Book Reviews

Science and Control

The New Politics of Science. DAVID DICKSON. Pantheon, New York, 1984. x, 405 pp. $22.95.

The author, writing on the basis of four years spent in Washington, D.C., as correspondent for *Nature*, provides a radical perspective on recent science policy in the United States. He divides the time since the end of World War II into three periods, during the last of which we encounter "the new politics of science." The initial period, the end of the war through the Kennedy presidency, was dominated by the philosophy set forth by Vannevar Bush in *Science: The Endless Frontier*, which recommended generous federal government support of basic scientific research along with maximum autonomy to the scientific community to determine research priorities and the appropriate way to conduct research.

From the Lyndon Johnson presidency to the mid-1970's, the second period, the country witnessed a growing official concern for the utilitarian benefits of scientific research, the constraint of military science to areas of relevance to national defense (via the Mansfield amendment), and the enactment of laws regulating environment, health, and safety to curb the excesses of technology. These changes found widespread popular support from groups that were trying to assert democratic control over technology. Official disillusionment with scientists in policy advisory capacities and the ensuing disestablishment of the President's Science Advisory Committee and the Office of Science and Technology during the second Nixon administration marked the end of this period.

It is the third, "new politics" period that concerns Dickson. Renewed enthusiasm for science has emerged, he argues, because advanced technology has become central to economic progress and military might; science, in turn, holds the key to advanced technology. Whoever controls access to science, therefore, controls the shape of the future. The line of conflict during this period lies between the popular and democratic forces ascendant in the second period and the technocratic interests increasingly dominant in the present. The latter, Dickson argues, have succeeded in concentrating decisions about science "in the hands of a class of corporate, banking, and military leaders," aided by university scientists and administrators. The fruits of their endeavors are seen in tax incentives for research and development, revisions of antitrust policy toward cooperative research ventures by private firms in the same industry, increased incentives for university-business relationships, and tighter controls over international technology transfer.

In successive lengthy chapters, Dickson sets out his argument concretely. He first examines the increasing support of university science by private industry and the concomitant erosion of academic freedom and open scientific communication because of the elevation of the value of commercial benefit over traditional university values. Next, he reviews the rapprochement between the Pentagon and university science, accompanied by the elaboration of military constraints on research and technology transfer as an extension of foreign policy toward the Soviet Union. His third major topic is the use by the United States of political control over science and technology to maintain imperialistic dominance over developing Third World countries and to preclude redistribution of wealth between the developed and developing nations. These three chapters tell the story of what the corporate, banking, and military elite have come together to do.

The following two chapters detail the attack on democratic controls of science that has joined universities, business, and military in common cause. The critical attack on science and technology that emanated from the left in the late 1960's and early 1970's was accommodated, without serious damage to science, by technology assessment, formally manifested in the evolution of the Congressional Office of Technology Assessment. The specific concerns with the perceived dangers of recombinant DNA research, Dickson argues, were similarly contained by the National Institutes of Health's Recombinant DNA Advisory Committee (RAC). Each instance "has tended to reinforce the dominant patterns of control over science and technology by heading off what the scientific and corporate establishments considered excessive demands for greater democracy." With respect to regulation of environmental quality and workplace safety, technocratic arguments for greater scientific bases for regulation, for example by the use of cost-benefit and risk-benefit analysis, have legitimated a retreat from the victories of the 1970's.

What of the future? The radical science movement, in the past, restricted itself narrowly to specific issues like control of chemical carcinogens and recombinant DNA. But the pattern of cooperative relations among universities, corporations, and the military, which has moved control over science into private hands, now must become primary, Dickson argues. The critique of the applications of science, which was followed by concern for the conditions under which science is produced, must now be integrated to include the question of control over access to science.

The merits of Dickson's book are several. He provides in an easily accessible form a coherent statement of a radical science perspective on present U.S. science policy issues. Second, he states the case in broad terms, both historically and substantively. Finally, he forcefully raises a number of disturbing questions, as radicals are wont to do. In particular, the meaning for university science of the commercial relations that have flowed from the now-unfolding promise of biotechnology troubles this reviewer.

But the book has its limits, serious ones as well. It seeks to be comprehensive in a far too ambitious way: each chapter represents a subject that deserves a book-length treatment. Second, though chock-full of data, the book is not data-driven: the conscientious reader will wish to establish an independent baseline for any subject that engages his or her interest. Rather surprisingly, not a single table of descriptive statistics appears anywhere in the text.

More fundamental a problem lies in the unexamined assumption of U.S. scientific and technological dominance of the rest of the world. That dominance having been seriously challenged in various technical fields by the Japanese in recent years, the future of U.S. hegemony can hardly be taken for granted. A related difficulty is that the context of the science policy issues is seldom developed adequately. Closer university-business relations, for instance, are driven partly by corporate desire to establish access to profitable future innovation. But they are driven as well by the changing world economy, which the United States does not dominate to the extent Dickson asserts, and by the desire to restore American industry to a competi-

tive international position. All of which suggests that science policy per se fails to provide an adequate basis for either explanation or critique of the range of "trans-scientific" issues that animate Dickson, namely, the organization of the U.S. and world political economies and the proper distribution of their goods and services.

