ENLIGHTENMENT AND SCIENCE

History 261

Professor Cecilia Miller

Wesleyan Winter Session 2021
Short Session
Grading Mode: Student Option

Class Meetings will be from 10:00 a.m. to 12:00 p.m., and 2:00-4:00 p.m. ET, every weekday, January 5-19, 2021, for a total of 10 class days and 40 hours.
Reading Day—no class—on Monday, January 11th.
No exam in this class, thus no class on Wednesday, January 20.
This will be a synchronous (full participation) class only.
No Prerequisites.
The first Assignment will be for Day 2.

This course will be a study of how we, as a society, have obtained our views on science. The class will concentrate on the positive and negative ways that twenty-first-century science and technology have been impacted by the Enlightenment. In general terms, the long-eighteenth-century European Enlightenment is taken to be the marker of the modern age—when modern science emerged. The time has now come for a reconsideration of the complexity of science and the scientific method during the Enlightenment as a means of comprehending its direct impact on the modern age in which we are living today. This class will focus overall on the strengths and weaknesses that modern science, technology, and thus society have inherited from the Enlightenment.

This is not wholly a story of science and technology in the West, but a World History story. This class will highlight test cases and ethical choices—to give two modern examples, decisions about resource allocation of fossil fuels, and of vaccines—that we are facing today. These choices are not made simply on scientific, logical lines but also according to the preferences of society. In order to understand our current situation, we must inform ourselves about how we arrived at this situation. Two centuries ago, without government or private sources of funding for science, the emphasis on immediate outcomes in science became common. Practitioners of science, the term "scientist" was not used until the nineteenth century, often had to be showmen to attract attention in order to get funding. Likewise, by the twenty-first century, it is now almost impossible for scientists to get grants for pure research; winning applications have to stress immediate public outcomes in order to get funded. This effectively puts a stopper into the very source of new scientific ideas—pure science—and of virtually all new scientific break throughs, and this is a world-wide trend in the sciences.

In this class, we will examine crucial examples of the key scientific subjects that emerged during the long eighteenth century and social and political responses to these same scientific discoveries from both the Enlightenment and Counter-Enlightenment, which stressed religion over science. We will also

read responses from non-practitioners of science at the time, educated people trying to make sense of emerging modern science in the midst of politically and economic troubled times.

There was, in the eighteenth century, no safety net, such as unemployment benefits, for those who wanted to practice science in a time that there were no jobs in science. There was certainly no safety net for rest of society either. The parallels to our own time are self-evident: political polarization, closely linked to radically different views toward science, in the midst of epidemics and widespread financial distress.

Emerging modern science in the long eighteenth century was relatively open to new types of people, not just new ideas. During the Enlightenment, science and technology were being advanced by artisans in addition to well-connected practitioners of science. Talented young men from less privileged backgrounds were, for the first time, slowly able to gain access to the major scientific circles during the Enlightenment. A surprising number of women—in a time when women had virtually no legal rights apart from their male relatives—were also active in scientific circles. Such accomplished women were rare during the Enlightenment but the few should not be ignored. Margaret Cavendish, Émilie du Châtelet, and Caroline Herschel are prime examples of women practitioners of mathematics, physics, and astronomy respectively. Women were also the organizers of the intellectual *salons* in Paris and the political *salons* in London. In all these cases, even the political *salons*, science was discussed as a general topic of discussion, not just a subject for specialists. And those knowledgeable in the sciences were expected to make their work accessible to non-specialists. Later, however, the nineteenth-century professionalization of, and specialization in the sciences led to mixed results. It certainly allowed for a substantial increase in the scale of modern scientific work. Nevertheless, it also led to a less open attitude toward those not trained as scientists in the newly-established manner. Alas, it also resulted in the end of the belief that educated people outside of the sciences should know about it in order to be proper citizens. Overall, this class will address areas of commonality and difference between Enlightenment science and technology and modern science and technology, including lingering problems, as well as possible solutions suggested from past writings and experiences.

This class has many distinctive aspects. There will be intensive textual analysis of primary documents, and an introduction to statistics and data analysis. Notably, there will be lively discussions with several guest speakers. There will also be a virtual visit to Special Collections, Olin Library, Wesleyan University, during which time we will learn about the history of scientific books. All of these activities will take place during class time.

