

TECHNOLOGY AND SCIENCE IN AMERICAN CULTURE

History of Science 240

Fall 2002

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Office Hours:
call or drop in

Today it's a truism that we live in an age of science and technology. How has that come to pass, and what has it meant for our lives? To answer those questions, this course reviews the social history of science and technology in the colonies and in the United States. It focusses on constructing an understanding of how American society has influenced and in turn been influenced by the development of science and technology. The majority of our time will be spent on technology, rather than science.

Classes

Classes meet Monday and Thursday afternoons, 1:10 - 2:15. With a few exceptions, they consist of discussion of assigned readings. Class participation is essential for arriving at clarification and qualification of ideas in the texts and in the discussion.

For the few lengthy reading assignments use skimming skills; it is not necessary to know every detail.

Workload

Six times during the semester, students are to submit a short paper [2-3 pp], dealing with a topic in the reading, or one suggested by it. The purpose of these papers is to stimulate and focus discussion, and to practice writing. All 6 papers are to be written and handed in by Monday, November 25, the 23rd class session. There will be a midterm hour exam, a second hour exam after Thanksgiving, and a final short quiz.

Grades will be based on class participation [attendance, quality and frequency of interaction], papers, and exams, in proportions respectively of 30%, 30%, and 40%.

The following are the textbooks for the course:

R. S. Cowan	<u>A Social History of American Technology</u>
T.P. Hughes	<u>American Genesis: A History of the American Genius for Invention</u>
C. Pursell	<u>The Machine in America: A Social History of Technology</u>

In addition to the textbooks, there are a series of required and some recommended readings [articles, excerpts and chapters from books] available in a packet obtainable at cost, \$??? (443 pp) from Ms. Kate Fletcher, Administrative Assistant, 189 Bronfman:

- Smith/Clancey, "What is Technology?"
Winner, "Brandy, Cigars, and Human Values"
R. S. Woodbury, "The Legend of Eli Whitney and Interchangeable Parts"
Cross and Szostak, "Iron, Steam, Rails"
Hindle and Lubar, "The *John Bull* and the Rise of American Railroading"
Cross and Szostak, "Machines on the Farm... 1800 - 1920"
B. Hindle and S. Lubar, "Farming and Raw Materials Processing: Causes and Effects of Mechanization"
Cross and Szostak, "Americans confront a Mechanical World"
D.E. Nye, "The American Sublime"
J. Kasson, "The Emergence of Republican Technology" [Ch. 1 of Kasson]
J. Kasson, "Technology and Utopia" [Ch. 5 of Kasson]
G. Basalla, "Keaton and Chaplin: The Silent Film's Response to Technology"
D. A. Hounshell, "The Ethos of Mass Production & Its Critics"
L. Marx, "Alienation and Technology"
L. White, Jr., "Dynamo and Virgin Reconsidered"
Fallows, "The American Army and the M-16 Rifle"
Smith/Clancey, "Countdown to Cyberspace: 1974 - 1990."
Abbate, "Cold War and White Heat: the Origins and Meanings of Packet Switching"
Smith/Clancey, "The Pest War: The Shifting Use and Meaning of Insecticides, 1940 - 1990"
Marcus "Unanticipated Aftertaste: Cancer, The Role of Science, and the Question of DES Beef..."
Marcus/Segal "Public and Private: Technology as a Social Question: The Later 1960s to the 1990s"
Marcus/Segal "Private and Public: Technology and Individual Autonomy: The Later 1960s to the 1990s"

Classes and Reading Assignments

1. 9/5 R Introduction. Social History of Science and Technology. The American Context. Science, Technology, and "Values"

Rec.: Smith/Clancey, Ch. 1 (1-25) "What is Technology? Packet
Winner, Ch. 9 (155-163) "Brandy, Cigars, and Human Values"
Packet

From the Colonial Period to the Early Republic.

2. 9/9 M Colonial Technology

Pursell, Ch. 1 (9-33), "The Tools Brought Over"
Cowan, Ch. 1 (5-27) "The Land, the Natives, and the Settlers"; Ch. 2 (28-43) "Husbandry and Huswifery in the Colonies"; Ch. 3 (45-65) "Colonial Artisans"
3. 9/12 R Science in the Colonies and Early Republic

The Nineteenth Century; Technology to the Civil War

4. 9/16 M The American System of Manufacturing - The Industrial Revolution Comes to America

Pursell, Ch. 2 (35-63) "Importing the Industrial Revolution"
Cowan, Ch. 4 (69-91) "The Early Decades of Industrialization"
Pursell, from Ch. 4 (87-97): "The Expansion of American Manufactures" American System, mass production

Rec: Smith/Clancey, Ch. 5 (144-189) "Inside Factory Systems, 1820 - 1885"
Woodbury, "The Legend of Eli Whitney and Interchangeable Parts"

