

REVOLUTIONS IN BIOLOGY: DARWINIAN, STRUCTURAL, AND EMBRYONIC -- HIST 107C/ES 107C/200HS Fall 2007

Buchanan 1930; Tuesday, Thursday 12:30-1:45

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office hours: Wed. 11:00-12:00, and by prior appointment
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Goals: Students will gain competence in the historical, philosophical, and social dimensions of modern biology, the basis for much thinking about the environment. The course begins with evolution, modern biology's first organizational paradigm. A second unit covers the discovery of DNA, biological reductionism, and the so-called "structural revolution." The course concludes with the advent of gene therapy, human embryonic stem cell research, and other contemporary scientific issues. All students, but especially those unfamiliar with the history of science, are *strongly* encouraged to familiarize themselves with the bibliographies and websites at the end of this syllabus.

Required Books: [available at UCSB Bookstore with selected items on course reserve, and electronic reserve, at library except.

Peter J. Bowler, *Evolution: The History of an Idea* (Third ed., 2003),
University of California Press.

Charles Darwin, *The Voyage of the Beagle: Charles Darwin's Journal of Researches* (1989), Penguin (USA).

Paul L. Farber, *Finding Order in Nature: The Naturalist Tradition from Linnaeus to E. O. Wilson* (2000), The Johns Hopkins University Press.

Mark A. Largent, *Sourcebook on History of Evolution* (Revised Printing, 2004),
(Kendall/Hunt).

James D. Watson, *The Double Helix*, edited by Gunther S. Stent (1980),
Norton Critical Edition by W. W. Norton.

General Requirements and Grades: Students are expected to attend lectures and read assigned readings prior to lecture. Attendance may be taken. All students are expected to do their own work and avoid plagiarism. It is the responsibility of all students to read and be familiar with UCSB University Regulation 102.01 which covers plagiarism [which means representing another's ideas or exact words as your own].

Grades: Based on attendance/discussion (10%); an eight to ten page typed and double-spaced analytical essay on the theme of the “scientific quest” which compares and contrasts Charles Darwin’s *Voyage of the Beagle*, and James D. Watson’s *The Double Helix* (30%) [DUE AT START OF CLASS 29 NOVEMBER, PENALTY OF ½ GRADE PER DAY FOR LATE ESSAY—NOT ACCEPTED AFTER MONDAY, 3 DECEMBER AT 12:00 IN MY OFFICE]; and two in-class blue book essay exams –a mid-term (30%), and a final (30%). Graduate students, while absolved of the essay, will have supplementary assignments linked with 200HS.

READINGS, WEEK 1

Bowler, 1-84; Farber, 1-21; Largent, 87-91 [Paley]. Start reading Darwin’s *Voyage* with the goal to have it done before the mid-term, if not earlier.

LECTURES

27 Sept.-- Introduction to class; Eighteenth century backgrounds.

2 Oct. — *****NO CLASS*****

READINGS, WEEK 2

Bowler, 84-176; Farber, 22-36; Largent, 3-12 [Lamarck], 13-17 [Cuvier], 19-28 [Lyell]. Keep reading Darwin’s Voyage.

LECTURES

4 Oct. Histories of the Earth and Universe: Buffon and Natural History.

9 Oct. Lamarckian Evolution, Charles Lyell, and The Voyage of the Beagle.

READINGS, WEEK 3

Farber, 37-55; Largent, 39-52 [Chambers], 53-62 [Sedgwick], 111-124 [Darwin, Origin].

LECTURES

11 Oct. -- Development and transformation as embryology: Karl Ernst von Baer.

16 Oct. -- The Vestiges of the Natural History of Creation and Darwin's Origin.

READINGS, WEEK 4

Bowler, 253-273, 327-333; Farber, 56-71, 87-99; Largent, 215-232 [de Vries, Loeb], 315-320 [Kellogg], 323-329 [Galton], 331-339 [Davenport].

