

HIST 366: Science in Germany, 1800-1945

MG 1094, 1:30-2:50 PM TTh

Instructor: Dr. Peter Ramberg

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Office Hours: MTWTh, 11:00-12:30, by chance, or by appointment

Course Description

This course will look at the transformation that took place in German science from its relatively unimportant position in Western science in the late eighteenth century to its dominance of European science between the last quarter of the nineteenth century and the 1930s. We will look at the influence of the Romantic movement on science in Germany, the transformation of the university to a research institution, the emergence of seminars and instructional laboratories, the character of individual sciences in Germany, and the effect of national socialism on German science. All required course readings will be in English.

Course Mechanics

Class meetings will primarily be devoted to discussion with the occasional short lecture. Reading assignments will consist of articles and portions of books.

Leading Discussion: After the second week of class, class discussion of assigned readings will be led by groups of 2-3 students. As part of leading discussion, you will need to turn in a summary of the day's reading (to me) and set of thoughtful discussion questions (to the class) the class period before your scheduled discussion meets. If you are not leading discussion, you will still need to turn in 2-3 discussion questions as part of your general participation and attendance grade. A sign-up sheet for leading discussions will be available during the second week of class. Your grade for leading discussion will also be determined in part by fellow students in the course.

Short Papers: For three class periods, there will be several articles assigned to read, but divided among the class. Each of you will choose one of these papers to read carefully (and skim the others), and turn in a one-page written summary. Each group of students who read the same paper will meet in class to organize and present a summary to the rest of the class for discussion and comparison to previous readings.

Research Paper: you will be expected to complete a major research paper (at least 20 pages) on the topic of your choice. This paper should consist of an analysis of a particular topic or issue related to German science that incorporates and addresses themes and issues addressed in class. You must also include primary sources in German or in translation. Early in the semester, you will submit a prospectus of your topic with a short written analysis of a primary or secondary source related to your research topic. This paper will serve as the starting point for your full paper. Later in the semester, you will turn in a working draft of your paper for grading. More details will be forthcoming.

Discussion of Research projects: The last three weeks of the semester will be devoted to your research project and completing the final draft of your paper. During class time, we will take time to discuss each specific project to make suggestions and improvements. Each student will need to present to the class a written summary of your project for evaluation and commentary. More information will be forthcoming.

Attendance/Participation: Attendance and participation is essential for a seminar class. I will note your attendance by your submission of discussion questions in class. Missing more than five class periods (of the 27 scheduled) will result in a lowering of your grade.

Note: Late work will not be accepted, except without *prior* arrangement. Computer problems will *not* be accepted as a reason for late work—plan ahead and always back up your work. Failure to submit an assignment will result in a grade of zero.

Grading

Your total grade for the course will be distributed as follows:

Short papers: 30%

Research Paper: 30%

Leading Discussion: 20%

Attendance/participation: 20%

Required Texts

Robert J. Richards, *The romantic conception of life: science and philosophy in the age of Goethe* (Chicago: University of Chicago Press, 2002).

Mark Walker, *Nazi science: myth, truth, and the German atomic bomb* (New York: Plenum Press, 1995).

Kate L. Turabian, *A Manual for Writers of Term Papers, Theses, and Dissertations*, 6th edition. (Chicago, University of Chicago Press, 1996)

A packet of readings available at the campus bookstore.

Academic Honesty

I expect that all your work in the class will be your own. Any violations of the principle of academic honesty will be treated in accordance with the policies outlined in Truman's General Catalog for 2005-7.

Tentative Schedule

Topics and readings listed here are general and subject to change. Reading assignments for each day will be given on separate handouts.

