

did not have the money or technology, let alone the compelling purpose, to pioneer the space frontier” (p. 202). Spiller seems to demur as to whether this is a good or bad state of mind, despite his belief that we have likely not seen the end of the frontier thesis. One hopes the current American attitude is not the last word, not least because there is a general misunderstanding of the cost of the space program in comparison with other government programs or ordinary expenses. To the extent that facts still matter in the current national discourse, the fact is that the United States spends less than \$20 billion per year on its civil space program, about 3 percent of its \$600 billion defense budget, and less than half of one percent of its entire discretionary budget.

As a former NASA Chief Historian, perhaps I have drunk the Kool Aid of the desirability of a vigorous space program for reasons both practical and existential. Whether or not one invokes the frontier paradigm, it seems to me a future in space is both desirable and necessary. Yes, to answer the question constantly posed to me by schoolkids and adults alike, we need to deal with problems on Earth. But, to answer a question this book leaves hanging, I am confident that \$20 billion for space exploration is well worth the investment for any nation that cares about its long-term future. Like the Antarctic program, the space program should benefit from the current cultural emphasis on environmental concerns, which it monitors from above. The extended environment of Earth, after all, *is* outer space, whence come asteroids that could destroy us, space weather that affects our power grids, and solar energy, the source of all life. And maybe aliens too.

This volume is the twenty-third to appear in the Palgrave Studies in the History of Science and Technology series. The publisher and the series editors, James Rodger Fleming and Roger D. Launius, are to be congratulated on the consistently high quality of these volumes.

Steven J. Dick

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Ina Heumann. *Gegenstücke: Populäres Wissen im transatlantischen Vergleich (1948–1984).* (Wissenschaft, Macht und Kultur in der modernen Geschichte, 4.) 391 pp., illus., bibl., index. Vienna: Böhlau Verlag, 2014. €49 (paper).

Gegenstücke deals with two popular science magazines: *Scientific American*, founded in 1845, and *Bild der Wissenschaft* (The image of science), which entered the print market in West Germany in 1964. It is a useful selection for a comparison, with an emphasis on what Ina Heumann calls—borrowing from Ludwik Fleck—“styles” of popularity, given that both journals came to be seen as paradigmatic, leading outlets in this market. The story begins in 1947, when two staff members of *Life* magazine, Gerard Piel and Dennis Flanagan, purchased *Scientific American* and relaunched it the following year. They turned the magazine into a huge success and determined its contents until 1984. Also in 1947, the German physicist Heinz Haber was brought to the United States, identified as a promising expert in the expanding field of aerospace medicine. Haber’s ability to communicate scientific and technological issues to broader audiences connected him to the charismatic Wernher von Braun and led the Disney Company to hire Haber as a “chief scientific consultant” in the 1950s. It was Haber who guided viewers through Disney’s 1957 production, *Our Friend the Atom*. In the early 1960s, he returned to Germany and founded *Bild der Wissenschaft*, initially meant to emulate its American counterpart.

Heumann opts for a systematic approach instead of a chronological narrative. She exploits an enormous wealth of sources, including personal papers, even though archival materials from the respective publishing houses either were not accessible or had been destroyed. In four densely written chapters, she succeeds in demonstrating that popular science magazines constitute a totality of textual, visual, intellectual,

and economic strategies. Especially intriguing are her long passages on images as bearers of meaning rather than mere illustrations, and on advertisement and economic backing from the private sector in both magazines. Heumann also demonstrates sensibility for the different epistemological assumptions that drove Piel and Flanagan on one side of the Atlantic and Haber on the other. Both magazines ultimately struggled to reach the much-acclaimed lay audiences, and they remained male dominated and kept their distance from applied science. Both oscillated between defining popularity as a task of communication and a potential “betrayal” (p. 22) of scientific standards. Yet Heumann also outlines clear differences. *Scientific American* took its inspiration from Robert Merton’s sociology and insisted that basic research needed to be ethically responsible and remain an integral part of a democratic exchange in modern society. Unlike *Bild der Wissenschaft*, it recruited scientists who had fled the Nazis. Haber, in contrast, wanted to mold his magazine after what he called *öffentliche Wissenschaft* (public science). His magazine staged controversial discussions on the premises that science needed to be trusted *per se*. Amateur science remained an outcast, and the “fear of the popular” (p. 310) never went away. Interestingly, both magazines were quick to contribute to discussions about the limits of growth, which inaugurated a phase of growing disillusionment with the promises of scientific progress from the early 1970s on. In 1973, *Bild der Wissenschaft* reacted to the changing political context and the growing competition presented by television with numerous changes in organization, layout, and so on, while its American counterpart was marked by an astounding editorial continuity.

Heumann insists that the history of popular science is best studied through case studies and in a “dense, microscopic, and comparative” fashion (p. 318), and she certainly demonstrates the merits of such an approach. Yet can we operate without a historicization that provides broader contexts and uses more general categories of comparison? For example, readers might want to know what role *Scientific American* and *Bild der Wissenschaft* played in their respective print markets in terms of competitors, print statistics, and intertextual relations with other forms of publications. How can we place them in the much longer tradition of commercializing popular science, given that magazines about nature and science had already experimented around 1900 with many of the outreach strategies and synergetic effects of print products described by Heumann? What role did the public promotion of scientific knowledge play at a time when the Cold War’s East was successfully presenting its own secularized vision of redemption through science? These questions do not arise only when the book extrapolates, at times too facetly, from its micro-observations to more general statements. For example, using “Germanization” to describe Haber’s reorientation of his magazine in 1973 seems to suggest a return to an ethnic nationalism that Haber did not have in mind when citing this term (pp. 135, 221, 262, 323), and Piel’s complaint about the underrepresentation of women in the STEM (science, technology, engineering, and mathematics) disciplines did not reflect a “proto-feminist” position (p. 270). The author herself resorts repeatedly to Fleck’s sociology of knowledge, yet the Fleckian terms quoted, such as “being knotted together,” “incarnation,” and “mother soil” (pp. 16, 40, 216), remain metaphorical and ambiguous. Even so, this astute case study, packed with impressive erudition, fine-grained analyses, and enthusiasm for the topic, deserves a wide readership.

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Michael Riordan; Lillian Hoddeson; Adrienne W. Kolb. *Tunnel Visions: The Rise and Fall of the Superconducting Super Collider*. xiii + 448 pp., illus., maps, bibl., index. Chicago/London: University of Chicago Press, 2015. \$40 (cloth).

“In 1985 . . . *Physics Today* reporter Irwin Goodwin predicted that the [Superconducting Super Collider (SSC)] would likely be ‘one of the Wonders of the World—certainly as impressive as the pyramids, Hoover