Getting Philosophy of Science Socially Connected

Janet A. Kourany†‡

Nearly a half century ago, Thomas Kuhn, Paul Feyerabend, Stephen Toulmin, Norwood Russell Hanson, and others issued a challenge to us philosophers of science to make our field more relevant to actual science. That challenge, over time, has elicited a number of useful responses but very few efforts to situate science within its wider social context when philosophizing about science. The unit of analysis for philosophy of science has tended to remain science-in-a-vacuum. I consider the justifications we offer for this failure, our resources for change, and our prospects if we do change.

1. The Problem. Nearly a half century ago, Thomas Kuhn, Paul Feyerabend, Stephen Toulmin, Norwood Russell Hanson, and others issued a challenge to us philosophers of science to make our field more relevant to actual science. That challenge, over time, has elicited a number of useful responses: first, efforts to "historicize" philosophy of science, to make philosophy of science relevant to the actual development of science, both past and present; and second, efforts to "socialize" philosophy of science, to make philosophy of science relevant not only to science's conceptual products, but also to the actual knowledge-productive social practices that have led to those products. But very few efforts have thus far been made to "societize" philosophy of science, to make philosophy of science relevant to the ways in which science interacts with the wider society in which it occurs, the ways in which science both shapes and is

†To contact the author, please write to: Department of Philosophy, 100 Malloy Hall, University of Notre Dame, Notre Dame, IN 46556; e-mail: JKourany@nd.edu.

‡An early version of this paper was written while I was a Visiting Fellow at the Center for Philosophy of Science at the University of Pittsburgh and presented at the Center's 5th Quadrennial International Fellows Conference in Rytro, Poland. I would like to thank the audience there (especially Alexander Afriat, Deborah Dysart-Gale, Philip Ehrlich, John Norton, and David Schrader) for very helpful comments and questions and both the Center and the University of Notre Dame for research support.

Philosophy of Science, 73 (December 2006) pp. 991–1002. 0031-8248/2006/7305-0045$10.00
Copyright 2006 by the Philosophy of Science Association. All rights reserved.

https://doi.org/10.1086/518804 Published online by Cambridge University Press

shaped by that society. The unit of analysis for philosophy of science has tended to remain (a historical, social) science-in-a-vacuum.

Meanwhile, even the mass media is rife with evidence of the influence of society on science and science on society—the suppression of scientific studies or scientific findings by industry and government alike or the turning of research results into "intellectual property" to be kept secret for commercial purposes; the initiation of agricultural or medical or economic or military policies worldwide in response to particular scientific projects, and the initiation of particular scientific projects in response to commercial or political objectives; self-promoting scientific press releases that bypass the usual scientific literatures in order to have a quicker, more dramatic effect as well as other kinds of popularizations of scientific findings that shape public opinion; the financial interests scientists have in specific kinds of scientific projects and scientific results; and so on. And our colleagues in other areas of science studies have already generated a sizable literature on this mutual shaping of science and society under such headings as the "commercialization of science," "postacademic science," and "Mode 2" (see, e.g., Ziman 2000). Why are we philosophers of science lagging so far behind?

2. Diagnostic Reflections. One reason we give for our persistent failure to situate science within its wider social context when philosophizing about science is that our concerns lie—have always lain—with the context of scientific justification, not with the context of discovery or the context of application. So we can safely ignore the wider society in which science occurs, we claim, because that society relates only to the context of discovery and the context of application, not to the context of justification. But just what do we mean by *justification* here? In 1938, when Hans Reichenbach proclaimed his now famous context of discovery/context of justification distinction and urged philosophers of science to follow him in concerning themselves only with the latter, he did not mean by justification the actual deliberative practices in which scientists engage. Those actual practices, Reichenbach said, are the province of the psychology and sociology of science, not the philosophy of science. They belong to the context of discovery, not the context of justification. What Reichenbach meant by justification, rather, was a "logical substitute" for what actually happens, "a better way of thinking than actual thinking," a "rational reconstruction" (1938, 3–8). But nowadays—now that our efforts to historicize and socialize philosophy of science have borne fruit—nowadays when we philosophers of science say that our concerns lie with the context of justification, what most of us mean by justification is much closer to the actual deliberative practices of Reichenbach's context of discovery than to his context of justification. And when we study those

