Chapter 3

Philosophy of Technology as Risk Assessment of Technological Ventures: Kristin Shrader-Frechette

Kristin Shrader-Frechette (according to her web autobiography) studied physics at Xavier University and then graduated, summa cum laude, in 1967, with an undergraduate major in mathematics from Edgecliff College. In 1972, she received her Ph.D. in philosophy from the University of Notre Dame—where she now teaches. Shrader-Frechette did postdoctoral work for two, one, and two years, respectively, in biology (community ecology), economics, and hydrogeology. She has held Woodrow Wilson Foundation, National Science Foundation, and Carnegie Foundation fellowships in philosophy of science and has held offices or served on committees in the American Philosophical Association, the Philosophy of Science Association, the Society for Philosophy and Technology, the Risk Assessment and Policy Association, the International Society for Environmental Ethics, and the US National Academy of Sciences. She has been a member of many boards and committees of the National Research Council/National Academy of Sciences, including its Board on Environmental Studies and Toxicology, its Committee on Risk Characterization, and its Committee on Zinc-Cadmium-Sulfide Dispersions. Associate Editor of *BioScience* until 2002, and editor-in-chief of the Oxford University Press monograph series on Environmental Ethics and Science Policy, Shrader-Frechette also serves on the editorial boards of 17 professional journals. Past President of the Society for Philosophy and Technology; the Risk Assessment and Policy Association; and of the International Society for Environmental Ethics, Shrader-Frechette was the first woman president of all three of these international organizations. She has also served as principal investigator for grants from the National Science Foundation, the National Endowment for the Humanities, the Council on Philosophical Studies, and the US Department of Energy**.**

Most of Shrader-Frechette's work is either on scientific method, on ethical theory, or on ethical issues related to technological risk and their environmental consequences. Since 1984, her work has focused on methodological and ethical problems associated with nuclear technology or with ecological measures of technological risks**.**

Shrader-Frechette has published more than 300 articles and more than a dozen

books or monographs, and many of these publications have been translated into half a dozen languages. Moreover, Shrader-Frechette has appeared—often as featured speaker—in all the countries where those languages are spoken. Since almost all of her books are relevant to this book, they will be found in the bibliography at the end.

Much of this sketch comes from Shrader-Frechette's own website. What I would add is this, that nearly everyone would agree with the claim that Shrader-Frechette's large body of works are important philosophical analyses of particular technologies and particular approaches to assessments of technology and the status of the environment. She strongly opposes philosophers of technology who cannot deal with technical experts on their own terms, and she has also made important contributions in the philosophy of science, for example to the analysis of the foundations of probability and statistics. There she seems ready to endorse a kind of learn-from-experience Bayesian approach—though on topics such as technology and environmental assessments she is quick to point out places where the assessors are not learning from experience but treating their prejudices as though they were exempt from criticism. To sum up her views in a nutshell, she is an avowed Rawlsian egalitarian social contract ethicist who uses this yardstick in all her particular assessments related to technological controversies. She is also an avowed feminist. I think she would also accept the currently unpopular liberal label, along with her intellectual hero, John Rawls.

In her approach to philosophy, Shrader-Frechette always insists on being precise, on getting things right. I will try to do the same here, and one way is to stick close to her own texts. They usually spell out her opponents' views in short arguments, philosophy-of-science style, before refuting them with equally short and precise arguments.

It would be impossible here to do full justice to everything Shrader-Frechette has written, so I am going to repeat what I did once before and focus on a representative series of three books. The survey appeared originally in Spanish (see *Isegoria*, October 1995), but the version I repeat here is in English, and can be found in my "Activist Philosophy of Technology: Essays 1989–1999" (www.udel.edu/Philosophy/pdurbin.html). I started with the latest of the three, *Burying Uncertainty: Risk and the Case against Geological Disposal of Nuclear Waste* (1993), then worked back to her earliest (and probably still the best known) book, *Nuclear Power and Public Policy* (1980). Here is that material, almost unchanged.

