

History of Science 343: The Darwinian Revolution, Fall 2019
University of Wisconsin – Madison
TR 2:30-3:45 Mosse Humanities 2637 (face-to-face)

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Office Hours: TR 11-12 (5118 Humanities)
and by appointment

Darwin's name is associated with one of the great developments in modern science: evolution. But he was not the first evolutionist, and a number of evolutionary theorists think we are currently in a new intellectual revolution surrounding evolution. So what does it mean, now, to talk about the “Darwinian revolution”? In this course we will situate Darwin's achievement in a longer timeline of evolutionary thought before and after his lifetime, all the way down to the present. In doing so, we will follow two chief aspects of evolutionary thinking: its scientific twists and turns, and its broader cultural significance, as it appeared in religious and sociopolitical realms.

Level: Advanced
Breadth: Humanities
Prerequisites: None
L&S Credit Type: C
Honors-optional (%)

Learning Outcomes: In successfully completing this course,

Undergraduates will:

- Identify the main features of Darwin’s own theory and its similarities and differences from evolutionary theories before and since, based on primary historical sources;
- Summarize, compare, and contrast leading social and religious issues involved in the reception of Darwin’s theory in different cultures, based on secondary historical sources;
- Identify the differences between primary sources and secondary sources in the history of science, and use them appropriately in analyzing historical questions;
- Practice accuracy in temporal succession through making timelines; and
- Present a persuasive argument using evidence and analysis to explain change over time in the history of evolution.

Honors undergraduates will develop and exercise these skills further through

- an independent primary-source based research paper of 9-12 pages plus bibliography.

Graduate students will:

- Extract and analytically summarize arguments from secondary source books in the history of evolutionary theory;
- Develop an original historical argument based on primary sources and using secondary sources to construct a framework.

Readings:

Charles Darwin, *Evolutionary Writings*, edited by James A. Secord (New York: Oxford, 2008). A copy of this book will be available on 3-hour reserve at College Library.

All other readings will be posted on Canvas.

Course Requirements and Expectations:

This 3-credit course has 3 hours of group meetings per week (each class meeting counts as 1.5 hours according to UW-Madison's credit hour policy). The course also carries the expectation that you will spend an average of at least 2 hours outside of class for every hour in the classroom. In other words, in addition to class time, plan to allot an average of at least 6 hours per week for reading, writing, preparing for discussions, and/or studying for quizzes and exams for this class.

Undergraduate requirements:

30% Class participation: read the assigned readings; post a minimum of 10 questions/comments on the reading for class sessions (about 1 per week, due by 7 a.m. the day of class in order to receive credit); active listening and intelligent discussing in class.

20% Part I essay (1200-1500 words), due **Friday March 1**

20% Part II essay (1200-1500 words), due **Monday, April 1**

30% final cumulative essay, (1500-2100 words), due **Wednesday, May 8**

All papers are due in CANVAS by 5 pm.

Honors papers are due on the last class day; paper grade will be 20% of overall course grade, with 5% taken away from each other part of your grade.

Grad requirements:

50% class participation, including weekly postings like undergrads, and a separate 1-hour discussion approximately every other week on a separate reading list (time TBA);

50% 20-25 page research paper on an approved topic of your choice.

Grading: Assignments in this course are graded on a 4-point scale:

A = 3.67-4.0

AB = 3.34-3.66

B = 2.76-3.33

BC = 2.26-2.75

C = 1.6-2.25

D = 1-1.6

F = below 1.0.

The number grade tells you if your paper is at the high, middle, or low end of the grade range for any given assignment. Final grades will be tabulated from these ranges. See Grading Criteria on final page of this syllabus for more details on essay expectations.

It is the University of Wisconsin's expectation (and mine) that you will know, understand, and abide by principles of **academic honesty and integrity**. Please review the Academic Guidelines and Expectations on pp. 7-8 of this syllabus for more details.

Access and Accommodation: I will make every effort to honor requests for reasonable accommodations made by individuals with disabilities. If you think you qualify for accommodation, please contact the McBurney Disability Resource Center to establish your eligibility for services. Requests for accommodation can be responded to more effectively if I receive them as far in advance as possible, preferably at the beginning of the semester. Such requests are confidential.

Religious Observance: If religious holidays or observances conflict with your participation in this course, please come talk to me **well in advance** for us to work out alternative arrangements.