5. 9/19 R Transportation
- Pursell, Ch. 3 (65-83) "Improving Transportation"
Cowan Ch. 5 (93 - 118) "Transportation Revolutions"
Cross/Szostak Ch. 6 (82 - 103) "Iron, Steam, Rails" Packet
- Rec: Smith/Clancey, Ch. 6 (191-232) "'Second Nature': Steam, Space, and a New World Order, 1840-1900" Packet
Hindle and Lubar, (125 -151) "The *John Bull* and the Rise of American Railroading" Packet
6. 9/23 M Agriculture, from colonial times to the later 19th century
- Pursell Ch. 5 (109-128) "The Mechanization of Farming"
Cowan (173-178) "Farmers and Unexpected Outcomes"
Cross/Szostak Ch. 8 (120 - 130) "Machines on the Farm... 1800 - 1920" Packet
- Rec: Hindle and Lubar, (94-108) "Farming and Raw Materials Processing: Causes and Effects of Mechanization" Packet
7. 9/26 R Engineers and Engineering; Changing Urban Environments
- Pursell, from Ch. 4 (97 - 108) "The Expansion of American Manufactures": patents and engineers
Pursell, Ch. 6 (1331 -154) "Creating an Urban Environment"
Cowan, Ch. 6 (120-146) "Inventors, Entrepreneurs, and Engineers"
8. 9/30 M Expanding Frontiers: Westward Ho! A Rising Empire.
- Pursell, Ch. 7 (155 -178) "Westward the Course of Industry"
Pursell, Ch. 8 (179 - 199) "Export, Exploitation, and Empire"
9. 10/3 R From Amateur to Professional: Science and Scientists in the Nineteenth Century
- Rec: Bruce, R. V. The Launching of Modern American Science, 1846-1876
10. 10/7 M Late 19th Century Attitudes to Technology
- Cowan Ch. 9 (201-218) "American Ideas about Technology"
Kasson, "Technology and Utopia" (183-234) Packet
Cross and Szostak, Ch. 9 "Americans confront a Mechanical World" (135-147) Packet

Rec: Nye, "The American Sublime" (17 - 43) Packet
Kasson, Ch. 1, "The Emergence of Republican Technology"
(3 - 51) Packet

11. 10/10 R "Systems"

Pursell, Ch. 9 (203-228) "The Coming of Science and
Systems"
Cowan Ch. 7 (150-171) "Industrial Society and
Technological Systems"

-----**READING PERIOD**-----

12. 10/17 R **Midterm Examination**

From 1865 to 1918: Between the Wars

13. 10/21 M The Age of Heroic Invention.

Hughes, Ch. 1-2 (13-95): "A Gigantic Tidal Wave of Human
Ingenuity"; "Choosing and Solving Problems"

14. 10/24 R Military Invention, and Industrial Research Laboratories

Hughes, Ch. 3-4 (96-183) "Brain Mill for the Military";
"No Philanthropic Asylum for Indigent Scientists"

15. 10/28 M Taylorism and Fordism (Scientific Management, Assembly Lines,
and the Gospel of Efficiency)

Hughes, Ch. 5-6 (184-248; 249-294) "The System Must
Be First"; "Taylorismus + Fordismus = Amerikanismus"

Rec: Smith/Clancey, Ch. 8 (267-311) "Inventing Efficiency:
Scientific Management, ca. 1900 - 1939"

Smith/Clancey, Ch. 9 (312-354) "Ford, Automobility,
and Mass Production, 1908 - 1941"

16. 10/31 R American Life in Transformation: Industrialization, Prosperity,
Consumption, Depression (1870s - 1930s)

Cowan, (178-200) "Daily Life and Mundane Work"
(Workers, Housewives, Servants)

Pursell, Ch. 10 (229-250) "The Decade of Prosperity and
Consumption"

Pursell, Ch. 11 (251-269) "Depression: Study and Subsidy"

Post WWI and the Depression

17. 11/4 M Critical Reflections on Technology.

Hughes, Ch. 7 (295-352) "The Second Discovery of America"

Basalla "Keaton and Chaplin: The Silent Film's Response to Technology" (192-201) Packet

Hounshell Ch. 8 "The Ethos of Mass Production & Its Critics" (303 - 330) Packet

Marx, "Alienation and Technology" (121-130) Packet

White, "Dynamo and Virgin Reconsidered" (57-73) Packet

Recommended Films: "Modern Times"; "Metropolis"

18. 11/7 R The TVA, Electricity, and the Atomic Bomb

Hughes, Ch. 8 (353-442) "Tennessee Valley and Manhattan Engineer District"

19. 11/11 M From little science to BIG SCIENCE: Science, Scientists, and Institutions in the Twentieth Century

From "pure science" to entrepreneurial science, from collaboration to teamwork, from freely sharing to patenting, science has become "a national resource."
(No assigned reading; questions instead)

20. 11/14 R The Military Industrial Complex, WWII, and its Legacy in Science and Technology.

