Other terms classified in the Nukespeak vocabulary, however, are merely everyday words that are used to describe particular situations or items. In discussing the categories of waste storage tasks at Hanford, Washington, for example, the authors cite "Confirmed Leakers" (pp. 154–55). It seems to me that such a term is quite appropriate as it is utilized—to describe a tank that is definitely leaking. I recall a summer job as a milkman when the half-gallon paper and wax milk containers that often used to leak were referred to by my colleagues as "confirmed leakers." Or take the authors' use of pentomic units, defined as "nuclear combat troops" (p. 85). The U.S. Army's pentomic divisional reorganization in the 1950s was a restructuring of the former three-element infantry regimental system into five smaller infantry battle groups as the basic fighting units in the standard infantry division. It was designed to give greater battlefield dispersion in the event of fighting on an atomic battlefield. Thus the term pentomic. This type of contextual explanation is not presented in the book. There are other terms used in a similar manner that space in this review does not permit citation of. Notwithstanding such caveats, the volume should be useful to readers of this journal who are interested in the interplay of nuclear technology and culture as it has been enunciated in this new language—Nukespeak.

GEORGE MAZUZAN*

Nuclear Waste: Socioeconomic Dimensions of Long-Term Storage. Edited by Steve H. Murdock, F. Larry Leistritz, and Rita R. Hamm. Boulder, Colo.: Westview Press, 1983. Pp. xxi + 343; tables, references, index. $26.50.

The purpose of this collection, although not stated explicitly as such, is to convince a technical policymaking community predisposed to skepticism that the nontechnical aspects of the nuclear waste problem are subject to systematic analysis and should be integrated into the planning effort for siting high-level waste repositories. Although the editors focus on the narrower problem of assessing local socioeconomic impacts, a field in which rural sociologist Steve Murdock and agricultural economist F. Larry Leistritz have established fine reputations, they also provide a five-chapter introduction to a wider range of technical and nontechnical dimensions. The central analytic problem is to identify and interrelate the contrasting dimensions of analysis. Historians of technology frequently confront the problem of describ-

*DR. MAZUZAN, chief historian at the United States Nuclear Regulatory Commission, is a coauthor of the forthcoming book, *Controlling the Atomic: The Beginnings of Nuclear Regulation, 1946–1962.*

ing relationships among technical and nontechnical dimensions and in recent years have looked increasingly to the social sciences for methodological assistance. This book provides a state-of-the-art application of socioeconomic impact assessment techniques. However, it is likely to leave the historian frustrated with social science analysis and confident in the methodological strengths of historical scholarship.

The volume provides an informative and reliable introduction to the nuclear waste problem by surveying separate sets of relevant dimensions, although the results are sometimes uneven. A preliminary overview of possible solutions to engineering and geological problems examines alternative storage concepts and describes a potential repository design, although it does not make clear nor justify the book's exclusive focus on high-level wastes, omitting low-level wastes and mill tailings. Chapters on ethical and legal dimensions provide interesting and comprehensive overviews, but the chapter on institutional organization lacks analysis, offering only a description of the federal program for managing socioeconomic impacts. Unfortunately, each of these chapters was written prior to the passage of the federal Nuclear Waste Policy Act, which has given concrete form to many of the issues described. Seven chapters examining socioeconomic impacts provide excellent summaries of economic, fiscal, demographic, public service, and social impacts of repository siting, as well as potential strategies for impact mitigation. In each case, the special impacts associated with nuclear waste disposal are distinguished from the standard impacts of large-scale technological projects. Each analysis also provides baseline profiles, baseline projections, and impact projections in order to distinguish project impacts from changes that would otherwise occur. Three final chapters tackle possibly the most important social impact of repository siting, the response from the local community, by summarizing lessons learned elsewhere and by proposing citizen participation strategies.

