

Managing for the environment

Technological Trajectories and the Human Environment by Jesse H. Ausubel and H. Dale Langford (eds). National Academy Press, Washington, DC, 1997, pp. 214, \$42.95 (hardcover); ***Linking Science and Technology to Society's Environmental Goals***, by the Policy Division, National Research Council. National Academy Press, Washington, DC, 1996, pp. 530 \$69.95 (hardcover).

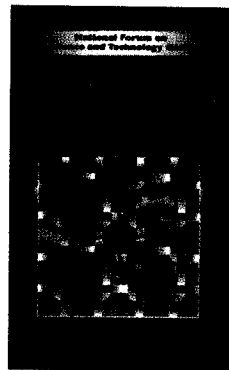
Sheldon Krimsky

The National Academy of Sciences has released two books that explore the roles of science and technology in promoting environmental goals, one under the auspices of the policy division of the National Research Council, and the other under the leadership of the National Academy of Engineering. The two works are quite distinctive in their emphasis and reflect the schism between technological and cultural approaches to biospheric decay (commonly referred to as the

culture-nature split) that has become increasingly evident during the past three decades of political environmentalism.

On the culture side, technological solutions are sought to address the problems of polluting industries, declining natural resources, and diminishing biodiversity. On the nature side, solutions are found in altering consumption patterns, renouncing environmentally demanding technologies, and embracing a more natural lifestyle. These books offer some interesting views on the impacts and possibilities of science and technology for, perhaps, its greatest challenge: To protect what we have inherited from the natural environment from our own devices.

In *Technological Trajectories*, the editors, with support from the National Academy of Engineering, have compiled 11 thought-provoking essays that challenge us to ask "whether the technology that has extended our reach can now also liberate the environment from human impact and perhaps even transform the environment for the better." In his intro-



duction, Jesse Ausubel outlines the technological agenda for the other contributors: A decarbonized, highly efficient hydrogen economy, landless agriculture, disappearance of waste and toxic pollutants, and a world in which "prosperous human populations [can] coexist with the whales and the lions and the eagles and all that underlie them."

This sounds more like technological utopianism than what we have come to expect from no less a pragmatic institution than the National Academy of Engineering. But these essays fuse cultural and technological musings. In Paul Waggoner's essay "How much land can ten billion people spare for nature?" we are asked to consider vegetarian diets that will enable us to use our present cropland to provide calories and protein for ten billion people. Lee Schipper's treatment of energy in "Life styles and the environment" notes that patterns of consumption are as critical to our environment as the modes of technology.

Other essays of equal merit ask us to imag-

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ine the dematerialization of our industrial society. This new way of thinking is radical in its truest sense—it reaches at the root causes of problems: Beyond toxic waste reduction, authors ask us to imagine zero waste production. When we create a new compound, we must also design its disassembly. Only the last essay by Chauncy Starr seeks to resurrect technologies, like nuclear, for which the disassembly of radioisotopes seems more than a utopian vision.

In the second book, the National Research Council (NRC), with support from the Carnegie Corporation of New York, has produced the first volume in a series it has entitled "National Forums on Science and Technology Goals." The NRC is experimenting with a new and slightly less top down approach for establishing science and technology goals to address national and global problems. This approach, from an organization that encapsulates the role of elites in framing public policy, is but a modest departure from the traditions of science panels. It is based on a process that draws ideas and analyses from a broader group of individuals than is its custom. In what it has termed its "innovative approach" the NRC surveyed 128 persons and organizations, commissioned background papers, and held a forum in preparation for its

final report. This weighty book contains the report of the Committee on the National Forum on Science and Technology Goals, commissioned papers, keynote addresses and presentations of the forum, and appendices describing the forum.

The discussion and recommendations center on six environmental themes: Economics and risk assessment, environmental monitoring and ecology, chemicals in the environment, the energy system, industrial ecology, and population. The findings are somewhat like a United Nations consensus position designed to offend no one while offering everyone something to advantageously misinterpret. The central ideas behind the recommendations are decades old (e.g., global population control requires universal access to effective family planning information, or we need more options for future energy and strategy for less carbon emissions), largely uninspiring, and sufficiently general that they are unlikely to serve as new guides to policy development.

In contrast to the committee report, the commissioned papers provide excellent sources of science policy discussion. John Ehrenfeld and Jennifer Howard produced a superb review of the current state and theory of industrial ecology using a five stage framework to explain corporate environmental

management. Their honest and informative analysis provides a template for how far polluters must go to reach the highest state of industrial Nirvana, namely "managing for the environment."

Notable, also, is Walter Reid's commissioned paper on the status of ecological knowledge in environmental decision-making, in which the author reveals some common myths about the natural state of ecosystems. From two decades of studies, this ecologist soberly reports that few generalizations can be made about ecosystem dynamics. Ecosystems are highly individuated and "unless a particular system has been the subject of intense research and monitoring, the current status of ecological knowledge only enables us to identify a list of potential consequences of a given action and to identify the set of data or experiments that could enable that uncertainty to be reduced."

Linking Science, in stark contrast to its sibling publication, *Technological Trajectories*, will assure some that technological incrementalism is the correct path to our environmental future. It will reassure others that elite groups like the National Research Council are not offering the innovative approaches that will turn the corner on environmental degradation. ///