If any other problems arise, either academic or personal, which might jeopardize your performance in the course, you must try to inform me after class or by the soonest available office hour, or by email (lknyhart@wisc.edu).

COURSE SCHEDULE

T 1/22: Course Introduction: Revolutions in Evolution?

Part I: From “Transformism” to Darwin’s Evolution

Analytic Focus: Situating the origin and development of Darwin’s theory

Skills focus: close reading of primary sources, using secondary sources to offer context, especially about the audiences for which the primary sources were written.

A. “Life” in Paris

R 1/24: Lamarck’s Transformism

What has been Lamarck’s reputation in the history of science? What were key features of Lamarck’s transformism? How did Lamarck seek to avoid extinction in his vision of the order of nature?

Rebecca Stott, “The Jardin des Plantes—Paris, 1800” in idem, *Darwin’s Ghosts: The Secret History of Evolution* (New York: Spiegel & Grau, 2012), 183-192.

Pietro Corsi, “Jean-Baptiste Lamarck: From Myth to History,” 9-18 in *Transformations of Lamarckism: From Subtle Fluids to Molecular Biology*, edited by Snait B. Gissis and Eva Jablonka (Cambridge: MIT Press, 2011), 9-18.

Jean Baptiste Pierre Antoine de Monet de Lamarck, *Zoological Philosophy*, trans. Hugh Elliot (New York: The Macmillan Company, 1914), Analytical Table of Contents (vii-xiv), 123-134.

T 1/29: The Meaning of Fossils

Georges Cuvier, “Living and Fossil Elephants,” and “The Megatherium from South America,” in *Georges Cuvier, Fossil Bones, and Geological Catastrophes*, edited and translated by Martin J. S. Rudwick (Chicago: University of Chicago Press, 1997), 13-32.

R 1/31: The Cuvier-Geoffroy Debate

What were Cuvier and Geoffroy arguing about? What was the big deal?

Rebecca Stott, “The Jardin des Plantes—Paris, 1800” in idem, *Darwin’s Ghosts: The Secret History of Evolution* (New York: Spiegel & Grau, 2012), 192-210, 340-345 [notes], 371-73 [further reading] – continued from 1/24.

Hervé Le Guyader, *Étienne Geoffroy Saint-Hilaire 1772-1844: A Visionary Naturalist* (Chicago: University of Chicago Press, 2004), 135-146, 152-165.

B. “Darwin’s” Theory

T 2/5: Darwin and the Voyage of the Beagle

What did Darwin include in his natural history writing? How did he react to encountering the very foreign peoples he met on the voyage? How does Beer’s essay help to contextualize Darwin’s writing?

James A. Secord, “Introduction,” vii-xx, and Charles Darwin, *Journal of Researches* excerpts, 15-39, both in Darwin, *Evolutionary Writings* (Secord ed.) [book for purchase; not in reader]

Gillian Beer, “Traveling the Other Way,” in *Cultures of Natural History*, edited by N. Jardine, J. A. Secord, and E.C. Spary (Cambridge, England: Cambridge University Press, 1996), 322-337.

R 2/7: *Vestiges*

What is Chambers up to in this selection? How does Yeo contextualize Chambers' Vestiges for us? What issues does he draw out for understanding its reception?

Robert Chambers, *Vestiges of the Natural History of Creation* [1844] (reprint ed. New York: Humanities Press, 1969), 191-205, 222-235.

Richard Yeo, "Science and Intellectual Authority in mid-nineteenth-century Britain: Robert Chambers and *Vestiges of the Natural History of Creation*," *Victorian Studies*, 1984, 28: 5-31.

T 2/12: Origin of Species 1: Natural Selection

In his first four chapters, Darwin sets up and introduces his theory of natural selection. How does he prepare the reader to be persuaded of its validity?

Secord, Intro, xx-xxiii; Charles Darwin, *On the Origin of Species*, 106-126, 132-151, 157-173.

R. 2/14: Origin of Species 2: Evolution

What sorts of evidence does Darwin bring to bear in favor of his theory? What does he set up as the alternative?

Darwin (in Secord, ed.) *Origin*, 179-211; reviews and responses, 212-230

"Adam Sedgwick (1785-1873)" in David Hull, *Darwin and His Critics* (Chicago: University of Chicago Press, 1983), 155-170.

