Book Reviews

Explaining Our Fears

Risk and Culture. An Essay on the Selection of Technical and Environmental Dangers. MARY DOUGLAS and AARON WILDAVSKY. University of California Press, Berkeley, 1982. x, 222 pp. $14.95.

Why has the environmental movement grown so much in recent decades? Why have large numbers of Americans begun to fear the pollution of their food, air, and water? Why do some people and organizations downplay the risks and others exaggerate them? Why do some groups believe that incremental reforms are possible and others believe that only wholesale destruction of the system will suffice? Why is the environmental movement so much stronger in the United States than elsewhere? These are among the questions that are posed by Mary Douglas and Aaron Wildavsky in this provocative but ultimately unsatisfying analysis of the cultural and social bases of the environmentalist critique of modern society.

Douglas is a social anthropologist who has been at the vanguard in exploring the implicit meanings of the patterns of behavior of everyday life. Wildavsky is one of our most wide-ranging and iconoclastic political scientists. He has written on the limits of planning, the difficulty of enforcing budgetary limits on our Congress, the problem of pluralistic decision processes, the dilemmas of policy implementation, and a host of other topics. Here they join forces to explore the social and cognitive bases of differences in the perception and the acceptance of risk.

They start from the undeniable assumption that groups and individuals differ in what they see as posing danger to themselves or society and that the selection of dangers is related to cultural beliefs and ways of life. They quote a Harris poll to the effect that three times as many corporate executives think there is less risk from chemicals in use today than 20 years ago (38 percent) as do members of the general public or federal regulators (13 percent each). Moreover, they are struck by the fact that the groups that make up the environmental movement differ significantly in structure and outlook. So they want to account for the variety in strategies for change as well.

For their analysis they draw upon a wide range of materials: reports of technical controversies, anthropological discussions of "pollution" and risk perception in primitive and nonindustrialized societies, theories of voluntary organization and communal society, economic theories of collective action, and so on.

The first four chapters of the book consider the factors that shape perception of risk, acceptance of risk, and institutional processing of these perceptions and acceptance in modern society. The authors ask how we come to evaluate risks imposed on us, given that the risks may be hidden. The amount of danger, its time span, its reversibility, and which groups will be affected may all be ambiguous. Each of these matters may be debated. Moreover, we select risks and institutionalize means of reducing the costs of some and not of others. Medical malpractice suits have grown, allowing us to limit some costs of surgical intervention, but their growth is based on a wider set of legal and institutional changes.

To develop limits to risks groups and individuals need to attribute blame. But who is to be blamed for a specific kind of damage? In other societies, the death of children may be attributed to their parents' presumed adultery. In our society, blame may be placed on a supervising engineer at a power plant or on the functionings of capitalism. The cultural analysis of these selections of risks is accomplished by the analysis of "pollution beliefs," beliefs about how danger and impurity occur in society. The anthropologist looks at a society and examines its answers to four questions: What is the damage? Who did it? Who are the victims? How to purify? Analysis of the answers given in a society as compared with those an outside observer might give begins to suggest how the questions and answers are focused by the social, moral, and political agenda. Douglas and Wildavsky compare how we might assign risks with how the Hima, a people of Uganda, assign risks. Unfortunately, although their discussion is provocative, they do no more than point the way to a cultural analysis of America's pollution beliefs. They do not systematically examine the way our society answers these questions compared, say, with European societies, or how America is distinctive in its answer to these questions. I learned more about the Hima than about America.

Much of the acrimony of the environmental and consumer safety movements might disappear if there were clear agreement concerning costs and risks. One solution to the lack of agreement is to develop methods of risk assessment, a common language for analysis and measurement. Douglas and Wildavsky argue that there are inherent limitations in the methods that have been developed. Uncertainties concerning measurement, time horizons, and unmeasurable aspects allow for the importation of personal and institutional biases. Here Douglas and Wildavsky follow the work of Herbert Simon and of Daniel Kahneman and Amos Tversky on decision-making under bounded rationality and in the face of uncertainty.

These first four chapters are interesting, and the argument seems unexceptionable as far as it goes. The more provocative, and I think the more misguided, part of the book is the later chapters. Why has there been a growth of fundamental criticism of the societies' risk-taking institutions and strategies? Why more so in America than elsewhere? Here the authors turn to an analysis of groups at the margin of society, drawing on the literature on religious and protest movements and sects and communes of all kinds. The argument is somewhat convoluted and I will not reproduce it here. But the core is that some sectarian groups have internal problems to which the only, or best, solution is to build solidarity by establishing closure against the world, making themselves attractive by their distinctiveness. Since members may easily leave, a group must find ways of making claims that show it to be holy and pure. "Attack on the center is a regular phase of its internal politics." Douglas and Wildavsky have a subtle discussion intertwining Rosabeth Kanter's analysis of commitment in communes with Mancur Olson's logic of collective action to explain the problems of maintaining the organization. This

seems to be a far cry from the environmental movement. But they argue that differences between organizations such as the Sierra Club, a revisionist organization, and the Friends of the Earth, a more radical one, can be explained in this way. Their final step is to argue that American society is, and has always been, a border society. So there is plenty of room for sectarian groups, and center perspectives are weak.