https://doi.org/10.1086/518804 Published online by Cambridge University Press

actual deliberative practices, we at least sometimes find that they are sensitive to the wider social context of the science in question. We sometimes find, for example, that scientists count as a factor in favor of a theory, or even as a constraint on their theorizing, that their theory help to promote a more egalitarian society or at least that their theory not help to promote a less egalitarian society. We sometimes find, for example, that scientists studying the development of sexual orientation adopt as a constraint on their theorizing that nonheterosexual orientations not be pathologized, or that scientists studying domestic violence adopt as a constraint on their theorizing that racial stereotypes not be perpetuated (see, e.g., West 2002 and Horvath 2004). Why, then, is our philosophical understanding of scientific justification and our philosophical picture of science in general not similarly sensitive to the wider social context of science?

Another reason we give for not philosophizing about the unit science-in-society is closely connected to this first one. It relates to science's aim. The aim of science, we philosophers say, is truth—or empirical adequacy, or empirical success, or explanatory success, or something of the sort—and science progresses by accumulating such truths or successes. Being sensitive to the wider social context of science does not, or at least need not, advance this aim or contribute to this progress. That a theory helps to promote a more egalitarian society, for example, is not relevant to the theory's truth or empirical success. So it should not be a factor in what we philosophers take to be the scientific justification of the theory, even if scientists sometimes count it as such. And more generally, sensitivity to the wider social context of science, to its funding as well as its social effects, for example, should not be part of our philosophical concerns about science.

The problem with this second reason for ignoring the wider social context of science lies with its conception of the aim of science. Determining what the aim of science is requires a great deal of information, information that tends to be absent from philosophical discussions (see Kourany 2000 for a fuller treatment). Determining what the aim of science is requires *empirical* information because the task it sets is to best interpret *science,* an actually existing activity, not an activity whose nature it is up to us to dream up. And determining what the aim of science is requires *normative* information because the task it sets is to *best interpret* science, to interpret it so that it makes the most sense, is the most reasonable or rational—what science (in this case, the aim of science) *ought* to be.

Start with the empirical. In order to determine how best to interpret the aim of science we need empirical data regarding what *scientists* (as against philosophers) say the aim of science is, or at least what scientists say the aim of their science is, scientists past and present, or better still,

https://doi.org/10.1086/518804 Published online by Cambridge University Press

what scientists say *their aim* as scientists is. (Many researchers within the health sciences, for example, say that the aim of these sciences is the obliteration of disease and infirmity, while many others say that it is the production of "complete physical, mental, and social well-being" [to use the World Health Organization's phrase], which might differ for people of different race, class, gender, and other characteristics. Many political scientists, by contrast, say that the aim of political science, or at least their aim as political scientists, is to obtain policy-relevant information for such organizations as Greenpeace and Amnesty International and the CIO and various heads of state.) More important for our purposes, however, is what scientists have actually aimed at in their research. Relevant here is what scientists have said they were aiming at, but also, who was funding their research and why they were funding it, who was evaluating that research (e.g., the way it uses animals) and why they were evaluating it, where that research would be published, and who would stand to profit from it and how. (What was being aimed at in the famous cloning experiments on Dolly, for example, can be variously interpreted as "basic understanding," or greater agricultural, or biotechnological, or medical efficiency, or money.)

