context in which Project Paperclip unfolded.

Related to this pattern is a final major shortcoming. Bower avoids openly confronting the hard issues raised by his topic. Was the policy of minimizing or ignoring the complicity of German scientists with Nazism wrong? In all or only some cases? By what criteria? What other courses were feasible and preferable? The tone of this book consistently implies a negative judgment of Paperclip and its protagonists, but Bower begs the tough questions. He thus neither leaves the reader free to reach independent conclusions nor provides firm rationales for his own.

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Radio Days

Inventing American Broadcasting, 1899–1922. SUSAN J. DOUGLAS. Johns Hopkins University Press, Baltimore, 1987. xxx, 363 pp., illus. $29.50. Johns Hopkins Studies in the History of Technology.

Inventing American Broadcasting opens with the arrival of Guglielmo Marconi in New York in 1899 to report the America's Cup yacht races by wireless. When it closes, what is generally considered America's first radio broadcasting station, built by Frank Conrad of the Westinghouse Corporation in Pittsburgh in 1920, is on the air. Between those events, "wireless," the sending of dots and dashes between individual stations by electromagnetic waves, evolves into "radio," with its potential for broadcasting words and music to all who tune in. In the United States between 1899 and 1920, Susan Douglas asserts, the concepts of radio and broadcasting were "socially constructed" out of elements of technology, entrepreneurship, economics, military needs, and newspaper reporting. The constructors included inventors and entrepreneurs; industrialists and government bureaucrats; naval officers and international negotiators; and boy wireless operators and newspaper reporters. Their construction remains with us today.

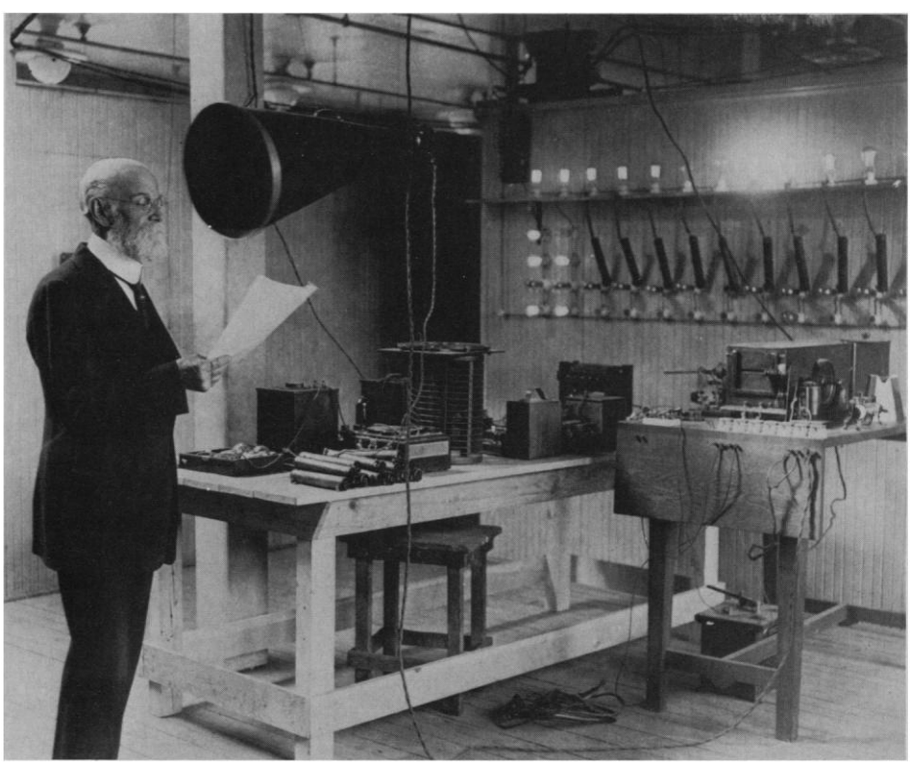
Treatment of the construction process is thematic. The author takes a broader view than earlier treatments of this era in radio history, such as Gleason L. Archer's *History of Radio to 1926* or W. Rupert Maclaurin's *Invention and Innovation in the Radio Industry*, fast-moving and clear narratives that leave the impression that this early period was either a preface to the rise of RCA or a monument to heroic inventor-entrepreneurs. Merits of Douglas's thematic approach include absence of technological or business jargon; freedom from hero worship; effective combination of archival and newspaper sources; and a linking up the specifics of the radio story with broader themes.

One of those themes is the social control of technology. Initial journalistic visions saw radio as a democratic technology free from the kind of corporate control that Western Union exercised over the telegraph and AT&T over the telephone. That vision foundered. However etheric the medium, the sources and receivers of the messages were constructions of metal and wood, often large, expensive, and intricate. Someone had to pay to build and maintain them. The money had to come from either the public at large, through a socialized scheme, or from specific customers, through a capitalist scheme. One guess which the United States chose.

There are at least five basic ways to make technology pay: sell equipment; sell service; sell stock; sell the right to use ideas; or sell advertising. Marconi and his backers chose to sell a service, communication to ships at sea. To do so they sought "monopoly control of the aether," refusing to communicate with rival transmitters or receivers. Reaction against this approach fueled two decades of international attempts to regulate radio and helped sustain radio backers within the U.S. Navy and the ranks of independent U.S. inventors in their efforts to find a rival approach more protective of American nationalism and capitalism. It also sparked proposed legislation (which never came close to passage) to turn radio into a U.S. government monopoly. In the end, the money to sustain radio (and profit investors) was made by selling equipment, milking patent monopolies, and selling advertising. How this came about is one of the major thematic threads of this book.

A second major theme is individuality versus systems. Douglas revives a character ignored by other radio histories, the boy wireless enthusiast. These enthusiasts sensed the potential of broadcasting. But they also became nuisances by interfering with the rescue of survivors from a sinking *Republic* or *Titanic*. The balancing of system needs against experimentation rights, boy enthusiasts and independent inventors against government, military, and corporate bureaucrats, is another thematic thread.

Such issues are well illuminated by the author's approach. The book does not supersede other ways of looking at the history of radio, such as those of Archer and Maclaurin, or Hugh Aitken's studies of the



"The first lecture being delivered by radio from Tufts University, 1922." To many commentators, "the educational possibilities [of radio] seemed unlimited. . . .'Who can help conjuring up a vision of a super radio university educating the world?' asked one writer. With radio, minds could 'be detonated like explosives.'" [From *Inventing American Broadcasting, 1899–1922*; Clark Collection, Smithsonian Institution]

technological ideas behind radio, or L. S. Howeth's study of radio in the Navy. But it does provide a more widely ranging, more interpretative alternative.

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Reprints of Books Previously Reviewed

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