Essay Review

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THE POLITICAL PHILOSOPHY OF SCIENCE POLICY

Philip Kitcher, *Science, Truth, and Democracy* (New York: Oxford University Press, 2001), Oxford Studies in Philosophy of Science, xiii + 219 pp., ISBN: 0195145836

INTRODUCTION

The tensions between modern science and democracy have created a variety of political dilemmas: science symbolizes and promotes liberal-democratic values such as transparency, skepticism, and collective problem-solving, and yet also challenges these values through its exclusivity and elitism. Science contributes to the wealth and security upon which modern democracy depends, and yet also produces technological risks. Science helps make politics and policy more rational and effective, but is used to exclude those deemed irrational, and to restrict democratic procedures thought ineffective.[1] During much of the postwar period, these tensions were held in check by what is commonly called a 'social contract for science', according to which a self-governing 'republic of science' received generous funding and wide-reaching freedom from political control in exchange for medical, military, and consumer technologies.[2] In recent decades, however, the 'contract' has become the subject of careful scrutiny, and the tensions between science and democracy have come to play a central role in the daily politics of advanced industrial societies. Today, it appears to some that these tensions are being resolved in favour of

[1] See Yaron Ezrahi, *The Descent of Icarus: Science and the Transformation of Contemporary Democracy* (Cambridge, MA: Harvard University Press, 1990); Roy MacLeod, 'Science and Democracy: Historical Reflections on Present Discontents', *Minerva*, 35 (4), (1997), 369–384.

[2] See Michael Polanyi, 'The Republic of Science: Its Political and Economic Theory', *Minerva*, 1 (1), (1962), 54–73; and the retrospectives on Polanyi's article by John Ziman and Steve Fuller in *Minerva*, 38 (1), (2000), 21–32. On the notion of a social contract for science, see David H. Guston, *Between Politics and Science: Assuring the Integrity and Productivity of Research* (Cambridge: Cambridge University Press, 2000), ch. 2.

Minerva **42:** 77–95, 2004.

democracy, as scientists are held accountable – not only to the standards of scientific disciplines and research institutions, but also to the ethical, legal, and political demands of the wider society.[3] However, many such requirements incorporate a managerial ethos, and are criticized for consisting of little more than cost-cutting measures. As such, they represent a distinctly neo-liberal form of democratization that has little to do with public participation or collective decision-making, and in fact threatens more robust forms of democratic politics.

In this context, it is refreshing to find a book by a leading philosopher of science that begins with the question, 'What is the role of the sciences in a democratic society?' (p. 3). There is, of course, a long tradition of research on public participation in technical decision-making, and science and technology studies have recently paid increased attention to the implications of social theories of science for the practice of democratic politics.[4] By contrast, political theory and political philosophy have devoted less time to the politics of science and technology, tending to focus instead on theories of 'technical rationality' or the 'scientific worldview'.[5] And the philosophy of science has traditionally restricted its concerns to questions of logic and method, leaving the social dimensions of science to sociology, history, and political science.[6] Philip Kitcher's *Science,*

[3] See the helpful discussions in Bruce L.R. Smith, 'The Accountability of Science', *Minerva*, 34 (1), (1996), 45–56; James H. Collier, 'Divining the Oracle of Big Science: Steps on the Path to a New Republicanism', *Minerva*, 38 (1), (2000), 109–120.

[4] See, for example, James C. Petersen (ed.), *Citizen Participation in Science Policy* (Amherst: University of Massachusetts Press, 1984); Ortwin Renn, Thomas Webler, and Peter Weidemann (eds.), *Fairness and Competence in Citizen Participation: Evaluating Models for Environmental Discourse* (Dordrecht: Kluwer Academic, 1995); Richard E. Sclove, *Democracy and Technology* (New York: Guilford Press, 1995); Steven Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge* (Berkeley: University of California Press, 1996); Simon Joss (ed.), Special Issue, 'Public Participation in Science and Technology', *Science and Public Policy*, 26 (5), (1999), 290–373; Daniel Lee Kleinman (ed.), *Science, Technology, and Democracy* (Albany: State University of New York Press, 2000); Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press, 1999); and Steve Fuller, *The Governance of Science: Ideology and the Future of the Open Society* (Buckingham: Open University Press, 2000).

[5] Mark B. Brown, 'Conceptions of Science in Political Theory: A Tale of Cloaks and Daggers', in Jason A. Frank and John Tambornino (eds.), *Vocations of Political Theory* (Minneapolis: University of Minnesota Press, 2000), 189–211.

[6] There are of course exceptions, including Helen Longino, *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry* (Princeton: Princeton University Press, 1990) and *The Fate of Knowledge* (Princeton: Princeton University Press, 2002); Hans Radder, *In and About the World: Philosophical Studies of Science and Technology* (Albany: State University of New York Press, 1996). The 'internal' *social* dimensions of science, as

Truth, and Democracy departs from mainstream philosophy of science by linking familiar epistemological questions with a discussion of fundamental tensions between science and democracy, particularly with regard to research ethics and agenda-setting. Kitcher's book is not a specialized work of either political theory or the philosophy of science, and is clearly written for an interdisciplinary audience. His aim is not to offer a general theory of science and democracy, but to provide philosophical tools for the resolution of problems faced by scientists and policy-makers. However, as we shall see, his goals are ultimately frustrated by his conception of the relationship between philosophy and politics.

