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J. Samuel Walker. *The Road to Yucca Mountain: The Development of Radioactive Waste Policy in the United States*.

The Road to Yucca Mountain: The Development of Radioactive Waste Policy in the United States by J. Samuel Walker

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their practices or open the black boxes of their protocols, but this is what Saunders begins to do throughout his chapters. “Cutting” examines the construction of the technology and hospital workflow around its use; “Diagnosing” considers how “gold standards” in radiological evidence have been derived in comparison to knowledge based on cadaver-based gross anatomy; “Curating” looks at data management and the ways that individual cases form part of a historical visual narrative culled from Picture Archiving and Communication Systems (PACS) and other repositories; “Testifying and Teaching” relies heavily on transcripts of dialogue offering somewhat tedious insight into how images are used in differential diagnosis and case conference discussions. The last chapter, “Exposition,” looks at some sites outside a university teaching hospital where radiographic projects are exposed to a wider public gaze, such as medical museums and technical exhibits; even here, we see that their products (their filmic “exposures”) are widely circulated though their techniques of production remain hidden.

Overall, *CT Suite* is a very descriptive book, heavy on field notes and transcriptions of verbatim dialogue among those the author silently observes. Saunders writes well when setting the context of his observations and likes to make his own thought process transparent to readers. Though the book is rich in ethnographic description, it seems to me that the take-home message is mainly historical. Saunders’s book suggests that CT is not a postmodern technology but one that is embedded in—he says “haunted by” (p. 12)—nineteenth-century natural historical practices of collecting, classifying, and analyzing specimens. Saunders points to historical precursors in the work of Goethe (on mapping), Cuvier (on comparative anatomy), and Galton (on photographic typologies) to illustrate how image “slices” are reconnected through historical rhetorical practices and presumptions about hidden structures and physiological associations. But while I understand the author’s references to history of science to help think about how medico-scientific representations have evolved, I do not think his historical comparisons are the book’s strength.

The book’s value might well lie in its detailed account of recent historical practices and technological performances that are disappearing before our eyes. Saunders’s ethnographic fieldwork took place in the mid- to late 1990s, when “image boxes,” “reading rooms,” “films,” and other radiologic accoutrements still existed. But already new technologies exist, most everything is digital, and the community of chatting expert

readers operates online around the world. Thus the historical reflections on representational epistemology are not irrelevant to the story—just not as interesting as the inadvertent documentation this book provides about the pace of professional adjustment and boundary shifting that is driven by the evolution of the technologies of image production. In this respect, Saunders’s book is a valuable contribution to the historical record of biomedical practices that we can no longer access through ethnographic methods, and as such it is a useful resource for both anthropology and history.

BRIAN DOLAN

J. Samuel Walker. *The Road to Yucca Mountain: The Development of Radioactive Waste Policy in the United States.* xi + 228 pp., illus., bibl., index. Los Angeles/Berkeley: University of California Press, 2009. \$34.95 (cloth).

The long-term disposal of radioactive waste has emerged as one of the most politically toxic and technically fraught regulatory challenges of the late twentieth and early twenty-first centuries. J. Samuel Walker, official historian for the U.S. Nuclear Regulatory Commission, has written a concise and straightforward account of the evolution of the nuclear waste debate from its origins during the Manhattan Project through the selection of Yucca Mountain as a potential permanent disposal site in 1987. Walker’s account covers the evolution of the waste issue from something seen by policy makers and experts as “challenging but solvable” into a problem “bewildering and perhaps insurmountable” in its political and technical complications.

The first half of *The Road to Yucca Mountain* is the more fascinating and lively, its narrative addressing a time when controversy had not yet made the waste question politically impossible on nearly all levels. During the Manhattan Project, large volumes of high-level liquid wastes, by-products of Hanford plutonium production, were pumped into “hastily fabricated, single-shell, steel-lined, underground storage tanks” near the Columbia River (p. 3). Low-level wastes were released into the environment in ways that would encourage their dilution to what was considered to be a safe level. When the Atomic Energy Commission (AEC) took over nuclear operations in 1947, it largely continued the tradition established by the Army during the war. Neither set of officials, in Walker’s eyes, was looking to foul up the environment or do anything that they thought would be unsafe. But both “consistently subordinated those con-

cerns to their assessment of national security demands” (p. 7).

