

Marcus, A. I., & Segal, H. P. (1989). *Technology in America: A brief history*. San Diego: Harcourt Brace Jovanovich, \$10, 380 pp. (ISBN 0-15-589762-4)

Reviewed by John R. Pannabecker

This book on the development of technology in America by Alan I. Marcus and Howard P. Segal should be of special interest to those who teach technology education and its educational heritage, the history of technology, and the history of industrial education. The organizational approach of the authors is conventional by intent, based on the identification of “specific, dominant cultural notions and social themes for different eras in the American past” (p. iv), such as colonial manufacturing America or the development of America as a social unit from the 1830s to 1870s. The authors affirm the importance of the history of technical and organizational aspects but they concentrate on the “impact of American society and culture on technology, rather than vice versa” (p. iv).

The book is organized into three major parts: (a) From the Old World to the New: 1607 to the 1870s; (b) Systematizing America: The 1870s to the 1920s; and (c) From Industrial America to Postindustrial America: The 1920s to the Present. Each part is approximately the same length, however, the first part covers a relatively long time period. This compression of such a long period is unfortunate, but is consistent with the authors' intent to emphasize the years after 1830.

In the first part, a variety of topics are covered such as mills, master-apprentice system, arms manufacture, printing, textile production, transportation systems, photography, and agricultural change. This book is, however, more than a simple account of technological themes. The emphasis on American social patterns is especially evident when the authors show how certain technologies developed differently in America than in Europe, for example, road design and construction (p. 58), rail transportation (p. 68), and factory design (p. 107). The influence of major ideological or social aspects such as mercantilism, colonial governance, the Constitution, and Jeffersonian and Hamiltonian perspectives are interwoven into the analysis without being over-emphasized.

The second part (1870s-1920s) is the most detailed period of American history covered in the book. This part corresponds closely to the period covered

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by Charles Bennett (1937) in his second volume on the history of industrial education and thus may be especially useful to teachers of professional courses in technology education. The authors concentrate on technological systems, not only in the physical sense but also as a conceptual framework. The Centennial Exhibition of 1876 in Philadelphia serves as a symbol for the developing concept of systems. The notion of systems is further illustrated through traditional themes such as electrification, communications, and factory organization.

It is in the first chapter of this second part that Marcus and Segal mention the Russian System of tool instruction and its introduction to America (p. 170). It is only later in the second part (chapter six) that the development of industrial education is discussed, and then primarily from a vocational perspective and in the context of systematizing factory work. The teaching of technology (e.g., through industrial arts) for the purposes of general education is overlooked. The authors are to be commended for having included educational aspects, but the coverage is heavily oriented to engineering education and organizations and thus does not reflect a very broad view of technologists in general.

The breadth of themes covered in this second section would, however, compensate for the scant attention to the heritage of technology education if the book is being used as a supplementary text. Topics range from the changing urban environment and leisure technology (sports, bicycles, automobiles, and motion pictures) to domestic technology and military technology. Domestic technology, for example, is treated as part of the systematizing of workers and the workplace and includes women and their work. The systematizing of spectator sports and the production and marketing of sporting goods are interpreted in the context of the rise of the middle class. Marcus and Segal conclude the second part with a summary of the period's static and hierarchical notion of systems.

The final part of the book consists of two chapters: the period from the 1920s to the 1950s when technology was generally perceived as a social solution and, in contrast, the period from the 1950s to the present when technology has usually been viewed as a social question. Part three begins with the emergence of a new concept of systems for which the Hawthorne experiments serve as the initial illustration. This new notion of systems is characterized by complex interrelationships, flexibility, and integration and is illustrated by such topics as the government and social engineering (Hoover and national planning; Roosevelt and the New Deal), revitalizing rural America, production techniques, new marketing and delivery technologies, mid-century high tech (computers; transistors), and military technology.

In the 1950s, criticism of technology, professionalism, and expertise increased as Americans acknowledged both the positive and negative aspects of technology. Chapter topics are varied but tend to focus on high-profile technologies that have often been the center of social controversy such as nuclear power, space flight, high-tech electronics, agriculture, and biotechnology. Divergent perspectives reinforce the authors' emphasis on how technology reflects dominant social patterns.

The book ends with a concise summary of the authors' philosophical perspective including a critique of technological determinism in which technology is viewed as a cause or a solution for social problems. Technological determinism “reduces society and culture to objects upon which technology acts” (p. 359). In contrast, the authors emphasize that technology has been a “manifestation or reflection of cultural and social perceptions; it is a human product” (p. 360).

Certain aspects of the book are, however, inadequately covered or integrated into the text. Visual illustrations are few in number and do not illustrate either the complexity of technology or its relationship to society and culture. The authors' attempt to contrast systems in the second and third parts is not as convincing as it might have been, for example, through the use of illustrations, schematics, or line drawings in the discussion of specific technologies. The interaction of non-Caucasian groups in the development of the social and cultural fabric of America is virtually absent.

In a survey text, it is difficult to communicate the complex nature of decision-making and the uniqueness of patterns of technological development. Although the authors contrast the American experience with that of Europe in the first few chapters, the distinguishing features of the American experience are less clear in later chapters. This lack of continuity is disappointing, especially when some major systems such as contemporary nuclear power generation and public rail transportation in America and Europe could have served as contrasting reflections of differing social patterns. Despite these shortcomings, this book should be considered seriously as a supplementary text in professional courses and main text in other courses where the history of technology is a central part of the course. The book's conventional organization and thematic approach coupled with its emphasis on social and cultural patterns make it very accessible as a beginning text. Not only will the text help technology educators to reinterpret the development of their field, it will stimulate them to reflect on how they perceive technology, communities of technologists, and their part in the American experience.

Reference

Bennett, C. A. (1937). *A history of manual and industrial education, 1870 to 1917*. Peoria: Manual Arts Press.