Finally, the presentation of the conflict between technocratic and democratic control over science suffers the fate of most dichotomous analytical schemes: perforce, the analysis is oversimplified. The reconciliation of the desire for democratic control with science (a necessarily elite enterprise), with American business (the most powerful political institution in the political economy), and with the American military (a professional hierarchy subject in complex but genuine ways to civilian control) remains an unfinished task. With his lack of attention to the democratic institutions of representative government—political parties, elections, legislatures—or to the elite institution of the federal judiciary and his suggestion that environmentalists, labor unions, the women's movement, and those pressing the demands of less developed nations constitute the potential for an effective political coalition, Dickinson realistically leaves to others, presumably less radical, the task of reconciling these competing values. But he has forcefully raised some of the important issues.

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Feelings about Risk

Workers at Risk. Voices from the Workplace. DOROTHY NELKIN and MICHAEL S. BROWN. University of Chicago Press, Chicago, 1984. xviii, 220 pp. $20.

As the issue of risk is generally framed, it is, What risks are we as a society prepared to bear to achieve economic and social progress? So put, risk becomes a quantifiable problem amenable to sophisticated risk-benefit analysis and discussions about trade-offs between "acceptable" risk and large social gains. *Workers at Risk* turns this technical formulation on its side and asks instead, How do men and women who actually bear the risks of work contributing to the common weal feel about what they do? The book presents extensive interview material, interspersed with brief editorial comments, detailing the perceptions and experiences of workers who deal with toxic chemicals in a wide, indeed disparate, range of occupations—from chemical operators to gardeners, from laboratory technicians to firefighters, and from railroad trackmen to graphic artists. The authors take work with such chemicals, substances at present indispensable to our economy, as a sort of paradigm of daily confrontation with risks.

I can mention only some of the main themes that emerge from the interviews. Workers are deeply anxious about the potential dangers of toxic chemicals to their own health, but especially about how their jobs might affect their families. Their anxiety is exacerbated by the wide gap between what they see as obscure and often conflicting scientific assessments of acceptable risk and their own frequent gut feelings that something is seriously amiss in their work situations. Their distrust of their corporations, of their management, of the scientific and medical professionals that serve both, of the Occupational Safety and Health Administration, and often of their own unions leaves them with no reliable public forum or authority to help them assess information accurately. It also leaves them with no institutionalized channels to translate their surmises, guesses, or actual specific knowledge about problems into practical solutions. Often, when it becomes clear that they have been exposed to hazards, their bosses blame them for negligence; they in turn blame their bosses for shortsightedness and callousness. For all these reasons, they are skeptical about the efficacy of those engineering controls that are in place. At the same time, they frequently resist mandated personal protections like respirators or "bunny suits" because of discomfort or social pressures from their fellows. Above all, with the exception of some activists who work for change and a few whose love for their work makes risk manageable, they feel powerless to alter their situations both because they perceive their institutional contexts to be intransigent and because exit is simply not a realistic alternative. For the most part, then, as do workers in other alienating contexts and other groups who feel powerless, these workers normalize their risks: they resign themselves fatalistically to their lot, or deny that risks exist, or deny that anything will happen to them. Such normalization sometimes breeds carelessness and a disregard for fundamental precautions. For some, dancing with hazards seems more bearable than enduring a twilight of anxious resignation.

In drawing this bleak but largely compelling picture, the book suggests that the real issues about risk are not technical at all but moral and political ones rooted in the problem of distributive justice. What is needed is not more scientific appraisals of hazards by removed experts but a social reorganization of the workplace to give workers greater control over dangerous work situations.

I cannot argue with the principle behind this conclusion, but the ambiguity of the suggestion points to the book's main recurring weakness. One might ask if greater influence in the workplace would help workers actually control the hazards they face or merely foster the illusion of control by altering their perceptions of risk. Despite the richness of the interview material, the book provides no way of answering such questions because the authors center their presentation on workers' responses to generalized dangers in widely variegated occupational settings that differ markedly in structure and rhythm. One cannot discern or appraise the specific organizational structures that mediate and shape workers' experiences in subtle and intricate ways. Without such links, these voices from the workplace are likely to remain just another set of perspectives easily discounted by those with the power to make their opposing views stick.

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Economic Geology

Metal Deposits in Relation to Plate Tectonics. F. J. SAWKINS. Springer-Verlag, New York, 1984. xiv, 325 pp., illus. $38. Minerals and Rocks, 17.

The author of this book was one of the first to realize the potential impact of the theory of plate tectonics on our understanding of how mineral deposits are formed and how we can find more. He has written a book that is clear and terse, linking with ease the characteristics of mineral deposits at all scales. Many of the insights are deceptively simple.

The contents of the book are divided into sections according to the mineral deposits produced in different plate tectonic regimes: Convergent Plate Boundary Environments, Divergent Plate Boundary Environments, and Collisional Environments and Other Matters. Within these regimes, mineral deposits are discussed in the context of more specific