Steve Usselman’s *Regulating Railroad Innovation* is a meticulously researched, carefully written, and long awaited study of innovation in American railroading. Usselman places his impressive archival research, especially extensive for the three principal railroads that serve as extended case studies, into the literatures of business, economic, and technological history. He presents a great deal of new firm-level evidence on such recurrent questions as the debate on railroads’ behavior during their changeover from iron to steel rails during the 1870s; the character of technical change during the managerial revolution; the uneasy relations between regulation, rate-setting, and scientific management during the Progressive period; and the relative decline of railroading in the early 20th century. Moreover, his book integrates into the narrative sensible readings of key political speeches, legislative debates, and court decisions, setting the internal workings of the railroads into the broader political history of the United States.

While drawing on such varied sources as court records, legislative hearings, and engineering conferences, the volume’s core is its solid grounding in railroad archives. The Chicago, Burlington and Quincy served as a technical and managerial model for those railroads operating west of Chicago. Its model, in turn, was the venerable Pennsylvania, which claimed to be the “standard railroad of America.” These two railroads, owing principally to savvy and well informed executive leadership, pioneered many of the era’s most important technical, managerial, and organization innovations. Usselman composes a clear picture of the difficulties in seeing, choosing, and solving technical problems from the Pennsylvania’s voluminous engineering and operating records at the Hagley Museum & Library. The Baltimore and Ohio is analytically valuable as a geographical competitor to the Pennsylvania and as a follower rather than leader of railroad trends. Other railroads such as the New York Central (important in the engineering debates on standardizing rail shapes) or the Philadelphia and Reading as well as the Chicago and Northwestern (among the many roads that locked horns with George Westinghouse over his air-brake and signaling patents) round out Usselman’s portrait of the railroad industry.

Usselman takes it as axiomatic that railroads loomed large as agents of change, but he does not portray them as deterministic driving forces or as unmoved movers. His is a contextual account that
organization spotlights changes in the railroads themselves. From 1840 to 1876 the overarching theme is “Assembling the Machine,” as Americans developed a political framework for economic expansion and launched a vigorous phase of inventing and patenting new railroad technologies. In this section Usselman delineates the consequences of the nation’s decentralized, federalist system of politics for its economic development in his simply masterful survey of early 19th century political economy.

“Running the Machine,” the second chronological theme, captures the dynamics of a distinct later phase. From 1876 to 1904, as he shows, carefully bounded engineering was more important to railroads than free-wheeling invention. In the earlier phase, railroads had engaged in opportunistic “insider innovation,” for instance, to capture the profits of locating Bessemer steel mills on their own lines, and had largely relied on master mechanics or outside inventors for new technologies. With the shift “from expansive development to operational stewardship” [p. 141] railroads increasingly directed and channeled innovation toward incremental improvements in a maturing system. Newly created staffs of engineers and chemists struggled to achieve stronger steel rail sections, more durable crossties, and standardized paints, steels, and soaps. Their efforts helped railroads reduce their dependence on the unpredictable market for patented inventions, the use of which had often enough landed railroads in court. All the same George Pullman with his patented sleeper cars and even more so George Westinghouse, with his unassailable patents for air brakes and signal systems, frustrated railroads’ efforts to completely internalize innovation. This section’s political analysis demonstrates the railroad industry, principally through its trade associations, as a key player in the mid-century reform of the U.S. patent laws.

Finally, “Friction in the Machine” underscores a third phase of railroading from 1904 to 1920 when Usselman finds that technical solutions no longer sufficed to deal with a world of changing markets and increasing federal regulation. The Pennsylvania, in the midst of its hugely capitalized rebuilding campaign (1898-1910) that aimed at speeding the flow of its rail traffic, was flabbergasted to find that its locomotives and railcars were not moving faster as it had hoped but rather more slowly. In addition to commodity shipping of coal, iron, or grain, the Pennsylvania, without quite realizing it, had dramatically increased its offerings of specialized services such as fast freights and local traffic. Railroads with this new and demanding mix of freight found that technical fixes such as signaling or other quasi-automatic control systems did surprisingly little to reduce traffic delays. An increasing focus on the standardizing concept of “ton-miles” as a measure of a railroad’s efficiency ironically obscured whether or not a railroad was making a profit with its efficiently carried freights. Railroad executives and managers were explicitly wary of challenging the established work routines of its heavily unionized workforce. Considerations of the “human element” were not amenable to...
For the most part, the railroad managers and executives at the center of Usselman’s account are reasonable, even rational actors seeking to adjust their complex systems to swirling changes in the economic and institutional environment [p. 177]. The impulsive or heroic figures at center stage in an earlier genre in railroad history such as William Vanderbilt, Jay Gould, or even J.P. Morgan appear only on the periphery of his account. Rather, Usselman’s attention, and evidently, too, his respect, are squarely on such non-celebrity figures as Charles Perkins and Robert Harris (of the CBQ) as well as Edgar Thomson and Charles Dudley (of the Pennsylvania).

While his introduction hints at developing “a comprehensive set of tools for understanding the framework in which technical change occurs in the American context” [p. xii], he develops these points implicitly rather than explicitly. For U.S. railroads, clearly, the country’s federalist politics, expansive and extractive economy, and shift from producer- to consumer-centered governmental interventions mattered deeply, as did the bounded rationality of the key railroad decision makers interacting with sharply felt local imperatives and dimly perceived national trends. The volume’s seven-page epilogue neatly summarizes its principal findings but does not synthesize these findings into a wider theoretical or programmatic statement. Usselman also largely confines to the footnotes his polite disagreements with such recent railroad writers as Austin Kerr, Albro Martin, and Gerald Berk.

Developing a more wide-ranging “comprehensive set of tools,” building on this volume, will require comparative analysis of railroad building in other political contexts, extensive cross-sector analysis of different industries, and explicit evaluation of theories and methods in business history (at the very least, those of Chandler, Scranton, Beniger, and Sabel and Zeitlin). One puzzle is that the railroads seemed early on to have pioneered a conservative, system-stabilizing mode of innovation yet they remained distant from the early 20th century enthusiasm for institutionalized industrial research evidenced in the electrical and chemical companies. Usselman, again, implicitly, seems also to challenge the most recent and fashionable work in business history by bounding his study to largely exclude direct analysis of race, class, or gender issues. Perhaps we can hope that Usselman, with his expertise also in the 20th century computer industry, will himself take up this wider synthetic task.

Thomas J. Misa’s book, *A Nation of Steel: The Making of Modern America, 1865-1925* (1995) was awarded SHOT’s Dexter Prize. He has recently co-edited *Modernity and Technology* (2003), and his *Leonardo to the Internet*, an interpretation of technology and culture from the Renaissance to the present, is in production at Johns Hopkins.