

**History of Science 337, Fall 1998**  
**History of Technology: A Thousand-Year Survey**  
9:30-10:45 TuTh, 4308 Social Science

|            |                     |             |                            |
|------------|---------------------|-------------|----------------------------|
| Professor: | Eric Schatzberg     | Office Hrs: | 2-3 Tuesday or by appt.    |
| Office:    | 7129 Social Science | Telephone:  | 262-3973                   |
|            |                     | Email:      | eschatzb@facstaff.wisc.edu |

Description:

This course surveys the history of Western technology from the Gothic cathedral to the Internet, roughly 1000 AD to the present. The course treats technology as an integral component of human culture and history, one that both shapes and is shaped by society. Major topics include the technological roots of Western hegemony, the causes and consequences of the Industrial Revolution, the rise of the United States as a technological power, and the central role of technology in twentieth-century culture and politics.

Requirements:

Reading responses (informal writing). There will be four one-page readings responses during the semester, usually in conjunction with discussion. I will send out instructions by email. The responses are due on 9/8, 10/15, 11/5, 12/10.

Take-home essays. There will be three short take-home essay exams during the semester, with a take-home final at the end of the semester. Essays are due 9/24, 10/22, 11/19, and 12/18.

Discussion. On weeks with reading responses or take-home essays, we will normally have a class discussion on Thursday. Please come prepared to participate; discussion is an important part of the grade.

Email Class List:

I have set up an email list for this course at "histsci-337@lists.students.wisc.edu"; anything mailed to the list will be distributed to everyone registered for the class. I will use the class list to distribute questions for the reading responses and essays. Students should feel free to contribute to the list, for example, by commenting on the readings or raising questions regarding lectures.

Grades

Take-home essays, 60%; reading responses, 20%; discussion, 20%.

Course Books:

The following books are available at Canterbury Booksellers, 315 W. Gorham Street, 258-9911.

Carlo M. Cipolla, *Guns, Sails, and Empires: Technological Innovation and the Early Phases of European Expansion, 1400-1700* (Manhattan, Kan.: Sunflower University Press, c1965);

Noel Perrin, *Giving Up the Gun: Japan's Reversion to the Sword, 1543-1879* (Boston: David R. Godine, 1979);

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

Thomas P. Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm* (New York: Viking Penguin, 1989);

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

A course packet for the other assigned readings are available for purchase from the History of Science department office, 7143 Social Science (262-1406). All readings will be on reserve at College Library.

## Course Outline

### **Week 1 (9/3): Introduction - Origins of "Western" Technology**

Roots of medieval inventiveness; the medieval agricultural revolution.

Reading: Langdon Winner, "Do Artifacts Have Politics?" 19-39;  
Jean Gimpel, "The Agricultural Revolution," 29-58.

### **Week 2 (9/8, 9/10): Symbolic Technologies of the Middle Ages**

Discussion--what is technology? Non-utilitarian medieval technologies: clocks and cathedrals.

Reading: David Landes, *Revolution in Time*, 53-82;  
Arnold Pacey, "The Cathedral Builders," 1-28;

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

Video: "The Cathedral Builders."

Assignment: one-page reading response on Winner due Tuesday, 9/8; come prepared for discussion.

### **Week 3 (9/15, 9/17): Western Expansion, 1**

Technological origins of Western imperialism.

Reading: Carlo M. Cipolla, *Guns, Sails, and Empires*, 15-131.

Supplementary source: Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800* (Cambridge: Cambridge University Press, 1988).

### **Week 4 (9/22, 9/24): Western Expansion, 2**

Resistance to Western technological expansion; the example of Japan.

Reading: Cipolla, 132-48; Noel Perrin, *Giving Up the Gun*, entire book.

Assignment: First essay due 9/24; come prepared for discussion on Thursday.

### **Week 5 (9/29, 10/1): Industrial Revolution - Economics and Technology**

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

Reading: E. J. Hobsbawm, *Industry and Empire*, 20-60;  
Joel Mokyr, "The Years of Miracles," 81-112.

### **Week 6 (10/6, 10/8): Industrial Revolution - The Role of Science**

Was science a factor in the Industrial Revolution?

Reading: A. R. Hall, "What Did the Industrial Revolution Owe to Science?" 129-51;  
Richard Olson, "Science, Technology and the Industrial Revolution," 316-44.

Assignment: One-page reading response due 10/15.

**Week 7 (10/13, 10/15): Industrial Revolution - Social Impact**

Workers and the factory system.

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

Andrew Ure, *The Philosophy of Manufactures* (1835), 298-313;

Friedrich Engels, *The Condition of the Working Class in England* (1845), 144-178.

Recommended reading: E. P. Thompson, *The Making of the English Working Class*, 553-602.

Video: "The Luddites."

**Week 8 (10/20, 10/22): The Cultural Effects of Industrial Technology**

Impact of the railroad on Western consciousness.

Reading: Schivelbusch, *Railway Journey*, 1-123.

Assignment: Second short essay due, 10/22. [Postponed to 10/27]

**Week 9 (10/27, 10/29): American Inventiveness and the Second Industrial Revolution**

Technology in the late-nineteenth century: the age of heroic inventors; and the rise of the industrial corporation.

Reading: Thomas P. Hughes, *American Genesis*, 1-95.

**Week 10 (11/3, 11/5): Source of Innovation: Military and Big Business**

Military sponsors; industrial research laboratories.