In order to determine how best to interpret the aim of science, we need to take into account empirical data such as these. But we also need to take into account normative considerations. These include the empirical underdetermination of theories, the nature of the observational-theoretical distinction, and the other issues habitually brought up in the realism/antirealism controversy that help to determine what the aim of science *ought* to be. But they also include other kinds of normative considerations. After all, society ultimately pays for science and society is deeply affected by science. Hence, the needs of society, including the justice-related needs of society, and the ways that science might satisfy those needs are also relevant when determining what the aim of science ought to be. Relevant here, for example, are the political aims of sociologists who research environmental racism, or the commercial and political aims behind the absence of research on the effects of pesticides and fertilizers on migrant farmworkers, or the moral aims of the animal rights activists who have obstructed the use of long-accepted biological research methods, or the moral and religious aims of the antiabortionists who have blocked fetal and embryo research.

Only if we philosophers of science take into account both kinds of considerations, both empirical and normative considerations, can we hope to gain an adequate understanding of the aim or aims of science, and thereby the methods and modes of assessment that are appropriate to science, the genuine progress it has achieved and has hope of achieving, and other central issues in the philosophy of science. But, of course, taking

https://doi.org/10.1086/518804 Published online by Cambridge University Press

into account those empirical and normative considerations—regarding the funding of science and the social needs science should serve and the rest—*is* to situate science within its wider social context when philosophizing about science.

This inspires a third reason we give for not situating science within its wider social context. This third reason reflects on *our* aims rather than the aims we impute to scientists. Our aim as philosophers of science, we say, is to understand science as a knowledge-producing activity, even if science is other things as well. Our interests, after all, are epistemological, not social or political. We are *epistemologists* of science, nothing else. So what is important to us in our various inquiries about science is whether scientists' methods are *epistemically* appropriate, whether their claims are *epistemically* justified, whether their research results make *epistemic* progress, not whether and in what ways these are *socially* motivated or *socially* worthwhile. In short, we philosophers of science simply do not need to be sensitive to the wider social context of science when philosophizing about science since that wider social context is irrelevant to our concerns.

The problem with this third reason for ignoring the social context of science is that it is self-defeating. Granted that our aims regarding science are epistemological. But the wider social context of science—the funding sources of scientists, the secrecy requirements surrounding selected scientific results, the pressures exerted on scientists by various interest groups (feminists, gay rights activists, animal rights activists), and so forth—this wider social context of science poses epistemological questions we cannot afford to ignore. Take the effects that activists representing AIDS patients have had on biomedical research related to AIDS—for example, activists' effects on the design and interpretation of randomized clinical trials (see, for this example, Epstein 1996). Critiquing what they call "pure" or "clean" or "elegant" science pursuing its leisurely course in the midst of an AIDS epidemic, AIDS activists have pushed for and achieved such changes as expanded access to clinical trials so that AIDS patients can be enrolled in more than one trial at a time or can be taking concomitant medications while enrolled in a trial, more rapid movement of compounds into clinical trials, and acceleration of the drug approval process. Are these changes epistemically progressive, yielding better knowledge because they effectively respond to the needs and desires of current AIDS patients, or are they epistemically regressive, yielding worse knowledge because they give up on claims to universal validity in favor of a validity that is more local and circumscribed? This is a "real world" epistemological question that currently divides the AIDS activist community. It is, moreover, an urgent epistemological question because now other groups—Alzheimer's patients, multiple sclerosis patients, breast cancer patients, and a host of others—are pressing for or achieving some of the same

https://doi.org/10.1086/518804 Published online by Cambridge University Press

kinds of changes as the AIDS activists (in former NIH Director Bernadine Healy's words, "The AIDS activists have led the way. . . . [They] have created a template for all activist groups looking for a cure" [quoted in Epstein 1996, 348]). This question about the epistemic effects of the changes wrought by AIDS activists is, however, not only an urgent practical question, but it is also an important theoretical question because the mode of experimentation that is being transformed by the changes—randomized clinical trials—has been for quite some time now the "gold standard" in medicine, central to medicine's legitimation as a fully scientific discipline. This urgent, theoretically important, real world epistemological question is the kind of question to which we philosophers of science are equipped to provide answers, but it is also the kind of question to which we philosophers of science will not be able to provide answers unless we take into account the wider social context of science.