Now, I agree that one explanation of radical attacks on the center may come from the organizational problems of dissident groups. Dissident groups have always had such problems to deal with. Moreover, America has been a seedbed of social movements and religious sectarianism. But Douglas and Wildavsky make no attempt to show how the environmental movement gained its prominence. The decades of the '60's and '70's saw the emergence of many social movements, from civil rights to gay rights, from prison rights to women's rights, from Greenpeace to the Symbionese Liberation Army. General processes of voluntary organization do not explain why some movements have wide appeal and others do not. Douglas and Wildavsky address this by examining the role of public interest groups and the growth of an educated class separate from industrial roles. Farmers or manufacturers tend to have a different view of ecological risk from members of the technical-service class. This seems true enough. But again what Douglas and Wildavsky say is applicable to all social movements. What is missing is an analysis of how the shape of the movements with which they are concerned grows out of central political and economic structures and ideological currents of our society. The environmental movement that worries about wetlands feeds into the movement opposed to nuclear power, which in turn has roots in the historic opposition to nuclear weapons. Each has its own organizational and ideological problems. Moreover, that government and corporations are vilified relates to large swings in populist ideology with deep roots in our history. Some social movements pick up this ideological thread, others do not. Yet Douglas and Wildavsky barely broach the issue. The search for an abstract cultural theory has in this case led away from a cultural-social map of this movement in our times.

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Bacillus subtilis

The Molecular Biology of the Bacilli. Vol. 1, *Bacillus subtilis*. DAVID A. DUBNAU, Ed. Academic Press, New York, 1982. xii, 380 pp., illus., $44. Molecular Biology.

Molecular Cloning and Gene Regulation in Bacilli. Papers from a conference, Stanford, Calif., June 1981. A. T. GANESAN, SHING CHANG, and JAMES A. HOCH, Eds. Academic Press, New York, 1982. xxii, 360 pp., illus. $29.50.

Bacillus subtilis has become an important subject in molecular biology. One reason for this is that *B. subtilis* undergoes a process of sporulation that shares with more complex forms of cellular differentiation temporally regulated gene expression. Another reason is that *B. subtilis* has potential industrial use as a molecular cloning host.

The two books under review are attempts to summarize the current knowledge of the molecular biology of the bacteria of the genus *Bacillus* with particular emphasis on *B. subtilis*. The books take different approaches. *The Molecular Biology of the Bacilli*, edited by Dubnau, consists of a series of in-depth review papers that cover such subjects as the *B. subtilis* genetic map, DNA replication, transcription, translation, transformation, sporulation, phage replication, specialized transduction, molecular cloning, and the industrial use of bacilli. *Molecular Cloning and Gene Regulation in Bacilli*, edited by Ganesan, Chang, and Hoch, consists of a series of research papers based on talks presented at the Cetus Conference on Genetics. The papers in this book are organized into sections on chromosome structure and gene arrangement, molecular cloning, expression of cloned genes, DNA metabolism, and transcription and translation. In contrast to those in the Dubnau book, the papers here are concerned with very specific topics, which permits the presentation of each subject in much greater detail.

Most subjects are covered well by the two books. The coverage of RNA polymerase and its apparent role in regulation of gene expression during spore formation is especially good. Since the early studies of Losick and Sonenshein it has been hypothesized that transcriptional controls are involved in the temporal regulation of spore genes. In the Dubnau book Roy Doi, in a very comprehensive overview of what is known about *B. subtilis* RNA polymerase, enumerates the various forms of RNA polymerase that have been found and discusses their subunit composition and whether they are found in vegetative or sporulating cells or in both. Though the fact that new forms of polymerase appear in sporulating cells has for years been used as evidence that transcriptional controls regulate the temporal expression of sporulation genes, it has been difficult to confirm that such regulation takes place, for it has been difficult to demonstrate that the different forms of RNA polymerase do actually have different template specificities and that the sporulation RNA polymerase forms are actually required for the transcription of sporulation genes.

In studies he reviews in the Dubnau book, Richard Losick and his colleagues cloned a fragment of the *B. subtilis* chromosome that contains vegetative and sporulation genes. Using the genes on this fragment they were able to demonstrate different template specificities for different forms of *B. subtilis* RNA polymerase. They found that the predominant form of polymerase in vegetative cells transcribed a cloned vegetative gene but not a sporulation gene whereas a sporulation form of polymerase transcribed the sporulation gene but not the vegetative gene.

Determination of the nucleotide sequences of several *B. subtilis* genes is covered in the Ganesan, Chang, and Hoch book. The genes that are transcribed by the major vegetative form of *B. subtilis* polymerase have conserved regions in their promoters that are similar to the -10 and -35 regions of *Escherichia coli* genes. Losick's group determined the sequence of the promoter region of a sporulation gene on their cloned fragment of *B. subtilis* DNA and found that it varies greatly from the promoters of the genes transcribed by the major vegetative polymerase.

The *B. subtilis* translational apparatus is thoroughly reviewed by Issar Smith in the Dubnau book. The review is timely, for it has been several years since the last such review.

It has been found that *B. subtilis* ribosomes will not translate *E. coli* mRNA even though *E. coli* ribosomes will translate both *B. subtilis* and *E. coli* mRNA's. The basis for this specificity resides in the 30*S* ribosomal subunit and is independent of the source of initiation factors. Cheryl Murray and Jesse Rabinowitz describe in the Ganesan, Chang, and Hoch book their observation that in several *B. subtilis* genes the complementarity between the apparent ribosome binding sites (Shine-Delgaro sequence) and the 3′ end of the *B. subtilis* 16*S* RNA