

History of Science 720

Introduction to Historiography and Methods

Fall 2009

3 Credits

2:30-5:00 pm Wednesday, 332 Bradley Memorial

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This seminar is designed to orient first-year graduate students in the Department of the History of Science to work in the field. It offers a sampling of classic and current work in the historiography of science – broadly understood to include technology and medicine. Graduate students in other departments who are interested in exploring the field, or in completing a minor in either History of Science or Science and Technology Studies are also welcome. Our readings will help students gain perspective on important features of the historical development of the sciences, while exploring styles of historical writing, the use of evidence, research methods, and ethical, legal and professional issues. The seminar will be reading and discussion intensive, and assignments will include issue papers, leadership in discussion, book reviews, and a historiographical paper.

Booklist (University Bookstore and other Madison bookshops)

G. E. R. Lloyd, *The Ambitions of Curiosity: Understanding the World in Ancient Greece and China* (Cambridge: Cambridge Univ. Press, 2002)

Peter Novick, *That Noble Dream: The "Objectivity Question" and the American Historical Profession* (Cambridge/New York: Cambridge Univ. Press, 1988)

Thomas Kuhn, *The Structure of Scientific Revolutions*, latest edition (Chicago: Univ. of Chicago Press, 1970). 3rd edition (November 1996)

Steven Shapin and Simon Schaffer, *Leviathan and the Air Pump: Hobbes, Boyle, and the Experimental Life* (Chicago: Univ. of Chicago Press, 1985).

Ian Hacking, *The Social Construction of What?* (Cambridge, MA: Harvard Univ. Press, 1999)

A **COURSE READER** will be available from the History of Science Department Office in two parts (the second part will come in the course of the semester, with readings that reflect class interests). **The reader is not refundable**; buy it only if you are committed to the class – or the readings.

Strongly recommended:

Wayne Booth, Gregory G. Colomb, and Joseph N. Williams, *The Craft of Research* (Chicago: Univ. of Chicago Press, 1995). This book is an **excellent introduction** to many aspects of scholarship, from the reading of sources to the writing of reviews and dissertations.

Ludmilla Jordanova, *History in Practice*, 2nd edition (London: Arnold, 2006)

Course Requirements

A. Reading and thinking

Each week, we will read and discuss several articles and book chapters, and occasionally an entire book. The reading load will vary somewhat between extremes of approximately 100 and 300 pages a week. I personally expect to spend a full day, sometimes slightly more, on my own preparation; you should too. This is crucial: seminars simply cannot function without **thorough preparation** on the part of all participants.

Not even a photographic memory substitutes for taking notes or for the acts of editing and of selecting that note-taking presupposes. Several of our readings are classics. Take good notes, and add your own favorite rubrics to the indexes of books (make indexes for the course reader), and you will find yourself returning to them during your graduate and professional careers. As you take notes, summarize, but also raise questions and draw connections in writing with what you know and with other readings – you will find yourself engaging more deeply with the material. At the risk of sounding too elementary: discipline yourself now to keep the near-verbatim summaries and direct quotations of authors distinct from your own prose, including your criticisms or asides (e.g., use indented paragraphs for the latter, for example). This habit will save you many headaches later! Using good bibliographic software, like Endnote, is also very helpful.

When reading entire books, it is possible (and it will sometimes be necessary) to skim. Learn to do this effectively (I do not recommend skimming introductions and conclusions, including those of chapters).

B. Speaking

1. Weekly class attendance, mental and oral participation. The seminar meets only once a week and is typically a small enrolment course. Attendance is therefore crucial, both for you and for the dynamics of the seminar. Your preparation of the reading and notes should give you the basis for a shared analytical and critical discussion of the material. 30% of the course grade.
2. Each student will carry primary responsibility for starting and nurturing the discussion in one or two weeks of the seminar (depending on class size) and for selecting the major issues with which we will grapple; see Writing C1, below.

C. Writing (crucial to sharpening thinking)

Browsing through Booth, et al., *The Craft of Research*, will be valuable for these assignments, esp. ch. 2, “Connecting with your Reader.”

