Comparative Environmental History of Large Scale Technologies in the 20th Century: Research and Writing Course

PhD course (3rd cycle)
led by Professor Paul Josephson, Colby College, Maine, USA

Spring Term 2015
7.5 credits
Division of History of Science, Technology and Environment
KTH Royal Institute of Technology Stockholm, Sweden

Course Description:
In this course based on an examination of large scale technological systems in the US, former Soviet Union, Brazil, China, Germany and Sweden (based on the work of seminar participants), we will consider how economy, polity, ideology, engineering culture, and attitudes toward nature have shaped such technologies as hydroelectric power stations, roads and railroads, nuclear reactors, and agricultural technologies. We will also examine their social and environmental impacts. We will pay attention to theoretical issues in the history of technology and environmental history, discuss research approaches and the kinds of primary sources available, and consider strategies for good – and efficient – writing.

Intended Learning Outcomes:
This course intends to train excellent researchers and writers and teaches critical reading skills. Students will see the larger connections between their own work and that of the work of others.

Course Schedule:
Five 5-hour sessions, Tuesdays 10:00-12:00 and 13:00-16:00
January 27
February 10
March 10
April 14
May 5

Course Requirements:
Preparation of course material; preparation of research tasks; regular attendance; active participation; four writing assignments with the last a final ca. 25 pages research paper. Written instructions will be handed out for each assignment. On each assignment, participants will receive extensive bibliographic, editorial, and substantive comments.

a) Paper Proposal, due week 2 (February 10, 2015, 5-7 pages and bibliography)

b) 1st draft, due week 4 (April 14, 15 pages).
c) Penultimate draft due week 5 (May 5, 20 pages).

d) Final paper due June 15, 2015, by email to paulrunsmarathons@gmail.com.

**Weekly Structure: History, Research and Writing**

Subject matter: from transport and hydroelectricity to agriculture, and from mining and metallurgy to nuclear issues, building each week on historical events and ideas, and leading to understanding of continuity and change in engineering approaches, world view, scientific concepts, public awareness and engagement.

Research and writing: from identification of a topic and sources to be consulted, to critical writing in an iterative and cumulative fashion.

Synthesis of the two: students will add to discussion from their own reading in primary sources from their own subject areas.

Each week will enable a focus on specific technologies, but also move chronologically. A brief outline of issues and ideas to be covered will be provided. Participants should be prepared to discuss major actors, institutions, and their concerns.

**Location:**
Seminar Room, Division of History of Science, Technology and Environment, Teknikringen 74 D, top floor.

**Course Registration:**
please contact:
Sabine Höhler
Associate Professor and Director of Graduate Studies
Division of History of Science, Technology and Environment
KTH Royal Institute of Technology Stockholm
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**Calendar of Meetings (Readings Follow)**

**Week 1 (January 27).** Introduction. Expectations. Syllabus Discussion.
- Hydrological Engineering. Canals, railroads, roads, automobility
- Writing. Primary sources. Archival research

**Week 2 (February 10).** Agriculture and Forestry (from horses to tractors, collectivization, rise of monocultures.
- Research paper proposal due (5-7 pp.) with bibliography.
Week 3 (March 10). State, Public, Environment.
  • How to Write Quickly and Well. How grammar and style shape successful writing.

  • Writing. 1st draft due. 15 pages

Week 5 (May 5). Energy (nuclear, fossil fuel, alternative).
  • Presentations. Writing. Penultimate draft due. 20 pages.
  • Followed by catered dinner (dinner out at my account).

Final Assignment
  • 25-page paper due (e-copy to me) by June 15. Think of a short, publishable article.
  • I shall be available for one-on-one discussions.

Readings

Week 1 (January 27). Hydrological and Roadway Engineering

In the twentieth century large-scale approaches to a series of pressing problems became emblematic. Engineers joined with financiers, government officials, and construction firms to build massive electrical power systems, irrigation networks, hydropower stations, roadways, and so on that seemingly stretched to the horizon. In most cases, they believed that the unquestioned benefits of these projects outweighed any such costs as temporary relocation of residents from the areas of projects including indigenous peoples, worker safety, environmental impacts (if they considered them at all). These projects included major highway systems in Germany, the United States, and elsewhere and water works from Europe to the USSR to China to North America and to Brazil. A great deal of research remains to be completed on the history and politics of these technologies. Who supported them and why? Where did they secure funding? What was the role of the government and the public? On a more theoretical level, what is the relationship between technology, nature, and the public?


