

# H-Net Reviews

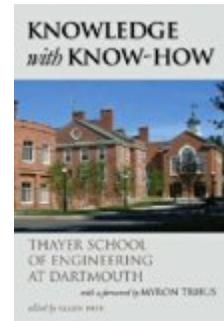
in the Humanities & Social Sciences

Ellen Frye, ed. *Knowledge with Know-How: Thayer School of Engineering at Dartmouth*. Hanover: University Press of New England, 2007. Illustrations. xii + 193 pp. \$24.95 (cloth), ISBN 978-1-58465-650-0.

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## An Engineering School in the Ivy League

Dartmouth College (the nation's ninth oldest, established in 1769) is unique among the Ivy League institutions of higher education (i.e., Harvard University, Yale University, University of Pennsylvania, Princeton University, Columbia University, Brown University, Dartmouth College, and Cornell University) in that it is the only one to eschew the word "university" in its name and to keep the word "college." This is despite the fact that by all traditional criteria (i.e., number of schools in the institution and undergraduate, graduate, and professional degrees awarded), it qualifies as a university. According to the college's Web site, it "enrolls approximately 4,100 undergraduates in the liberal arts and 1,700 graduate students. In addition to 19 graduate programs in the arts and sciences, it is home to the nation's fourth oldest medical school: the Dartmouth Medical School founded in 1797; the nation's first professional school of engineering: the Thayer School of Engineering, founded in 1867; and the first graduate school of management in the world: the Tuck School of Business, established in 1900." [1] All schools at the college are relatively small; the 1,700 graduate students include 411 medical, 234 engineering, and 532 business students.

*Knowledge with Know-How* was designed as a sequel to the book *The First Hundred Years of the Thayer School of Engineering at Dartmouth* (1971). The older work covers the period 1867-1972, and the book under review here covers the shorter, recent period of 1972-2006. The school offers both undergraduate and graduate degrees.

Ellen Frye, the editor and writer of this in-house history, has a long association with the Thayer School and served as senior editor in the communications department at the school. Professional writers Doug Wilhelm and Anita Warren, contributors to Dartmouth publications, and Annelise Hansen, a third-year student at Dartmouth College, also contributed sections to the book. Finally, the brief foreword and preface were written by former deans, and the too brief final piece, "Looking to the Future," was contributed by the present dean, Joseph Helble. Given this information, it should come as no surprise that the book is a straightforward, insider (i.e., written by deans, administrators, alumni, faculty, and overseers), positive, informative, if mainly uncritical, description of the evolution of the Thayer School during its recent development. The first part is a summary of the highlights of the school from the founding vision of Sylvanus Thayer through 1972. The three remaining parts highlight developments during the administration of the eight most recent deans: 1972-84 (one dean), 1984-97 (four deans), and 1998-2006 (three deans). Charles E. Hutchinson served as dean from 1984 to 1994 and 1997 to 1998, and three persons served on an interim basis. An equal number of deans, eight, served during the first one hundred years, and the first dean, Robert Fletcher, served for the period 1871-1918 (forty-seven years). The only female dean served from 1995 to 1997.

There is no doubt that this narrative is "dean-centric." For instance, in a discussion of undergraduate core cur-

ricula, the reader is informed that “two deans are credited with bringing Thayer School into the modern era” (p. 20). The first, William P. Kimball (1945-61), brought the engineering school into a close relationship with the mathematics and science departments. He recognized that engineers in the post-World War II era had to have a solid education in the sciences. However, it was his recommended successor, Myron Tribus (1961-69), who is credited with bringing about “the Tribus revolution” (p. xiii). In place of individual disciplines, such as chemical, civil, and electrical engineering, engineering sciences would form to be the foundation of an integrated core curriculum. Thayer would graduate engineers, trained in the sciences and mathematics, to solve problems. According to Hansen, “at the time, no other school would have dreamed of doing this. Nor would any other school have taken Tribus’s steps to bring it about” (p. 21). At the same time, Hansen argues, although these ideas were revolutionary in content, “they were perfectly in tune with the spirit of Thayer School” (p. 22). In his foreword, Tribus states: “I was one dean among many at Thayer School whose aim was to provide students with a strong grounding in science while teaching future engineers how to convert scientific knowledge into engineering know-how” (p. xi); hence the title, *Knowledge with Know-How*. Kimball certainly prepared the way for “the Tribus revolution,” but is “revolution” the right term if the changes introduced are “in tune” with the “spirit” of the school? Once again, the reader can turn to Tribus’s foreword for the appropriate words: “The reorganization of scientific knowledge is now a continuous exercise” (p. xi). Why not refer to Tribus’s program as “the Tribus reorganization”?

