HISC 108
Science and Technology in the Twentieth Century: The Life and Environmental Sciences

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Office Hours: Wednesdays 1-3 p.m., or by appointment

Synopsis Scientific knowledge has transformed life in the twentieth century from birth to death. In this course, we will examine scientific and technological developments in the life and environmental sciences: evolutionary theory, genetics and eugenics; biology and birth control; environmental science and chemical pesticides; prenatal diagnostics and biotechnology. How has scientific knowledge and technologies changed the way we think about who we are and might be? How has it changed how we see our selves in relation to the natural environment? How has it changed the way we approach our most intimate decisions about sex, procreation, and the start and end of life?

Required books, available at Groundworks and on reserve at Geisel Library

Stephen J. Gould, *The Mismeasure of Man* (New York: Norton, 1996).
Diane B. Paul, *Controlling Human Heredity* (Atlantic Highlands, NJ: Humanities Press, 1995).
Elizabeth S. Watkins, *On the Pill* (Baltimore: The Johns Hopkins University Press, 1998).
Rachel Carson, *Silent Spring,* any edition.
Course Reader, University Reader Printing Service

Grading Two essay assignments (3-5 pages) on questions that I will provide, based on the readings [three essays will be offered, you pick two to complete and submit (20% each)], plus a midterm (30%) and a final (30%).

Class schedule and assignments

All readings other than the required books are in the course reader.

I. Evolution, Environment, and Inheritance

Charles Darwin's theory of the origin of species through natural selection is the most famous scientific idea of the nineteenth century, perhaps of all time, but at the end of the nineteenth century, few scientists accepted it. The problem was inheritance: Breeding showed inheritance to be a conservative process, and this raised doubts about the efficacy of natural selection in creating new species.

9/21 Mayr, "Evolution before Darwin."
9/26 Selections from *The Origin of Species* and *Descent of Man.*

II. Selective Breeding and Eugenics

Darwin had based his theory on an analogy with animal breeding, so it stood to reason that humans might be improved through selective breeding, too. This idea was pursued with great vigor at the turn of the century. At the heart of the eugenics movement was the belief that society had the right and the responsibility to screen out "defectives" to improve the fitness of the race.

9/28 Galton, "Hereditary talent and character."

Essay #1 Due in class 10/3

10/3 Allen, "The Eugenics Record Office," and Paul, *Controlling Human Heredity* pp. 1-71.
10/5 Paul, *Controlling Human Heredity* pp. 72-135.
10/10 Gould, *Mismeasure of Man* 176- 263.

III. The Evolutionary Synthesis and Decline of Eugenics

In the 1920s, Thomas Hunt Morgan and colleagues demonstrated that particular traits, passed from parent to progeny, were associated with particular sites on the chromosomes found in cell nucleii. Although H. J. Muller showed that X-rays could cause gene mutations, mostly genes appeared to be unaffected by the external environment. Genetics thus shifted the focus of biologists away from the environment and inward toward the cell, the molecule, and DNA.

10/ 12 Allen, "The convergence of disciplines."

IV. From Eugenics to Birth Control

Both feminists and population control advocates hailed the first chemical contraceptives as a huge advance; only gradually did the potentially harmful effects of oral contraceptives emerge.

10/17 Sanger, selections from *Pivot of Civilization*, Borell, "Controlling Population Growth." Allen, "Old Wine in New Bottles."

10/19 Watkins, pp. 1-73. -137; Talbot, "Should doctors prescribe birth control pills?"

10/24 Morantz, "The Scientist as Sex Crusader," Pearce, "Cultural conflicts," in reader.

Essay #2 Due in class 10/26

V. From ENOVID to Silent Spring

Fears about the negative effect of chemical contraceptives coincided with an increasing awareness of the potentially harmful effects of chemicals in the natural environment. The most famous alarm call was Rachel Carson's 1962 best-seller, *Silent Spring*. But just as doctors were reluctant to acknowledge that contraceptive pills might do harm, scientists and economists were reluctant to admit that DDT—which had stopped malaria and helped foment the green revolution—might have unintended consequences.

10/26 Carson, *Silent Spring,* 1-152

10/31 Carson, *Silent Spring*, 153-297.

11/2 **MID TERM EXAM (short answers and an essay) in class.**

11/7 Russell "The strange career of DDT."

VI. Reproduction Revisited: From excess fertility to infertility and "perfect" babies

Margaret Sanger thought effective contraception would free women to live life as they chose, but technology sometimes complicates rather than clarifies choice. Do all individuals have a "right to reproduce"? Is it ethical to abort a fetus with an undesirable genetic characteristic? Are pre-natal diagnostic technologies re-introducing the weeding out of "defectives" under the rubric of personal freedom and "choice"?

11/9 Readings from *The Technological Woman;* Rothman, "The meanings of choice."

11/14 Video in class: "The Secret of Life: Children by design."

11/16 Kishwar, "Deficit of Women in India."

Essay #3 Due in class 11/21

VII. Biotechnology: The next revolution?

If genetics only recently seemed like destiny, now it begins to look like the latest area of human innovation and discovery. Will we soon be able to alter our genes to suit our wills? What impact will this have on the world and society we live in?

11/21 Cranor, "Are genes us?"

11/23 THANKSGIVING, no class.

11/28 Reading to be announced.

11/30 No further reading.

Final exam Tuesday December 5, 3-6 pm