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In *Waterpower in Lowell*, Patrick M. Malone, a professor of urban studies and American civilization at Brown University, examines the technological and environmental history of Lowell, Massachusetts, during its rise to prominence as one of the key centers of textile production in America. Malone is successful in producing a quality narrative and an accessible explanation of the advances in hydraulic technology that allowed Lowell to rapidly expand and become a model industrial city in the nineteenth century. He is less successful in his aims to reveal the “social and environmental costs associated with dependence on the river,” as he does not tie these technological advances to any substantive discussion of their effect on the environment (p. 6).

The book consists of six chapters, which chronologically cover most of the nineteenth century. Malone’s work guides the reader through the process of harnessing the power of the Merrimack River by engineering it to serve the needs of humans. Malone is most successful as a narrator, telling the story of those who sought to turn Lowell, Massachusetts, into a first-rate industrial city by utilizing the ideal hydraulic conditions present at Pawtucket Falls. Much of this biographical account deals with the life and numerous contributions of James B. Francis, the chief engineer for the Locks & Canals company from 1845 to 1885. Under Francis, the existing canal system in Lowell underwent numerous modifications and additions, until it provided enough waterpower to operate the textile mills of over eleven different companies. In addition to the services provided to the mills, which collectively controlled Locks & Canals, Francis’s innovations and efforts led to the creation of a municipal reservoir for cleaner drinking water and a hydrant system for firefighting.

The discussion of drinking water in chapter 6, “Controlling the System, 1865-1885,” gave Malone his best chance to fulfill his promise made in the introduction to reveal the social and environmental costs related to the industrial use of the river, but he only hints at the resulting problems. Malone states that “the increasingly contaminated
waters of the Merrimack, without sand filtering, turned out to be better for fire protection than for human ingestion,” but does not elaborate on the causes of this contamination (p. 198). A deeper analysis of the causes of the river’s contamination would have made this work far more relevant to readers interested in the environmental effects of Lowell’s textile industry. Similarly, Malone only gives a cursory mention of the negative effects of the Pawtucket Dam and the numerous other hydraulic technologies employed in Lowell on the fishing industry. Perhaps there are only so many ways to say that dams can make life difficult for fish.

The highlight of this work in relation to the environmental impact of the man-made changes to the river’s natural channel is Malone’s discussion of the engineering marvel known as the Francis Gate. This safety feature was built into the canal system in 1850, at the urging of Francis. Francis had become concerned that the canal system’s redirection of the river toward the city of Lowell made the danger of a catastrophic flood far greater than when the river had been in a more “natural” state. Despite an enormous cost and doubts about the necessity of such a project, the gate was constructed and saved the town for the first time when it was employed in 1852. This discussion of the dangers of flooding due to the canal system is the closest Malone came to revealing the environmental consequences of harnessing the power of the river through changes to the environment.

It would be unfair to say that the book does not accomplish its more general purpose of being “a case study of urban industry and a history of technological choices” (p. 6). In this respect, Malone accomplishes his goal. The book clearly illustrates how individuals like Francis cleverly employed the latest hydraulic technologies to manipulate the canal system, and to provide not just for the industrial need for power, but also the growing residential need for water. Along the way, Malone’s in-depth discussions of the technologies employed to accomplish these goals serve to illustrate the progression of ideas from early rudimentary efforts to the complex systems employed toward the end of Francis’s career.

Readers seeking to learn more about the technology used to run the textile mills will not be disappointed, nor will those seeking to learn more about advances in hydraulic technology in this era. The book vividly recounts the technological history of the changes made to the Merrimack River at Lowell and the vast contributions of Francis to the understanding of and precise use of waterpower for industrial purposes. The book will be most valuable to students seeking a greater understanding of early technological advances in industry. Because of the book’s detailed discussion of hydraulic technology in the nineteenth century, it will be of use in courses related to the history of technology. It will also be helpful in enhancing the study of urban planning and the interplay between industry and the growth of American cities in either an urban history or a course on American business history.

*Engineering and Industry in Nineteenth-Century America*
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