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Science, Technology, and Democracy*
edited by Daniel Lee Kleinman

Reviewed by E. J. Woodhouse**

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** Science & Technology Studies, Rensselaer Polytechnic Institute

What role can lay people play in democratizing science and technology? That question is explored in eight essays first presented at a meeting of the American Association for the Advancement of Science. The editor “required that contributors accept no particular definition of democracy or citizen involvement in science,” only that citizens “in some fashion can be involved.” Taken literally, that is not a high bar; fortunately, the contributors include some of the most insightful scholar-observers of the subject, and they have an impressive set of conceptual and empirical materials on which to draw. The edited collection makes an attractive package for classroom use as well as worthwhile reading even for experts in the field.

The back cover blurb says that the contributors analyze “socio-economic and ideological barriers to creating a science oriented more toward human needs.” I suppose that is not exactly incorrect, but there actually is not an authority on ideology among them, nor are there political sociologists or others interested in social stratification or other professional approaches to socio-economic barriers. It would be more accurate to say that many of the contributors tell interesting and important stories about social movements and other instances where lay expertise is being developed and utilized. The contributors come from eclectic backgrounds, including sociology, political science, philosophy, nursing, environmental studies, biology, and geology – and even some of the scientists prove astute observers and interpreters of social phenomena. Half the contributors have worked as full-time activists, congressional staff, or in other practical positions.

Part I contains four stories of citizen action. First, Steven Epstein reprises his well-known analysis of the development of lay expertise by AIDS treatment activists. Those who have not read the longer study, *Impure Science*, will be especially impressed by Epstein’s deftness at being an advocate for stronger influence by ordinary people, at the same time as not lionizing his subjects or supposing that lay expertise is without significant complications. Although the

author does not spell it out, from the essay could be gleaned a set of (very demanding) requirements that have to be met in order to develop lay expertise and utilize it effectively in political negotiations.

Richard Sclove, previously director of the Loka Institute dedicated to building democracy at the grass roots level, discusses “Town Meetings on Technology.” He summarizes the methodology used by Danish consensus conferences, and then discusses the first U.S. consensus conference organized by Loka in Boston in 1997 on telecommunications and the future of democracy. It will come as no surprise that Sclove found the citizens panel a rousing success, and that he would like to see many more of them. He provides no serious analysis of the difficulties in making consensus conferences matter in the U.S. setting that is so huge compared with the Danish environment. However, his reasoning is cogent: “Whereas the ordinary argument for ceding judgment and influence to elite representatives of the *producers* of science and technology is that lay citizens have neither the competence nor the passion to be involved,... Against this argument stands the brute fact that given a chance, our Boston-area Citizens’ Panelists...competently assimilated a broad array of written and oral expert and stakeholder testimony, and then integrated this with their own, very diverse life experiences to reach a well-reasoned collective judgment.”

Neva Hassanein, formerly a full-time activist with the Northwest Coalition for Alternatives to Pesticides and now a professor of environmental studies, is the author of *Changing the Way America Farms*. Like the book, her essay on “Democratizing Agricultural Knowledge” concerns “sustainable farming networks” -- in which farmers band together to develop their own local knowledge as a basis for reforming farming practices. This constitutes a move from critique to innovation,” and she argues that “sustainable agriculturalists fundamentally challenge the inequitable power relations characteristic of the dominant system of agricultural knowledge production and distribution.”

The system of agricultural science has long been undemocratic, partly because “the superiority of scientific over farmer-generated knowledge has been claimed and quite widely accepted.” With the rise of land-grant universities and the effort to secure public funding for agricultural science, “farmer-generated knowledge was maligned and slowly hidden from history,” establishing “a unidirectional flow of communication from expert to practitioner.” Moreover, the research questions predominating in agricultural science have tended to “represent the interests of certain members of society (such as) agribusiness corporations and large-scale, industrial farmers.”

The cases that Hassanein summarizes are those of the Wisconsin Women’s Sustainable Farming Network and the Ocooch Grazers Network, which pioneered intensive rotational grazing as an alternative to confinement feeding. In both cases, “network members unearthed their own knowledge-generating capacities,” thereby developing “a sense of epistemic self-reliance, as they asked the questions that have not been of interest to agricultural scientists and as they

turned to one another for answers.” As she understatedly concludes, “The activities of the networks suggest the need for greater accountability on the part of agricultural science.” The goal should be “equal participation in answering the questions about what knowledge is produced, by whom, for whom, and toward what ends.” For me, this was the most powerful essay in the book, partly because of my ignorance about agriculture.

Louise Kaplan, a family nurse practitioner and faculty member in nursing, serves on the Hanford Health Effects Subcommittee that advises the Center for Disease Control and other federal agencies. She previously served as research coordinator for the Hanford Information Network, and her chapter, “Public Participation in Nuclear Facility Decisions,” is based on her experience at Hanford. For anyone not familiar with the fascinating and terrible legacy in the Hanford area, this chapter is a succinct and eye-opening point of entry. Kaplan argues that the Hanford Education Action League (HEAL) “helped shift the balance of power between the public and Hanford officials” in a few short years in the mid 1980s. In addition to chronicling some of the activities of that organization, the chapter discusses the Spokane chapter of Physicians for Social Responsibility, the Hanford Environmental Dose Reconstruction Project, the Hanford Health Effects Subcommittee (on which the author is a member), and a congeries of other Hanford “downwinders.” Kaplan’s short essay offers a realistic but somewhat reassuring insight into “a process that developed in slow motion,” in which “citizens demonstrated the ability to take an active role in deciding what science and technology policies pose a danger to public health and the environment and the ability to work to change those policies. The government brought citizens and experts together to formulate policies that fused social values and technical data.”