MODERATE REALISM AND SCIENTIFIC SIGNIFICANCE

In the first half of the book, Kitcher takes up a series of long-standing issues in the philosophy of science, in defence of what he calls 'modest realism'. He skillfully steers a path between the objectivist 'scientific faithful', who see science as a value-free search for truth that becomes political only in application, and the relativist 'demonizers of science', who claim that science always represents power and interest.

Against the relativists, Kitcher argues that successful science provides true and reliable knowledge about a world independent of human cognition. He rejects, for example, the constructivist claim that because scientific explanations of natural phenomena have changed over time, current explanations cannot be true. Such changes merely show that scientific knowledge is always fallible, not that it lacks truth. Similarly, cultural variation in beliefs about nature does not mean that all are equally true, although they may well be equally rational and deserve equal respect. Scientific explanations about how physical traits are passed from one generation to the next, for example, are true, and religious explanations are false, simply because scientists have invested time and effort in learning how to predict when particular traits will be inherited.

Kitcher also argues against the radical-constructivist notion that scientists can never access a reality beyond their conceptual categories. Scientists have often been surprised, for example, by novel observations that have violated expectations supported by their categories. And although different scientific theories describe and dissect nature in different ways, the truths they reach are in principle compatible with each other, if not always in obvious ways, because they all represent the same world. Kitcher

compared to its 'external' *societal* aspects, have of course been a central theme in the philosophy of science since at least the publication of Thomas S. Kuhn's *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962, 1970).

thus insists that 'we should not confuse the possibility of constructing representations with that of constructing the world' (p. 51). Constructivists are certainly right that science and technology literally 'construct' our surroundings through such practical interventions as clinical trials, plant and animal breeding, or environmental pollution. But that does not make scientific representations of nature any less reliable or less true.[7]

Against the 'scientific faithful', Kitcher argues that science is never merely the pursuit of truth pure and simple, but rather the pursuit of those truths that scientists deem significant. Scientific significance can be either theoretical or practical, 'pure' or 'applied', and motivated by instrumental goals or what Kitcher calls 'natural curiosity' (p. 81). Theoretical and practical significance are often interwoven, and Kitcher rejects the standard division between science and technology because it ignores both the practical benefits of much 'pure' research and the epistemic significance of many 'applied' scientific projects.

The book's dramatic turning point comes when Kitcher considers what figures into assessments of scientific significance. In opposition to prominent efforts to isolate science from society, Kitcher argues that 'All kinds of considerations, including moral, social, and political ideals, figure in judgments about scientific significance . . .' (p. 86). 'Pure researchers, then, are not simply those whose intentions are entirely to promote epistemic significance but whose lack of interest in the practical *can be justified*' (p. 89, emphasis added). It is telling that Kitcher does not specify *to whom* pure science must be justified, but he makes clear that any adequate justification must take account of the needs and desires of the general public. The second half of the book considers just what this might entail.

AN IDEAL OF WELL-ORDERED SCIENCE

First, Kitcher considers the possibility of banning research that is likely to harm members of disadvantaged social groups – such as studies in sociobiology that seek to link intelligence and race. Although the scientific ideal of exposing error through free discussion remains powerful, Kitcher rightly

[7] In the same vein, Kitcher rejects empiricist claims that scientists have no basis for making inferences about unobservable entities such as electrons. Just as card players and detectives use observable data to infer the properties of unobservable cards or criminals, scientists can use observable data to predict the behaviour of unobservable entities, and hence are justified in claiming to know those entities exist. This ' "success to truth" rule' (p. 21), Kitcher says, supports a realism about the natural world that matches our everyday 'natural epistemological attitude' (p. 12).

points out that John Stuart Mill's famous defence of the ideal subordinated freedom of speech to the goals of individual and social development. Restrictions on inquiry are thus justified, Kitcher argues, if they prevent research from harming the disadvantaged. The trouble, he says, is that bans on dubious science tend to backfire. They lead sympathizers to believe that research confirming their views has been suppressed for ideological reasons that foster animosity towards the disadvantaged and make their situation worse than before (p. 105). Furthermore, it is generally not possible to resolve conflicts among research preferences by claiming that some are objectively right and others, objectively wrong (p. 115). Kitcher concludes that a better approach is to develop an ideal standard that shows how, under ideal conditions, societies can choose research programmes reflecting the values of all citizens. Kitcher calls this ideal 'well-ordered science', and he proposes to apply it not only to politically controversial science but to any given society's entire research agenda.

To articulate his position, Kitcher asks us to imagine a group of 'ideal deliberators' who have widely varying science policy preferences. They are first instructed (by whom, Kitcher does not say) about the expected epistemic and practical significance of potential research programmes, transforming their initial preferences into 'tutored personal preferences' (p. 118). Next, the deliberators discuss their tutored preferences and compose a list of desired research outcomes. They then consult with experts to learn whether different lines of inquiry will actually realize the desired goals. A neutral arbitrator then assembles all the input into a set of alternative agendas for inquiry, specifying a range of funding levels for the projects in each. Lastly, the deliberators select an agenda by either consensus or majority vote. 'The result ... is the course of inquiry that best reflects the wishes of the community the ideal deliberators represent' (p. 121). Decisions about the best methods for pursuing research are left to scientists, with the exception of moral constraints on research specified by the deliberators. Once the research has produced outcomes, the deliberative process is used again to make decisions about the application and dissemination of results. Given that the entire procedure comprises an ideal, Kitcher assumes social inclusiveness, rational discussion, and mutual respect among the deliberators. He also explicitly assumes the existence of unbiased experts and a neutral arbitrator.