Date	Subject
January 9, 11	Introduction Romanticism
January 16, 18	Romanticism, <i>con.</i>
January 23, 25	Romanticism, <i>con.</i>
January 30, February 1	Library research class (meet in Pickler 103) Universities
February 6, 8	Universities, <i>con.</i>
February 13, 15	The Teaching and Research Laboratory
February 20, 22	The Teaching and Research Laboratory, <i>con.</i> Science Popularization
February 27, March 1	Science Popularization
March 6, 8	<i>Spring Break, no class</i>
March 13, 15	Disciplines and Institutes, 1870-1933
March 20, 22	Disciplines and Institutes, 1870-1933 Science under National Socialism
March 27, 29	No class Science under National Socialism
April 3, 5	<i>Student Research Conference, no class</i> Science under National Socialism
April 10, 12	Science under National Socialism <i>Discussion of Projects</i>
April 17, 19	<i>Discussion of Projects</i>
April 24, 26	<i>Discussion of Projects</i>
April 30	<i>Final Papers due 12 noon</i>

Assigned Readings

Unless stated otherwise, all readings are available in books for purchase or in the course reading packet. Copies of articles are also on reserve in the library.

Romanticism

Thursday, January 11, 2007 Early Romanticism

Richards, Prologue (all), Chapter 1 (all), and Chapter 2 (pp. 17-36, 59-60, 94-105, skim the rest)

Tuesday, January 16, 2007 Schelling and *Naturphilosophie*

Richards, Chapter 3, pp. 114-146, 151-166, 176-192, skim the rest), Chapter 4 (all)

Thursday, January 18, 2007 Romantic biology

Richards, Chapter 6 (skim), Chapters 7, 8 and 9.

Tuesday, January 23, 2007 Goethe and morphology

Richards, Chapter 10 (pp. 364-376, skim the rest for biographical information), Chapter 11 (all)

Thursday, January 25, 2007 Romanticism in the physical sciences (**choose one**)

Pierce C. Mullen, "The romantic as scientist: Lorenz Oken," *Studies in Romanticism* 16 (1977), 381-99.

Malcolm Nicolson, "Alexander von Humboldt and the Geography of Vegetation," 169-88 in *Romanticism in the Sciences*, ed. Andrew Cunningham, and Nicholas Jardine (Cambridge, UK: Cambridge University Press, 1990).

Dennis L. Sepper, "Goethe, Colour and the Science of Seeing," 189-98 in *Romanticism in the Sciences*, ed. Andrew Cunningham, and Nicholas Jardine (Cambridge, UK: Cambridge University Press, 1990).

H.A.M. Snelders, "Oersted's Discovery of Electromagnetism," 228-40 in *Romanticism in the Sciences*, ed. Andrew Cunningham, and Nicholas Jardine (Cambridge, UK: Cambridge University Press, 1990).

Walter D. Wetzels, "Johann Wilhelm Ritter: Romantic Physics in Germany," 199-212 in *Romanticism in the Sciences*, ed. Andrew Cunningham, and Nicholas Jardine (Cambridge, UK: Cambridge University Press, 1990).

Tuesday, January 30, 2007 Library research techniques

Meet at Pickler Library, room 103

The German University

Thursday, February 1, 2007 Romanticism and the University

Elinor Shaffer, "Romantic Philosophy and the Organization of the Disciplines: The Founding of the Humboldt University of Berlin," pp. 38-54 in *Romanticism in the Sciences*, ed. Andrew Cunningham, and Nicholas Jardine (Cambridge, UK: Cambridge University Press, 1990).

Tuesday, February 6, 2007 The university in nineteenth century Germany.
Daniel Fallon, *The German University: A Heroic Ideal in Conflict with the Modern World* (Boulder, CO: Colorado Associated University Press, 1980). Chapters 2-5, pp. 5-53.

Thursday, February 8, 2007 The "Research Imperative"
R. Steven Turner, "The Growth of Professorial Research in Prussia, 1818-1848: Causes and Context," *Historical Studies in the Physical Sciences* 3 (1971): 137-82.