Cowan, Ch. 11 (250-270) "Taxpayers, Generals, and Aviation"

Pursell, Ch. 12 (271-297) "Wars and the American Century"

Fallows, "The American Army and the M-16 Rifle" (382 - 394) Packet

Rec: Smith/Clancey, Ch. 12 (427-469) "The Military - Industrial - University Complex, 1945-1990"

From WWII to Y2K: Modern to Postmodern Technology

21. 11/18 M Communications, Computers, and Information: A Revolution?

Cowan, Ch. 12 (273-298) "Communications Technologies and Social Control"

Smith/Clancey, Ch. 13 (471-519) "Countdown to Cyberspace: 1974 - 1990. Packet

Abbate "Cold War and White Heat: the Origins and Meanings of Packet Switching" (351 - 371) Packet

22. 11/21 R Biotechnology: Postwar Expansion. Farm Pest Control.

Cowan, Ch. 13 (301-326) "Biotechnology"

Smith/Clancey, Ch. 11 (383-426) "The Pest War: The Shifting Use and Meaning of Insecticides, 1940 - 1990" Packet

Marcus (191 - 205) "Unanticipated Aftertaste: Cancer, The Role of Science, and the Question of DES Beef..." Packet

23. 11/25 M Making Sense of the Past 40 Years: Limits, Controls, Prognoses.

Marcus/Segal Ch. 10 (299 - 333) "Public and Private: Technology as a Social Question: The Later 1960s to the 1990s" Packet

Marcus/Segal Ch. 11 (334 - 381) "Private and Public: Technology and Individual Autonomy: The Later 1960s to the 1990s" Packet

Note: The **deadline** for **all 6 papers** is **5:00 pm today, Monday 11/25**

-----**THANKSGIVING RECESS**-----

24. 12/2 M **2nd Hour Examination**

25. 12/5 R Countercultural Reactions and Alternative Technology
Suggestions for the Future **Quiz** (very brief). SCES

Pursell Ch. 13 (299-319) "Challenge, Defense, and
Revolution in a Postmodern World"

Hughes, Ch. 9 (443-472) "Counterculture and Momentum"

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Selected Readings in the History of American Science and Technology

- Boorstin, D. The Americans: the Democratic Experience
Bruce, R. V. The Launching of Modern American Science, 1846-1876
Cassedy, J. H. Medicine in America : a Short History
Cowan, R. S. More Work for Mother: The Ironies of Household
Technology from the Open Hearth to the Microwave, 1983
Cravens, H., Technical Knowledge in American Culture: Science,
Marcus, A., and Technology, and Medicine since the Early 1800s 1996
Katzman, P.M., eds. Technology and American Society: A History 1995
Cross, G. and
Szostak, R.
Daniels, G. American Science in the Age of Jackson
Daniels, G. Science in American Society 1971
Dupree, A. H. Science in the Federal Government
Duffy, J. From Humors to Medical Science: A History of American
Medicine, 2nd edition, [Formerly, The Healers] 1993
Elliot, Clark A. History of Science in the United States: A Chronology and
Research Guide, 1996
Elliott, Clark A., comp. Biographical Index to American Science: The
Seventeenth Century to 1920. 1990
Fogel, R. Railroads and American Economic Growth 1964
Hindle, B. The Pursuit of Science in Pre-Revolutionary America
Hindle, B. and Engines of Change: The American Industrial
Lubar, S. Revolution, 1790-1860. 1986
Hounshell, D. From the American System to Mass Production, 1800-1932
Hunter, L. Steamboats on Western Rivers 1949
Kasson, J. F. Civilizing the Machine 1976
King, L. S. Transformations in American Medicine : from Benjamin
Rush to William Osler
Layton, E., ed. Technology and Social Change in America 1973
Link, E. P. The Social Ideas of American Physicians (1776-1976) :
Studies of the Humanitarian Tradition in Medicine
Marcus, A. and Technology in America: A Brief History 1989
Segal, H.P.

Marx, L. The Machine in the Garden 1964

Nye, D. The American Technological Sublime 1994

Pursell, C., ed., Technology in America: A History of Individuals and Ideas 81

Pursell, C. The Machine in America: A Social History of Technology 95

Rae, J. B. The American Automobile

Reingold, N., ed. Science in Nineteenth Century America, a Documentary History

Rothenberg, M. The History of Science in the United States: A Critical and Selective Bibliography 1993

Shryock, R. H. Medicine and Society in America, 1660-1860.

Smith, M. R. and Major Problems in the History of American Technology 1998

Clancey, G. eds

Stearns, R. P. Science in the British Colonies of North America

Struik, D. J. Yankee Science in the Making

van Tassel, D. D., and Science and Society in the United States 1966

Hall, M. G., eds.

Winner, L. The Whale and the Reactor