One failing of the book is that despite its attempt to interrelate dimensions of analysis, it sheds no new light on the subject. The editors propose a comprehensive framework for multidisciplinary research borrowed from ecological theory, which distinguishes population, organization, environment, and technology as the key dimensions. However, they fail to explain the relationship between these analytic dimensions and their rationale for chapter selection. Not only is the ecological framework unhelpful in understanding most of the nuclear waste problem, the editors do not even use it themselves.

The problem of integration is equally serious but more subtle in the book's extensive treatment of socioeconomic dimensions. The methodology of impact assessment may be effective for handling quantifiable variables, but, as the authors of the chapter on social effects correctly point out, qualitative factors such as changes in community perceptions and social organization are likely to prove decisive in determining

how the local community calculates net impacts. Juxtaposing quantitative and qualitative dimensions is necessarily a qualitative act, whether performed by analysts or by decision makers. If the impact assessment process involves projecting past trends into the future on the basis of lessons learned elsewhere, then the whole endeavor is nothing less than a qualitative exercise in applied history. Social scientists are normally reluctant to accept such a conclusion, so, rather than explore innovative ways of integrating dimensions, the editors adopt the more typical strategy of falling back to methodologically secure but theoretically weak ground. They elaborate the quantitative dimensions, assert that the various dimensions are complexly related, and then depart without further analysis. Few alternatives are currently available, but, since the goal is to guide the actions of decision makers, they might have at least attempted, for example, to outline potential future outcomes. I myself prefer trying a group-centered analysis that identifies relevant participating groups and outlines both how each is likely to integrate dimensions and when that integration is important for decision making. But the field is wide open.

In social impact assessment, the qualitative problems of social science analysis merge with those of historiography. The lesson for historians is that, rather than come to social science for methodological assistance, they should begin to think of ways of providing advice.

GARY L. DOWNEY*

Engineering Professionalism and Ethics. Edited by James H. Schaub and Karl Pavlovic, with M. D. Morris. New York: John Wiley & Sons, 1983. Pp. xv+559; notes, references. $32.95 (paper).

This book is an anthology of readings about the ethical issues facing engineers. As the leading practitioner of technology, the engineering profession has been given both credit and blame for the consequences of industrial technology. Many of the articles here point to a crisis of public confidence in engineering; engineers are now held responsible for the bad consequences of technology. The work provides an overview of the moral problems involved in modern engineering practice, and it also presents many different viewpoints of the ethical responsibilities of engineers.

*DR. DOWNEY is assistant professor of technology studies at Virginia Polytechnic Institute and State University's Center for the Study of Science in Society. A mechanical engineer turned anthropologist, and formerly a postdoctoral fellow with the National Academy of Sciences' Committee on Radioactive Waste Management, he is now completing a book on the role of ideology in the 1970s opposition to nuclear power plants.

The book is divided into eight sections, each beginning with a short introduction by the editors. The first section covers the rise of the engineering profession in the 20th century, the development of engineering education, and the growing interdependence of engineering and business. The next two sections deal with engineers' obligations to employers, fellow engineers, government, and public. Modern engineers must serve many masters; this often leads to serious conflicts of interest. The readings show the wide diversity of opinion about the primary responsibility of engineers and the gap that exists between engineers' perceptions of their obligations toward society and the public's expectations of them. A section on the role of professional engineering societies reveals that these bodies, although claiming to hold public service paramount, tend to protect their own interests over those of society as a whole. Codes of engineering ethics stress the public interest, yet there is ample evidence in this book to show that lofty goals are often perverted by economic considerations.

The difficult choices facing engineers are illustrated in "The Ethical Dilemma," which gives real-life examples of the ethical problems encountered by engineers. A section on whistle blowing provides further case studies of ethical and unethical conduct, with brief accounts of some of the engineering scandals of the 1960s and 1970s. The last sections deal with ethical codes, with their enforcement, and with professional registration and the maintenance of professional competence.

