Digital State: The Story of Minnesota's Computing Industry

Thomas J. Misa

(Minneapolis: University of Minnesota Press, 2013.
299 p. Cloth, $90.00; paper, $24.95.)

Americans love their heroes. Lately, they all seem to come from the region south of San Francisco known as Silicon Valley. Some think Silicon Valley exists there because William Shockley, who shared the 1956 Nobel Prize for discovering the transistor effect, located his first transistor factory in Mountain View, right in the middle of the region. But we can also point to Stanford professor of electrical engineering Fred Terman for implementing the idea of university—corporate partnerships, in which Stanford students and professors were encouraged to work closely with industry to solve practical problems. No longer considered unethical or unseemly, this collaboration became one of the enduring leitmotivs of why this region keeps producing new products and technologies.

But computing is a vast enterprise with practitioners clustered around the world. Surely one of the most underrated such regions is the Twin Cities and Rochester, Minnesota, which not only produce sophisticated IT goods and services today but have a fascinating and influential legacy, starting in the pioneering days of electronic digital computing after World War II.

Digital State is the book we've all been waiting for—a thoroughly researched and delightfully written history of how this region was a center of computer design and manufacturing for decades, what sustained it, and how it adapted to change. As Misa explains, part of its relatively low public profile was due to selling products and services mainly to other companies or government—rarely, if ever, directly to consumers. Early corporate customers did not require advertising to make their decisions, while government buyers usually demanded discretion and secrecy.

A low profile is exactly how things began: A small group of former Navy experts in cryptography formed a company in 1946 to build highly specialized, top-secret, code-breaking machines for the Navy. In 1951 their company, Engineering Research Associates, finished building its first electronic digital computer, the ERA 1101. It sounds advanced (it was), but Minnesota's economy still relied on its staples: milling, weaving woolens, iron ore, and meat-packing.

ERA was purchased in 1952 by Remington-Rand, which had earlier bought the Eckert-Mauchly Computer Corporation based in Philadelphia. The two did not merge well, prompting several top engineers and managers from ERA to spin off and create Control Data Corporation (CDC) in 1957. Led by the brilliant engineer and computer architect Seymour Cray, CDC built the world's fastest commercially available computers from

about 1959 to 1975—"supercomputers." By 1960, mainframe computer and peripherals powerhouse Honeywell was also booming, employing over 14,000 people. And in 1958 IBM established its enormous research, development, and manufacturing facility in Rochester. (It really was enormous—slightly over half the size of the Pentagon). IBM Rochester became home to some of the most profitable products in company history, notably the AS/400 midrange computer family.

From the earliest days, dozens of companies were started by former employees who saw a better way of doing something, usually in a highly specific niche. They often became vendors to their old companies, weaving a web of people, skills, and technological capabilities that formed a stable yet vibrant ecosystem for computer design, development, and manufacturing. With this stable, highly competent labor force, "relatively" temperate climate, and sources of capital, a final key to success was the University of Minnesota, a source of technical talent and ideas. Early on, for example, ERA hired 40 percent of the university's graduating electrical engineers.

As Misa reminds us, his book seeks to fill the gap in our historical understanding between the early ERA-era and Silicon Valley. He ably shows that the Minnesota computer industry, from the major "anchor" firms to the small, highly skilled, specialized vendors, is a significant piece of that history.

While the mainframe is still with us, its glory days have passed. Fortunately, beginning in the 1980s Minnesota planted the seeds that transformed it into today's global hub for medical-device design and development. Much of the infrastructure that had supported large-scale computing production and development translated to the medical-device field.

While everyone was paying attention to Silicon Valley, Minnesota has been, for over six decades, making major contributions to the computer systems that shape our daily lives. As the center of the medical-device industry, this is even truer today. Misa's book deepens our historical grasp of this vital region, is a sorely needed corrective to the often-overwrought claims made for Silicon Valley, and is wonderfully written. I recommend it highly to those interested in understanding how Minnesota developed into a technology region and the importance of the computing industry to Minnesota's economy and people.

—*Dag Spicer*
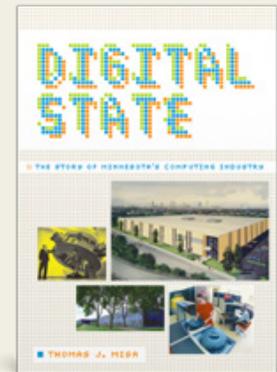
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BOOK REVIEWS

The Settlers' Empire: Colonialism and State Formation in America's Old Northwest
Bethel Saler
(Philadelphia: University of Pennsylvania Press, 2014. 382 p. Cloth, $45.00.)