The Teaching-Research Laboratory and Professionalization

Tuesday, February 13, 2007 The Chemical Teaching/Research Laboratory
Frederic L. Holmes. "The Complementarity of Teaching and Research in Liebig's Laboratory." *Osiris* (1989): 121-64 (on JSTOR, focus on pp. 121-145, and the conclusion).
Alan J. Rocke. "Origins and spread of the 'Giessen Model' in University Science." *Ambix* 50 (2003): 90-115

Thursday, February 15, 2007 Professionalisation in Chemistry
Ernst Homburg. "Two factions, one profession: the chemical profession in German society 1780- 1870." In *The making of the chemist: the social history of chemistry in Europe, 1789-1914*, edited by David Knight and Helge Kragh, 39-76. Cambridge: Cambridge University Press, 1998.

Tuesday, February 20, 2007 **Physics** Pedagogy in Physics
Kathryn Olesko, "On Institutes, Investigations, and Scientific Training," pp. 295-332 in *The Investigative Enterprise: Experimental Physiology in Nineteenth-Century Medicine*, ed. William Coleman, and Frederic L Holmes (Berkeley/Los Angeles: University of California Press, 1988)

Science Popularization

Thursday, February 22, 2007 Emil Roßmäßler and early popularization
Andreas W. Daum, "Science, politics, and religion: Humboldtian thinking and the transformations in civil society in Germany, 1830-1870," *Osiris* 17 (2002): 107-40.

Tuesday, February 27, 2007 Darwinism in Germany I
Alfred Kelly. *The descent of Darwin: the popularization of Darwinism in Germany, 1860-1914*. Chapel Hill, NC: University of North Carolina Press, 1981. **Chapters 1 and 2.**

Thursday, March 1, 2007 Darwinism in Germany II
Alfred Kelly. *The descent of Darwin: the popularization of Darwinism in Germany, 1860-1914*. Chapel Hill, NC: University of North Carolina Press, 1981. **Chapters 4 and 5.**

Disciplines and Institutes, 1871-1933

Tuesday, March 13, 2007

Jeffrey A. Johnson, "Academic Chemistry in Imperial Germany," *Isis*, 76 (1985), 500-524

Lynn K. Nyhart, "The disciplinary breakdown of German morphology, 1870-1900," *Isis* 78 (1987): 365-89. (on JSTOR)

Thursday, March 15, 2007

David Cahan. "The institutional revolution in German physics, 1865-1914." *Historical Studies in the Physical Sciences* 15 (1985): 1-65.

Tuesday, March 20, 2007 Weimar science: physics and genetics (**choose one**)

Paul Forman, "Weimar culture, causality, and quantum theory, 1918-1927: adaptation by German physicists and mathematicians to a hostile intellectual environment," *Historical Studies in the Physical Sciences* 3 (1971), 1-115 (handout).

Jonathan Harwood. "Mandarins and outsiders in the German professoriate, 1890-1933: a study of the genetics community." *European history quarterly* 23 (1993): 485-511.

Jonathan Harwood, "National styles in science: Genetics in Germany and the United States between the World Wars," *Isis* 78 (1987): 390-414. (on JSTOR)

Jonathan Harwood, "Weimar culture and biological theory: a study of Richard Woltereck (1877-1944)," *History of science* 34 (1996): 347-77.

Science under National Socialism

Thursday, March 22, 2007 Science under National Socialism

Walker, chapters 1-4.

Tuesday, March 27, 2007 *No class, work on papers*

Thursday, March 29, 2007 Science under National Socialism (con.)

Walker, chapters 5-8.

Tuesday, April 3, 2007 *Student Research Conference, no class*

Thursday, April 5, 2007 Science under National Socialism (con.)

Walker, chapters 9-11.

Tuesday, April 10, 2007 Biology and Chemistry under National Socialism (*choose one*)

Ute Deichmann, and Benno Müller-Hill, "Biological Research At Universities and Kaiser Wilhelm Institutes in Nazi Germany," pp. 160-83 in *Science, Technology and National Socialism*, ed. Monika Renneberg, and Mark Walker (Cambridge: Cambridge Univ. Press, 1994).

Ute Deichmann, "Chemists and biochemists during the National Socialist era," *Angewandte Chemie-international edition in English* 41 (2002): 1310-28.

Thursday, April 12, 2007 *Discussion of projects begins*