This ideal of 'well-ordered science' offers a provocative counterimage to the traditional view of science as a self-governing community. It also points toward an 'enlightened democratic' approach to science policy that Kitcher persuasively argues is better than any of the alternatives – that is, rule according to uninformed popular preferences ('vulgar

democracy'), rule by scientists ('internal elitism'), or rule by science patrons ('external elitism'). Kitcher's ideal also underlines the common sense notion that science should serve the public good, and thus helps illuminate many failings of current science policy. By contrasting science policy with the ideal of 'well-ordered science', Kitcher shows, for example, how the needs of disadvantaged groups are often neglected by the research agenda; how intriguing questions of epistemic significance are sometimes sacrificed to the short-term interests of poorly informed politicians; how scientists are often pressured into fostering unrealistic expectations of practical benefits so as to secure public funding; and how scientists sometimes promote research agendas with reference to social goals that can be more easily achieved by other means (pp. 127–135).

These are insightful and important points and deserve a wide hearing. Kitcher's discussion has the unusual advantage of locating the rationale for democratizing science within the dynamics of science itself – namely, in the need for scientists publicly to justify claims about scientific significance. This adds a significant dimension to the familiar claim that science requires some form of democratic control because it is publicly financed, benefits from the public infrastructure, and has significant implications for public life.

Nevertheless, I want to raise two concerns about 'well-ordered science': first, with reference to its content; and second, with regard to its potential role in the politics of science. I do not wish to guess whether the ideal will ever be realized, since its idealism is precisely what Kitcher thinks will enable it to guide practice. Nor is my aim to evaluate the ideal as a contribution to recent debates among political theorists about 'deliberative democracy'. Kitcher does not defend the claim that democratic politics should be deliberative, nor does he compare his notion of democratic deliberation with other theories of democracy. I wish only to examine Kitcher's view that an ideal such as his will help improve contemporary science policy.

Substance and Procedure in Deliberative Science Policy

It is useful to note that each of the failings Kitcher identifies in science policy concern the substantive outcomes of policy, not the procedures whereby policy gets made. This is apparently not accidental, as Kitcher suggests:

> [T]here's no thought that well-ordered science must *actually institute* the complicated discussions I've envisaged. The thought is that, however inquiry proceeds, we want it

to match the outcomes those complex procedures would achieve at the points I've indicated. Quite probably, setting up a vast population-wide discussion that mimicked the ideal procedure would be an extraordinarily bad idea, precisely because transactions among non-ideal agents are both imperfect and costly. So the challenge is to find institutions that generate roughly the right results, even though we have no ideal deliberators to make the instantaneous decisions we hope to replicate. (p. 123, original emphasis)

This passage suggests that Kitcher's primary concern is not so much with democratic deliberation, as with getting 'roughly the right results'. This gives undue priority to one-third of Abraham Lincoln's famous formulation of the democratic ideal: 'government of the people, by the people, for the people'. Despite Kitcher's rejection of elite governance by scientists and politicians, and despite his persuasive argument against 'objectivist' ethics, Kitcher appears more concerned with what government can do *for* people than with what people can do *by* government.[8] He seems to want a science policy attuned to what citizens *would* support, were they informed and able to express their views, rather than one which (more-or-less) informed members of the public might actually shape themselves. Kitcher cites John Rawls in his bibliographic essay, and apparently follows him in employing a subjunctive formulation of the deliberative ideal.[9]

Kitcher occasionally points briefly toward procedural issues, as when he effectively counters many of the standard arguments against participatory conceptions of democracy (pp. 133–135). But he always reverts to his primary concern with outcomes. This can be seen, for example, in his criti-

[8] Helen Longino briefly makes a similar point in 'Science and the Common Good: Thoughts on Philip Kitcher's *Science, Truth, and Democracy*', *Philosophy of Science*, 69 (4), (2002), 566, note 3. She then discounts the point, however, writing that Kitcher means to require that science funding agencies 'design structures (such as public oversight committees) that will mimic on a small scale ideal deliberation by the entire society' (*ibid.*). This is an interesting suggestion, but Kitcher does not make it himself, and even if it captures what he meant, it remains subject to several of the criticisms discussed below. It remains unclear, for example, to what extent such public oversight committees could appropriately be thought to represent the entire society.

[9] Rawls writes that 'full autonomy is realized by citizens when they act from principles of justice that specify the fair terms of cooperation they *would* give to themselves when fairly represented as free and equal persons'. *Political Liberalism* (New York: Columbia University Press, 1993), 77, emphasis added. As Frank I. Michelman notes, this requirement 'wouldn't yet require actual, public, discursive engagement among inhabitants over the contents of their country's constitutive laws. Rather, this requirement would be satisfiable, in theory, by everyone's separately reading, cogitating, and considerately endorsing a single philosopher's book . . .', 'How Can the People Ever Make the Laws? A Critique of Deliberative Democracy', in James Bohman and William Rehg (eds.), *Deliberative Democracy: Essays on Reason and Politics* (Cambridge, MA: MIT Press, 1997), 145–171, at 157.

cism of the scientists who secured funding for the Human Genome Project by exaggerating its potential medical benefits, while failing to articulate their fundamental interest in basic science. Kitcher notes, quite rightly, that although the scientists' strategy produced results consonant with his ideal of 'well-ordered science', 'the way of achieving this goal is unreliable, and that unreliability has serious consequences' (p. 131). But what worries Kitcher is not that misleading the public might have consequences for public willingness to participate in science policy-making. Rather, he argues that exaggerating the potential short-term benefits of research leads to hasty applications and complaisance with social problems that the public has been led to expect will be quickly solved by science (*idem*). These are insightful and important points, but they do not have much to do with improving democratic procedures.