Walker’s AEC is generally benevolent, but prone to hubris and utterly deficient in humility. It is an organization of experts who continually underestimated the technical difficulties of waste disposal and at the same time were woefully inept at managing the political aspects. In the early decades, the AEC consistently saw the waste problem as something manageable, technically boring, and a problem for the future to worry about. But by the 1960s numerous problems—including the accidental leakage of thousands of gallons of high-level liquid waste at Hanford—and persistent warnings from sanitary engineers should, in Walker’s view, have forced the AEC to take a more measured stance on the simplicity of the waste issue. Instead, the AEC “demonstrated complacency to the point of smugness,” and officials “largely disregarded the arguments of their critics” (p. 50).

All of this laid the groundwork for the first major public controversies about waste in the 1970s, when attempts to develop a repository in an abandoned salt mine in Lyons, Kansas, utterly failed both technically and politically. The technical problems of guaranteeing the reliable containment of radioactive wastes over very long timescales proved far more difficult than had been anticipated; politicians and the public had come to see the AEC as a paternalistic, untrustworthy technocracy; and with increased public consciousness of the waste problem, the prospects of having one’s state labeled an “atomic garbage dump” motivated politicians of all stripes to oppose attempts by the AEC to develop disposal sites.

By the 1980s, the issue of developing permanent disposal sites for the ever-growing quantities of high-level, low-level, and transuranic wastes had become intractable. The AEC and its successor agencies had at last become aware of the engineering complexity and the political sensitivity of the waste situation, but rising fears, expectations, and distrust made satisfactory solutions increasingly unlikely. Walker concludes, “After more than six decades of addressing the problem of high-level radioactive waste, the related issues of storage, geologic disposal, reprocessing, and transportation continued to defy easy or certain resolution” (p. 184).

Walker’s history seems generally fair to his actors, and he explicates both the technical and the political issues with concision and clarity. The earlier chapters include more discussion of colorful figures and big questions than the later chapters, which revolve around maneuvering

and overlapping jurisdictions between numerous federal, state, and local agencies, as well as emergent antinuclear power organizations. The most fulfilling moments in the text are invariably the last few pages of each chapter, where Walker delivers concise historically informed and policy-relevant conclusions about what went wrong. And there is little that has gone right on this issue.

This book will be an essential reference on the evolution of the nuclear waste problem specifically, but also as a meaty case study documenting the emergence of a thorny intersection of scientific expertise, policy making, and public interest in the late twentieth century.

ALEX WELLERSTEIN

■ Sociology and Philosophy of Science

Barry Allen. *Artifice and Design: Art and Technology in Human Experience.* ix + 213 pp., illus., index. Ithaca, N.Y./London: Cornell University Press, 2008. \$35 (cloth).

In design theory meaning is often separated from materiality, aesthetics from technology. Design lends itself to semiotics; artifacts are commonly analyzed in terms of symbolic meaning and interpreted in terms of the language of signs. Yet Barry Allen puts forward a compelling argument about their nature: artifacts should not be perceived according to what they mean and signify but *by what they do*—how they look and sound, how they motivate attention and memory, and the entire set of effects on the users’ perception. Thus in order to appeal they do not rely on discursive, linguistically mediated reasoning; they are, rather, social partners of the designer that impose themselves. The analysis of different technological artifacts, such as bridges (but this could apply to other functional artifacts like aircrafts, ships, etc.), provided by Allen demonstrates the irrelevance of the modernist opposition between what is social, symbolic, subjective, and lived and what is material, real, objective, and factual. It shows that there are no distinctive ways of grasping and designing an artifact—one through its intrinsic materiality, the other through its more aesthetic or “symbolic” aspects. To design is not simply to add meaning to a brute, passive, and technical matter, to make form follow function. There is no purely technical rationality followed by aesthetic shape; they rather go hand in hand.

Take a walk along a river and contemplate the bridges you see. Why do they all have different