A Culture of Improvement: Technology and the Western Millennium

by Robert Friedel. MIT Press, Cambridge, MA, U.S.A., 2007. 576 pp., illus. Trade. ISBN 10: 0-262-06262-3; ISBN 13: 978-0-262-06262-6.

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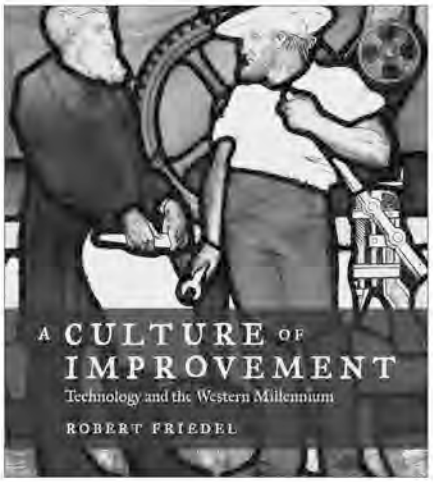
A Culture of Improvement: Technology and the Western Millennium by Robert Friedel is an ambitious survey. Beginning with the 11th century and surveying a series of transformative inventions since that time, the author framed the study with three goals. First, he is trying to tell the chronological story of technological development over the last one thousand years. Second, the volume is intended as a proposal for how we should talk about technological change and technologies. Third, he is trying to convey that there is a moral dimension to technology and to demonstrate that



histories of technology have tended to obscure this aspect of the issue.

In terms of his efforts to tell a story, *A Culture of Improvement* completely conveys the mastery and inventiveness of creative minds, as well as the development of devices that have altered human life throughout the Western world. Organized using a theme-based approach (e.g. with chapters devoted to topics such as power, textiles, building, transforming matter, light, printmaking, networking, engineering, etc.), the text conveys Friedel's view that technological change comes about through a deep-rooted belief that things can be done in a better way. Whether the efforts relate to warfare or farming, evidence is presented to show that technological innovations are largely conceived through an incremental process of trial and error by many minds (despite our tendency to assign individual authorship to each invention).

Although the book is theme-driven, the chapter topics do follow a loose chronology. In this way, Friedel creates a sense of how life changed from era to era and how differently we live as compared to those in the 11th century, for example. In other words, each episodic chapter creates a connection with human activity and the sum total shows how ongoing developments have vastly changed the human community and our relationship with nature. Within this rubric, the book covers a broad sweep without losing sight of incremental moments. In other words, it is clear that innovation does not just happen so much as contingencies of events come together in technological development and we later simplify the context as we outline our narratives.

Regardless of the technological entity he is discussing, Friedel is at his best when setting technological progress within a context; he does so in a way that conveys the creative imaginations of those who seek out ways to advance our ability to accomplish various tasks. His talent for setting the scene and adding flavor to the story was most evident in areas where I had more background on the subject matter (e.g. the development of railroads and tools for navigation). Reading sections that introduced aspects of life I have hardly considered in terms of technology, I marveled at how much information Friedel could pack into a paragraph or a page. Cheesemaking, for example, which came up in the section on "Land and Life," left me thinking about what a technological artifact actually is. We all know that cheesemaking is an ancient activity, long used to preserve milk products over time. Prior to the 18th century, however, cheesemaking was primarily a home-based technology, so the techniques used to create the various tastes are largely undocumented. Yet, as is often the case, when home-based activities moved out of the house, the intuitive processes used by homemakers to perfect the various approaches were formally studied. In this case a literature began to emerge in the 18th century as factories began to develop categories and recipes as well as techniques for controlling bacteria and other microorganisms. Similarly, Friedel's writing makes it possible to imagine we are in other times. For example, when discussing electricity, the words take the mind into a domain without light and power so fully that it is possible to step outside of the world as we know it.

The historical description is also effective in demonstrating that innovation does not tell the whole story of technology. Equally important, at least in terms of how advancements settle into our lives, is the role investment, marketing and society play in turning a good (or excellent) idea into something that human culture begins to perceive as a necessary component of life. Josiah Wedgewood's story offers a case in point. Although his name is associated with development of earthenware for the table, his push to develop a product name had a great deal to do with how marketing is done today. Indeed, Friedel argues, Wedgewood's greatest contribution was his promotion of the idea of consumption and insight into how to develop marketing techniques that would promote demand for a product along with the production techniques to fulfill it. Seeing the possibilities of large-scale production of moderately priced goods combined with good transport systems, Wedgewood worked wonders with sales methods that ranged from endorsements by high-ranking members of society to newspaper advertisements and ever-changing styles and fashions. He also understood that his marketing efforts would pay better dividends if he kept costs under tight control. Because he never tired of promotions, Wedgewood was able to make his goods appear as necessities despite the availability of less expensive products of equal quality.