Almost from the beginning of her philosophical career, as noted above, Shrader-Frechette has been involved with a variety of technology assessment and environmental impact assessment commissions, first at the state level and then at higher and higher levels up to the Federal level in Washington, D.C. Indeed, I think it is a fair guess to say that no North American philosopher has been involved in more such committees. In some ways this is paradoxical, because, since the appearance of *Nuclear Power*, Shrader-Frechette has often been accused of being not only anti-nuclear but anti-technology in general—a charge she has repeatedly felt that she has to combat. But several characteristics—the fairness of her arguments, the expertise that she brings to discussions, and the fact that she always tries to make a positive contribution—keep getting her invited back again and again.

Burying Uncertainty is in many ways the most detailed of her books, and it is a good example of all of the best qualities of her work. The first four-fifths of the book constitute her critique of the major plan to bury nuclear wastes deep in Yucca Mountain in Nevada. The critique includes many by-now-familiar features of her arguments: the risk assessments used to justify the plan are faulty because they hide certain value judgments; the subjective risk assessments used are in fact mistaken in many cases; faulty inferences are drawn from these faulty assessments; there are fatal but unavoidable uncertainties in predictions of the geological suitability of the site; and the entire venture violates an American sense of fair play and equity, especially with regard to the people of the state of Nevada. These are her conclusions. The arguments in support of them are meticulous, even-handed, and unemotional in every case.

This does not mean, of course, that they have been or will be viewed as such by Federal officials, including scientists, especially bureaucrats in the Department of Energy with vested interests in pushing the official project to completion; she has even been heckled when presenting her arguments in their presence.

A second notable point is that Shrader-Frechette knows what she is talking about; indeed, her knowledge of both geology and the risk assessment process is remarkable in a philosopher in these days of academic specialization—though her critics, naturally, maintain that some of her geological claims are irrelevant and that her accounts of particular risk assessments are biased against official government experts.

One bias Shrader-Frechette does not attempt to hide is in favor of equity; she has even given one of her more general studies a subtitle that underscores this bias: *Risk and Rationality: Philosophical Foundations for Populist Reforms* (1991). This might make her sympathetic toward some aspects of John Dewey's progressivism, but the social philosopher she invokes most often is Rawls and his contractarian, neo-Kantian theory of justice as fairness.

What typifies Shrader-Frechette's approach more than anything, and what clearly makes her a welcome addition to any discussion (including the discussion, here, of how to deal fairly with the urgent problem of finding a place to put highly toxic nuclear wastes), is her insistence on being more than just a critic. She feels that it is necessary to make a positive contribution to the discussion; as she says, one purpose of the book is "to provide another alternative to the two current options of either permanently disposing of the waste or rendering it harmless" (p. 2). The positive contribution makes up the last part of the book.

Admittedly providing only a sketch (one-fifth of the book versus the four-fifths devoted to critiquing current policy as epistemologically faulty and ethically unfair), what Shrader-Frechette argues for, in place of permanent disposal, is placing "high-level radwastes in negotiated, monitored, retrievable, storage facilities" (negotiated with the host community or communities), for at least a hundred years.

It is too early to tell whether Shrader-Frechette's book will have any impact, either on Department of Energy scientists and officials, or on public officials more generally—or even on the educated public (except perhaps in Nevada). The debate is still ongoing. But one thing is clear even now: if a philosopher were to choose to follow Dewey's advice, to get involved actively in trying to solve some urgent technosocial problem like the disposal of nuclear wastes, he or she would have to search far and wide for a better model than Shrader-Frechette as she makes her case in this book. (For a contrast with a more specific pragmatism, see Chapter 14 below on Hickman.)

