Progressive Enlightenment: The Origins of the Gaslight Industry, 1780–1820 by Leslie Tomory

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The railroads were not the first tightly integrated industry, Leslie Tomory argues in this fine study. Britain's Gas Light and Coke Company (GLCC), formed in 1812 and by 1826 serving nearly every British town with a population greater than 10,000, was closely integrated nearly a generation before railroads; it adopted a highly structured style of management that gave it stability in riding out crises and also flexibility in responding to the sorts of difficulties that attend complex enterprises in which changes in one area cascade throughout the system. Gas lighting as an industry required robust distribution systems, careful and continued attention to load factors and usage patterns, and a particularly complex and mediated relationship with customers, due in the case of GLCC to a legal settlement with the rival firm of Boulton & Watt (yes, the steam firm) that prevented GLCC from selling machinery and thus restricted it to selling the products of its distillation works. It was the successful British experiment with gaslight as an industry that was imported elsewhere in Europe after 1820.

But gaslight did not begin as a uniquely British invention. Tomory describes how interest in using inflammable gases for illumination developed nearly simultaneously in workshops in continental Europe and in Britain, as people working in the nascent science of pneumatic chemistry built apparatus that later became central to the industry. Consider Briton Stephen Hales, who invented the pneumatic trough for his work in distilling airs from decaying vegetables. Hales designed the apparatus to clean away binding particles by forcing gases to rise through a water bath; the pneumatic trough was a prototype for the water main in a gasworks. People working in industrial distillation fused techniques and knowledge borrowed from pneumatic chemistry with the commercial orientation that made it possible to turn a workshop

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process into a business enterprise. French engineer Philippe Lebon's thermolamp inspired developers in Britain and Germany, but Lebon was unable to find the financial backing to commercialize his invention himself and instead turned his efforts to other products of distillation such as tar. Tomory argues that gaslight's roots in pneumatic chemistry and industrial distillation mark it as one of the useful products of the open science of the Enlightenment.

The firm of Boulton & Watt transformed gaslight from a workshop invention to a viable commercial enterprise, organized along the lines of its steam engine business: individual gasworks each dedicated to the illumination of a single large building or mill, much as a single steam engine had powered an individual enterprise. Boulton & Watt promoted employee William Murdoch as a hero of gaslight and engineered honors for him from the Royal Society, but by 1812 the firm had lost interest in promoting the industry and the center of activity shifted to the work of the technically incompetent but entrepreneurially gifted Frederick Winsor, an immigrant to Britain from Germany. Winsor formed the National Light and Heat Company and attracted scores of investors but was marginalized after the firm was granted a royal charter as a limited-liability joint stock corporation and named the Gas Light and Coke Company in 1812. Tomory argues that GLCC's formation as a joint-stock corporation was an important milestone in the consolidation of the firm's network strategy and illustrates gaslight's character as a technology of the second-wave of industrialization. Technologies of the first wave typically required little capital and relied on craft skills, and were often only tangentially related to contemporary scientific work. Gaslight grew out of work in the traditions of natural philosophy; its growth as an industry required extensive capital investment beyond what a single firm could supply; and it required almost continual technological innovation, undertaken in-house. This well written and cleanly organized study is especially good on internal developments at Boulton & Watt and GLCC, and draws extensively on the archives of both companies. It offers an important comment on early relationships between science and industry, and demonstrates how significant an analysis of entrepreneurship may be for our understanding of industrial revolutions.