One may ask, of course, whether Kitcher is right to avoid advocating procedures for informed public participation. Kitcher does not examine this question directly, but argues that 'the sociological information required to build realistic models [of lay participation in science policy] is currently not available' (p. 135). Kitcher probably knows more about contemporary social science than most social scientists know about his field, but it must be said that here he is simply mistaken. There is still a lot to learn about what kinds of institutions best foster democratic deliberation, and one can always find examples of lay incompetence. But empirical studies on such participatory venues as public hearings, citizen juries, and consensus conferences, as well as studies of political activism in response to technological risks, clearly show that lay people are capable of making intelligent decisions on complex technical issues.[10] Similarly, research on public opinion and political behaviour demonstrates that, although citizens tend to be poorly informed about specific candidates or policies, they use various cues and shortcuts to reach decisions that over time exhibit considerable reasonableness, stability, and coherence.[11] Steve Fuller makes the point with an analogy between science policy and professional sports.

[10] See the literature cited in note 4. Intelligent participation in science policy debates probably depends less upon knowledge of scientific facts and methods than upon a more easily acquired basic understanding of the institutional dynamics of science and science policy. See, among others, Jon D. Miller, 'The Measurement of Civic Scientific Literacy', *Public Understanding of Science*, 7 (3), (1998), 203–223; Martin W. Bauer, Kristina Petkova and Pepka Boyadjieva, 'Public Knowledge of and Attitudes to Science: Alternative Measures that May End the "Science War" ', *Science, Technology, and Human Values*, 25 (1), (2000), 30–51; and Fuller, *op cit.* note 4, 45–46.

[11] See Samuel L. Popkin, *The Reasoning Voter: Communication and Persuasion in Presidential Campaigns* (Chicago: University of Chicago Press, 1991); Benjamin I. Page and Robert Y. Shapiro, *The Rational Public: Fifty Years of Trends in American's Policy Preferences* (Chicago: University of Chicago Press, 1992); Stephen L. Elkin and Korel

When watching sports, 'the public has no difficulty evaluating a set of complex rules and skilled performances, following running commentaries and statistical indicators abstracted from those performances, and identifying its own fate with possible outcomes'.[12] If lay citizens can argue about professional sports, they can deliberate on science policy.

Of course, creating the social and institutional preconditions for lay deliberation on science policy – and the other forms of political activity that should accompany it – is a difficult task. Moreover, asserting that informed lay deliberation is possible does not show that it is desirable. There are a number of reasons, however, for supposing that a deliberative approach to science policy should consider both democratic procedures and results, and when in doubt, give priority to the former over the latter. This claim touches on a wide range of issues extensively debated by theorists of deliberative democracy. All I can do here is highlight a few considerations relevant to Kitcher's discussion.

First, Kitcher does not clarify how his deliberative ideal relates to the ideal of democratic representation. In this respect, Kitcher's contrast between 'enlightened democracy' and rule by elites is somewhat misleading. Modern democracies are necessarily representative, so even an enlightened democracy requires some elements of elite rule, because selecting representatives logically implies picking a candidate deemed better than other candidates.[13] This point is often missed in discussions of the relationship between science and democracy. Scholars tend to focus on the ways that science incorporates both egalitarian and elitist elements (e.g., norms of public discussion and transparency, on the one hand, and merit-based restrictions on membership, on the other), but then equate democracy with its egalitarian elements (e.g., voting rights) and neglect its elitist elements (voting is a process for selecting representatives who, for a specified time, rule over others).[14] Kitcher remarks that the ideal deliberators are representatives, but does not fully explore the implications of this.

Edward Soltan (eds.), *Citizen Competence and Democratic Institutions* (University Park: Pennsylvania State University Press, 1999).

[12] Fuller, *op cit.* note 4, 148.

[13] Bernard Manin, *The Principles of Representative Government* (Cambridge: Cambridge University Press, 1997), 134–149.

[14] For an example, see Jean-Jacques Salomon, 'Science, Technology and Democracy', *Minerva*, 38 (1), (2000), 33–51, at 33. Salomon's apparent equation of democracy with voting on the first page of his article might appear to clash with his suggestion at the end that genuine lay participation in science policy should involve 'citizen control' over decisions through consensus conferences and referendums. In each case, however, Salomon implicitly frames the issue in terms of elite versus popular control, thus neglecting the issue of political representation, which depends upon combining them.

He notes only that it does not matter whether each deliberator is thought to represent a group of like-minded citizens or an individual citizen in a one-to-one relation, and that the deliberators ought to consider the needs of both other societies and future generations (pp. 123–126).

