Huib J. Zuidervaart; Rob H. van Gent. *Between Rhetoric and Reality: Astronomical Practices at the Observatory of the Amsterdam Society "Felix Meritis," 1786–1889.* 152 pp., illus., apps., bibl., index. Hilversum: Uitgeverij Verloren, 2013. €19 (paper).

The learned society of arts and sciences "Felix Meritis" was established in Amsterdam in 1786. Two years later, the society was housed in what was called a "Temple of Enlightenment," a magnificent building on one of the principal canals whose architectural design was much more ambitious than that of the better known Teyler's Museum in Haarlem. It included, for example, a concert hall, a drawing department with an arts cabinet and an exhibition room, a reading room with an opulent library, a physics department with a large cabinet of scientific instruments, a natural history cabinet, a chemical laboratory, a balcony for meteorological observations, and a two-story astronomical observatory. According to the Dutch mathematician and physicist Jan Hendrik van Swinden, who delivered the inaugural speech, the research facilities of Felix Meritis could withstand comparison with those of larger institutions abroad.

This glorious beginning notwithstanding, Huib Zuidervaart and Rob van Gent's history of the society's astronomical and meteorological observatory is anything but a success story. Van Swinden's high hopes for the observatory as a locus for original research were never fulfilled. As it turned out, the upper-middle-class burghers who had founded the organization and constituted its membership had a hard time keeping the society and its costly facilities and collections in good condition, and there simply were insufficient funds left over for research. The problem was aggravated by the dwindling interest in scientific societies as centers of elite sociability in the course of the nineteenth century; membership numbers dropped from 420 in the early nineteenth century to under 200 in 1886, which resulted in the decision to liquidate the society in 1889.

Thus, in spite of the fact that the astronomical observatory of Felix Meritis was equipped with an impressive collection of scientific instruments, it would serve almost exclusively for lectures and demonstrations. The observatory did attract a number of talented researchers, but it seems that the society was unable to pay them enough to keep them long; most researchers soon preferred a better-paid position at a university. The society even had trouble paying for qualified public lecturers. Nevertheless, membership fees and the social prestige that was attached to membership continued to be high, and the ballot procedure for membership was kept intact till the end. In line with this policy, the society was unwilling to allow skilled researchers of lower social rank to use the facilities for lecturing and research. An example is the very talented physicist and mathematician Jan Frederik Keijzer, a former army sergeant who had to be elected to the Dutch Royal Academy before he was allowed entrance to the observatory of Felix Meritis. Meteorology fared better at Felix Meritis: daily recordings were performed over half a century, until the Royal Dutch Meteorological Institute was established in 1854.

During most of the nineteenth century, the society itself was mainly a place where the Amsterdam elite met for pleasure and leisure—for instance, in the concert hall or the exposition rooms. There is a clear parallel here with Teyler's Museum, whose scientific collections lost the central position they had had under Martinus van Marum's directorship to the art collection, which would ensure the museum's continuing social role in the nineteenth century in a quite different way.

The authors have documented their story in detail, and *Between Rhetoric and Reality* presents many fine illustrations of the researchers, instruments, and facilities of Felix Meritis. They convincingly show how the rise of the natural sciences in the nineteenth century was paralleled by a decline in the interest of the social elite in participating in these developments. The parallel with Teyler's Museum emphasizes that we need to know more about the background of this changeover in cultural preferences in Dutch polite society.

BERT THEUNISSEN

■ Recent (1950–)

Paul M. Leonardi. *Car Crashes without Cars: Lessons about Simulation Technology and Organizational Change from Automotive Design.* (Acting with Technology, 12.) x + 334 pp., illus., tables, bibl., index. Cambridge, Mass./London: MIT Press, 2012. $35 (cloth).

Despite the diligent work of historians, sociologists, and philosophers of technology, many social actors have deterministic views of technological development. Those adhering to technological determinism argue that technology develops autonomously according to its own internal logic and is the most important source of organizational and societal changes.