1. **Two short discussion pieces** (2-4 pp. each) at the interface between an essay and a critical outline and/or list of questions. Each of these is associated with your leadership in B2 above and should be available in advance to everyone in the seminar (by Tuesday noon at the latest). This can be emailed (using a file format that everyone can download, e.g., rtf), or posted to the class website discussion forum. 10% total.

2. **Two critical summaries** (each ca. 700 words; no more than 3 pages double-spaced). The first is of either Lloyd, Kuhn, or Shapin & Schaffer (see weeks 2, 6, & 7). This may be prepared or drafted in time for our discussions of the books, but is ***due in week 8***. The second is of a classic book in the field that you will choose in consultation with me, ***due in week 14***. In the space allotted, summarize the main argument of the book, the author's approach and use of sources/evidence, and provide a brief evaluation. This assignment is akin to a book review, but is intended to place less pressure on you than that august scholarly assignment would do, especially in the area of "original" criticism. 15% each
3. **A final historiographical essay** (ca. 8-10 pages) that synthesizes, analyzes, and/or criticizes some aspect of the readings you have done for the course and preferably also builds upon the analysis of your book. Pick a theme, an unusual grouping, a methodological problem, an approach, etc., that you find especially challenging, stimulating, or problematic and would like to explore in greater depth and/or clarify. *To deepen your engagement with the material, in addition to our readings you should consult one primary resource in preparing this essay.* By the time you are through with your exploration, this paper should have a thesis or argument that you are prepared to defend. ***Due by Wednesday December 16.*** 30% of course grade

D. Academic honesty

It is only fair to tell you that I (and the department) take academic honesty very seriously. Please do so likewise. All submitted work must be your own. All sentences, portions of sentences, and thoughts borrowed from others must be credited to others, using quotation marks and other forms of proper citation. If you have questions about proper form, see Booth, et al., *The Craft of Research*, or contact me. (When in doubt, it is always better to overattribute than to underattribute.)

Syllabus

Week 1: Sept. 2

Introduction: Where do we meet the history of science, technology, and medicine? What does it look like in those contexts? What is it that *historians* and *historians of science* do?

William Cronon, "Getting Ready to do History," in *Carnegie Essays on the Doctorate, Carnegie Initiative on the Doctorate* (Palo Alto: Carnegie Foundation, 2004), 1-18.

Peter J. Bowler and Iwan Rhys Morus, *Making Modern Science: A Historical Survey* (Chicago: Univ. of Chicago Press, 2005), chap. 1, pp. 1-19.

Week 2: Sept. 9

Ancient Science and the Cross-Cultural Study of Science (and emergence of the historical discipline)

G. E. R. Lloyd, *The Ambitions of Curiosity: Understanding the World in Ancient Greece and China, Ideas in context* (Cambridge/New York: Cambridge Univ. Press, 2002).

Peter Novick, *That Noble Dream*, Intro and chs. 1-2, pp. 1-60.

Week 3: Sept. 16

Issues in the Cross-Cultural Study of Science, II (and early days of the discipline)

David Pingree, "Hellenophilia versus the History of Science," *Isis* 83 (1992): 554-563; also in Shank, ed., *The Scientific Enterprise in Antiquity and the Middle Ages* (Chicago: Univ. of Chicago Press, 2000), pp. 30-39.

Martin Bernal, "Animadversions on the Origins of Ancient Science," *Isis* 83 (1992): 596-607; also in Shank, ed., *The Scientific Enterprise in Antiquity and the Middle Ages*, pp. 72-83.

Robert Palter, "Black Athena, Afrocentrism, and the History of Science," in Mary R. Lefkowitz and Guy MacLean Rogers, eds., *Black Athena Revisited* (Chapel Hill: Univ of North Carolina Press, 1996), pp. 209-227, 255-259.

A. I. Sabra, "The Appropriation and Subsequent Naturalization of Greek Science in Islam," *History of Science* 25 (1987) 223-243; reprinted in F. Jamil Ragep and Sally P. Ragep, eds., *Tradition, Transmission, Transformation. Proceedings of Two Conferences on Pre-Modern Science held at the University of Oklahoma* (New York: Brill, 1996), pp. 3-27.