T 2/19: Darwin on Human Descent and Sexual Selection

What features of evolution does Darwin's theory of sexual selection explain? How is sexual selection tied to race, in his theory? How should we understand Darwin's attitudes toward race and gender? Did he do "bad" science?

Descent of Man, Part I, 233-247, 251-255, 273-288; *Descent of Man*, Part II, 299-313, in Secord, ed.

R 2/21: British Interpretations of Sexual Selection and Sex Differences

What was at stake in sexual selection in late nineteenth-century Britain?

Darwin, *Descent of Man*, 313-18; "Reviews and responses," 334-337 in Secord

George John Romanes, "Mental Differences between Men and Women," *The Nineteenth Century*, May 1887, 21: 654-672.

Edith Simcox, "The Capacity of Women," *The Nineteenth Century*, Sept. 1887, 22: 391-402 (plus title page and Contents of vol. 22).

Receive Unit 1 Essay Question

Part II: Darwinism in the World

Analytic Focus: Comparative reception of Darwinism

Skills Focus: Comparison/Contrast

Questions for this unit: what issues do different authors highlight in interpreting the reception of Darwin's theory in different countries? How should we assess the roles of particular individuals, religious and cultural contexts, and institutional factors in understanding how Darwinism was received across the world?

T 2/26: The German Reception of Darwin's Theory

Sander Gliboff, "Introduction," pp. 1-28, 205-209 in idem, *H.G. Bronn, Ernst Haeckel, and the Origins of German Darwinism* (Cambridge: MIT Press, 2008)

Robert J. Richards, *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought* (Chicago: University of Chicago Press, 2008), 135-156.

R 2/28: Darwin's Reception in France

Jean Gayon, "Darwin and Darwinism in France before 1900," In M. Ruse (Ed.), *The Cambridge Encyclopedia of Darwin and Evolutionary Thought*. Cambridge, UK: Cambridge University Press.

Joy Harvey, "Chapter 4: 'True Science': Translating Darwin, Seeking a New Life," pp. 62-79 and 216-222 (notes) in idem, *'Almost a Man of Genius': Clémence Royer, Feminism, and Nineteenth-Century Science*.

Grad student report on Harvey

FRIDAY 3/1: Part I Essay Due by 5 pm in Canvas.

T 3/5: Darwin in Arabic

*Marwa Elshakry, "Global Darwin: Eastern Enchantment," *Nature*, 28 October 2009, 461:1200-1201

*Marwa Elshakry, *Reading Darwin in Arabic, 1860-1950* (Chicago: University of Chicago Press, 2013), 261-305

Grad student report on Elshakry

R 3/7: Darwin in Chinese

Haiyan, Yang. "Encountering Darwin and Creating Darwinism in China." In M. Ruse (ed.), *The Cambridge Encyclopedia of Darwin and Evolutionary Thought*. Cambridge, UK: Cambridge University Press, 2013.

Grad student report on James Pusey, *China and Charles Darwin*

T 3/12: Darwinism in the U.S. 1: The Scientists

Largent, M. A. (2013). Darwinism in the United States, 1859--1930. In M. Ruse (Ed.), *The Cambridge Encyclopedia of Darwin and Evolutionary Thought*. Cambridge, UK: Cambridge University Press.

Asa Gray, "Darwin and his Reviewers: Natural Selection and Natural Theology, Part III:

Natural Selection not Inconsistent with Natural Theology." *Atlantic Monthly*, October 1860, pp. 412-419. Reprinted in Asa Gray, *Darwiniana*, ed.A.Hunter Dupree. Cambridge, MA: Harvard/Belknap, 1963. 118-123

R 3/14: Darwinism in the U.S. 2: Creationism and the Scopes Trial

Ronald L. Numbers, "Creationism, Intelligent Design, and Modern Biology" [selection], pp. 302-316 and 414-418 (notes) in *Biology and Ideology from Descartes to Dawkins*, edited by Denis Alexander and Ronald Numbers. Chicago: University of Chicago Press, 2010 **{EVERYONE}**

Adam Shapiro, *Trying Biology: The Scopes Trial, Textbooks, and the Antievolution Movement in American Schools*. Chicago: University of Chicago Press, 2013. Chapter 1 **{EVERYONE}**; Ch. 5 **(1/2 the class)**, pp. 87-110.