Given his claim that it is unnecessary to institute a population-wide approximation of ideal deliberation, it appears that Kitcher does not see the deliberators as actively 'representing' their constituents in the sense of promoting their best interests while remaining responsive to their expressed wishes.[15] Rather, the representative activity of the deliberators seems to involve 'making representations of' their constituents' perspectives on science policy. The deliberators might thus be said to 'stand for' rather than 'act for' their constituents.[16] Here Kitcher again implicitly follows Rawls, who called the thought experiment at the centre of his theory of justice a 'device of representation' that 'serves as a means of public reflection and self-clarification'.[17] However, this amounts to a philosophical rather than political form of representation. That is, without input from their constituents, the deliberators must rely upon introspection, intuition, or speculation to assess popular preferences. It may be appropriate to view the deliberators in this sense, provided that their recommendations have no binding force on elected officials. But Kitcher's ideal is at best only one part of an ideal process of democratic representation, which requires that representatives remain responsive to the views expressed by citizens themselves.

Second, even if the primary aim of lay participation remains the achievement of desirable outcomes, democratic thinkers from Thomas Jefferson to Robert Dahl have argued that the best cure for the ill effects of lay participation is more participation.[18] Citizens cannot learn to participate, and then participate, but must learn through participation. This is not to say that the introduction of participatory institutions can replace

[15] 'A representative government must not merely be in control, not merely promote the public interest, but must also be responsive to the people. [. . .] Correspondingly, a representative government requires that there be machinery for the expression of the wishes of the represented, and that government respond to these wishes unless there are good reasons to the contrary. There need not be a constant activity of responding, but there must be a constant condition of responsive*ness*, of potential readiness to respond'. Hanna Fenichel Pitkin, *The Concept of Representation* (Berkeley: University of California Press, 1967), 232–233.

[16] *Ibid*., chaps. 4–6.

[17] Rawls, *op. cit.* note 9, 25, 26. For a critique of Rawls on this and other points, see Roberto Alejandro, 'What is Political about Rawls's Political Liberalism?', *Journal of Politics*, 58 (1), (1996), 1–24.

[18] See Robert A. Dahl, *Democracy and Its Critics* (New Haven: Yale University Press, 1989).

concern with substantive outcomes, as deliberative theorists often seem to suggest. Nor does it imply that democratic procedures are value-neutral, as standard liberal theory asserts. The authority of procedures always rests on the underlying substantive values that motivate and justify them. But even if enhanced participation does not produce immediate and desirable results, it is a key part of the means by which such results are in the long run achieved.

Third, participation provides indirect substantive goods. As Mill put it, 'Among the foremost benefits of free government is that education of the intelligence and the sentiments, which is carried down to the very lowest ranks of the people when they are called to take a part in acts which directly affect the great interests of their country.'[19] This claim is not to be confused with the Aristotelian view that participation is an inherent part of the good life, nor with the communitarian notion that political activity necessarily fosters virtuous behaviour and social membership. Even under favourable conditions, there is every reason to expect that political participation may increase social conflict, challenge personal identities, and in general not be much fun.[20] Moreover, it makes little sense to argue that participation should be undertaken for the sake of indirect benefits, because these only arise as a by-product of instrumental goals.[21] The point is merely that political participation should be welcomed not only for its contribution to outcomes, but also for its effect on citizens' knowledge, habits, and skills. One might even view the indirect benefits of political participation as the inverse of the practical benefits of science – that is, just as participation undertaken for instrumental ends may bring intrinsic benefits to those who participate, scientific research 'for its own sake' may also bring society instrumental benefits.

In some cases, substantive and procedural values conflict. Threats to public safety, for example, may require that outcomes receive initial priority over democratic procedures.[22] But when in doubt, popular sover-

[19] John Stuart Mill, *Considerations on Representative Government* (1861), in John Gray (ed.), *On Liberty and Other Essays* (New York: Oxford University Press, 1991), 327.

[20] See Mark E. Warren, 'What Should We Expect From More Democracy? Radically Democratic Responses to Politics', *Political Theory*, 24 (2), (1996), 241–270.

[21] Attempts to turn the byproducts of political activity into its goal lead to a narcissism that tends to undermine the byproducts. See Jon Elster, 'The Market and the Forum: Three Varieties of Political Theory', in James Bohman and William Rehg (eds.), *Deliberative Democracy: Essays on Reason and Politics* (Cambridge, MA: MIT Press, 1997), 3–33, esp. 20–25.

[22] One must also here distinguish between substantive goods that may foster democracy but are not an integral part of it (such as science and technology), and goods that are either integral to the democratic process (freedom of speech and assembly) or a precondition for

eignty requires that democracies err on the side of procedure. Might this lead to less efficient, even highly inefficient, science policy? Might it cause billions of dollars to be taken from research projects of great scientific significance and devoted to the short-term needs of short-sighted people? Probably not – but yes, it might. However, that is one of the risks of democracy. It is remarkable how many people readily accept the many risks of science and technology while rejecting those of democratic government.[23]

Now it might well be that, despite the statements quoted above, Kitcher actually means to endorse popular participation in science policy. That is certainly the reading of a few disgruntled scientists who have reviewed the book. Lewis Wolpert complains that 'Kitcher's analysis ... suggests that citizens should have a key role in the funding of science'.[24] And David Goodstein writes that Kitcher 'concludes that ideally the decisions that set the agenda of science would be made democratically, with the informed collaboration of every segment of society'.[25] If Kitcher actually thinks more lay people should be directly involved in science policy-making, it is a shame that he did not endorse that goal more clearly and examine its implications more fully. The reason he did not do so may lie in his understanding of the relationship between philosophy and politics.