Taking a step back in time, Shrader-Frechette's *Nuclear Power and Public Policy: The Social and Ethical Problems of Fission Technology* (1980, with a second edition in 1983) was her first venture into the epistemological/methodological fallacies of nuclear policy, along with its ethical inequities. It is clearly more strident than *Burying Uncertainty*. There is already all the care—to get the facts right, to deal with risk assessors on their own terms

(even when pointing out their errors), and to argue carefully and meticulously—that one finds later. Also, as later, the ultimate aim is to make an equity-based ethical claim; but here it is reduced to little more than a dozen pages. And, though Shrader-Frechette, when she wrote this book, already had an exemplary record of working with assessment teams, this early venture does not show the same degree of care as the later one when it comes to understanding and appreciating the motives and feelings of her opponents.

Shrader-Frechette's *Science Policy, Ethics, and Economic Methodology* (1985), falls midway between *Nuclear Power* and *Burying Uncertainty*. There, Shrader-Frechette broadens the scope of her critique, taking on the fallacies and hidden assumptions of a whole host of technology and environmental-impact assessments. *Science Policy* is an extended critique of risk/cost/benefit analysis, the most widely used methodology in these various assessments. In this book, Shrader-Frechette points out general and specific problems, and she makes an extended case for what she calls regional equity—avoiding, where possible, imposing risks or costs on people in particular geographical regions.

In this middle one of these three books, Shrader-Frechette clearly moves toward providing positive alternatives to the methodologies she has criticized. She offers two: an ethically-weighted version of risk/cost/benefit analysis, and a technology tribunal—a public procedure for weighting equitably the competing values that different scientists bring to their risk/benefit analyses. Shrader-Frechette is here, then, clearly moving toward the positively collaborative attitude so much in evidence in *Burying Uncertainty*—though perhaps the generality of the argument, focusing on a variety of assessments, probably dooms the book to have less of an impact than the later book. *Nuclear Power* may have had more of an impact, though it also gave more ammunition to opponents accusing her of being anti-technology.

Shrader-Frechette's *opponents*, as they show up in these summaries, include not only public officials she accuses of bias but also early philosophers of technology, whom she accuses of not doing their homework before offering their critiques of technology—especially if they are critiquing something like Technology with a capital T. Defenders of current policy on nuclear power, including the disposal of nuclear wastes, do not agree that they are biased. And, while early generalist critics of technology within the Society for Philosophy and Technology welcomed Shrader-Frechette within their circles, most did not follow her example with detailed technical studies. We have already seen Carl

Mitcham, in Chapter 1, say that concrete studies are a good beginning, but what is more important is a broad critique of technological culture as a whole. One bias that Shrader-Frechette does not attempt to hide, as noted, is in favor of equity; she has even given one of her more general studies a subtitle that underscores this bias: *Risk and Rationality: Philosophical Foundations for Populist Reforms* (1991). This might make her sympathetic toward some aspects of John Dewey's progressivism, but the social philosopher she invokes most often is Rawls and his contractarian, neo-Kantian theory.

So, full range of *controversies*? Clearly Shrader-Frechette's controversial stands make her a hybrid, disagreeing with many within the *science* quadrant. For example, Joseph Pitt (see Chapter 9 below) also falls within the *science* camp, but Shrader-Frechette has accused him of not being fair to LangdonWinner (Chapter 11 below), the non-Marxist but *radical* critic of undemocratic technological ventures. Shrader-Frechette herself tends to interpret Rawls as *meritocratic*, which would still keep her within the *science* quadrant. On the other hand, her egalitarian value slant is often perceived (e.g., by her nuclear bureaucrat opponents) as *idealist* (even anti-science). But opponents also include *idealist* philosophers of technology who do not think they need to do the kind of scientific work that she does, or (like Mitcham) who insist that what our technological culture needs is radical critics. Shrader-Frechette is less clear about her opposition to standard Marxists, but it seems clear that she opposes them—as they oppose liberalism. Her attitude toward *pragmatists* like Hickman (Chapter 14) is not clearly spelled out—though some pragmatists and other progressives (e.g., recent writings of Martha Nussbaum) criticize Rawls's version of egalitarianism in ways Shrader-Frechette might have questions about.