Current reorganization in colleges and universities frequently takes the form of interdisciplinary and collaborative research and programs. Examples of such activities at the Thayer School are: biomedical engineering, biochemical engineering and biotechnology, microengineering and power electronics, computational science and computer-aided design, materials science research, nanotechnology, and environmental fluid dynamics programs. One can see the value of having colleagues in the sciences, mathematics, and computer disciplines as well as at the Dartmouth Medical School and the Tuck School of Business. Given the current oil spill catastrophe in the Gulf of Mexico, the research of Graham Wallis on “Multiphase Flow” deserves special attention. Although he has focused on nuclear applications, in 1994 he pointed out that one area in which “Multiphase Flow” can be studied is the “mixture of oil and water in an oil spill” (p.162).

Later, he had the following to say about pollution: “We are going to have to clean it up—and then keep it clean” (p. 163).

The coexistence of what I have referred to as “the Tribus reorganization” in the curriculum and the research programs cited above is an indication of the Thayer School’s stress on the bridge between theory and practice and of the importance of knowledge with know-how. One challenge for the school is to avoid conflict between teaching and research and the well-known publish or perish phenomenon. Most of the research projects cited above were associated with the hiring of research-oriented professors during the post-1972 period. For the period 1973-84, the sponsored research at Thayer increased from approximately \$500,000 to approximately \$2,000,000 per year. And, “under Dean Duncan, sponsored research ... tripled, from \$6.3 million in 1998 to \$18.5 million in 2004” (p. 108). To meet research developments, about sixty research scientists joined the staff as full-time research associates. Although one professor stated that teaching quality did not go down, “there was a lot more pressure to do more sponsored research—and we now had enough faculty who were strongly interested in research, who had come here expecting to do research” (p. 37). The growth in research required not only human resources but also the upgrading, expansion, and development of support equipment and facilities.

Increased research activities led a number of professors to explore possibilities of marketing their work. Indeed, in the 1980s, Dean Hutchinson began to speak of Thayer’s role as an “innovation incubator.” And in a 2005 interview he acknowledged that “there’s a fundamental resistance to this in any academic institution” (p. 50). For him, the resistance stems from the view that anything that makes money is evil. However, the independence of the Thayer School, its separate endowment, and its small size enables it to be creative. On an institutional level, the college began to enter into collaborative relationships with companies. For instance, in the late 1970s, six companies agreed to provide financial support and bring in projects on which students could work, guided by faculty and in consultation with industry representatives. This evolved into the Cook Engineering Design Center. In the early 1990s, a Corporate Advisory Board (CAB) was established and in 2004 this was replaced by the Corporation Collaboration Council (CCC). Although the CCC included greater input from alumni and friends rather than connections with targeted industries (CAB), its existence reflects the goal at the school to have close relationships with industry.

I admire the desire at the school to support research and yet not to emulate large schools, such as the Massachusetts Institute of Technology. Now that research and the corporate relationship have been institutionalized, attention should be paid to the possibility of conflict of values between the academic world and the corporate world. In *Selling Out: Academic Freedom and the Corporate Market* (2009), Howard Woodhouse of the University of Saskatchewan has depicted a number of cases to support his thesis that administrators have sold out the university system, which values the advancement and dissemination of shared knowledge, to the corporate-market model, which values the maximization of private monetary profits. There is no indication that this has occurred at the Thayer School; however, Woodhouse's work should make overseers, administrators, and faculty sensitive to the possibility of a conflict between the values of academia and those of the corporate world.

In terms of readability and information, *Knowledge*

*with Know-How* does a nice job sharing the major developments at the Thayer School for the period 1972-2006. The book, filled with approximately 120 photographs and appendixes that include the names of overseers, endowed professorships, and faculty, will be of particular interest to current and former members of the Thayer community. It will also be of value to scholars with a particular interest in the history of engineering education and schools. However, the relative lack of discussion of the academic-political context within the broader Dartmouth College community will limit the audience beyond these two narrow groups. Finally, the book would have been strengthened by the inclusion of a discussion of the role of students in the recent history of the Thayer School of Engineering at Dartmouth College.

Note

[1]. "Dartmouth College," <http://www.dartmouth.edu/> (accessed September 10, 2010).

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