This compilation covers much the same ground as previous anthologies on professional ethics; it draws on the work of Robert Baum, Samuel Florman, Edwin Layton, Milton Lunch, Ralph Nader, and William Wisely. The readings are taken mostly from engineering journals and proceedings, papers, official reports, and monographs. The case studies are dated. It is unfortunate that some of the recent developments in engineering ethics, such as the American Society of Mechanical Engineers' standards-setting court cases, came too late to be included.

The editors maintain strict impartiality throughout and have taken pains to include all points of view. They have also struck a balance between the dry legal and philosophical articles and material written in a more popular vein. They faced an extremely difficult task in establishing a coherent framework for more than seventy readings. The didactic purpose of the book would have been better served with longer introductions to each section and a tighter scheme of organization. The anthology lacks a general introduction which lays out the basic issues and dilemmas in a form easily digestible by the average engineering student.

One consensus emerges from all the different viewpoints expressed: engineering education is in need of an overhaul. There is general agreement on the need to train ethically sensitive engineers who will

argument, particularly since communities are demanding answers to the social implications of technology-based questions.

GEORGE T. MAZUZAN*

The Politics of Nuclear Waste. Edited by E. William Colglazier, Jr. Elmsford, N.Y.: Pergamon Press, 1982. Pp. xxv+264; notes, appendixes, index. $27.50.

The lasting value of this work is that it stands, however unevenly, as a strategic historical document, recording for the interested reader the struggle to solve the problems of nuclear waste management at the height of their uncertainty. An ill-founded technological optimism had persuaded federal officials well into the 1970s that the management of nuclear waste was an uninteresting endeavor devoid of scientific, technological, and institutional challenges. By 1979, however, the year in which this volume was assembled, the accumulation of high- and low-level wastes in both the commercial and military sectors had combined with increasing institutional dilemmas to produce a national problem of enormous complexity. Suddenly everyone was studying it.

The U.S. Congress became the focus of attention because, in order to achieve lasting solutions, Congress would have to modify or replace older policies. That body, however, was running in place. Each year it considered a set of proposed solutions, but with its jurisdiction over nuclear waste management divided in both houses among committees representing competing interests, reaching agreement on a comprehensive plan was extremely difficult. The Carter administration, acting through the fourteen-member Interagency Review Group (IRG), had worked diligently to construct a unified policy, but delays in submitting the formal proposal to Congress eroded its influence.

As a response to what appeared from the outside to be a growing crisis of governance, three independent educational organizations held conferences in 1979 to confront directly the problem of political conflict over nuclear waste. The present work is an updated set of papers commissioned by the Aspen Institute for Humanistic Studies for a November 1979 meeting at Harvard University's JFK School of Government. Unlike efforts mounted by the Keystone Center in Colorado and the Conservation Foundation's RESOLVE forum, the Aspen Institute did not organize consensus-building workshops in order to reach concrete policy recommendations but concentrated on defining issues and clarifying differences. The printed result is a loosely organized collection of eight essays examining the major institutional issues at this crucial point in the history of nuclear waste

*DR. MAZUZAN is chief historian at the United States Nuclear Regulatory Commission. His article, "Atomic Power Safety: The Case of the Power Reactor Development Company Fast Breeder, 1955–1956," appeared in the July 1982 issue of *Technology and Culture* (vol. 23).

management. It is of use to students of that history both as a secondary source summarizing policy developments and as a primary source providing interpretations of the policymaking process by some of its participants.

The book's major contribution is the informed analyses of the development of Carter administration policy and of the problem of federal-state conflict. Ted Greenwood, formerly a White House participant in IRG activities, offers a detailed, insightful view of its internal deliberations and subsequent proposals. Thomas Moss, a staff member for the House Committee on Science and Technology, follows by describing how factional disputes within Congress and the administration combined to undercut the considerable institutional momentum that had built up behind the IRG. However, he does so in a much shorter article whose bird's-eye view fails to provide sufficient understanding of the factions themselves. Lawyers Harold Green and Marc Zell then highlight the existing legal structure of federal and state authority over nuclear waste, providing a summary of earlier congressional legislation as well as a focused study of federal-state conflict. Emilio Varanini of the California Energy Commission examines the proposal to grant states "consultation and concurrence" authority, an innovation that eventually became law. A conclusion written by the editor neatly completes the package by identifying outstanding issues as well as the institutional prerequisites for solving them.

