Gould repeatedly emphasizes 'contingency' in his account of the history of life. What does this word mean and why does Gould stress it so forcefully? What is the alternative possibility?

Fri 12/16

**Six page paper due.**

"The contours of debate over evolutionary theory have changed remarkably little over the past hundred years. One major problem facing Darwin has been resolved in that we understand, much better than he did, the mechanism of heredity. But many of the other great problems of his day remain central to our own research and focal points of contention."

What "problems" is the author of this passage referring to? Where do you see continuities between the debates of the second half of the nineteenth century and those of recent times? Where do you see discontinuities?