3. Therapeutic Reflections. But how do we take into account the wider social context of science—how do we societize philosophy of science? Fortunately, we do not have to start from scratch. Feminist philosophers of science, in collaboration with feminist historians and sociologists of science and feminist scientists themselves, have already given us a model for how to do it.

First, feminists *have* situated science within its wider social context when reflecting on science. Indeed, feminists have been especially concerned with the social consequences of science—in particular, the ways science has all too frequently perpetuated and added to the problems of inequality women confront. This concern with science's social consequences has led feminists to scrutinize those features of science that help to shape its social consequences—not only the research strategies of scientists, but also their social location (gender, race, etc.) and training, the social as well as epistemic values that inform their practice, and the funding priorities that direct their research. What's more, in all this feminists have been motivated, not only by the need and desire for understanding, but also by the need and desire for social change, and they have explored social/political/epistemic initiatives intended to bring about that change—new funding priorities for science, for example, or new kinds of recruitment or training programs, or new social or epistemic values. In short, feminist philosophers of science, in collaboration with feminist historians and sociologists of science and feminist scientists themselves, have been pursuing a comprehensive analysis of science-in-society, and a comprehensive plan of action to bring about needed change in both science and society. This is the first way in which feminists have given us a start to a societized philosophy of science—by giving us a ready-made example of such philosophizing.

https://doi.org/10.1086/518804 Published online by Cambridge University Press

In addition, the ready-made example of societized philosophy of science that feminists have given us can be *generalized*—this is the second way in which feminists have given us a start to a societized philosophy of science. Indeed, science has all too frequently perpetuated and added to other kinds of inequality besides gender inequality—inequality relating to race and sexual orientation and physical ability and disability, for example. And science has all too frequently perpetuated and added to other kinds of social problems besides those relating to inequality—problems relating to the environment, for example, and problems relating to the inability to achieve peaceful coexistence among nations. What's more, with different kinds of funding priorities, or different kinds of recruitment or training programs, or different kinds of social or epistemic values, or the like, science can not only cease to put obstacles in the way of solutions to these problems, but more effectively help to bring those solutions about. So there is much descriptive and normative philosophical work to be done on many fronts, philosophical work that can, at least in part, be modeled on the work already done by feminists.

Finally, the work done by feminists provides not only a generalizable example of societized philosophy of science, but it provides important additional resources as well—insights concerning the relations between epistemic values and social values and the place of social values in science, for example, insights concerning what makes for scientific objectivity and what threatens it, insights concerning the ultimate goals of science and the methods that are appropriate to them, and the like. This is the third way in which feminists have given us a start to a societized philosophy of science. Though societized philosophy of science is quite different from most contemporary philosophy of science, in short, it is not out of the reach of contemporary philosophers of science.

4. Prognostic Reflections. But what is in the offing if we do make efforts to societize philosophy of science? First note what is not in the offing. Abstract logicomathematical analysis in such areas as philosophy of physics, philosophy of mathematics, and philosophy of biology will not disappear from philosophy of science, nor will it be discounted or downgraded in importance. Why should it? Such work can and often does fulfill important roles in both philosophy of science and the sciences—can and often does fulfill these roles even in the midst of the efforts that have been made to historicize and socialize philosophy of science. Indeed, abstract logicomathematical analysis often enriches and is enriched by historical and/or sociological analysis, and there is no reason to suppose that abstract logicomathematical analysis will not similarly enrich and be enriched by societal analysis. At the same time, a philosophy of science that takes into account the wider social context of science, including the needs

https://doi.org/10.1086/518804 Published online by Cambridge University Press

and resources of that wider social context, will have to reflect that context not only in its substantive work but also in its priorities. Such a philosophy of science will strive to cover the issues of greatest social concern. So while abstract work in such areas as philosophy of physics, philosophy of mathematics, and philosophy of biology will not disappear from a societized philosophy of science, or be discounted or downgraded in importance, work in such areas as philosophy of the social and behavioral sciences and philosophy of medicine will need to become much more prominent in the field—more encouraged in philosophy of science curricula and conferences and publications, and more rewarded.