Unfortunately, the remaining chapters do not hang together; they are useful more for the data they present than the conclusions they draw. David Deese's cross-national comparison of decision-making processes is informative, but he fails to achieve his goal of demonstrating how cross-national data can be used to solve nation-specific problems. An overview by Dorothy Zinberg of nongovernmental groups and public participation in different countries has no clear argument. And the chapter by environmentalist Marvin Resnikoff is instructive in presenting a nuclear critic's viewpoint, but the volume suffers from the absence of an equally impassioned counterpart.

In 1980 Congress agreed on an institutional mechanism for managing low-level wastes and in 1982 created a wholly distinct structure for managing commercial high-level wastes. Many of the governmental issues raised at the Aspen conference have been resolved by these two laws. But by providing a picture of the complex issues that clouded the future of nuclear waste management in 1979, this collection preserves the sense of alarmed uncertainty exhibited by those who were engaged in the search for solutions.

GARY L. DOWNEY*

*DR. DOWNEY is assistant professor of Technology Studies at Virginia Polytechnic Institute's Center for the Study of Science in Society. A mechanical engineer turned anthropologist, and formerly a postdoctoral fellow with the National Academy of Sciences' Committee on Radioactive Waste Management, he is now researching decision-making issues in the siting of high-level waste repositories.

Land into Water—Water into Land: A History of Water Management in Florida. By Nelson Manfred Blake. Gainesville: University Presses of Florida, 1980. Pp. viii+344; illustrations, notes, index. $19.95.

The Florida peninsula may well represent one of the worst examples of environmental tinkering perpetrated by civilization. For almost a century and a half Florida's land and water endured the abuse of ambitious developers who had little use for the environment in its natural state. Only in the past decade has an effort been made to stop the destruction of Florida's ecological system and to repair the damage caused over many decades by selfish promoters.

This is the message enunciated by Nelson M. Blake in his carefully researched, comprehensive study of how Florida's resources historically have been the target of a long succession of developers and schemers. The first Americans to visit the newly acquired territory in 1821 found a flat peninsula with a huge lake, meandering rivers, swamps and marshes, and a lengthy coastline that spelled danger for sailing ships. Subsequent generations of promoters attempted to carry out such schemes as digging a canal across the peninsula, draining the swamps, and promoting Florida as an agricultural paradise. Visitors remarked on the colorful names of the lakes and rivers, took potshots at alligators and exotic birds from the safety of steamboats, and hatched development plots. The Florida state government, eager for settlers and an expanding economic base, established an Internal Improvement Fund in 1855 to administer the unsold lands of the state and to invest the proceeds. The IIF proved a boon to railroad developers, who used it to finance the laying of track—and to build canals and drain swamps, particularly the Everglades. In many cases the promoters overextended themselves; one notable developer committed suicide when expenditures persistently exceeded his land sales.

With the 20th century came more sophisticated programs. The Army Corps of Engineers tamed rivers, dredged channels, and constructed reservoirs. Development-minded senators and congressmen obtained favorable federal legislation for flood-control projects, and for a time it seemed that the Cross-Florida Canal might become a reality. But by the 1960s a budding Florida environmental movement recognized the need to make up for decades of abuse and to protect the state's rapidly vanishing resources. In 1972 the state passed the Water Resources Act and the Environmental Land and Water Management Act, along with other important laws, in an effort to bring some coherence to Florida's chaotic exploitation of its land and water resources. Stiff environmental protection laws have finally given pause to the ambitious schemes of Florida development corporations; but legislative compromises and political maneuverings in the past decade demonstrate that both sides are continuing their struggle for control of Florida's future development.