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BOOK REVIEWS

Feature Review

Steven Epstein. *Impure Science: AIDS, Activism, and the Politics of Knowledge.* (Medicine and Science, 7). xiv + 466 pp., index. Berkeley/Los Angeles: University of California Press, 1996. \$29.95.

The AIDS epidemic has produced unique cultural and political responses in the United States. This reaction is significantly due to its devastating impact on urban, middle-class gay men who already had well-developed social and political networks at the time they contracted the disease. Gays and other populations affected by AIDS banded together in activist groups across the country to form highly visible and effective advocacy groups. Although many sociological and cultural analyses of AIDS have been published, Steven Epstein's *Impure Science* is the best book I have read on the complex interaction between these activist groups and diverse biomedical institutions.

The two main parts of the book focus on American research on the etiology of AIDS and on clinical trials of anti-HIV medication. Epstein examines how this research departs from the ideals of supposedly "pure" science under pressure from external forces, principally AIDS activists. His central theoretical contention is one familiar to historians and sociologists of science: biomedical research does not operate in an epistemological and political void but is tightly enmeshed in broader social conflicts. To demonstrate this point Epstein weaves together a wealth of documentary materials including biomedical publications, activist newsletters, and interviews with the primary actors.

Epstein's reporting of the discovery of HIV, virological debates, and clinical trials is detailed and precise yet thoroughly accessible to nonspecialists. Unlike many other writers on AIDS, Epstein avoids polemics, idiosyncratic opinions, and Manichaeic dichotomies. Instead he provides a carefully documented and sober analysis. He reveals the evolving give and take between activists and researchers. The latter gradually acquiesced to activists' demands for accelerating clinical trials and expanding access to new treatments. The activists, in turn, gained epistemic

expertise and institutional access, gradually becoming more sympathetic to and realistic about the huge challenges faced by AIDS researchers.

The major issue in the first part of the book is the conflict between those committed to the HIV theory of AIDS etiology versus those advocating theories concerning gay lifestyles and resulting "immune overload." When the latter included only a small group of largely lay individuals (mainly publishing in the *New York Native*) their efforts drew little media attention. Ironically, however, this fringe group helped promote Peter Duesberg, a Berkeley molecular biologist, and his critiques of the HIV theory of AIDS. The Duesberg controversy serves Epstein as a strong example of the economy of scientific prestige in the media marketplace.

The most important case in the second part concerns azidothymidine (AZT). AIDS activists were instrumental in expediting its approval by the Food and Drug Administration, only to be chastened by more thorough international studies that showed AZT had little long-term clinical value. Epstein demonstrates how the experience with AZT and other equally unsuccessful drugs prompted changes in the attitudes of activists and researchers alike. Activists became more wary of promoting experimental drugs on the basis of only meager preliminary results, while scientists became more sensitive to the clinical and existential urgency of their research to people with AIDS (PWAs).

Certain important "external" forces are underplayed in Epstein's account. He focuses on urban gay men (mainly from New York and San Francisco), paying scant attention to African-American, Latino, female, and injecting-drug activists. He ignores alternative and psychosomatic therapies, although these have been vital to many PWAs, especially because of the toxic side effects and slight efficacy of early anti-HIV drugs. And only occasionally does he mention the eco-

nomic role of pharmaceutical companies, although it was the object of intense activist fury. As these issues would have added even greater complexity to Epstein's analysis, I cannot fault him for paring them from an already dense story.

As it stands, *Impure Science* will prove rewarding reading for historians of medicine and a valuable, engrossing text in courses on AIDS and the sociology of science.

VERNON A. ROSARIO

■ General

Henry Petroski. *Invention by Design: How Engineers Get from Thought to Thing.* viii + 242 pp., illus., bibl., index. Cambridge, Mass./London: Harvard University Press, 1996. \$24.95.

In *Invention by Design* Henry Petroski, currently the most successful of those writers attempting to explain engineering to the general public, uses various case histories to bring his readers into close contact with nine distinct works of engineering: paper clips, pencil points, zippers, aluminum cans, fax machines, airplanes, the water

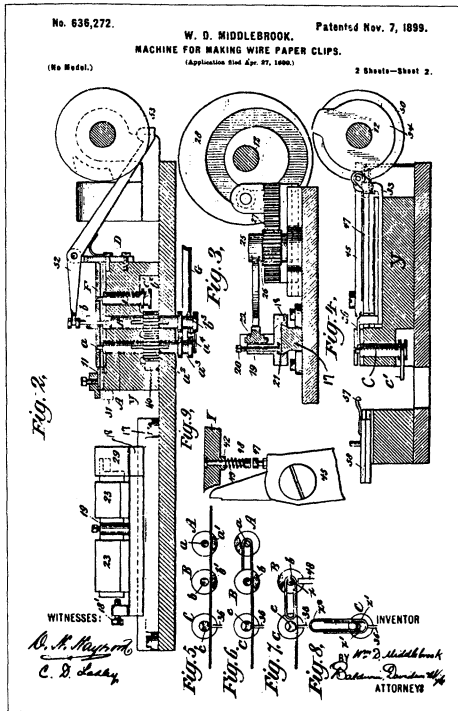
supply, bridges, and skyscrapers. Petroski combines the talents of solid engineering competence and lively writing to tell a series of stories that show how simple devices such as the pencil can lead us back, through the theories of cantilever beams, to Galileo's original ideas, which, even though erroneous, constitute the beginnings of the science of structural mechanics.

Petroski differentiates engineering from science by showing how design must be influenced by society through politics and economics even as it is constrained by the laws of nature. He gives a clear description of the development of the Boeing 777, revealing that the company consulted airline customers before making the design so that technical efficiency was compromised in favor of the passengers' comfort. Petroski connects major failures such as the crashes of airbus planes to engineers' plans for new designs, especially in the light of Boeing's intensive use of computers in the 777 plane.

Petroski never loses the main thread of his book: to show how engineering demands both scientific thinking and a concern for the marketplace or the public welfare. The story of the zipper takes us from an 1851 invention by Elias Howe, Jr. (who is best known for inventing the sewing machine), to B. F. Goodrich's 1923 hookless boot fastener, which the company trademarked "zipper." As in the case of the paper clip, the machines for making these everyday products were as crucial to their commercial success as were the design features.

Petroski's chapter on the 1936 Oakland Bay Bridge is a highlight of the book. Usually overshadowed by its famous Golden Gate neighbor, the Bay Bridge has a history of diverse proposals involving issues of aesthetics, economics, and the failures of earlier bridges, such as that of the Quebec Bridge in 1907.

Ultimately what makes this story, and this book as a whole, of great interest is its focus on specific people and objects that characterize beautifully our modern technological society in general. Indeed, this book represents a new genre of writing, made possible by the maturity of the field of the history of technology, in which engineers begin to see their works both as individ-



William Middlebrook's 1899 patent drawing of a machine for making a paper clip (reprinted from Petroski, *Invention by Design*).