would have been helpful to understand if the South's lower use of rail was a symptom of social backwardness or of privileged geography.

Second, although Marrs does discuss briefly some of the difficulties southern railroads experienced raising private capital, he does not delve into this issue deeply enough. The Old South had developed a sophisticated merchant network with Europe, why did not Europeans finance railroads in the South, as they did in the North? Or was it that railroads were not expected to be profitable? Why?

As these questions attest, the book is thought-provoking. Although it does not fully answer the question posed, the archival work is nicely knit together to provide a better understanding of the complex changes Old Southerners experienced with railroads during antebellum era. The chapter on the role of slavery in construction and operation of the railroads provides unexpected and eye-opening insights. And the book will trigger many valuable questions in the reader's mind. Independently of whether the reader is a business historian, a cultural historian, an economic historian, or a historian of technology, it is certainly worth reading the book.

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Leslie Tomory. *Progressive Enlightenment: The Origins of the Gaslight Industry, 1780–1820*. Cambridge, MA: MIT Press, 2012. xii + 348 pp. ISBN 978-0-01675-9, $28.00 (cloth).

The urban gaslight system was arguably the most important antecedent to the great technical networks that came to dominate life in the nineteenth and twentieth centuries. Leslie Tomory's fine account of how this system was created at the turn of the nineteenth century will redress a spectacular void in the current literature. It is a book that should be read by historians of technology, of urban infrastructures, and of corporations and capitalism. Tomory's story is largely a British one, but he is careful to situate gas lighting's emergence in late-eighteenth century England in its larger European context. Indeed, he suggests that the development of the initial apparatus and approaches was an example of "multiple simultaneous inventions," following as they did widespread interest in using the products of

the distillation of wood and coal, particularly to expand supplies of marine tar. When this interest coincided with the burgeoning of pneumatic chemistry and the discovery of a number of "inflammable airs," then the stage was well set in many parts of Europe for the emergence of an important new industry.

Why this industry only succeeded initially in Britain is a central element of Tomory's book. Scientific and technical expertise existed in France and Germany as well, but these turned out to be insufficient to push the technology beyond the experimental stage. The British story is appropriately divided into two discrete, successive parts. The first of these revolved around the steam engine makers, Boulton & Watt, with the active participation of the sons of their famous founders (and cameo appearances by the elder James Watt himself). The second story shifts to London and to the quixotic promoter, German-born Frederick Winsor (neé Friedrich Winzer) and the Gas Light and Coke Company. It is a great virtue of Tomory's work that he makes good account of both of these stories, sorting out their relative contributions to the whole and their complex interconnections.

The involvement of Boulton and Watt began with the work of their employee, William Murdoch. In the early 1790s, Murdoch patented a distillation process used primarily to make tar for protecting ship bottoms. That one of the by-products of this was an inflammable gas was initially a fact worth remarking but not acting on. The first person to focus attention effectively on the possible uses of this by-product was Philippe Lebon in France. Lebon's "thermolamps" were the first devices designed with something like a gas lighting system in mind, but support was not forthcoming for commercializing this in Revolutionary or Napoleonic France. They were well-known enough, however, to come to the attention of Murdoch, so in the first decade of the nineteenth century he and his employers sought to see what commercial possibilities lay in devising means for gas illumination. The Boulton & Watt efforts focused on lighting factories—primarily textile mills—and Tomory points out the role of the technological enthusiasm of mill owners in pushing the new technology ahead, with some small scale success.

Gas lighting, however, was not the company's primary business, and it never occupied more than a small fraction of its attentions. For this reason, Tomory suggests, Murdoch and his colleagues never had the vision of an urban utility. This vision was the contribution largely of Frederick Winsor, and much of the book is an account of the organizational, political, and technical challenges this vision evoked. There is a degree to which Winsor was, in fact, a bit of a humbug, and one of the virtues of this study is the degree to which Tomory confronts this fact, made manifest by the general incompetence of Winsor

in most matters financial and technical, and explores how his vision, nonetheless, came to pass. Gaslight was a widely appealing technology, quickly popular among those who viewed it and could afford it. But the complications of conceiving a practical urban supply, delivery, and control system and of solving the myriad technical problems—many with little or no precedent—such a system presented were formidable. The promotional chutzpah of a Winsor may have been necessary to push the system into the popular consciousness, but it was not sufficient to make such a system actually work.

The gaslight system that actually emerged by 1820, however, was not simply a technical accomplishment, but it was every bit as much an organizational and political achievement, and Tomory makes extensive use of archival sources, pamphlets, and press accounts to piece together the creation of what Tomory argues was an indispensable model for many of the highly capitalized technical systems to come. He not only recounts in some detail the complex political maneuvering required to charter the Gas Light and Coke Company, but he also provides details on the financial and managerial innovations. Therein lie some of the answers to why Britain was able to move ahead when other countries, equally well qualified scientifically and technically, could not. For example, he remarks, "Without the joint stock model that had matured in British business and legal practice . . . gaslight's successful transition from the stand-along plant [of Boulton & Watt] to a network strategy would have been impossible"(167).

This is not a perfect book. It ends far too abruptly: we know, of course, that the gaslight system spread and became a significant part of nineteenth-century urban life in the industrialized West, but Tomory owes us just a bit more than the brief reminder of this fact that he gives us. Even just a little data would have been better than cutting the story as abruptly as he does. He attempts to illustrate many of his technical descriptions, but often these contemporary illustrations are simply too obscure for the modern reader. Finally, it is remarkable that a book centered on the construction of a pioneering urban system should attempt to make do with a single, nearly illegible, map. Nonetheless, Tomory's work commendably fills a significant gap in our understanding of the origins of the technical systems that so define our lives in the twenty-first century and it will be a useful source for years to come.

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