

BOOK REVIEWS

■ General

Benjamin A. Elman. *A Cultural History of Modern Science in China.* (New Histories of Science, Technology, and Medicine.) 270 pp., illus., figs., index. Cambridge, Mass./London: Harvard University Press, 2006. \$35 (cloth).

The history of modern Chinese science is receiving increasing attention. Harvard University Press alone, for example, has published four relevant books in the last three years, two of them authored by Benjamin A. Elman. Elman, a leading scholar in the history of Chinese science and technology, published a massive work, *On Their Own Terms: Science in China, 1550–1900*, in 2005 (it was reviewed in the September 2006 issue of *Isis*); he has now written an accessible volume for classroom use, *A Cultural History of Modern Science in China*, that is based on that work.

Despite its title, this concise text actually concerns science, technology, and medicine in China, with a principal focus “on Chinese natural studies and the literati mastery of European natural learning from 1600 to 1900” (p. xi). The book starts with the Jesuits’ introduction of European mathematics and astronomy in the seventeenth and eighteenth centuries, which they carried out to facilitate their missionary work. Elman shrewdly observes that the Jesuits adopted such an approach only in China, “precisely” because “many Chinese literati [and emperors] were extremely curious about European science” (p. 1). Assisted by their collaborators among the Chinese literati, Jesuit missionaries introduced Euclidean geometry (1607) and the geoheliocentric Tychonic system (1630s). The former introduced a formal logical system that was absent from traditional Chinese mathematics, and the latter helped the Chinese overcome the “calendar crisis” (p. 16). It should be noted that the Jesuits who chose the Tychonic rather than the Copernican system in the matter of calendar reform had more than just religious concerns. For the purpose of calendar making, as Jiang Xiaoyuan and others have pointed out, only the Tychonic system could beat the traditional algebraic Chinese astronomical system in the precision of predicting planetary positions—and thus it was the best choice then available.

The promising Sino–Europe scientific ex-

changes by way of the Jesuits were largely interrupted in the eighteenth century, a breakdown historians usually blame on the “Controversy of Rites,” a standoff between the Vatican and Beijing. Elman stresses that the breakdown was “not due to lack of Chinese interest” in scientific and mathematical knowledge but “caused by the demise of the Jesuits worldwide” (p. 2).

In the aftermath of the controversy, Chinese literati “contended that European learning was rooted in China’s ancient classics” (p. 5), an idea Emperor Kangxi (r. 1662–1722) endorsed and promoted. Kangxi’s role in China’s scientific development was intriguing, important, and controversial. An amateur of Western science himself, Kangxi seemed to have opportunities to advance Chinese science substantially. Indeed, his patronage of Mei Wending apparently raised the social standing of Chinese mathematicians (p. 36); yet his ignorance and arrogance delayed the introduction of algebraic notational forms for 150 years. Furthermore, the Sino–European gap in mathematics and astronomy was further enlarged during Kangxi’s reign. The Chinese historian of science Xi Zelong even blamed Kangxi’s erroneous policy for “China’s scientific slide” (*Sunday Times*, Singapore, 3 Oct. 1999). Regrettably, Elman does not offer more discussion on these issues.

After the First Opium War (1839–1842), Protestant missionaries came to the newly opened treaty ports, where they translated more Western scientific works during the 1850s; thus resumed the scientific transmission from the West. Among the most important works were those translated by Li Shanlan, Alexander Wylie, and Joseph Edkins on calculus and Newtonian mechanics. Although the Chinese were also strongly interested in Newton’s *Principia*, no complete translation was available before the twentieth century.

After repeated humiliations by Western powers and the long and strenuous struggle to overcome the Taiping Rebellion, reform-minded officials and literati recognized the power of Western science and technology. They then launched the Self-Strengthening Movement in the 1860s and took the initiative in sponsoring and supporting scientific translation. In contrast with the contemporaneous Japanese practice, however, the Chinese continued to rely on foreign missionaries for translations until the end of the century, a fatal weakness. As a result, the

missionaries' intentions and capabilities set the limits on the depth and scope of scientific transmission. There were certainly other restrictions imposed by the government, and the translators were *not* "free to choose books for translation" (p. 169). As Elman himself points out, at Jiangnan Arsenal "[John] Fryer's work was narrowly defined to translate Western books on manufacturing" (p. 173).

