

PLEASE READ THE SYLLABUS!

History of Science 337, Fall 2012
History of Technology: A Thousand-Year Survey
9:30 am – 10:45 am TuTh, 2104 Chamberlin

Professor:	Eric Schatzberg	Office Hrs:	11:00-noon Tuesday or by appt.
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Description: "Technology is a relentless force that creates and destroys with little pity." Or so proclaimed *Business Week* magazine a few years ago. Similar statements pervade our mass media, as professional pundits hail that the latest, greatest innovations, and large corporations saturate the airwaves with images of technological progress.

This dominant view of technology is, I argue, highly distorted. Technology is a human product, not an autonomous force. Technology makes nothing happen by itself, but only as the result of human action. We can, therefore, only make sense of technology by examining it as an integral part of human history.

This course seeks to understand the place of technology in the history of the West over roughly 1000 years ending about 1945, from the medieval cathedral to the atomic bomb. The course does not examine technology in isolation, but rather in connection with economics, politics, labor, and culture. I make no attempt to be comprehensive but rather focus on a series of chronologically arranged topics. These topics include medieval technology, Western expansion, the Industrial Revolution, and the rise of the United States as a technological power. Along the way we will learn a bit about clocks and cannons, spinning wheels and steam engines, electric lights and atomic bombs.

The primary theme of the course is a critique of the concept of technological determinism. This concept has two components. The first is the idea that technological change follows its own logic, isolated from politics and culture. Second is the idea that technological change automatically produces social change, regardless of what people want. *Both these claims are false*, even though they contain an element of truth that makes them seem plausible.

Two secondary themes run through the course. First is the role of the state, often in its military function, as an agent of technological change. Many present-day technologies have their roots in the military, from interchangeable parts to the Internet. The second theme concerns the role of culture and symbolic meanings in the development of technology. Technologies are significant not just for what they can accomplish practically, but also for what they mean, for the way they express particular cultural values.

Requirements: Your grade in the course will be based on three one-page reading responses, three take-home essay exams, two micro-essays, and active participation in discussions. Doing well in this course requires close attention to both the course readings and the lectures; neither the lectures nor the readings stand on their own.

Due dates: take-home essay exams, 10/9, 11/6 and 12/18 (final exam); one-page readings responses, 9/25, 10/23, and 12/6; micro-essays, 9/6, 11/27. There will also be graded full-period discussions several times during the semester.

Graduate students must register concurrently for Hist Sci 637, 2:30-3:20 Tuesdays. This is a requirement of the Divisional Committee that the department cannot waive. Hist Sci 637 requires additional readings and a small research paper.

Honors credit students need to contact me by the end of the second week of class to discuss creating an honors project. Honors credit requires a significant paper on a topic directly relevant to the course.

Grades: Take-home essays, 50%; reading responses, 35%; discussion, 15%. Grading is on a 4-point scale, with A=4, AB=3.5, B=3, BC=2.5, C=2, D=1, F=0. Boundaries between grades fall at the numeric midpoints.

The *discussion* grade is based on attendance and class participation, particularly during the full-period discussions indicated in the syllabus. I am looking for one or two halfway intelligent comments from every member of the class during each full-period discussion.

The *readings responses* are less formal writing assignments, but I do expect correct grammar and punctuation. They will be graded as follows: evidence that reading was done but little else: C; basic summary on the theme of the question: B; solid summary and analysis addressing the question: AB; particularly perceptive summary and analysis: A. If writing problems are serious enough to make the response difficult to read, the response will receive a 1/2 letter grade reduction. Also, don't try to use Wikipedia as a substitute for the reading; that would be academic misconduct, and furthermore, it's usually pretty obvious.

The *essays* will be graded roughly equally on writing and content. In order to receive an A, the essay must have the following: 1) a clearly stated thesis making a non-trivial point in response to the questions posed; 2) properly focused paragraphs each contributing to the thesis; 3) specific evidence, drawn from the readings, supporting the thesis; 4) direct, concise prose that conveys your meaning with specific, carefully chosen words; 5) generally correct spelling, grammar and punctuation.

A note about writing. Writing is not just for English courses, but a skill you should work on in all your courses. I grade the take-home essays on quality of prose as well as content. Help with writing is available from the Writing Center, <http://www.wisc.edu/writing/>.

Course Books and Packet: The following books are available from the Rainbow Bookstore Co-op, 426 W. Gilman Street (off State St.), 257-6050, open 10-6 Mo-Sa, 12-5 Su, with extended hours until 8 pm during the first week of classes. (See <http://www.rainbowbookstore.org/>.)

Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm, 1870-1970* (Chicago, University of Chicago Press, 1989);

Patrick M. Malone, *The Skulking Way of War: Technology and Tactics Among the New England Indians* (Baltimore: Johns Hopkins University Press, 1991);

Wolfgang Schivelbusch, *Railway Journey: The Industrialization of Time and Space in the 19th Century* (Berkeley: University of California Press, 1986);

Loren R. Graham, *Ghost of the Executed Engineer: Technology and the Fall of the Soviet Union* (Cambridge: Harvard University Press, 1993).