Rather than shrugging one's shoulders and saying "that's just the way it is," Paul Leonardi suggests a phrase underlying many constructivist studies of science and technology: "things could be different"—provided we "envision the alternatives and act on them" (p. 3). Drawing on an ethnographic study conducted over a period of ten years at a U.S. automobile manufacturer, Leonardi studies the relationships between organizational changes and simulation technologies used to study "crashworthiness," which "refers to how well a vehicle protects its occupants in a crash" (p. 294). Simulations have the ability to function as stand-ins for the systems they are meant to represent, meaning that organizations relying on simulation technologies straddle discovery and manipulation. Given the reliance on simulation technologies in crashworthiness analyses and the design of automobiles, the use of simulations by automobile manufacturers is a subject that warrants careful examination.

Leonardi sets out to understand how simulation technologies affect the process of organizing, how these changes acquire the status of being "inevitable," and, finally, how perceptions of inevitability lead to more changes (p. 16). Two social constructivist theories of technology have attempted to understand the mutual shaping of technologies and organizations. The first are constructivist theories of technology development, which focus not so much on the impacts of technologies but, rather, on the "sociopolitical context in which actors negotiate and use persuasive techniques to guide the evolution of a technology's material features" (p. 25). The second are constructivist theories on the impact of technologies, which take the outcome of technological development as their starting point and argue that "organizational changes aren't prefigured by a technology's material features, but rather are enacted while people are physically engaged in the *use* of a technology" (p. 28). According to Leonardi, both of these approaches are ill-equipped to deal with the mutual shaping of technologies and organizations, since they end up on different sides of an "implementation line" (p. 32 ff.). Constructivist theories of technology development tend to work toward the moment of implementation and abstain from delivering a substantial account of the impact of a given technology. By contrast, constructivist theories of the impact of technologies focus on organizational changes that may occur after a technology has been implemented. As a result, existing constructivist approaches may render technological change and organizational change as nonoverlapping.

Leonardi argues that organizations and technologies are composed of the same basic elements: human and material agencies (p. 5). The intertwining of these agencies is identified as a process of "imbrication," which means "to arrange distinct elements in overlapping patterns so that they function interdependently" (p. 42). The fundamental interdependence of social and material agencies evolves over time and establishes path-dependent chains of social and material agencies that both afford and constrain technological and organizational developments. Thus technology and organizing cannot be separated, and the life cycle of a new technology is rendered as "a chain of decision points" (p. 288). The notion of imbrication affords a more "nuanced understanding of change" (p. 267), in which social agencies impact material agencies and vice versa: "organizing work is just as much a process of material change as it is a process of social change" (p. 291). The notion of imbrication avoids the inevitability of technological and organizational choices, allowing people to recapture choice (p. 280 ff.).

Car Crashes without Cars is a well-argued attempt to address potential shortcomings of social constructivist theories. However, the question is whether the notion of imbrication will have the empowering effect to reinstate choice when it comes to technological designs. First, the view that "people ultimately decide how they respond to a technology" (p. 40) may be true, but technologies may very well constrain the views and actions of social actors in persuasive ways. Second, as the author himself suggests, technological determinism needs to be taken seriously because of its social currency. It is not self-evident that social actors would respond favorably to the notion of imbrication, which leads to the question of how the research subjects of Leonardi's book have responded to the author's findings.

MATTHIJS KOUW

Rebecca Priestley. *Mad on Radium: New Zealand in the Atomic Age*. xii + 275 pp., bibl., index. Auckland: Auckland University Press, 2012. NZ $45 (paper).

Nuclear history may be about powers, but not only superpowers. The Atomic Age burst upon a world set free from war, seeking peace and the prospect of plenty. Nowhere was this vision embraced more strongly than in New Zealand, where politicians and the populace were captivated by the promise of a brighter world through nuclear energy. That this promise was quickly to