Joseph Needham, Introduction to *Science in Traditional China* (Cambridge, MA: Harvard Univ. Press, 1981), pp. 1-26.

Nakayama Shigeru, "The History of East Asian Science: Needs and Opportunities," *Osiris* 10 (1995): 80-94.

Nathan Sivin, "Why the Scientific Revolution Did Take Place in China – or Didn't It?" *Chinese Science* 5 (1982): 45-66. Also in Everett Mendelsohn, ed., *Transformation and Tradition in the Sciences: Essays in Honor of I. Bernard Cohen* (Cambridge: Cambridge Univ. Press, 1984), pp. 531-554.

Florence Hsia, "Some Observations on the *Observations*: The Decline of the French Scientific Mission in China," *Revue de Synthèse* (1999): 305-333.

Peter Novick, *That Noble Dream*, chs. 3-4, pp. 61-110

Week 4: Sept. 23

Approaches to the Scientific Revolution I (and trends and institutions before WWII)

Michael H. Shank, "Setting up Copernicus? Astronomy and Natural Philosophy in Giambattista Capuano da Manfredonia's *Expositio* on the *Sphere*," *Early Science and Medicine* 14 (2009): 290-315.

David C. Lindberg, "Conceptions of the Scientific Revolution from Bacon to Butterfield: A Reappraisal," in D. C. Lindberg and Robert S. Westman, eds., *Reappraisals of the Scientific Revolution* (Berkeley: Univ. of California Press, 1990), pp. 1-26.

Boris Hessen, "The Social and Economic Roots of Newton's *Principia*," in *Science at the Crossroads* (London: Kniga, n.d. [=1931]), pp. 155-176.

P. G. Werskey, "On the Reception of *Science at the Crossroads* in England," from 1971 reprint of *Science at the Crossroads* (London: Frank Cass and Co., 1971), pp. xi-xxix.

Loren Graham, "The Socio-political Roots of Boris Hessen: Soviet Marxism and the History of Science," *Social Studies of Science* 15 (1985): 705-22.

Robert K. Merton, *Science, Technology and Society in Seventeenth-Century England* (repr. ed. New York: Harper, 1970 [1938]), pp. 80-111, 160-183.

Peter Novick, *That Noble Dream*, chs. 5-9, pp. 111-280.

Week 5: Sept. 30

Approaches to the Scientific Revolution II (the Post-War/Cold War Boom)

Alexandre Koyré, "Galileo and Plato," in his *Metaphysics and Measurement* (Cambridge, Mass: Harvard Univ. Press, 1968 [1943]), pp. 16-43.

J. D. Bernal, *Three Prefaces to Science in History*, 4 vol. (London, Watts [1954]; Cambridge: MIT Press, 1969), I, pp. 1-18.

Marie Boas Hall, "Recollections of a History of Science Guinea Pig," in Margaret Rossiter ed., *Catching up with the Vision: Essays on the Occasion of the 75th Anniversary of the Founding of the History of Science Society* (Chicago: Univ. of Chicago Press, 1999) [Supplement to *Isis* 90 (1999): S68-S83.

Melvin Kranzberg, "For a Start," *Technology and Culture* 1 (1959): 1-10.

Thomas S. Kuhn, "Professionalization Recollected in Tranquility," *Isis* 75 (1984): 29-32.

Thomas S. Kuhn, "History of Science," *International Encyclopedia of the Social Sciences*, vol. 14 (New York: Macmillan, 1968), pp. 74-83; also in Kuhn, *The Essential Tension* (Chicago: Univ. of Chicago Press, 1977), pp. 105-126.

Victor L. Hilts, "History of Science at the University of Wisconsin," *Isis* 75 (1984): 63-94.

Victor L. Hilts to Julianna Chen, 2 Nov. 2005.

Peter Novick, *That Noble Dream*, chs. 10-12, pp. 281-414.