So much for what is not in the offing. Turn, now, to what is. If we do make efforts to societize philosophy of science, certainly we shall be left with a philosophy of science more relevant to actual science, as Kuhn, Feyerabend, and other philosophers of science demanded nearly a half century ago. But we shall also be left with a philosophy of science more relevant, more responsive, to society. To get some sense of the possibilities here consider the controversy regarding the so-called "politicization of science" currently in the news. Two years ago (in July 2003) two conservative think tanks, the Hoover Institution at Stanford University and the George C. Marshall Institute in Washington, D.C., published a collection of essays entitled *Politicizing Science: The Alchemy of Policymaking* (Gough 2003). The authors of the essays—scientists who have participated in or witnessed firsthand the interactions of politics and science—provided a series of examples suggesting that the science that informs policy making in this country has been manipulated, distorted, or suppressed to advance liberal causes, to the detriment of society. "The more that political considerations dominate scientific considerations," warned the editor, biologist Michael Gough, "the greater the potential for policy driven by ideology and less based on strong scientific underpinnings" (2003, 3). The next month (in August 2003), Congressman Henry Waxman, a liberal Democrat, released a report detailing another series of examples of political manipulation, distortion, or suppression of science. This time, however, the report, entitled *Politics and Science in the Bush Administration* (U.S. House of Representatives 2003), suggested that the science that informs policy making in this country has been manipulated to advance conservative causes. The Waxman report was followed, six months later (in February 2004; updated in March 2004), by *Scientific Integrity in Policymaking: An Investigation into the Bush Administration's Misuse of Science*, issued by the Union of Concerned Scientists (2004a), and by *Restoring Scientific Integrity in Policy Making*, a condemnation of the Bush Administration's political interference with science signed by 62 eminent scientists, including 20 Nobel laureates (Union of Concerned Scientists 2004b). And these were followed, two months later (in April

https://doi.org/10.1086/518804 Published online by Cambridge University Press

2004), by Science Advisor to President Bush John Marburger's denial of the charges (Marburger 2004). What all these publications had in common was a view of science as a disinterested force that can guide policy making by providing appropriate facts, but only so long as science is kept separate from politics. As the Union of Concerned Scientists put it: "Science and scientific knowledge have played a large part in the policies that have made the United States the world's most powerful nation and its citizens increasingly prosperous and healthy. For science to play this positive and rational role in governance, the processes through which science influences government must be free of distortion and misrepresentation" (2004a, 29).

Not everyone in the current controversy shares this view, however. Consider one kind of politicization being discussed, that of screening scientific experts regarding their political views before they are invited to serve on scientific advisory committees and replacing such scientific experts when their political views come into conflict with the preferred political views. Representative Waxman, the Union of Concerned Scientists, and the scientists who signed *Restoring Scientific Integrity in Policy Making* all have accused the Bush Administration of politicizing science in this way—for example, by asking candidates for advisory committee vacancies whether they voted for President Bush or whether they agree with the Bush Administration's policies—and up until very recently (April 17, 2005) Science Advisor Marburger consistently denied these charges.[1] But some Administration sympathizers have claimed that such politicization is understandable and appropriate. Thus, one of the participants in a recent (March 23, 2004) Marshall Institute Roundtable on politicizing science, political scientist Steven Hayward, said: "When you win elections, you get to hire the people you want to work for you"; "the suggestion that the Administration shouldn't be able to hire the people they want to hire and [shouldn't be able to] not hire the people that [a left-leaning organization like] the Union of Concerned Scientists wants them to hire smacks of . . . political naiveté" (Kieper et al. 2004).

