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The Civil Engineering of Canals and Railways before 1850  
(review)

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## The Civil Engineering of Canals and Railways before 1850.

Edited by Mike Chrimes. Aldershot and Brookfield, Vt.: Ashgate, Variorum, 1998. Pp. xxxviii+378; illustrations, figures, notes/references, index. \$153.95.

This frustrating and rewarding volume appears in a new series, *Studies in the History of Civil Engineering*, intended, according to its general editor, Joyce Brown, as a “reference collection” for “civil engineers—and other readers” (p. xii). Brown, like the editor of this volume, Mike Chrimes, and a majority of Chrimes’s contributors, appears to have been trained as a civil engineer. “Other readers,” like me, will find here a lode of useful information about how canals and railways were built embedded in a matrix of irrelevant, local, and even antiquarian detail.

The content of *The Civil Engineering of Canals and Railways before 1850* is considerably more limited than its title suggests. First, its geographical coverage is essentially limited to Great Britain, and its chronological emphasis, 1750 to 1850, is on the period of British leadership in canal and railway technologies. There are exceptions, however. William N. T. Wylie provides an excellent account of the workforce on the Rideau Canal in Ontario. Darwin Stapleton shows how American railway technology had its origins in Britain. Pietro Redondi reinforces the stereotypical conflict between theory-obsessed scientists and practical engineers in his tendentious account of the failure of the Saint Quentin canal in eighteenth-century France. And A. W. Skempton’s old but still masterful sketch for *History of Technology* of rivers and canals from ancient times to 1750 naturally emphasizes the contributions of the Italian Renaissance and the French seventeenth century as well as British river improvements from around 1650 to 1750. But the other fifteen selections are all restricted to Great Britain.

The technologies covered in this volume are likewise limited. For bridges and aqueducts we are referred to another volume in the series, and neither canal boats nor railway locomotives qualify as products of civil engineering. Furthermore, Chrimes insists that his selections will address “how these works are carried out,” “how they were built” (p. xiii)—that is, the construction of canals and railways to the exclusion of their *operation* as technologically complex transportation systems.

The terminal date of 1850 imposes a further limitation. By 1850 the canals had reached technological (and economic) maturity while railway technology was still relatively new and changing. Once Skempton's survey describes the development of the pound lock and the watershed canal, the other canal selections are freed from the burden of discovering origins. In contrast, four of the ten railway selections focus in a very learned but somewhat antiquarian spirit on the origins of the modern railway rail. I was left puzzled by the arcane terminology and unexplained significance of the developments described in these articles.

Finally, the illustrations are of limited value. Most of the poorly reproduced contemporary drawings and modern photographs are not self-explanatory and are seldom explained in the text.

Still, we "other readers" can learn a good deal from this collection. Begin with Chrimes's excellent introduction, an informed, sensible survey of the literature that places each of his selections in the larger context so often unclear in the selections themselves. Then discover, amid the masses of irrelevant detail on this or that local project, concrete answers to basic questions about how canals and railways were built. How was the terrain surveyed, and how detailed and finished were the specifications for routes and constructions before digging actually began? How was construction organized, and what were the duties, authority, and salaries of consulting, chief, and resident engineers? How exactly were tunnels dug? Who were the navvies that dug them, and what was their life like on and off the job? Three selections treat that neglected figure, the contractor, whose solvency, honesty, and skill in recruiting and managing large gangs of laborers was a major determinant of a project's success.

This is a collection whose sum is greater than its parts. It goes beyond the nuts and bolts of canal and railway construction to connect their technology with business and labor history. Perhaps most significantly, by juxtaposing material on canals and railways in a single volume, it pushes home the central truth that the technology of railway engineering developed directly out of the experience of the canal builders.

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