Here is the outline for the class:

PART ONE: ENLIGHTENMENT SCIENCE
Day 1: Introduction
Day 2: History of Science
Day 3: What is the Scientific Method?
Day 4: Artisans, Technology, and Modern Science
Day 5: Enlightenment Salons and Scientific Societies, Journals, and Reference Works
Day 6: The Pan-European Enlightenment and the Rise of Modern Science
Day 7: World History and Non-Western Science and Technology

PART TWO: ASSESSMENT OF THE LASTING IMPACT OF ENLIGHTENMENT SCIENCE
Day 8: Medicine to Public Health
Day 9: Benefits and Problems Inherited from the Enlightenment by Twenty-First-Century Science and Technology
Day 10: Conclusion

Assignments: Intensive, Close Reading of the Required Readings, which includes selected books and articles; Quizzes; an Introduction to Statistics and Data Analysis as linked to the major class topics; a Current News Article, related to each of the major topics, selected and presented by each student; and Active Class Participation.

This Winter Session class will vary from the semester version of the class as the emphasis in the Winter Session will be on evaluation via Quizzes, Class Presentations, and Active Class Participation instead by writing traditional papers.

Grading Mode:
Student Option: A/F OR Pass/Fail is possible up to the first day of classes.

Selected Required Reading:

Note: All readings will be available on Wesleyan University, Olin Library, Online Reserves.

David Christian, "World History in Context," *Journal of World History*, vol. 14, no. 4 (December 2003): 437-458, esp. on Symbolic Language and Collective Learning.

Barry S. Levy and Jonathan A. Patz, "Climate Change, Human Rights, and Social Justice," *Annals of Global Health*, vol. 81, no. 3 (May 2015): 310-322.

Neil MacGregor, *A History of the World in 100 Objects* (London: Penguin, 2016), selections.

William F. Bynum, *A Little History of Science* (New Haven: Yale University Press, 2013), complete book.

Daniel R. Headrick, *Technology: A World History* (Oxford: Oxford University Press, 2009), complete book.

Robert Darnton, *The Great Cat Massacre, And Other Episodes in French Cultural History* (New York: Basic Books, 1985), ch. 2: "Workers Revolt: The Great Cat Massacre of the Rue Saint-Séverin."

Ludwik Fleck, *Genesis and Development of a Scientific Fact* (Chicago: University of Chicago, 1979). First published, in German, in 1935. Read the pages in this order: pp. 38-51, 20-22, 59-65, 149-165, 172-183.

Thomas S. Kuhn, *The Structure of Scientific Revolutions 50th Anniversary Edition* (Chicago: University of Chicago Press, 2012), Preface, chs. I-II, V-VI.

Paolo Rossi, *The Birth of Modern Science* (Oxford: Blackwell, 2000), ch. 16: Academies.

Steven Shapin, *The Scientific Revolution* (Chicago: University of Chicago Press, 2018), Introduction; ch. 3: What Was Knowledge For?

Phyllis Deane, *The First Industrial Revolution* (Cambridge: Cambridge University Press, 1965, 1979), ch. 3: The Agricultural Revolution.

David Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe, 1750 to the Present* (Cambridge: Cambridge University Press, 2003), 2nd ed., end of ch. 2: pp. 80-123.

Jacques Ellul, *The Technological Society* (Vintage, 1964), first published, in French in 1954, ch. 1: Techniques.

Cecilia Miller, *Enlightenment and Political Fiction*: *The Everyday Intellectual* (New York/London: Routledge, 2016), Conclusion.

Thomas L. Hankins, *Science and the Enlightenment*, Preface; ch. I; The Character of the Enlightenment; ch. VI: The Moral Sciences & Bibliographic Essay.

Alain Corbin, "The Stench of the Poor," in *The Foul and the Fragrant* (Cambridge, MA; Harvard, 1986), pp. 142-160.

Jo N. Hays, *Epidemics and Pandemics: Their Impacts on Human History* (Santa Barbara, CA: ABC-Clio, 2005), "Plague in Marseilles, 1720-1722" through "Typhoid Fever in Cities, 1850-1920."

George Rosen and Elizabeth Fee, *A History of Public Health* (Baltimore: Johns Hopkins University Press, 2015), chs. I, IV, V, VI.

Bruno LaTour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1991), ch. 4: Relativism.

Isabella Tree, *Wilding: Returning Nature to Our Farm* (New York: New York Review of Books, 2018), chs. 1-4.

Darrell Huff, *How to Lie with Statistics* (New York: W. W. Norton, 1954), complete book.