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Stephen B. Adams, Orville R. Butler. *Manufacturing the Future: A History of Western Electric.* New York: Cambridge University Press, 1999. xi + 270 pp. $34.95 (cloth), ISBN 978-0-521-65118-9.

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For more than a century, Western Electric supplied equipment to AT&T's long distance and local telephone companies as the manufacturing arm of the old Bell System. Regulators around the country hated the situation. Many believed that AT&T hid excess profits or bureaucratic inefficiencies in Western's charges to Bell System customers. Repeatedly, the federal government tried to force AT&T to divest the company. AT&T fought these efforts and made enormous concessions to the government to retain its vertical integration - until 1995. That year, AT&T announced that it would divest what remained of Western Electric and portions of Bell Laboratories to create a new company - Lucent Technologies.

Dan Stanzione, who became the president and chief operating officer of Lucent, recognized in the birth of this new company both a need and an opportunity to confront the past. He commissioned historians Stephen B. Adams (Gordon Cain Fellow at the Chemical Heritage Foundation) and Orville R. Butler (historian for the Academy of Management's International Management Division) to research and write *Manufacturing the Future: A History of Western Electric*, and he gave them license to tell the story "warts and all." Stanzione hoped that their story would convey the heritage of Western Electric to both retirees and employees of the newly independent Lucent. But Adams and Butler have done much more.

Manufacturing the Future chronicles the history of Western Electric from the formation of its predecessor, Gray & Barton, in 1869 to the creation of Lucent Technologies in 1996. It offers a classic story of vertical integration, but treats that integration as a process that evolved over nearly four decades, rather than as a single event. Throughout the book, Adams and Butler show the enormous influence of the regulatory environment on the evolution of the Bell System's strategy and structure. They also trace the tension between innovation and implementation within the context of an enormous bureaucratic culture.

Indeed, Western Electric and Bell Laboratories (formed as a joint venture between Western and AT&T in 1925) proved capable of tremendous innovation in science, manufacturing, and human relations. The company was an early leader in global manufacturing. It developed breakthrough technologies in typewriters, vacuum tubes, radio, television, motion pictures, radar, and transistors. One could almost say that they invented the things that made the twentieth century work. In manufacturing, Western Electric supported groundbreaking innovations in the field of statistical process control and exported these methods to Japan to give birth to the modern Total Quality movement. In human resources, studies from 1924 to 1933 at Western Electric's enormous Hawthorne

plant outside of Chicago sparked the development of the field of industrial psychology. And in the 1960s, Western Electric emerged as a leading corporate advocate of civil rights and affirmative action. According to the authors, AT&T's desire to remain in the good graces of the federal government motivated many of these initiatives as scientific discovery, manufacturing efficiency and even defense contracting became hallmarks of the Bell System's commitment to universal service and good public relations.

Yet Western Electric was often unable to reap the returns from its own innovations, and in many ways Western Electric's story is a spectacular tale of paths not taken. As Adams and Butler point out, corporate pressures to maintain the company's focus on domestic equipment manufacturing led to the divestment of businesses in radio, motion pictures, electrical supplies, and international manufacturing. To settle the government's antitrust suit in 1956, AT&T agreed to confine its manufacturing business to telephone equipment and license any new technologies it developed to others. Statistical process control languished in Western Electric manufacturing until the 1950s, despite regulatory pressure on the Bell System to provide assurances of Western Electric's efficiency. And not withstanding the enormous amount of information collected from the Hawthorne studies, the creation of a counseling program for employees marked the only visible outcome of this effort. As Adams and Butler conclude, the company's monopolistic situation produced "an abundance of ideas and innovation, but slow implementation or change."

Manufacturing the Future provides a valuable overview of Western Electric's history, an excellent teaching tool for undergraduates studying the American economy. Adams and Butler deftly summarize important chapters in Western Electric's history that have been covered more richly in the historiography of the Bell System. They also enrich that literature by refining our understanding of historical processes, especially on vertical integration and affirmative action. However, many historians will finish the book feeling unsatisfied.

In many ways *Manufacturing the Future* raises as many questions as it answers. How did Western Electric influence the Bell System and its culture of engineering, especially in the 1950s and 60s when two of Western Electric's presidents went on to become presidents of AT&T? Given the drumbeat of literature extolling the virtues of competition and its influence on innovation, why were Western Electric and Bell Labs so prolific with new ideas? And what about the regulator's concerns about efficiency and profits? Adams and Butler suggest that the past is traditionally believed to foreshadow the future. With Lucent, however, the future may inform the past. Perhaps Western Electric achieved "a pattern of efficiency" that explains Lucent's success on Wall Street and in the marketplace today.

However, even the authors acknowledge that this is not a sufficient answer. The question of Western's efficiency and AT&T's use or abuse of its captive relationship leads to many of the issues at the heart of regulatory politics and antitrust activity in the United States. Indeed, the history of Western Electric and the Bell System opens windows onto many aspects of the culture and economy of the United States in the twentieth century. The writing of Western Electric's history remains an unfinished project, but Adams and Butler have given us an admirable guide to the territory ahead.

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