LECTURES

18 Oct. Mendel, theories of inheritance, and modern genetics.

23 Oct. Discussion of readings; summary of class to this point. Bring Largent reader.

READINGS, WEEK 5

Bowler, 177-223, 375-381; Largent, 125-136 [Darwin, Descent], 137-214 [Wilberforce, Owen, Jenkin, Agassiz, Huxley, Gray, Darwin letter to Asa Gray, Cope], 407-414 [Dobzhansky], 385-393 [Bryan]. Plan to complete Darwin's *Voyage* prior to the mid-term.

LECTURES

25 Oct. Comparative reception of the Origin.

30 Oct. MID-TERM EXAM, BRING YOUR OWN BLUE BOOKS

READINGS, WEEK 6

Farber, 72-86. Get a start on Watson's *The Double Helix*. *Electronic reserve* at Davidson Library [under week 5], or find on JSTOR "Judith V. Grabiner and Peter D. Miller, "Effects of the Scopes Trial," *Science* 185 (6 September 1974): 832-837.

LECTURES

1 Nov. Creationism and Evolution. Has the debate changed? Movie, lecture, short discussion.

6 Nov. Physiology: The French perspective: Claude Bernard.

READINGS, WEEK 7

Electronic reserve at Davidson Library [under week 6] Herman von Helmholtz, "The application of the law of conservation of force to organic nature."

LECTURES

8 Nov. -- Physiology: The German reductionists: physics as biology.

13 Nov. -- A fundamental unit of biological analysis? Cell theory.

READINGS, WEEK 8

Electronic reserve reader [under week 8], Rudolf Virchow, "Recent Progress in Science and its Influence on Medicine and Surgery."

LECTURES

15 Nov. -- Rudolph Virchow and the foundations of cellular pathology.

20 Nov. -- Microbiology and bacteriology: Robert Koch and Louis Pasteur.

READINGS, WEEK 9

Farber, 100-121; Largent, 397-405 [Julian Huxley]. Reader [reserve book room] under week 9, William Patten, "The message of the biologist," Science, new series, 51 (30 January 1920):93-102; and Joel B Hagen, chapter 1 of An Entangled Bank: The Origins of Ecosystem Ecology. Articles by Leo Marx and N. N. Vorontsov.

LECTURES

22 November *****NO CLASS***** Thanksgiving holiday!

27 Nov. -- Politics and biology: T. D. Lysenko

READINGS, WEEK 10

BOWLER, 325-327, 333-346, 347-374; Reader, week 10, W. French Anderson, "Human gene therapy: Scientific and ethical considerations," Journal of Medicine and Philosophy 10 (1985): 275-291.

LECTURES

29 Nov. DNA, Molecular Biology, and the Human Genome Project.

4 Dec. -- Developmental biology. Are stem cells revolutionary?

6 Dec. -- Course summary; review for final.

FINAL EXAM: Tuesday, 11 December 12:00-3:00p.m.—GOOD LUCK!

History of Biology –Bibliography and Websites

A Guide for Undergraduates by Michael J. Crowe [brief explanation of what history of science is]

<http://web.clas.ufl.edu/users/rhatch/pages/02-TeachingResources/crowe/crowe.html>

A listing of electronic bibliographies, digitized archives, and various websites in history of science

http://www.hssonline.org/teach_res/resources/mf_resources.html

Bibliographic Essays: Life Sciences in the Twentieth Century by Garland E. Allen [reviews essential sources for the Darwinian Revolution and history of modern biology]

http://www.hssonline.org/teach_res/resources/mf_resources.html

Reading the History of Western Science: A List of Good Places to Start

Compiled and Edited by A. B. Van Riper [bibliographical references to some one hundred books on the history of science classified by subject]:

http://www.hssonline.org/teach_res/resources/mf_resources.html

History of the Human Genome Project

http://www.ornl.gov/TechResources/Human_Genome/project/hgp.html

California Institute of Regenerative Medicine

<http://www.cirm.ca.gov/> [non-historical official website of CIRM funded by Proposition 71]