

innovations in organizations and the consequences of innovation. The discussion of organizations provides some suggestive insights. For example, Rogers shows that starting with a solution and trying to match it with a problem is both the most common and the most rational behavior for organizations because the problems an organization faces far outnumber the solutions available. He has less solid information on the consequences of innovation, but the agenda for future research he lays out contains key questions for historians of technology. He even criticizes the proinnovation bias in diffusion research and provides an interesting discussion of issues of equity.

Unfortunately, the chapter on the sources of technological innovation is weak. The attempt to characterize the whole process from invention through development and diffusion to consequences is valuable, but the discussion of invention and development is not up to the standards of recent work in the history of technology.

One of the most useful features of all three editions is the bibliography. By Rogers's count, the third edition covers a research area that has produced 3,085 publications, of which 2,297 are empirical research reports (p. xv). Unfortunately, the field has grown too large for the new edition to provide a complete bibliography even of publications since the second edition. The bibliography of the third edition provides a valuable starting point for scholars because it lists important recent works, but for a more complete bibliography it is necessary to also go to the second edition (which is listed by the Library of Congress as the second edition of *Diffusion of Innovations* rather than under its actual title, *Communication of Innovations*). These bibliographies contain much that is valuable to the study of the later phases of technological change and 20th-century technology in general.

I strongly recommend this book to historians of technology interested in phases of technological change beyond research and development.

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Energy for Developed and Developing Countries. Edited by Behram N. Kursunoglu, Jean Couture, Andrew C. Millunzi, Arnold Perlmutter, and Linda Scott. Lexington, Mass.: Lexington Books, 1983. Pp. xx + 190; tables, figures, notes, references, appendix. \$28.95.

A Global View of Energy. Edited by Behram N. Kursunoglu, Andrew C. Millunzi, and Arnold Perlmutter. Lexington, Mass.: Lexington Books, 1982. Pp. xvii + 318; tables, figures, notes, references, appendix. \$36.95.

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These books are the published proceedings of two scientific forums on energy technologies for industrialized and developing nations. Although their subject matter is scientific, their primary objective is political. They have been produced as weapons to be used against the critics of nuclear power. The books are of considerable interest to a technology studies audience, both for their technical content and for their political orientation. For while they self-consciously survey the political and economic complexities of developing alternative energy technologies, they also provide revealing case studies of the central role of ideology in a technical controversy.

Held in 1979 and 1980 at the University of Miami's Center for Theoretical Studies, the week-long forums were the third and fourth installments in an annual series of world energy issues. But their titles (hereafter *EDDC* and *GVE*) are misleading. The major thesis of the series was established in the 1977 forum, "An Acceptable Nuclear Energy Future of the World." Each later forum, including "An Acceptable World Energy Future" in 1978, provides but a new subtitle and updated support for the thesis of nuclear power's acceptability. The contributors to the written proceedings include researchers from universities (ten), industry (twelve), research institutes (six), and government organizations interested in energy (twelve), as well as two U.S. Congressmen. Although the quality of the scientific presentations is generally quite high, their pronuclear alignment emerges both in the individual chapters and in the overall structure of the books.

Both collections begin on a high note by presenting a French perspective on energy development. France is the world's only country currently deploying nuclear power at maximum speed, and nuclear proponents elsewhere look on her with a combination of pride and envy. The editors follow with three chapters establishing the need for new energy technologies and three chapters advocating the expanded use of nuclear energy to meet that need. Further chapters in *EDDC* identify political factors that have slowed the growth of nuclear power (two), examine both the promise and the limitations of solar energy (two) and biomass (one), explore the potential negative effects of CO₂ from fossil-fuel plants (one), and alert us both to the small but permanent demand for oil by petrochemical industries (one) and to the increasing use of energy in agriculture (one). A chapter on developing nations rests somewhat uncomfortably at the end, for it argues that the energy problems of these countries involve managing demand as much as creating supply. The remaining chapters in *GVE* reaffirm the vast potential of fusion power (four) and advanced fission technologies (three), argue for electricity as a substitute for liquid fuels (two), warn of the consequences for the United States of another Arab oil embargo (one), review the World Bank's lending program for energy development (one), assess the future of the coal industry (one), and present the risks of nuclear power vis-à-vis alternative energy technologies in a generally favorable light (four).

The editors achieve their goal of providing factual and objective information about energy technologies, for they have produced credible scientific products. But by claiming to serve as a corrective to antinuclear misunderstandings and misrepresentations (*EDDC*, p. xix), they have betrayed a misunderstanding of both themselves and their competition, for these books are also intensely ideological. In the barest of terms, the editors (and most of their contributors) exhibit a "progress" ideology that views economic growth as fundamental to societal progress and nuclear technology as necessary for meeting supply needs and thus maintaining that growth and progress. Opponents of nuclear power are, by definition, antitechnology, antigrowth, antiprogress, and irrational.

Consider as evidence the following observations. First, although they define the energy problem as one of supply and demand, these analyses focus almost exclusively on enhancing supply rather than controlling demand. Reductions in demand threaten economic growth. Second, their titles notwithstanding, these books include little analysis of the unique needs of developing countries. For when the energy problem is limited to supplying new technologies, the needs of developed and developing countries are essentially the same. Third, while updating an original set of heavily pronuclear findings, each book laments the "labyrinthine trial-type procedures" that have slowed nuclear power development in some countries and embraces "less ritualistic" legislative procedures that deny legal standing to members of the public (*EDDC*, pp. xiii–xiv; *GVE*, p. xiii). These findings were compiled by the program committees, based on the "consensus" of the scientific presentations. And finally, the forums were supported financially by corporations interested in nuclear power, suggesting a likely ideological harmony.

The science-minded organizers of these forums fully realize that understanding world energy problems requires one to consider "complex . . . economic, environmental, social, and political issues" (*EDDC*, p. xix). But they do not realize that the interpretation of these issues is also a complex social phenomenon. The ubiquity of ideology cannot be explained as the irrational manipulation of facts by scientists. Rather, it suggests a routine and wholly rational process whereby members of scientific communities on both sides of a given issue achieve consistency between their scientific studies and shared ideological identities. By providing reliable examples of that process, these books reveal a core analytic problem for historical and contemporary studies of technical controversies.

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