PHILOSOPHICAL IDEALS AND SCIENCE POLICY PRACTICE

For Kitcher, philosophy comes first, providing a standard that political theory and political science should translate into practice. He thus humbly remarks, 'I hope the ideal will serve as a first shot at the kind of standard we need, and will provoke others to refine (or replace) it and to do the empirical work of connecting it with the concrete decisions that now confront

it (public safety). It is easier to justify a suspension of the democratic process for the sake of the former than for the latter. On this point, see Dahl, *op cit.* note 18, ch. 12.

[23] See Langdon Winner, *The Whale and the Reactor: A Search for Limits in an Age of High Technology* (Chicago: University of Chicago Press, 1986), 39. This point is nicely echoed in a symposium on Fuller's *Governance of Science*: 'Democracy, especially of the republican variety, is bound to be ... a weird, cranky sort of thing, always bootstrapped, with no ideological preconditions on who's rational and who gets to speak ... . Does graduate or professional education in science prepare anybody for a world in which the Kansas creationist episode is standard fare?' William Keith, 'Good Questions in Search of Good Answers', *Futures*, 34 (2002), 178–181, at 181.

[24] Lewis Wolpert, 'Unpersuasive Thoughts and Unhelpful Ideals', *Science*, 295 (25 January 2002), 633.

[25] David Goodstein, 'Setting Scientific Agendas', *American Scientist* (March–April, 2002), at http://www.americanscientist.org/bookshelf/Leads02/scitruthdem.html.

us' (p. 146). At another point he states, 'Once the ideal of a well-ordered science is recognized, there's an important need for a political theory of science that will consider the various ways in which the interests of actors and social institutions might easily divert us from the outcomes that would be reached in a state of well-ordered science' (p. 133, note 8).[26] Looking at the failed attempts of the US National Institutes of Health to integrate public debate into science policy, he locates the difficulty in its failure to 'articulate just what the democratic ideal should be' and to address 'empirical questions about how to promote that ideal' (p. 145). But can one really expect to improve science policy by contrasting it with an ideal? There are several reasons to be skeptical.

First, when policy discussions focus on comparisons between realities and ideals, the goal tends to shift from action to knowledge, from decisions towards speculations. The hair-splitting debates common among dogmatic proponents of Communism, anarchism, or any other utopia suggest the risks of applying philosophical ideals to political activity. To the extent that philosophers succeed in converting political deliberation into epistemological debate, they dampen the spirit of creativity, innovation, and experiment that is arguably central to democracy.[27] To the extent they fail, as they usually do, philosophy becomes irrelevant to politics. Furthermore, it is important to remember that deliberation is only one aspect of politics. The most common models of deliberative politics, which (like those of Rawls and Kitcher) emulate courts and juries, typically limit political considerations because they assume the existence of a 'right outcome'. Courts are, of course, embedded within political institutions, but in seeking a single true answer they are fundamentally apolitical. Even if people agree that it is imperative to do X, they will likely disagree about how or when

[26] Although Helen Longino's review does not raise the point I make here, in his reply Kitcher restates this view of philosophy: 'Well-ordered science is intended as an ideal, and, though my 2001 book poses the problem of how we might work towards this ideal, I believe that solving this problem (giving a substantial account of the governance of science) requires a significant body of empirical knowledge (which I lack). Thus I provide evidence to show how scientific research currently seems to be organized in ways that lead it to diverge from my ideal, and invite a collaboration between philosophy of science and the social sciences to investigate how we might make up for some of the deficiencies'. Philip Kitcher, 'Reply to Helen Longino', *Philosophy of Science*, 69 (4), (2002), 569–562, at 569–570.

[27] See Benjamin R. Barber, 'Foundationalism and Democracy', in Seyla Benhabib (ed.), *Democracy and Difference: Contesting the Boundaries of the Political* (Princeton: Princeton University Press, 1996), 348–359.

or at whose expense. That is why permanent agreement on political issues is rare.[28]

Second, when public officials adopt ideals elaborated by philosophers, they risk setting political goals that are neither appropriate nor welcomed by their constituents. No matter how persuasive a philosopher's argument that a particular policy is right, good, or just, this by itself does not make the policy democratically legitimate. Moreover, hypothetical deliberation under ideal conditions – such as that of Kitcher's 'well-ordered science', as well as Rawls's theory of justice – cannot generate the collective learning fostered by actual deliberation among citizens. As Jürgen Habermas once put it, 'Moral justifications are dependent on *argumentation actually being carried out*, not for practical reasons of an equalization of power, but for internal reasons, namely that real argument makes moral insight possible'.[29] Similarly, Amy Gutmann and Dennis Thompson point out, 'To fulfil the purposes of deliberation in a democracy, it is not enough that the policy *could* be justified. The political process of justification itself shapes in several ways the nature and validity of the reasons that officials give'.[30]

For these authors, the point of hypothesizing ideal deliberation is not to formulate ideal policies, against which real policies can be measured, but

[28] Michael Walzer, 'Deliberation, and What Else?', in Stephen Macedo (ed.), *Deliberative Politics: Essays on Democracy and Disagreement* (New York: Oxford University Press, 1999), 58–69. The problems with over-emphasizing the role of deliberation in the democratization of science are discussed in Hans Radder's review of Fuller's 'Governance of Science', in *Science, Technology, and Human Values*, 25 (4), (2000), 520–534, at 523–524.