Part II offers assessments and strategies, beginning with Daniel Sarewitz’s “Human Well-Being and Federal Science: What’s the Connection?” The essay reflects the author’s role as director of the Center for Science, Policy, and Outcomes – and his keen desire to target science and technology policy toward actually making the world a better place. He points out the still powerful legacy of the Cold War in shaping U.S. science and science policy, and discusses eight problems including the fact that “Science is not organized to integrate...considerations of equity into its research priorities.” To forge new links between science and well-being, he argues, will require “mechanisms to better connect democratic process to the establishment of scientific priorities and practices.” This is largely a matter of “political vision and will.” Just as the Department of Defense created “a huge, integrated knowledge production enterprise aimed at achieving...victory over the Soviet Union,” so a “stronger linkage between science and human well-being can be framed as an organizational challenge that requires a clear definition of the outcomes desired, and a mobilization of intellectual activity aimed at achieving these outcomes. If the resources and institutional structures are put in place, the science will happily follow.”

Well-known atmospheric scientist Stephen Schneider poses what initially seems to be a pretty good question, “Is the ‘Citizen-Scientist’ an Oxymoron?” It turns out that he means to ask whether ordinary people can learn enough science to figure out which experts are correct. At best, that formulation would fit oddly with the other essays in the book; as rendered, his answer borders on the moronic. A selection: Controversial public issues need “a balanced partisan-free presentation of the issues;” science literacy taught in elementary schools (should teach future citizens) how to separate facts and values, the difference between objective and subjective probability...”; and “a fourth branch of U.S. government...(is needed) to expose the phony scientific claims of the government” and to blow the whistle on policy proposals based on “junk science.” Despite a citation to Jasanoff and Wynne, Schneider writes like a naïve positivist who has learned nothing from social scientists who actually study lay knowledge and other aspects of technoscientific controversies. Nearly half his references are to his own previous work, and most of the rest are scientific in nature. He conveys nothing of a professional nature about law, politics, public opinion, or interactions between expert and lay people. Perhaps he is in the book because the essay would make a great case for students to dissect as an instance of pathology.

Sandra Harding’s essay is at the opposite end of the spectrum in sophistication and insight. She asks, “Should Philosophies of Science Encode Democratic Ideals?,” and builds on her work concerning strong objectivity to argue that a more democratic science would also be a better science with more reliable ideas. “External democracy” is Harding’s term for progressive attempts to raise questions about the distribution of the social benefits and costs of science, and for efforts to diversify participation in decisions about science funding and priority setting. Although extremely important, such efforts “do not challenge the idea that social and political neutrality can, does, and should characterize sciences’ internal, cognitive, technical cores.” In contrast, cognitive democracy would be “concerned with how social and political fears and desires get encoded in that purportedly purely technical, cognitive core of scientific projects.” The basic intention is a longstanding one in Science and Technology Studies, going back to early work by Barnes and Bloor, Latour and Woolgar, and others. Harding advances the inquiry, however, and, to my mind, with far more radical political implications than the earlier, pre-feminist analysts; that is partly because she is bold enough, along with Steve Fuller and a few others, to ask not only how science gets made but how it should get made.

The concluding essay by editor Daniel Kleinman is far from a *pro forma* wrap-up. He delineates a spectrum of public participation in science policy, and then shows where numerous approaches (including many not already covered in the book) would fall on the spectrum. For example, one of the more democratic approaches is that of popular epidemiology, as used especially in hazardous waste communities, where lay people engage in hypothesis formation, data collection, and analysis in systematic ways normally associated with professional scientists. Kleinman goes on to discuss barriers to democratizing science, emphasizing especially that the organization of the contemporary economy

makes it unlikely that most people will have the time to devote. And he concludes with some strategies for overcoming the obstacles to democratization, although I think he overestimates how much can be achieved by voluntarist actions and underestimates the extent to which citizens are structurally mobilized out of meaningful participation – and not just when it comes to science.

From the perspective of readers of this journal, it is unfortunate that the collection lacks any contributors who specialize in law. There is no contribution on the use and misuse of science in the law such as David Faigman might have written, nor does it reprise or build upon Sheila Jasanoff's ideas about what judges ought to know from Science and Technology Studies. Nor is there a scholar-observer who knows about litigation in the tobacco, asbestos, or hazardous waste toxic tort proceedings. And given that some of the most important recent controversies at the expert-lay divide (GMO food, mad cow) have had higher profiles in Europe, it is unfortunate that U.S. materials dominate the analysis.

Shortcomings aside, *Science, Technology, and Democracy* delivers solid value. As Sclove concludes, "At least in the abstract, we Americans are fiercely proud of our democratic heritage and our technological prowess. But it is striking that we do virtually nothing to ensure that these twin sources of national pride are in harmony with one another...Consensus conferences are not a magic bullet,...but they do reawaken hopes that, even in a complex technological age, democratic principles and procedures can prevail and, indeed, extend into the technological domain." If this book does not exactly show the way, it at least extends the conversation and the vision.