Jeffrey Moran, "Reading Race into the Scopes Trial: African Americans, Science, and Fundamentalism," *Journal of American History*, Dec. 2003, 90: 891-911 **(1/2 the class)**

**Receive question for comparative essay
Spring Break**

T 3/26: Global comparison/review

R 3/28: Timeline construction

Monday 4/1: Comparative (Part 2) Essay due by 5 pm in Canvas.

Part 3: Reimagining the Tree of Life and How It Came To Be

Analytical Themes: Rethinking our assumptions about evolution; insiders and outsiders; audiences

Skills:

T 4/2: The Modern Evolutionary Synthesis 1

What constituted “the modern synthesis,” according to Julian Huxley (a participant)? According to Stephen Jay Gould (looking back on it later)?

Julian Huxley, *Evolution: The Modern Synthesis* (New York: Harper, 1942), 13-46

Stephen Jay Gould, *The Structure of Evolutionary Theory* (Belknap/Harvard, 2002), 503-508, 518-21, 524-28.

R 4/4: The Modern Evolutionary Synthesis 2

*Gould characterizes Mayr’s 1942 **Systematics and the Origin of Species** in relation to some of the main themes Gould himself is interested in. What are these? What is Mayr’s goal in Ch. 5 of his book? How does his definition of species contribute to the synthesis? What does it exclude?*

Stephen Jay Gould, *The Structure of Evolutionary Theory*, 531-43.

Ernst Mayr, Ch. 5, “The Systematic Categories and the New Species Concept,” in idem, *Systematics and the Origin of Species* (Columbia Univ. Pr., 1942), 102-122.

T 4/9: Evolutionary Humanism after World War II

How did the evolutionary synthesists interpret the place of humans in nature after World War II? What lessons did they seek to impart to the broader public?

Julian Huxley, “Man’s Place and Role in Nature,” in idem, *New Bottles for New Wine* (London: Chatto & Windus, 1959), 41-60.

George Gaylord Simpson, “Man’s Place in Nature,” chapter 17 in idem, *The Meaning of Evolution: A Study of the History of Life and of Its Significance for Man*. New Haven: Yale University Press, 1967 (first ed. 1949), 281-294.

R 4/11: The Descent of Woman

How did you respond to reading Morgan? How does her writing compare with Huxley’s and Simpson’s? How do you account for the differences?

Erika Milam, “Dunking the Tarzanists: Elaine Morgan and the Aquatic Ape Theory,” in *Outsider Scientist: Routes to Innovation in Biology*, edited by Oren Harman and Michael R. Dietrich (Chicago: University of Chicago Press, 2013), 223-237

Elaine Morgan, *The Descent of Woman* (New York: Stein and Day, 1972), 14-33

4/16: Punctuated Equilibrium and the Expansion of Evolutionary Theory

David Sepkoski, "Radical or Conservative? The Origin and Early Reception of Punctuated Equilibrium," 301-325 in idem, ed. *The Paleobiological Revolution: Essays on the Growth of Modern Paleontology* (Chicago: University of Chicago Press, 2009)

Stephen Jay Gould, "Darwinism and the Expansion of Evolutionary Theory," *Science*, 23 April 1982, 216: 380-387.

Stephen Jay Gould, *Wonderful Life: The Burgess Shale and the Nature of History*. New York: W. W. Norton, 1989. Chapter 1, "The Iconography of an Expectation," 23-52

4/18: Rethinking the Ancestry of Life: Carl Woese and Archaea

Jan Sapp, "Molecular phylogeny and microbial evolution," chapter 18 in idem, *Genesis: The Evolution of Biology* (Oxford UP, 2003), 217-233

Ernst Mayr, "Two empires or three?" *PNAS* 95, August 1998, 9720-9723

Carl Woese, "Default taxonomy," *PNAS* 95, September 1998, 11043-11046

4/23: The Past in the Present: "Living Fossils"

Michel Morange, "Reading the Palimpsest of Life," Chapter 8 in idem, *Life Explained*. New Haven: Yale University Press, 2008. 72-77

Scott Lidgard and Alan C. Love, "Rethinking Living Fossils," *BioScience* 2018, 68: 760-770.

4/25: Horizontal Gene Transfer and Symbiogenesis

Jan Sapp, *Genesis*, chapter 19, "Symbiomics," 234-251, 333-340.

