

Networked Machinists: High Technology Industries in Antebellum America. *By David R. Meyer.* Baltimore: Johns Hopkins University Press, 2006. xi + 311 pp. Figures, maps, tables, notes, index. Cloth, \$49.95. ISBN: 0-801-88471-3.

Reviewed by John K. Brown

In technological or business history, books with the synthetic aspirations of *Networked Machinists* are too rare. So David Meyer earns real credit for this survey of American “high-technology industries” between 1790 and 1860. His coverage includes most branches of ironworking and finishing to produce machinery of various kinds. This breadth results in many good revisionist correctives to the historiography on antebellum industrialization. Unfortunately, those insights are secondary to his central purpose. In nine chapters showcasing different metalworking industries, Meyer hammers away at a thesis as durable as it is unremarkable—that skilled practitioners came together in informal and shifting networks to transmit and develop technological expertise. Joseph Wickham Roe first laid out this thesis in his *English and American Tool Builders* (1916). Telling quite different stories, both David Hounshell (*From the American System to Mass Production, 1800–1932* [1984]) and Philip Scranton (*Endless Novelty* [1997]) carried out fine primary research to explore how such networks of knowledge and practice actually worked. Meyer eschewed primary research, fair enough for a synthetic volume. But in reaching for breadth, he provides little analytic depth beyond the repeated assertion that networks mattered—for generalist iron foundries, steam-engine builders, makers of cotton machinery, locomotive builders, armories, and machine-tool firms.

More valuably, Meyer astutely counters the privileged position that Nathan Rosenberg gave to machine-tool makers in his “Technological Change in the Machine Tool Industry, 1840–1910” (*Journal of Economic History* [1963]). Meyer shows that Rosenberg’s concept of “technological convergence” occurred repeatedly in different machine-building sectors—and long before a real machine-tool industry existed. Meyer is especially cogent in describing generalist iron foundries as the original “nests” of metalworking knowledge that inaugurated the industrial era. By contrast, the Federal

armories and their contract partners in gun-making had only narrow roles in antebellum industrial growth (p. 278), despite their outsized positions in the historiography.

Alongside its virtues, the book displays sizable weaknesses. The source base is long on journal articles from economic history and on government documents, such as antebellum census reports and patent records. Meyer makes insightful use of these aggregative sources. But both source types are ill-suited to tracing networks of knowledge and practice. The book lacks a proper bibliography, in favor of that hermaphrodite known as an “Essay on Sources.” It lists only three articles from *Technology and Culture* and only four firm histories (monographs). Missing are a number of fine-grained, archivally grounded studies (articles, theses, dissertations, and firm histories) that shed real light on the communities of knowledge and practice in machine building. Compounding the unsatisfactory sourcing are the inadequate endnotes. With only 102 notes for its 311-page text, the documentation is perilously incomplete and essentially useless.

Machinists are Meyer’s focus, but these are not the proud, class-conscious artisans we know from labor historiography (another literature absent here). All are petit bourgeois, striving examples of *Homo economicus* (p. 4). No beer breaks or strikes intrude into the narrative of these men-on-the-make, nor is there any divergence of interest between employer and employed. Meyer’s descriptions of his case studies also depart from common historical understanding at points. On one hand, he defines firearms as a producer durable (p. 4), while foundries making cooking stoves show up in a chapter on “the heavy capital equipment industry” (pp. 107, 131–35).

The book offers some interpretive stances that drew this reader to a full stop. To cite but one example, Meyer asserts that American machine tools “were already highly refined by 1860” (p. 218). His evidence: illustrations from the 1880 census of manufactures show very sophisticated tooling. But, in his view, the Civil War and the 1870s recession were “not conducive” to innovation (p. 218). So, in a feat of backward reasoning, he argues that the sophisticated tooling *had* to predate the war. In point of fact, the war greatly spurred precision metalworking techniques across the Northeast, while the recession drove machine makers to innovate in order to revive sales—as the

patent record and trade catalogues attest. There is every bet that Meyer's own networks also played some important innovative roles between 1860 and 1880.

In the final analysis, the key problem of the book lies in the incomplete development it gives to that core concern—networks. How did networks actually work? Meyer cannot really say, beyond tracing a tie (such as business dealings or the movement of trained personnel) from one shop to another. For example, locomotive builders had ongoing network ties to railroads and to machine-tool makers (analogs to the forward and backward linkages of vertical integration). Which ties were more important? In what ways? What discrete factors contributed to the strength and longevity of a network? Did any machinist-proprietors resist this happy world where all knowledge flowed without apparent hindrance? Meyer never raises such issues.

His central argument is that networks boosted the creation and diffusion of cutting-edge industrial practices. That was certainly true in individual cases—and was likely true in the aggregate for diffusion. But the free flow of technological knowledge, best exemplified in the tramping journeyman machinist, also imposed real costs for individual firms and the economy at large. Proprietors made their knowledge proprietary for a reason, patenting ideas in an attempt to wall them off from network freeloaders. Another cost: bosses found it difficult to maintain craft apprenticeship programs when their young cubs wandered off in search of higher wages as soon as they possessed any valuable skills. In turn, the broader economy was weighted by a labor scarcity (especially in skilled trades like machine-tool making) that surely hindered growth while biasing the direction of technological change. That labor-saving bias aimed directly at those tramping journeymen, revealing the divergent interests of the men and their masters. The circulating supply of knowledgeable machinists made it easy to create new firms (commonly partnerships), but difficult to sustain them. It was the firm, not the network, that created knowledge in the first place. New York's great maker of printing presses, Richard March Hoe, kept his best ideas under wraps in his experimental room. Hoe took from varied networks whenever it suited his firm's interests, but he also withheld when advantage dictated.

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