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Leslie Tomory. *Progressive Enlightenment: The Origins of the Gaslight Industry, 1780-1820*. Cambridge: MIT Press, 2012. x + 348 pp. \$28.00 (cloth), ISBN 978-0-262-01675-9.

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In 1820, Johann Hecke described London by night as a “fairy-tale palace” (p. 234). The gas-lit streets and public buildings awed visitors to the metropolis, and Robert Southey described the effect on St. Paul’s Cathedral as sublime. Oil lamps could now be dismissed as quaint, gothic, and inadequate. Mid-nineteenth-century commentators routinely included gas lighting with railways, steamships, and telegraphy as one of the great recent advances of civilization. Gas lighting was said to have made city streets safer, and to have transformed the domestic interior for those who wished to read, write, or sew in the evening.

Yet by the end of the century, gas lighting had lost its novelty, and electric lighting was being hailed as the technology of the future. In 1897, when the *Illustrated London News* published a set of paired images celebrating material progress over the sixty years of Queen Victoria’s reign, it was electric lighting which now stood with railway and steamship (and telegraph wires, a bicycle, and an early motor car) to represent modernity. And thus it has been with historical scholarship: despite the continuing widespread use of gas for cooking and heating (as studied by Anne Clendinning), far more historical attention has been devoted to electricity and its use for lighting, power, and traction. Leslie Tomory’s new study of the origins of the gaslight industry is thus extremely welcome.

Tomory places his work firmly in the context of economic history: he explicitly addresses the question of British exceptionalism in industrialization, and devotes considerable attention to the business practices of the gas light pioneers. There are five chapters, which fall into three parts: the roots of gas lighting in pneumatic

chemistry and industrial distillation; Boulton & Watt’s role in scaling up gas lighting to a commercial scale; and the story of how the (London) Gas Light and Coke Company (hereafter GLCC) developed a business based on a gas network. The latter two parts are based on substantial archival research, and show in minute detail the almost daily working of innovation, development, and customer relations at Boulton & Watt, and the GLCC.

Tomory begins by explaining the simultaneous invention of gas lighting in several European contexts in the late eighteenth century by reference to a widespread awareness of pneumatic chemistry among natural philosophers and in “public culture,” and a simultaneous growing industrial interest in the distillation of wood and coal. Alessandro Volta, Jan-Peter Minckelers, and Charles Diller all demonstrated that inflammable gases could be used for the purposes of illumination—but, despite the undoubted spectacle of Diller’s “philosophical fireworks,” these were small-scale efforts. Philip Lebon and Zachaeus Winzler, on the other hand, sought to find uses for the products of the distillation of wood: inflammable gas was one of those products, and so gas lighting was a possible use. But although Lebon’s Paris demonstration in 1801 impressed viewers—including Gregory Watt—he failed to find financial backers, and like Winzler, ended up focusing on the other distillation products (tar and resins).

For Tomory, the reason that commercial gas lighting was developed in Britain—and not in Paris, Louvain, or Moravia—lies in the fact that, due to their natural resources, the British tended to distill coal rather than wood (and thus produced a gas that was more suitable for illumination); and that the British—and particularly the firm

of Boulton & Watt—were able to utilize their existing expertise in building gas-tight apparatus, most obviously for steam engines.

Tomory's second part describes Boulton & Watt's involvement with gas lighting in the period 1801-09. The firm was by now run by the sons of its founders: James Watt junior took substantial interest in gas lighting for a while; but Matthew Robinson Boulton ultimately convinced him that the firm should remain focused on its core business of steam engines. One of their employees, William Murdoch, was another of the men who experimented with using inflammable gas for lighting; in 1799, the firm discouraged his experiments; but after Gregory Watt saw Lebon's Paris demonstration, James Watt junior appears to have been fired with a nationalistic determination to ensure that the credit for gas lighting went to a British inventor. Unlike the various continental experimenters, Murdoch had the significant benefit of Boulton & Watt's technical, manufacturing, and commercial expertise, and their useful social and political connections.