[29] Jürgen Habermas, *Moral Consciousness and Communicative Action* (Cambridge, MA: MIT Press, 1990), 57, emphasis added, see also pp. 66–67. This point is further explained in Samuel Freeman, 'Deliberative Democracy: A Sympathetic Comment', *Philosophy & Public Affairs*, 29 (4), (2000): 371–417, at 385–386. It is worth noting that, despite his rejection of Rawls's notion that individuals can use a thought experiment to determine principles of justice without engaging in deliberation with others, Habermas's own approach also involves a thought experiment. The difference is that, for Habermas, citizens rather than philosophers do the experimenting. Actual practices of deliberation should require that *each participant* make judgments about what would be agreed to by hypothetical persons in an 'ideal speech situation' – that is, persons who are fully rational, completely informed, mutually attentive, and morally responsible.

[30] Amy Gutmann and Dennis Thompson, *Democracy and Disagreement* (Cambridge, MA: Harvard University Press, 1996), 100, emphasis added. Similarly, Gutmann and Thompson argue, 'The distance between theory and practice is less in deliberative theories than in other theories of justice. Theory itself becomes subject to practical test under certain conditions and, to this extent, is less autonomous than other theories are usually assumed to be.' See 'Democratic Disagreement', in Stephen Macedo (ed.), *Deliberative Politics: Essays on Democracy and Disagreement* (New York: Oxford University Press, 1999), 243–277, at 277.

rather to set standards for actual instances of deliberation. Actual deliberation allows participants to develop a sense of commitment to the norms at issue, and to remain the last court of appeal concerning their own interests. From this perspective, the problem with Kitcher's approach to combining philosophy and science policy is not simply that it is 'abstract', as one reviewer has suggested.[31] Rather, Kitcher's approach threatens one of the fundamental principles of modern democracy – namely, that citizens see the polity as something they have made themselves.

A third reason to be skeptical about Kitcher's approach lies in its division between means and ends. If philosophy contributes to politics by articulating ideal ends, as Kitcher suggests it ought, politics easily becomes restricted to questions of means. A central element of political life is thus removed from the realm of collective choice and democratic legitimation.[32] As John Dewey argued, if philosophically determined ends are not adjusted reflexively in light of available means, they quickly acquire an other-worldly aura, fostering either cynicism or sentimentalism.[33] Kitcher's ideal might thus be expected to promote either naive dreams of participatory democracy, or disdain for concrete efforts to involve lay people in science policy. Of course, Kitcher's book might be read as an invitation to contribute to, rather than as an attempt to short-circuit, the political process. After all, Kitcher is nobody's philosopher-king and he has not been authorized to provide moral direction for science policy. He clearly states that he can do nothing more than provide '*an* answer' to which others may respond (p. 116, original emphasis). Kitcher wants his 'answer' to be understood as an argument, but his answer says nothing about how to construct an institutional space where others might argue with him. Insofar as his well-ordered science amounts to a substantive rather than procedural standard, he discourages others, particularly non-philosophers, from critically engaging with it.[34] Such critical engagement,

[31] See Jay Aronson's review of the two books: Kitcher's *Science, Truth, and Democracy* and Daniel Lee Kleinman (ed.), *Science, Technology, and Democracy* (Albany: State University of New York Press, 2000), in *Science, Technology, and Human Values*, 28 (1), (2003), 162–168.

[32] Kitcher's ideal, of course, does not come out of thin air, and he notes that it depends on contemporary liberal-democratic values (pp. 123–124). Not all such values can be questioned at once, of course, but in principle they must remain open to public scrutiny.

[33] John Dewey, 'Reconstruction in Philosophy' (1920), in Jo Ann Boydston (ed.), *The Middle Works* (Carbondale and Edwardsville: Southern Illinois University Press, 1988), vol. 12, 121.

[34] Habermas makes a similar point when he argues that 'Rawls views the substantive parts of his study . . . not as the *contribution* of a participant in argumentation to a process of discursive will formation regarding the basic institutions of late capitalist society, but as the outcome of a "theory of justice", which he as expert is qualified to construct' (*op. cit.* note

however, is precisely what leads people to develop a feeling of 'ownership' in social ideals.

Fourth, Kitcher's view of politics – as a matter of approximating ideal standards – tends to push political discussion towards questions of individual rather than collective action. 'What should I do?' is a question that can plausibly be addressed in light of an ideal standard. But in a diverse society, the question, 'What should *we* do?' can only be answered democratically with reference to specific instances of collective decision-making. Ideal standards thus tend to individualize ethical questions. Ironically, they do so no less effectively when the ideal standard is one of collective deliberation. This individualist bias of ideal standards appears in Kitcher's concluding chapter, in which he offers a sample application of his ideal to research ethics in genetics. He carefully notes that the problems are 'entangled with larger sociopolitical questions' (p. 189) and that many of the ethical dilemmas faced by genetic researchers can be traced to 'a broader failure of democratic commitment' (p. 194). He also argues that the NIH's Ethical, Legal, and Social Implications programme failed precisely because it was based on the assumption that one could separate ethical principles from political arguments (p. 189). But despite these nods to socio-political issues, in the end Kitcher's normative claims remain at the level of individual ethics.[35] He notes that 'researchers have responsibilities, individually and collectively' (p. 197), but he does not thematize the collective responsibilities. Similarly, as another reviewer has noted, he does not consider the systematic differences between situations faced by privately and publicly funded scientists.[36] Instead, he pleads lack of professional competence in political questions, and concludes with recommendations for individual scientists coming to terms with conflicts between personal ideals and professional constraints. It may well be that some scientists can benefit from such advice, but it does not amount to a democratic political philosophy of science policy.