A course reader for the remaining readings will be available for purchase from the Social Science Copy Center, 6120 Social Science (262-5396) by the end of the first week of classes. Hours are Monday to Friday, 7:45 am to 11:45 am; 12:30 pm to 4:00 pm.

All readings will be on reserve at College Library.

Email Class List and Web Site: I use the course email list to distribute assignments and other information. Students can post relevant comments to the list at histsci337-1-f12@lists.wisc.edu. Also see the course website: <https://courses.moodle.wisc.edu/prod/course/view.php?id=234>.

Lecture and Discussion Etiquette: This is a relatively small class, and I'd like to keep things pretty relaxed. But there are a couple points of etiquette that I'd like everyone to follow. Please sit near the front of the class. Please do not read newspapers or have private conversations during lectures. You may take notes on your laptop, but save Facebook, chats, and net surfing for after class. The same rules apply to your smartphone. During discussion, address your remarks to your classmates, not to me. Try to respond to your classmates by name. Always respond respectfully to your classmates, even if they say something you disagree with strongly.

How to Read (in history courses): History courses have a lot of reading, and this course is no exception. None of the readings I assign were written as college textbooks. Some of the readings are by general historians who do not focus on technology. As a result, you should not expect every fact in each reading to be directly relevant to the course.

When approaching historical readings, especially longer ones, you need to keep specific questions in mind to help you focus on the relevant details. To this end, I will email the class a brief introduction to each week's readings along with questions for discussion and reflection.

Religious Holidays and ADA Notice: You may take off any religious holidays you want, as long as you let me know in advance and make up the work. I try not to schedule tests on the more popular religious holidays.

If you have a disability that might adversely affect your performance in this course, let me know, and I'll do my best to accommodate you. For more information, contact the McBurney Disability Resource Center, 263-2741, <http://www.mcburney.wisc.edu>.

Freaking Out: College life often involves a lot of stress. If you feel like things are getting out of hand, either for personal or academic reasons, don't hesitate to let me know. More help is available from the Counseling and Consultation Service, 333 East Campus Mall, 265-5600. For information, see <http://www.uhs.wisc.edu/services/counseling/>.

Course Outline

Week 1 (9/4, 9/6): Introduction – What is Technology, and Why Care About Its History?

Overview of the course; defining technology; questioning technological determinism.

Reading: Lynn White, Jr., "The Medieval Roots of Modern Technology and Science," 75-91.

Assignment due Thursday 9/6: 50-word micro-essay on central argument of the White reading.

Week 2 (9/11, 9/13): Symbolic Technologies of the Middle Ages

Symbolic versus utilitarian technologies–Gothic cathedrals and mechanical clocks.

Reading: Arnold Pacey, "The Cathedral Builders," 1-28;

David Landes, *Revolution in Time*, 53-82.

Video Thursday: selections from *The Cathedral Engineers*.

Week 3 (9/18, 9/20): Western Expansion, 1

Printing and gunpowder weapons; the technological basis of Western imperialism.

Reading: William H. McNeill, *The Pursuit of Power*, 63-143 (chaps. 3-4).

Assignment due Tuesday 9/25: one-page reading response; be prepared for discussion.

Week 4 (9/25, 9/27): Western Expansion, 2

Europe becomes a global power: the role of military technology overseas.

Reading: Geoffrey Parker, *The Military Revolution*, 82-145 (chaps. 3-4);

Ronald Findlay, "The Roots of Divergence: Western Economic History in Comparative Perspective," 158-61.

Week 5 (10/2, 10/9): Western Expansion, 3

Encounters with the "new" world; the technological basis of the Atlantic economy.

NOTE: there will be no class on 10/4. A make-up class will be held Wednesday evening, 10/10.

Reading: Malone, *The Skulking Way of War*, 8-128.

Assignment due Tuesday 10/9: first take-home essay; discussion of Malone book.

Week 6 (10/10, 10/11): Industrial Revolution–Economics and Technology

Nature of industrialization; key technological changes in textiles, iron and steam power.

NOTE: Make-up lecture Wednesday evening.

Reading: Thomas J. Misa, "Geographies of Industry," 59-96;

Joel Mokyr, "The Years of Miracles," 81-112

Week 7 (10/16, 10/18): Industrial Revolution–Social Impact

Workers, the factory system, and resistance to skill-destroying machinery.

Reading: J. L. Hammond and Barbara Hammond, "The Shadow of the Slave Trade," 190-209;

Kirkpatrick Sale, *Rebels Against the Future*, 1-59, 126-151.

Thursday: Video, "The Luddites"

Assignment due Tuesday 10/23: one-page reading response on Luddites.

Week 8 (10/23, 10/25): Industrial Revolution–Explanations

Science, Atlantic trade, and slavery; first we'll discuss the Luddite film.

Reading: E. J. Hobsbawm, "Origin of the Industrial Revolution," 20-39 (chap. 2);
Richard Olson, "Science, Technology and the Industrial Revolution," 316-44;
Barbara Solow, "Capitalism and Slavery in Exceedingly Long Run," 711-37.