Week 6: Oct. 7

The Structure of Scientific Revolutions (Kuhn and the historians)

Thomas Kuhn, *The Structure of Scientific Revolutions*, latest edition (rev. ed. Chicago: Univ. of Chicago Press, 1970 [1962]).

Suggested background: John L. Heilbron, "Eloge of Kuhn," *Isis* 89 (1998): 505-515.

Peter Novick, *That Noble Dream*, ch. 15 (**skim** chs. 13-14).

Week 7: Oct. 14

Science and Politics, Material Culture, and Social Construction

Steven Shapin and Simon Schaffer, *Leviathan and the Air Pump: Hobbes, Boyle, and the Experimental Life* (Chicago: Univ. of Chicago Press, 1985).

Find at least two reviews of this controversial book; and be ready to discuss them in class!
Peter Novick, *That Noble Dream*, ch. 16, pp. 573-629.

Week 8: Oct. 21

Nature, the Laboratory, and Metrology [Note: first book review due]

Raymond Williams, "Ideas of Nature," in *Problems in Materialism and Culture* (London: Verso Editions/NLB, 1980 [1972]), pp. 67-85.

Steven Shapin, "The House of Experiment in Seventeenth-Century England," *Isis* 79 (1988): 373-404.

Iwan Rhys Morus, *Frankenstein's Children: Electricity, Exhibition, and Experiment in Early-Nineteenth-Century London* (Princeton: Princeton Univ. Press, 1998), Introduction and chs. 1-2, pp. 3-69.

Catherine M. Jackson, "Visible Work: The Role of Students in the Creation of Liebig's Giessen Research School," *Notes and Records of the Royal Society of London* 62 (2008): 31-49.

Bruno Latour, "Give Me a Laboratory and I Will Raise the World," in *Science Observed: Perspectives on the Social Study of Science*, Karin D. Knorr-Cetina and Michael Mulkay, eds. (London/Beverly Hills/New Delhi: Sage, 1983), 141-169.

Joseph O'Connell, "Metrology: The Creation of Universality by the Circulation of Particulars," *Social Studies of Science* 23 (1993): 129-173.

Graeme J.N. Gooday and Morris F. Low, "Technology Transfer and Cultural Exchange: Western Scientists and Engineers Encounter Late Tokugawa and Meiji Japan," *Osiris* 13 (1998), 99-128.

Week 9: Oct. 28

Science and Civil Society, in Field, Empire, and Environment

Thomas Broman, "Introduction: Some Preliminary Considerations on Science and Civil Society," in Thomas Broman and Lynn K. Nyhart, eds., *Science and Civil Society*, *Osiris* 17 (2002): 1-21.

Henrika Kuklick and Robert E. Kohler, "Introduction," in idem, eds. *Science in the Field*, *Osiris* 11 (1996): 1-14.

Jane Camerini, "Wallace in the Field," *Osiris* 11 (1996): 44-65.

Lynn K. Nyhart, "Civic and Economic Zoology: The 'Living Communities' of Karl Möbius," *Isis* 89 (1998) 605-630.

Micaela Sullivan-Fowler, "Doubtful Theories, Drastic Therapies: Autointoxication and Faddism in the Late Nineteenth and Early Twentieth Centuries," *Journal of the History of Medicine and Allied Sciences* 50 (1995): 364-390.

Roy MacLeod, "Introduction" in idem, ed. *Nature and Empire: Science and the Colonial Enterprise*, *Osiris* 15 (2000): 1-13.

Christophe Bonneuil, "Development as Experiment: Science and State Building in Late Colonial and Postcolonial Africa, 1930-1970," *Osiris* 15 (2000): 258-281.

David Wade Chambers and Richard Gillespie, "Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge," *Osiris* 15 (2000): 221-240.

Richard White, "American Environmental History: The Development of a New Historical Field," *The Pacific Historical Review* 54, no. 3 (1985): 297-335.

Richard White, "Afterword Environmental History: Watching a Historical Field Mature." *The Pacific Historical Review* 70, no. 1 (2001): 103-111.

Week 10: Nov. 4

Women in Science, Science and Feminism

Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven: Yale Univ. Press, 1985), pp. 158-176.