The story of Boulton and Watt's involvement in gas lighting is an odd one. On one level, Tomory demonstrates convincingly that they were the ones who scaled up gas lighting, and who made it commercially viable, largely by lighting Philips & Lee's textile mill in Salford near Manchester in 1806. Yet they were slow to respond to the enthusiasm of other mill owners in the north of England, and often seemed entirely uncertain whether to devote serious attention to building up their gaslight business. Tomory describes the extensive and methodical experimentation that went on in the Philips & Lee plant, as the mill owners and Boulton & Watt tried to work out the best production processes, plant design, and operating procedures. And yet, having done all this work, and, in 1809, put considerable effort into fending off a potential rival, the firm turned its back on gas lighting.

The potential rival was Frederick Winsor, a man for whom Tomory clearly has little respect, describing him as "devoid of almost any useful technical knowledge or talent" (p. 121). Nonetheless, he had vision and an impressive line in self-publicity. It was Winsor who convinced the London public that gas lighting was possible and viable: he waged a campaign based on public lecture-demonstrations and frequent pamphlets and advertisements, and managed to convince several larger financial backers as well as thousands of smaller shareholders. Although their first attempt to get an act of parliament to set up a joint-stock company failed due to Boulton & Watt's opposition, he and his backers were successful the

following year (1810) when they abandoned any desire to manufacture or sell apparatus, and defined themselves as a gas supply company: the GLCC.

Tomory's lengthy chapter on the GLCC details the almost farcical problems the new company faced: they had plenty of eager customers for gas lighting, but virtually no ability to supply those customers. Their first years in business were marked by a total lack of coordination, money wasted on land and apparatus, and a desperate struggle to establish the technical basics of large-scale gas production and distribution. Things got much better from 1814, with a new management (Winsor himself had long been sidelined) and a trained accountant. And by 1820, the GLCC appeared to be doing pretty well, supplying gas to street lights, public buildings, and private shops and homes all over central London. In 1814, they had four customers and £180 in revenue; by 1820, they operated 120 miles of gas mains, supplied 30,000 lamps, and had a revenue of £101,000 (p. 234).

And this is where Tomory leaves the story. His aim was to investigate the "origins" of the gaslight industry, but it would have been helpful to have had at least a summary of what happened next. I have the impression that Tomory assumes we all know what gas lighting went on to become—his few lines explaining his own motivation, in the preface, refer to this very briefly—but I fear that he has lost a potential audience by not explaining more about the wider and longer context of gas lighting. This will not be a book I am likely to set for my senior undergraduates studying the place of technologies in Victorian society. I need someone to write a more comprehensive history of nineteenth-century gas technologies, which would extend the story beyond 1820 and place significantly more emphasis upon the social and cultural history of gas. (Tomory has fourteen pages near the end on the GLCC's relations—and problems—with customers, but this is from a business history point of view.) Tomory has written an excellent economic and technical history of early gas lighting, and his arguments will be pertinent to those studying the role of science in the Industrial Revolution, technical innovation, and the organization of early big business, and several of his chapters (or the previously published articles) should certainly appear on economic history reading lists.

Tomory writes clearly, and has a useful ability to explain exactly what each chapter will be about. He has a number of historiographical points to make: the one about British exceptionalism mentioned above; the role of formal science in industrial development (where he

draws upon Joel Mokyr); and a group of related points centered on the significance of the GLCC as a joint-stock company running a network technology. He points to interesting comparisons to existing water supply companies, and he makes significant play of gaslight as both the first significant network technology and also an early science-based technology. I was intrigued that explicit discussion of Thomas Hughes's work on electrical systems was avoided until chapter 5 and then treated briefly. Tomory writes of "networks," not "systems," but there are clearly many parallels in the treatment. Nonetheless, he is right that running a gaslight company on a net-

work model (as the GLCC did, but Boulton & Watt did not) is a different type of enterprise from most companies; railways and electricity supply companies are our usual models for such things in the nineteenth century, but now Tomory has shown us that gaslight must also be part of this story.

I left this book wanting more: not more of the archival details, which I admire but would have trimmed a bit; but more on the longer story and on the social context, which would have made this a richer book and enabled it to appeal to a broader audience.

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