The Self-Strengthening reform, which began a decade earlier than similar efforts in Meiji Japan, ended with the disastrous Chinese defeat in the Sino-Japanese war (1894–1895). According to Elman, Chinese reformers and revolutionaries since that time "increasingly demeaned their traditional sciences as incompatible with the universal findings of modern science." Consequently, a "failure narrative" that tends to view Qing China as "irrevocably weak and backward in contrast to a powerful Europe and a rapidly industrializing Japan" emerged (p. 8). Elman denounces this "failure narrative," for it has undervalued the contemporary scientific and technological achievements "in light of the increased training in military technology and education in Western science available to Chinese after 1865" (p. 191). Elman's historiographical arguments, though likely controversial, are admirably bold and will be thought provoking for students as well as scholars.

In this concise but comprehensive new book, Elman makes his masterful synthesis of the scholarship in the field—including his own—accessible to nonspecialists. A textbook treating modern Chinese science up to 1900, long awaited, has at last emerged.

DANIAN HU

Mikael Hård; Andrew Jamison. *Hubris and Hybrids: A Cultural History of Technology and Science*. xv + 335 pp., bibl., index. New York: Routledge, 2005. \$29.95 (paper).

The "hubris" and "hybrids" of the title of this volume are intended to form an organizing set of themes for a new look at the history of technology and science called a "cultural history." After identifying science-based technologies as "threats and opportunities," which "represent risks and dangers, as well as profit and potential," Mikael Hård and Andrew Jamison introduce the basic thesis of their book: "Only through successful processes of cultural appropriation can we manage to tame or control the *hubris* that is fundamental to the innovative spirit. And only by becoming *hybrids*, combin-

ing the human and the nonhuman, the technical and the social, are we able to make effective use of our scientific and technological achievements" (p. xiii). Unfortunately, despite the suggestive language, there is not much that is new here.

The three key concepts—"hubris," "hybrid," and "cultural appropriation"—really add very little to a sweeping, broad-brush look at roughly four hundred years of primarily Western history. "Hubris" is used as shorthand for the old theme that humans constantly seem to reach beyond their abilities. "Hybrid" refers to the use of technologies—nothing more. "Cultural appropriation" simply refers to the assimilation of new technologies and their distribution throughout a society. There is an interesting chapter on India, China, and Japan that unfortunately just seems stuck in. Nothing else is done with the East and technology. Other topics include the origins of what the authors rather anachronistically call "technoscience" in the sixteenth- and seventeenth-century scientific revolution; a recasting of the old technology-as-applied-science theme in terms of the cultural appropriation of science as industrialization; public and private hygiene and sanitation; and environmentalism and sustainable technology. All of these topics are addressed at a fairly high level of abstraction—some, such as the origins of technoscience, not very successfully—with an occasional quick snapshot of a particular technology or scientific development.

The history is told in the language of post-modern social science and is heavy with jargon. The word "hegemonic" appears so often that the reader rapidly starts to criticize the Routledge editor for failure to use a thesaurus. Equally disturbing is the authors' tendency to move back and forth across history, pointing out dubious similarities among developments. For example, speaking of the autostrada and autobahn systems of roads and how they were constructed so as to blend into the countryside, the authors jump backward to a brief allusion to the appeal of nineteenth-century pastoral visions, then forward to post-World War II Europe, concluding with "In a way, one could say the European Union has been built on highways" (p. 192)—all in three paragraphs.

Finally, while there are lots of very sweeping claims, there are few arguments and little evidence put forth in their support. Thus: "Boys, much more strongly than girls, are socialized into a world of mechanics, first by playing with toy cars, then by learning to repair a flat tire, by driving and trimming a moped, and later by