Judith Walzer Leavitt, "'Typhoid Mary' Strikes Back: Bacteriological Theory and Practice in Early Twentieth Century Public Health," *Isis* 83 (1992): 608-629.

Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," in Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), pp. 183-201.

Margaret Rossiter, "Women's Work in Science," *Isis* 71 (1980): 381-398.

Judith McGaw, "No Passive Victims, No Separate Spheres: A Feminist Perspective on Technology's History," in Stephen Cutcliffe and Robert Post, eds., *In Context: History and the History of Technology*, (Bethlehem, PA: Lehigh Univ. Press, 1989), pp. 172-191.

Judith Houck, "'What Do These Women Want?' Feminist Responses to Feminine Forever," *Bulletin of the History of Medicine*, 77 (2003): 103-132.

Noretta Koertge, "Feminism: A Mixed Blessing to Women in Science," in Ángela M. Pattatucci, ed., *Women in Science: Meeting Career Challenges*. (Thousand Oaks, CA: Sage, 1998), pp. 189-202.

Gerda Lerner, "Why History Matters," in idem, *Why History Matters: Life and Thought* (Oxford: Oxford Univ. Press, 1997), pp. 199-211.

Week 11: Nov. 11

Episodes in Science and Medicine; Science and Religion

Walton Schalick III, "To Market, to Market: The Theory and Practice of Opiates in the Middle Ages," in M. Meldrum, ed. *Opioids and Pain Relief: A Historical Perspective* (Seattle, WA: IASP Press 2003), vol. 25: 5-20.

Christopher Lawrence, "Incommunicable Knowledge: Science, Technology and the Clinical Art in Britain 1850-1914," *Journal of Contemporary History* 20, no. 4 (1985): 503-520.

Susan E. Lederer, "Screening Syphilis: Dr. Ehrlich's Magic Bullet Meets the Public Health Service" (with John Parascandola), *Journal of the History of Medicine* 53 (1998): 345-370.

Christian Oberländer, "The Rise of Western 'Scientific Medicine' in Japan: Bacteriology and Beriberi," in Morris Low, ed. *Building a Modern Japan: Science, Technology, and Medicine in the Meiji Era and Beyond* (New York: Palgrave Macmillan, 2005), 13-36.

Richard Keller, "Madness and Colonization: Psychiatry in the British and French Empires, 1800-1962." *Journal of Social History* 35 (2001): 295-326.

Jordan Goodman, "Can it Ever Be Pure Science? Pharmaceuticals, the Pharmaceutical Industry and Biomedical Research in the Twentieth Century," in Jean-Paul Gaudillière and Ilana Löwy, eds. *Invisible Industrialist: Manufactures and the Production of Scientific Knowledge* (Houndsmill: Macmillan, 1998), pp. 143-66.

David C. Lindberg and Ronald L. Numbers, *God and Nature: Historical Essays on the Encounter Between Christianity and Science* (Berkeley: Univ. of California Press, 1986), Introduction, pp. 1-18.

Ronald L. Numbers, "Creating Creationism: Meanings and Uses Since the Age of Agassiz," in idem, *Darwinism Comes to America* (Cambridge, MA: Harvard Univ. Press, 1998), pp. 49-57.

Edward J. Larson, "The Scopes Trial in History and Legend," in David C. Lindberg and Ronald L. Numbers, eds. *When Science and Christianity Meet* (Chicago/London: Univ. of Chicago Press, 2003), pp. 245-264.