A 1938 political cartoon celebrating the achievement of Tennessee Valley Authority electricity production in the United States during President Roosevelt’s “New Deal.” (Note the use of political cartoons as a potential source.)


Katy Siegel and June Y. Mei, “Yun-Fei Ji's Three Gorges Dam Migration,” Art Journal, Vol. 69, No. 3 (Fall 2010), pp. 73-78.


**Other Readings if Time and Interest Permit:**


**Week 2 (February 10). Agriculture and Forestry**

One of the major trends in the twentieth century in the history of technology has been the extension of industrial processes – and attitudes – toward the natural world. This, of course, raises the question, What is the natural world? Think of the rise of the industrial forest with *Forstwissenschaft* in the nineteenth century, and the efforts of self-confident specialists to “improve” upon the productivity of natural resource harvesting. By the early to mid-twentieth century industrial metaphors and terms penetrated forestry, fishery, and agricultural journals. Not only tractors, combines, and harvesters turned the small-scale family farm into agribusinesses, but also the water works that provided irrigation to previously arid regions. State-funded research institutes conducted research on experimental fields to increase productivity. Notions of conservation and preservation of natural resources, and later “sustainability” were debated. By the postwar years and
the rise genetic engineering of GMOs, all remaining lines between nature, science, and industry had become obscured – and required our diligent study.


Monsanto, Developing Countries Biotechnology Bibliography (.pdf)


Union of Concerned Scientists, CAFOs Uncovered (Cambridge, MA, 2008).

Tractors in the 1920s were brute force machines with metal, not pneumatic wheels, that were difficult to operate. (Can we identify archival photographic collections for research projects?)

**Other Readings if Time and Interest Permit:**


**Week 3 (March 10). The State, Public, Technology, and the Environment.**

The relationship between science, technology, and the citizen has evolved in the twentieth century along with the growth in the scale of technological systems. In more democratic regimes, the public seemingly has access to the policy process and can influence the choice and direction of innovation. In more authoritarian regimes, it seems that role is circumscribed if not prohibited. On top of this, some specialists argue that certain technologies are more democratic – those that are small scale for example, while those that are large scale tend to be more authoritarian and rise the prospects of significant, if not irreversible social and environmental impacts. What has been the experience of the public and environment under communism, fascism and democracy?

![Image of a dam with a view of the surrounding landscape.](image)

The Sardar Sarovar dam in India has provoked significant controversy, including opposition from farmers who have been displaced from the massive project. (*Economic Times*, June 14, 2014).


Other Readings if Time and Interest Permit:


So-called mountaintop removal has obvious aesthetic and physical impacts on the quality of life. Large scale machinery and equipment has been employed in the widely-spread practice.


**Other Readings if Time and Interest Permit:**


**Week 5 (May 5). Energy (mostly nuclear, but also fossil fuel and some alternative).**

The nations of the world have spent trillions of dollars, rubles, francs, marks, yen, pounds, rupees and other currencies on nuclear technologies since the mid-1940s. These nations’ leaders and scientists have justified the expenses in the name of national security, imminent threat, the promise of electricity “too cheap to meter,” elixirs and other medical uses, and applications in agriculture and industry that would revolutionize production processes. Many of them see nuclear power as the best alternative to a carbon economy since nuclear power does not contribute to global warming. How have political, economic, and ideological desiderata contributed to the development of large scale energy technologies in the twentieth century?


In 1957 Walt Disney produced a film replete with utopian visions for the future of atomic energy, “Our Friend the Atom.”


Other Readings if Time and Interest Permit:

Robert Jungk, Brighter Than a Thousand Suns.

Gabrielle Hecht, The Radiance of France.

Paul Josephson, Red Atom.


**Other Secondary Sources on Asia, India, China**


Robert Marks, Tigers, Rice, Silk, and Silt: Environment and Economy in Late Imperial South China (New York: Cambridge University Press, 1998).