Another observer, geologist Daniel Sarewitz (2004), has pointed out that representatives of different scientific specialties bring to an advisory committee different disciplinary orientations, including different methods, standards of proof, interests, and values as well as different bodies of knowledge, and thus far in the development of science such differences among specialties have become increasingly marked. This increasing disunity within science "translates into a multitude of different yet equally

1. Marburger finally admitted that the Bush Administration had politicized science in this way in the session on "Scientific Integrity in Government" at the April 2005 meeting of the American Physical Society. He also promised that the Bush Administration would discontinue the practice.

https://doi.org/10.1086/518804 Published online by Cambridge University Press

legitimate scientific lenses for understanding and interpreting nature," some more congenial to one political perspective, some more congenial to another (Sarewitz 2004, 390). The ongoing debate over genetically modified organisms in agriculture is an obvious case in point with, on the one side, plant geneticists and molecular biologists at once concerned with understanding and controlling the attributes of specific organisms and allied with the politics of the agricultural biotechnology industry and, on the other side, ecologists and population biologists concerned with the complexity, interconnectedness, and lack of predictability of nature and allied with the politics of environmentalists. The upshot is that even without asking candidates for scientific advisory committee vacancies whom they voted for or whose policies they support, decisions on their candidacy can still be political.

Still another observer, political scientist David Guston (2004), has concluded that *no* way of choosing scientific advisory committee members is politically neutral—not only because different disciplinary orientations tend to be aligned with different political perspectives, but also because scientists' credentials tend to be tied to the politics of funding as well as, we might add, the politics of publishing, among other things (see, for a telling case of the last, McCook 2005). As a result, the whole question regarding the politicization of science is unproductive. "Asking whether science is politicized distracts us from asking, 'Who benefits and loses from which forms of politicization?'" (Guston 2004, 25). We thereby neglect the more critical question, How *should* science be politicized.

For Sarewitz (2004), however, the critical question is not, How *should* science be politicized, but rather, How should *politics* be *descientized*. The reason is that nature is so complex that a variety of different disciplines is needed to investigate most aspects of it. Think of global climate change—which can be understood as a problem of climate impacts, weather impacts, biodiversity, land use, energy production and consumption, agricultural productivity, public health, economic development patterns, material wealth, demographic patterns, and so forth. The rub is that, as previously noted, the different disciplines bring with them different, even incompatible, methods, standards of proof, interests, and values as well as different, and even incompatible, bodies of knowledge. The upshot, says Sarewitz, is that progress in addressing the environmental issues like global climate change—and doubtless the health issues as well—that are the main focus of the politicization controversy "will need to come primarily from advances in political process, rather than scientific research" (2004, 399), since scientific research can be used "to support entirely different interpretations of what is going on, and entirely different courses of action for how to address what is going on" (389). This does not mean that science should disappear from the scene. But it does mean

https://doi.org/10.1086/518804 Published online by Cambridge University Press

that science should take "its rightful place as one among a plurality of cultural factors that help determine how people frame a particular problem or position—it is a part of the cognitive ether, and the claim to special authority vanishes" (400).