Reading: Hughes, *American Genesis*, 96-184.

Assignment: reading response due 11/5.

**Week 11 (11/10, 11/12): The Spirit of System: Mass Production and Electric Power**

Controlling workers; the assembly line; big technological systems.

Reading: Hughes, *American Genesis*, 184-248;

Stephen Meyer, "The Evolution of the New Industrial Technology," 9-36.

**Week 12 (11/17, 11/19): Technology, Ideology and the State**

Political implications of twentieth-century technology; technology under Stalin.

Reading: Loren Graham, *Ghost of the Executed Engineer*, 1-106.

Optional reading: Hughes, *American Genesis*, 249-94.

Assignment: Third short essay due 11/19; be prepared for discussion.

**Week 13 (11/24): Technology and Aesthetic Modernism**

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

Reading: Hughes, *American Genesis*, 295-352;  
Le Courbusier, *Towards a New Architecture*, 9-31.

**Thanksgiving Recess (11/26)**

**Week 14 (12/1, 12/3): The Manhattan Project and the Postwar Order**

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

Reading: Hughes, *American Genesis*, 353-442.

**Week 15 (12/8, 12/10): Technology and the Counterculture**

The critique of technology in the 1960s and beyond: the consumer movement, environmentalism, and the counterculture.

Reading: Hughes, *American Genesis*, 443-472;  
Herbert Marcuse, "Introduction," *One-Dimensional Man*, ix-xvii;  
Barry Commoner, "Technology and the Natural Environment," 69-73;  
Ralph Nader, "The Safe Car You Can't Buy," 310-13. and "Fashion or Safety,"  
214-16.

Assignment: Reading response due 12/10; be prepared for discussion.

**Week 16 (12/15): Technology and the Future?**

Hype and hope for digital age.

Reading: Langdon Winner, "Mythinformation," in *The Whale and the Reactor*, 98-117;  
Esther Dyson, George Gilder, George Keyworth and Alvin Toffler, "Cyberspace and  
the American Dream: A Magna Carta for the Knowledge Age," Release 1.2,  
August 22, 1994;  
David Noble, "The Truth About the Information Highway," Feb. 15, 1995.

**Final Essay Due, Friday, 12/18, 5:00 pm.**

### Photocopied Readings

1. Langdon Winner, "Do Artifacts Have Politics?" in *The Whale and the Reactor* (Chicago: University of Chicago Press, 1986), 19-39.
2. Jean S. Gimpel, "The Agricultural Revolution," in *The Medieval Machine: The Industrial Revolution of the Middle Ages* (New York: Viking Penguin, 1976), 29-58.
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. 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.
5. Lynn White, "The Medieval Roots of Technology and Science," in *Medieval Religion and Technology: Collected Essays* (Berkeley, University of California Press, 1978), 75-91.
6. E. J. Hobsbawm, "The Origin of the Industrial Revolution," and "The Industrial Revolution, 1780-1840," in *Industry and Empire* (London: Weidenfeld & Nicolson, 1968), 23-78.
7. Joel Mokyr, "The Years of Miracles," in *The Lever of Riches: Technological Creativity and Economic Progress* (Oxford: Oxford University Press, 1990), 81-112.
8. A. R. Hall, "What did the Industrial Revolution Owe to Science?" in *Historical Perspectives: Studies in English Thought and Society in Honour of J. H. Plumb*, ed. Neil McKendrick (London: Europa, 1974), 129-51.
9. Richard Olson, "Science, Technology and the Industrial Revolution," in *Science Deified & Science Defied*, vol. 2 (Berkeley: University of California Press, 1990), 316-44.
10. 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.
11. Andrew Ure, "Moral Economy of the Factory System," in *The Philosophy of Manufactures, or an Exposition of the Scientific, Moral, and Commercial Economy of the Factory System of Great Britain* (London: Charles Knight, 1835; repr. 1967), 298-313.
12. Friedrich Engels, *The Condition of the Working Class in England* (Oxford: Oxford University Press, 1993; orig. 1845), 144-178.
13. E. P. Thompson, *The Making of the English Working Class* (New York: Pantheon, 1963), 553-602.

14. Stephen Meyer, "The Evolution of the New Industrial Technology," 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.
16. Herbert Marcuse, "Introduction: The Paralysis of Criticism: Society Without Opposition," in *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society* (Boston: Beacon Press, 1964), ix-xvii.
17. Barry Commoner, "Technology and the Natural Environment," *The Architectural Forum* 130 (June 1969), 69-73.
18. Ralph Nader, "The Safe Car You Can't Buy," *The Nation* 188 (April 11, 1959), 310-13 and "Fashion or Safety," *The Nation* 197 (Oct. 12, 1963), 214-16..
19. Langdon Winner, "Mythinformation," in *The Whale and the Reactor* (Chicago: University of Chicago Press, 1986), 98-117.
20. Esther Dyson, George Gilder, George Keyworth and Alvin Toffler, "Cyberspace and the American Dream: A Magna Carta for the Knowledge Age," Release 1.2, August 22, 1994, available at <http://www.townhall.com:80/pff/position.html>, modified July 11, 1996.
21. David Noble, "The Truth About the Information Highway," *CPU: Working in the Computer Industry* no. 13 (Feb. 15, 1995), <http://www.cpsr.org/program/workplace/cpu.013.html#Feature1>.