Portrayals of omnipotent federal officials, law-abiding settler families, and compliant Native people participating in a seemingly inevitable story of American progress can get stuck in our heads. Grounded in solid historical research, this work provides evidence to reclaim the complexities of the past and perhaps remind us of the need to question more simplistic and popular historical accounts.

The Settlers' Empire begins with the often-missed recognition that the young American nation began as both a "post-colonial republic" and a "contiguous domestic empire," simultaneously espousing ideals of participatory democracy for some and social control for others. In examining the challenges, complexities, and consequences inherent in such a predicament, Saler reveals key figures, themes, and interactions in the Old Northwest from the late 1700s to the middle 1800s. Her focus on Wisconsin over five decades provides a long view of the evolution of state formation.

The book's attention to national goals and their local implementation is a great strength. Readers can see how policies of Thomas Jefferson, the War of 1812, and the Civilization Act of 1819 connect with Wisconsin Territory, including treaties from 1804 (with the Sauks and Mesquakies) to 1837 (leading Americans to claim half of Wisconsin), lead mining in the 1820s, and missionary work among white and Native peoples. Saler also shows how settlers resisted and influenced national policy until federal officials caught up to make "the settlers' empire" official.

The seven-chapter work (plus epilogue) chronologically and thematically examines political, economic, cultural, and social developments of Indian-white relations and state formation. Early chapters explore the gradual evolution of federal authority over a region mainly comprised of French, French Canadian, African American, metis, and tribal communities. Officials could make plans in Washington D.C. but, as Saler notes, history in the early years was "written on the ground." Not until after the War of 1812 did the influence of settlers (and then the state) grow beyond the cultural fluidity of the eighteenth and early-nineteenth centuries.

The book then moves to more thematic analysis of the evolution of economic, religious, and social structures establishing the control of the state by replacing a preexisting, dynamic world with an American-sanctioned system. "Exchanging Economies" shows the shift from kin-based to a commodity-driven system, the challenges of regulating trade, American miners invading tribal lands, and Native adaptations to the emerging economic system. "A 'Peculiarly Missionary Ground'" addresses religious competition between Protestants and Catholics, distinctive missionary policies toward white and Native communities, and varied tribal responses to Christianity. "The Cornerstone of Marriage and Family" examines a prominent method of asserting state power through prescribing marriage norms and racial categories that indicted those who crossed racial boundaries. Throughout, Saler introduces a range of individuals including Ho-Chunk lead miners, African American explorer James Beckwourth, Menominee leader Oshkosh, and the disreputable Partridge family (really) who kidnapped a Menominee boy in 1852.

With a sense of this complex history laid out, "The State of Imagination" and "Epilogue: The Historical Present" consider the connections between state formation and the establishment of the State Historical Society of Wisconsin in the later 1840s. Both, Saler asserts, were challenged with uniting diverse people—developing a governance structure or constructing a common narrative of the past. Politicians held two constitutional conventions and then dodged controversial issues to pass the 1846 constitution. Historical society leaders promoted a unifying story while also collecting divergent sources for future historians. Consequently, in a period espousing American exceptionalism and empire building, historians like Frederick Jackson Turner could promote stories of settlers making their own world while, decades later, Saler could connect this "settlers' empire" to state formation.

In an era of specialization, it is refreshing to find such a fine synthesis of sources, systems, ideas, and individual actions in a single, well-written work. No book can do it all, though this comes close. Students of American Indian history, for instance, may wish to consult other sources for additional examples of tribal "agency" in the mid- and later-nineteenth century. Teachers of U.S. history and advanced students will benefit from new linkages between national history, state formation, the American West, and American Indian history. Scholars will appreciate 50 pages of endnotes. All will gain from learning about the broad array of individuals that populated the varied layers of early Wisconsin and American history.

—*Robert W. Galler Jr.*
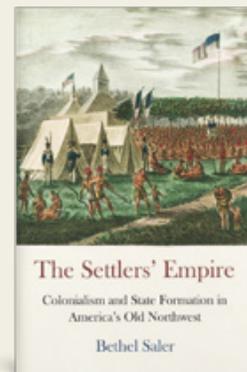
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