Ilana Zilber-Rosenberg and Eugene Rosenberg, "Role of microorganisms in the evolution of animals and plants: the hologenome theory of evolution," *FEMS Microbiolog. Rev.*, 2008, 32: 723-735

4/30: Review of final unit, Timeline work

5/2: Course Wrap-up

FINAL ESSAY DUE WED. MAY 8 by 5 pm.

ACADEMIC GUIDELINES AND EXPECTATIONS

Essays: Every essay you write should take the form of an argument supporting a thesis. Since all essays are open-book, grading will NOT depend solely or even primarily on the correctness of the facts marshaled for your argument; this correctness is assumed as a base-point. Rather, much of your grade will be based on the persuasive power, sophistication, originality, and succinctness of your argument. (More on this during the course.)

Extensions are only granted if requested before the due date, and only in case of illness or other serious emergency. All extensions will have a definite new due date established. Papers received after the new due date will be subject to late paper penalties.

Late paper policy: any piece of writing that you hand in late without an extension will have the following penalties assessed: a quarter of a point for every working day late. For example, if the paper on its merits deserves a B (3.0), after one day it would receive a B/BC (2.75), after two days a BC (2.5), after three a BC/C (2.25), after four a C (2.0). NOTE: LATE FINAL ESSAYS WILL NOT BE ACCEPTED.

Academic Credit and Plagiarism: Students may not copy sentences or ideas from others (including authors, websites, or other students) without giving credit to those sources; if someone else's words are so wonderful that you cannot substantially rephrase them, you must put them inside quotation marks, using the exact same words. If you omit the quotation marks or the credit, you are plagiarizing. Plagiarism is

grounds for failure on the assignment plagiarized; repeated plagiarism is ground for failure in the course. If you use 3 or more words in a row from another source, they must be placed in quotation marks and footnoted. Otherwise, it is plagiarism. For more details on what plagiarism is and how to avoid it, consult a style manual, the Writing Lab, or the History Lab.

Appealing a Grade: If you have questions about a grade, come speak to me. If the problem is not resolved, speak with the History of Science Undergraduate Advisor, Scott Burkhardt. He will attempt to resolve the issue informally and inform you of the Appeals Procedures if no resolution is reached informally.

GRADING SCALE FOR TAKE-HOME ESSAYS:

- A: For outstanding essays only. Thesis and argument are clear, thought-provoking, and based on correctly understood facts; material used to support the argument synthesizes ideas from different parts of the course (readings, lectures, discussions from different weeks); relationships drawn between facts and ideas are sophisticated, subtle, and/or original. Writing is grammatically correct and succinct. The argument flows well from point to point, without any puffery or wasted words.
- AB: For very good essays that for some reason fall short of the criteria listed above. For example, the argument may be murky in one place; information may be presented that doesn't directly or clearly contribute to the argument; writing style may be awkward here and there, or flawed by one or two consistent (if minor) grammatical errors.
- B: For solid, workmanlike essays. The essay may pursue a straightforward but not especially deep or sophisticated argument; it is okay as far as it goes, but doesn't penetrate the material very far. It may have a flash of brilliance that is unfulfilled, counterbalanced by minor grammatical problems, a weakness in argumentation, and/or a significant misunderstanding of events or chronology.
- BC: The essay shows some of the basics of the ideal essay, but is weakened by a lack of serious think-work or writing problems. It may make superficial connections without offering sufficient evidence to make the connections plausible or persuasive, or it may have what is in principle a good argument supported by incorrect facts or chronology. Alternatively, it may provide a fairly solid argument with minor flaws, from which the reader is repeatedly distracted by awkward or ungrammatical prose.
- C: A grade signifying some serious problem in essay-writing. It may deliver facts without a recognizable thesis or argument; it may wander away from the point; or it may be a thoughtful attempt so weakened by writing problems (grammar, punctuation, word choice) that it is difficult for the reader to understand a crucial point you are trying to make.
- D: A marginal grade. There may be enough in here to show you have attended a few classes and/or done some of the reading, but the essay indicates no effort at synthesis or thinking on your own, or else shows a serious misunderstanding of the nature of the material and/or the assignment. Also used for essays that are just barely coherent.
- F: For unacceptable essays. An essay may be judged unacceptable if it contains plagiarism (see above); if it consists primarily in content inappropriate to the question or the material for this course; if it shows a complete misunderstanding of the course content; or if the writing fails to meet standard college-level requirements of basic communication in English.