

actual waste landscapes with larger social and cultural issues, thus transcending their mundane nature. While waste landscapes may be physically marginalized and perceived as repulsive or unwanted, the author insists that their larger meanings should not be buried, dumped, washed away, or neglected. This is stimulating reading.

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### **Shouldering Risks: The Culture of Control in the Nuclear Power Industry.**

By Constance Perin. Princeton, N.J.: Princeton University Press, 2005.  
Pp. xxiii+379. \$35.

Constance Perin's *Shouldering Risks* is an impressive ethnographic study of the nuclear power industry, focused on four problematic situations that could become accidents in nuclear power plants. This is a valuable addition to a literature ranging across disciplines that addresses normal operations as well as risks and accidents in complex and potentially dangerous systems. Like Charles Perrow's *Normal Accidents*, Edwin Hutchin's *Cognition in the Wild*, and Diane Vaughan's *The "Challenger" Launch Decision*, Perin's book describes the actual working of complex systems rather than relying on abstract descriptions of such systems as strictly hierarchical, and thus perfectly amenable to a logic of command and control for their operation.

Perhaps the most important aspect of Perin's book is the way in which she addresses the notion of "a culture of safety" and her examination of what this could mean within a hierarchical, militarily oriented management structure in an industry faced with intense pressures regarding schedule, output, and cost. It has become almost a commonplace, after an incident or accident in a complex system, for investigators and managers to call for (often unspecified) changes to promote such a culture of safety.

We may compare this to the idea of "human error." Before the development of human factors as a field of inquiry, identifying an accident's cause as human error meant, in effect, telling the humans in the system, "don't make errors." Clearly this was not helpful or effective. Human factors developed ways of identifying both designs and processes that were prone to error, and changes that could reduce error. Currently, the study of organizational culture is at a similar early stage. Calling for a culture of safety means, in effect, telling workers and managers to "behave differently under the same circumstances." For example, a finding that a nuclear plant suffers from poor communications might be taken to suggest that workers should

be trained to speak clearly or assertively. But, as the author argues, this is actually a symptom of the organization of knowledge—the existence of knowledge “silos” in a domain where problems cross technical areas. The current assumption is that cultural change comes free, or at least very cheaply, and that major structural changes are not essential to accomplishing a change of culture.

Perin begins by describing an organizational structure that would allow for real cultural changes. The nuclear industry is currently organized in a logic of command and control, which appears to offer an a priori account of the ways things work. Based on her detailed study of the often messy and contingent ways that things *actually* work, she suggests the unrecognized existence of a parallel logic of “doubt and discovery” that can be used to locate and diagnose problems. She believes that conferring official status on doubt and discovery would produce a powerful cultural change.

This book will prove valuable for readers in any discipline who wish to understand more about the functioning of complex systems. Perin’s background in anthropology contributes to her respect for the actual complexities of work on the ground, although no knowledge of anthropology is demanded of the reader. What is demanded, rather, is considerable knowledge of the nuclear industry. The author honorably refrains from emphasizing her own views of the incidents and accidents she describes; instead, she presents excerpts from the reports of review teams and quotes from interviews with participants, as well as her own reflections. Consequently, in her own book she provides a model for the kind of respect for multiple meanings that she recommends for the nuclear power industry. Science and technology are too often “idealized,” in both senses of the term. This book presents the real thing.

CHARLOTTE LINDE

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**Establishing Research Corporation: A Case Study of Patents, Philanthropy, and Organized Research in Early Twentieth-Century America.**

By Thomas D. Cornell. Tucson, Ariz.: Research Corporation, 2004.  
Pp. 328. Available through university libraries in North America.

Historians have examined in much detail the origins and growth of the scientific research establishment in the United States. This institutional transformation was wrought by the rise of big business during the late nineteenth century, the specialization of knowledge into new professional disciplines, and the rapid expansion of the university system under the aus-