Friedel's attempt to convey how we "should" talk about technology is much harder to evaluate. Reading through the text, I was reminded of how art history survey courses titillate our senses and yet leave us feeling less than satisfied. On the one hand, everything goes by so quickly and, on the other hand, perhaps invariably, some of an individual's "favorite" works are not discussed because there simply is not enough time. Friedel, too, needed to grapple with this type of smorgasbord. His presentation contains so much that it seems nothing could possibly be left out, and yet I found that several topics of great interest to me received minimal treatment. This kind of dilemma is endemic to surveys.

A Culture of Improvement, for example, does convey motivations, patterns and implications of technological change. Yet, as a member of the art, science and technology community, I felt that the commentary was skewed toward the conventional history-of-technology canon, which has always traditionally downplayed art's close relationship to science and technology. Thus, while art-making techniques are frequently mentioned (e.g. in relation to architecture, papermaking and printmaking, photography, improvements in craft-making, etc.), I would have made them more predominant in the discussion. For example, in the chapter that opens with the bombing of Guernica, I was disappointed to find no mention of Picasso's powerful *Guernica*, often considered his best-known work.

Similarly, I would have emphasized alternative examples in the "Improving Knowledge" chapter. Here Friedel correctly notes that both Nicolas Copernicus's *De revolutionibus orbium coelestium* (Concerning the revolutions of the celestial spheres) and Vesalius's *De humani corporis fabrica* (Concerning the fabric of the human body) were published in 1543. Both books were

constructed as direct challenges to generally accepted and long-taught ways of looking at their subjects. According to Friedel, the Copernican challenge is easier to grasp, and so he goes on to explain it. Given that the history of science has traditionally favored physics and astronomy, I would have preferred that he focused on the less familiar story of how Vesalius's contributions provided a foundation for the modern disciplines of human and comparative anatomy and physiology, while also serving as an adjunct to biological research. Human dissection was forbidden, even to doctors, until the early Renaissance. Because Vesalius was among the first who actually studied the human body through direct dissections, he was able to join observational elements with analytical science and do so in a manner that marked a radical change from earlier times. Furthermore, although the text of the *Fabrica* was not widely read, the illustrations firmly established that visual methods were essential for understanding bodily structure. Similarly, although non-Western contributions to technological development are mentioned in passing, I do not think this is adequate in our global world. Suffice it to say, had it been my book, I would have structured it in a way that conveyed the need for academic histories of technology to move away from the traditional Western bias.

I also would have more fully highlighted the discussion of the moral dimensions of technology. Although mentioned in various chapters, the emphasis on improvement makes it easy to overlook the questions raised as technological change alters human life. It is only in the final chapters, "The Corruption of Improvement" and "Improvement's End," that the downside of technological advancement is directly addressed. Even here, admittedly, I would have mentioned some details he omitted. For example, I was sorry to see no reference to the Pugwash Conferences on Science and World Affairs. Many individuals who were involved in developing nuclear weapons regretted their roles. The Pugwash organization was one outgrowth of this. It has brought scientists, scholars and public figures together since 1957 in an effort to work toward reducing the danger of armed conflict and to seek solutions to global security threats.

All in all, I think Friedel has approached the content with the history of science and technology community in mind, and thus his direct audience will find the book well done and on target. My background in art, science and technology has led me to look for an alternative history. Clearly, my criticisms here reflect my desire to see these areas more fully discussed in the canon. The fact that Friedel and I favor different details when scanning the subject speaks volumes about the tremendous difficulties we face when trying to balance the sweep of history with the need to limit, structure and organize our accounts. In this case, Friedel admirably offers entry into the technological pulse of Western technology. His readable writing style will appeal to technological aficionados and non-specialists alike.

In summary, Robert Friedel, a professor in the Department of History at the University of Maryland, has presented a sweeping text that will work well in courses intended to survey the history of technology, although I would hope that any instruction includes a reader with articles that highlight other cultures. Non-theoretical and engaging, the study paints with a broad brush but also presents a grasp of the many small details that are at play as humans consider ways to reconfigure how they live. The impressive outline of the Western record is enhanced through his artful use of stories and graphics that bring the reader into each world. Chapter by chapter, we can see how the newer technologies made a difference in the lives and aspirations of those involved. It also serves as a vehicle to more clearly show the role of technology in all aspects of human living.

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