Week 9 (10/30, 11/1): Industrialization and Western Culture

Railroads and their impact on Western consciousness.

Reading: Schivelbusch, *Railway Journey*, 1-123 (45-51 optional).

Assignment due Tuesday 11/6: second take-home essay. Discussion Thursday.

Week 10 (11/6, 11/8): American Inventiveness and the Second Industrial Revolution

Technology in the late-19th century; heroic inventors and the rise of the industrial corporation.

Reading: Thomas P. Hughes, *American Genesis*, 1-95 (Introduction, chaps. 1-2).

Week 11 (11/13, 11/15): Source of Innovation: Military and Big Business

The rise of the industrial research laboratory; military origins of mass production.

Reading: Hughes, *American Genesis*, 96-183 (chaps. 3-4).

Week 12 (11/20, 11/27): Mass Production, the Faustian Bargain

Controlling workers; the assembly line; big technological systems.

Reading: Hughes, *American Genesis*, 184-248 (chap. 5);
Stephen Meyer, "The Evolution of the New Industrial Technology," 9-36.

Assignment due Tuesday 11/27: 100-word micro-essay on mass production; discussion.

Thanksgiving Recess (11/22)

Week 13 (11/29): Technology and Aesthetic Modernism

Technology as inspiration for art and architecture between the World Wars.

Reading: Hughes, *American Genesis*, 295-352 (chap. 7);
Le Corbusier, *Towards a New Architecture*, 9-31.

Week 14 (12/4, 12/6): Technology, Ideology and the State

Technology under Stalinism.

Reading: Loren Graham, *Ghost of the Executed Engineer*, 1-106;
Recommended: Hughes, *American Genesis*, 249-294 (chap. 6).

Assignment due Thursday 12/6: one-page reading response; be prepared for discussion.

Week 15 (12/11, 12/13): The Manhattan Project and the Postwar Order

Origins of the military-university-industry-science-technology complex.

Reading: Hughes, *American Genesis*, 353-442 (chap. 8).

Final Essay Due, Tuesday, Dec. 18, 2:30 pm

Turn in final essay at my office, 224 Bradley Memorial.

Packet Contents

1. Lynn White, Jr., "The Medieval Roots of Modern Technology and Science," in *Medieval Religion and Technology: Collected Essays* (Berkeley: University of California Press, 1978), 75-91.
2. Arnold Pacey, "The Cathedral Builders," in *The Maze of Ingenuity: Ideas and Idealism in the Development of Technology*, 2nd ed. (Cambridge: MIT Press, 1992), 1-28.
3. David Landes, *Revolution in Time: Clocks and the Making of the Modern World* (Cambridge: Harvard University Press, 1983), 53-82 (chaps. 3-4).
4. William H. McNeill, *The Pursuit of Power: Technology, Armed Force, and Society Since A.D.1000* (Chicago: University of Chicago Press, 1982), 63-143 (chaps 3 and 4).
5. Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800*, 2nd ed. (Cambridge: Cambridge University Press, 1996), 82-145 (chaps. 3, 4).
6. Ronald Findlay, "The Roots of Divergence: Western Economic History in Comparative Perspective," *American Economic Review* 82, no. 2 (1992): 158-61.
7. Thomas J. Misa, "Geographies of Industry," chap. 3 in *Leonardo to the Internet: Technology and Culture from the Renaissance to the Present* (Baltimore: Johns Hopkins University Press, 2004), 59-96.
8. Joel Mokyr, "The Years of Miracles," in *The Lever of Riches: Technological Creativity and Economic Progress* (Oxford: Oxford University Press, 1990), 81-112.
9. J. L. Hammond and Barbara Hammond, "The Shadow of the Slave Trade," in *The Rise of Modern Industry*, 9th ed. (London: Methuen, 1966), 190-209.
10. Kirkpatrick Sale, *Rebels Against the Future: The Luddites and their War on the Industrial Revolution, Lessons for the Computer Age* (Reading, Mass., Addison-Wesley, 1995), 1-59, 126-151.
11. E. J. Hobsbawm, "The Origin of the Industrial Revolution," and "The Industrial Revolution, 1780-1840," in *Industry and Empire* (London: Weidenfeld & Nicolson, 1968), 23-39 (chap. 2).
12. Richard Olson, "Science, Technology and the Industrial Revolution," in *Science Deified & Science Defied*, vol. 2 (Berkeley: University of California Press, 1990), 316-44.
13. Barbara Solow, "Capitalism and Slavery in Exceedingly Long Run," *Journal of Interdisciplinary History* 17 (Spring 1987): 711-37.
14. Stephen Meyer, "The Evolution of the New Industrial Technology," chap. 2 in *The Five Dollar Day: Labor Management and Social Control in the Ford Motor Company, 1908-1921* (Albany: State University of New York Press, 1981), 9-36.
15. Le Corbusier, *Towards a New Architecture* (New York, Brewer & Warren 1927), 9-31.