The politicization of science controversy, then, involves a whole spectrum of positions—politics should be kept out of the science that informs public policy; politics can properly shape such science; politics inevitably shapes such science; such science should be kept out of the politics that informs public policy, at least until that politics can be worked out. And the controversy continues. A year ago (in July, 2004), the Union of Concerned Scientists published yet another investigation of the Bush Administration's interference with science (2004c); more than 7,000 scientists have now signed *Restoring Scientific Integrity in Policy Making*, including 49 Nobel laureates, 63 National Medal of Science recipients, and 154 members of the National Academies of Sciences; books and articles and news stories and conference sessions continue to focus on the politicization of science, and many have said that the future of American public policy, and even, in significant ways, American science, hangs in the balance. But philosophers of science have remained silent—despite the fact that we and our colleagues in related areas of philosophy have been far from silent through much of the twentieth century about such topics as the relations between facts and values, the theory-ladenness of facts, the underdetermination of theory, the epistemic requirements for belief versus the practical requirements for action, and the relations among the contexts of discovery, justification, and application. This silence is an embarrassment. After all, the issues that lie at the heart of the politicization controversy are epistemological ones—just the kind we take to define our field—and feminists have already provided a good start toward dealing with these issues through their own work on feminist values and science. A societized philosophy of science would enable us to do our fair share toward resolving this controversy. And surely we philosophers of science should do no less. This is just one of the good things in store if we do make efforts to societize philosophy of science.

REFERENCES

Epstein, Steven (1996), *Impure Science: AIDS, Activism, and the Politics of Knowledge*. Berkeley: University of California Press.

Gough, Michael, ed. (2003), *Politicizing Science: The Alchemy of Policymaking*. Stanford, CA: Hoover Institution Press and George C. Marshall Institute.

Guston, David H. (2004), "Forget Politicizing Science. Let's Democratize Science!" *Issues in Science and Technology* (Fall): 25–28.

Horvath, Christopher (2004), "The Developmental Challenge to Genetic Determinism: A Model Explanation for Sexual Attraction," talk delivered at the Center for Philosophy of Science, University of Pittsburgh, February 13, 2004.

https://doi.org/10.1086/518804 Published online by Cambridge University Press

Kieper, Adam, Michael Gough, Steven Hayward, Robert Walker, and William O'Keefe (2004), *Who Is Politicizing Science? Understanding the Interactions and Interests in Science and Politics*. Washington Roundtable on Science and Public Policy. Washington, DC: George C. Marshall Institute.

Kourany, Janet A. (2000), "A Successor to the Realism/Antirealism Question," *Philosophy of Science* 67 (Proceedings): S87–S101.

Marburger III, John H. (2004), *Statement of the Honorable John H. Marburger, III on Scientific Integrity in the Bush Administration*, http://www.ostp.gov/html/ucs/SummaryResponsetoCongressonUCSDocumentApril2004.pdf.

McCook, Alison (2005), "Journal Prints Rejected Paper—as Ad," *The Scientist*, http://www.biomedcentral.com/news/20050429/02.

Reichenbach, Hans (1938), *Experience and Prediction*. Chicago: University of Chicago Press.

Sarewitz, Daniel (2004), "How Science Makes Environmental Controversies Worse," *Environmental Science and Policy* 7: 385–403.

Union of Concerned Scientists (2004a), *Scientific Integrity in Policymaking: An Investigation into the Bush Administration's Misuse of Science*, http://www.ucsusa.org/rsi.

_____ (2004b), *Restoring Scientific Integrity in Policy Making*, http://www.ucsusa.org/rsi.

_____ (2004c), *Scientific Integrity in Policy Making: Further Investigation of the Bush Administration's Misuse of Science*, http://www.ucsusa.org.

U.S. House of Representatives (2003), *Politics and Science in the Bush Administration*, Committee on Government Reform—Minority Staff, http://www.house.gov/reform/min/politicsandscience/.

West, Carolyn (2002), "Black Battered Women: New Directions for Research and Black Feminist Theory," in Lynn Collins, Michelle Dunlap, and Joan Chrisler (eds.), *Charting a New Course for Feminist Psychology*. Westport, CT: Praeger, 216–237.

Ziman, John (2000), "Postacademic Science: Constructing Knowledge with Networks and Norms," in Ullica Segerstrale (ed.), *Beyond the Science Wars: The Missing Discourse about Science and Society*. Albany: State University of New York Press, 135–154.

https://doi.org/10.1086/518804 Published online by Cambridge University Press