Week 12: Nov. 18

Technologies, Material Culture, and Science

- Henry Lowood and Robin Rider, "Literary Technology and Typographic Culture: The Instrument of Print in Early Modern Science," *Perspectives on Science* 2 (1994): 1-37.
- H. Otto Sibum, "Reworking the Mechanical Value of Heat: Instruments of Precision and Gestures of Accuracy in Early Victorian England," *Studies in History and Philosophy of Science* 26 (1995): 73-106.
- Andrew Warwick, *Masters of Theory: Cambridge and the Rise of Mathematical Physics* (Chicago/London: Univ. of Chicago Press, 2003), ch. 3, "A Mathematical World on Paper: The Material Culture and Practice-Ladenness of Mixed Mathematics," pp. 114-175.
- Eric Schatzberg, "Materials, Symbols, and Ideologies of Progress," in his *Wings of Wood, Wings of Metal: Culture and Technical Choice in American Airplane Materials, 1914-1945* (Princeton: Princeton Univ. Press, 1999), pp. 3-21.
- Robert E. Kohler, "Moral Economy, Material Culture, and Community in *Drosophila* Genetics," in Mario Biagioli, ed. *The Science Studies Reader*, (New York: Routledge, 1999), 243-257.

Week 13: Nov. 25

Authors, Audience, Publishers, and Oral History

- Roland Barthes, "The Death of the Author," 1967, 4pp. First published in English (translation by Richard Howard) in *Aspen Magazine* 5/6 (1967). Available online at <http://www.ubu.com/aspen/aspen5and6/threeEssays.html#barthes>
- Michel Foucault, "What is an Author?" in *Language, Counter-Memory, Practice*, translated by Donald F. Bouchard and Sherry Simon, (Ithaca, NY: Cornell Univ. Press, 1977), pp. 113-138.
- James A. Secord, *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation* (Chicago: Univ. of Chicago Press, 2000), Prologue, "Devils or Angels," chs. 1, "A Great Sensation," and 4, "Marketing Sensation," pp. 9-40 and 111-152.
- Richard Staley, *Einstein's Generation: The Origins of the Relativity Revolution*. Chicago: Univ. of Chicago Press, 2008, ch. 8 "On the Histories of Relativity," pp. 294-343.
- Peter Galison, "The Collective Author," in Mario Biagioli and Peter Galison, eds. *Scientific Authorship: Credit and Intellectual Property in Science*, (New York/London: Routledge, 2003), 325-355.
- Hugh Gusterson, "The Death of the Authors of Death: Prestige and Creativity Among Nuclear Weapons Scientists," in Mario Biagioli and Peter Galison, eds. *Scientific Authorship: Credit and Intellectual Property in Science* (New York/London: Routledge, 2003), 281-307.
- Lillian Hoddeson, "The Conflict of Memories and Documents: Dilemmas and Pragmatics of Oral History," in Thomas Söderqvist and Ronald E. Doel, eds. *The Historiography of Contemporary Science and Technology: Writing Recent Science* (London/New York: Routledge, 1997), 187-200.
- Pamela Gossin, "Literature and the Modern Physical Sciences," in Mary Jo Nye, ed. *The Cambridge History of Science. Vol. 5: The Modern Physical and Mathematical Sciences*, 91-109. Cambridge/New York: Cambridge Univ. Press, 2003.

Week 14: Dec. 2

Image Making and Objectivity [Note: second book review due]

- Lorraine Daston and Peter Galison, *Objectivity* (New York/Cambridge, MA: Zone Books, 2007), Prologue, "Objectivity Shock," and ch. 1, "Epistemologies of the Eye," pp. 1-53.

David Gooding, "From Phenomenology to Field Theory: Faraday's Visual Reasoning,"
Perspectives on Science 14 (2006): 40-65.

Michael Lynch and John Law, "Pictures, Texts, and Objects: The Literary Language Game of Bird-Watching," in Mario Biagioli, ed. *The Science Studies Reader*, (New York: Routledge, 1999), 317-341.

Gregg Mitman, "Cinematic Nature: Hollywood Technology, Popular Culture, and the American Museum of Natural History," *Isis* 84 (1993) 637-661.

Ronald E. Doel and Pamela M. Henson, "Reading Photographs: Photographs as Evidence in Writing the History of Modern Science," in Thomas Söderqvist and Ronald E. Doel, eds. *The Historiography of Contemporary Science and Technology: Writing Recent Science* (London/New York: Routledge, 1997), 201-236.

Week 15: Dec. 9

Using History of Science: Concluding Thoughts

Ian Hacking, *The Social Construction of What?* (Cambridge, MA: Harvard Univ. Press, 1999).