Finally, it is worth noting that Kitcher's comments on the relationship between theory and practice in politics contradict his treatment of the same

29, 66, original emphasis). 'The moral theorist may take part in [substantive discourses] as one of those concerned, perhaps even as an expert, but he cannot conduct such discourses by *himself alone*. To the extent to which a moral theory touches on substantive areas – as Rawls's theory of justice does, for example – it must be understood as a contribution to a discourse among citizens' (*ibid.*, 94).

[35] Kitcher's approach thus reflects the widespread individualist bias in research ethics (see the discussion in Fuller, *op. cit.* note 4, 22–25). This is ironic, given that Kitcher chastises mainstream philosophy of science for treating diverse scientific communities as 'a magnified version of the individual' (p. 110).

[36] Longino, *op. cit.* note 8, 567.

issue in his philosophy of science. In his discussion of scientific significance, for example, he rejects the view – defended by the mid-twentieth-century Unity-of-Science movement – that the significance of particular research projects rests on their contribution to formulating general laws of nature. Thus, 'is there any reason to think that significance flows from the general (or the "causally fundamental") to the particular, rather than having its source in very specific concerns about particular types of properties of entities that matter to us . . .?' (p. 77). By analogy, one might ask: is there any reason to think that democratic politics flows from general philosophical ideals to particular political actions? More generally, one could apply many of Kitcher's criticisms of mainstream philosophy of science to his own conception of political philosophy – with its stark division between pure and applied research, its emphasis on logical problems of justification, and its reduction of a fundamentally social process to a matter of individual knowledge. Whereas Kitcher asserts the need for a contextual approach to the philosophy of science, in his political philosophy he offers an abstract ideal and leaves the work of contextualizing it to others.[37]

CONCLUSION

So does philosophy have no constructive role to play in the democratization of science? One reviewer suggested as much. Noting that the US National Science Board has already committed itself to the notion that science should serve the public interest, Richard Lewontin laconically concludes that 'Kitcher could have saved himself a lot of trouble. We are already in a state of well-ordered science.'[38] But this goes too far, because philosophy is indispensable to the task of designing, justifying, and clarifying efforts to make science policy more democratic. But a truly *political* philosophy of science policy needs to build upon the recognition that philosophy does not become political simply by treating politics in a philosophical way. Rather, philosophy becomes political when it adopts concepts, methods, and aims appropriate to the world of politics. One might argue that Kitcher's philosophy is political in that it seeks to

[37] In this lack of consistency between his political philosophy and his philosophy of science, Kitcher would be subject to the same criticisms recently levelled by I.C. Jarvie at Michael Polanyi and Karl Popper. Jarvie accuses both philosophers of being 'inconsistent', because they did not apply the principle of critical inquiry to both politics and science equally. See I.C. Jarvie, 'Science in a Democratic Republic', *Philosophy of Science*, 68 (4), (2001), 545–564, esp. 547, 557.

[38] Richard Lewontin, 'The Politics of Science', *The New York Review of Books* (9 May 2002), 30.

establish order, articulate rules, and provide philosophical sanctions for the use of power. But it is not political in the sense of conceptualizing or facilitating actual public deliberation about the political order itself.[39] From this perspective, Kitcher's deferral to social scientists is simply the flip side of his disinterest in adapting philosophical ideals to social scientific knowledge. There is nothing wrong with an academic division of labour in which philosophers focus on issues of justification, for example, and social scientists, on questions of institutional design. But the division of labour works best when it is undertaken cooperatively, in such a way that practitioners in different disciplines can make use of each other's work. Philosophers who fail to give consideration to institutional questions risk developing theories that obscure rather than illuminate the problems of social science.[40]

I cannot answer the question: what should be the aims and methods of a distinctly political philosophy of science policy? But it seems that it could do worse than to join Dewey's search for 'a philosophy which will intervene between attachment to rule of thumb muddling and devotion to a systematized subordination of intelligence to preexisting ends . . .'[41] Rather than offering an ideal standard to work *for*, a political philosophy of science policy could explore ideas and ideals that people could or do work *with*. It might, among other things, explicate the logic and implications of political practices; analyze the concepts and categories of science policy; and formulate hypotheses for research. Rather than seeking to resolve the tensions between science and democracy, it could articulate ways to cope with them democratically. This is not to say that there is one best way of doing the political philosophy of science policy, nor that Kitcher's book does not merit the label. An approach inspired by Rawls, like Kitcher's, will certainly look different from one inspired by Dewey, but both make important contributions. Indeed, Kitcher identifies many key failures of contemporary science policy and offers persuasive reasons for addressing them in light of a broad range of social, political, and scientific concerns.

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[39] On this point see Sheldon S. Wolin, 'The Liberal/Democratic Divide: On Rawls's *Political Liberalism*', *Political Theory*, 24 (1), (1996), 97–118, esp. 117; and Alejandro, *op. cit.* note 17, 20ff.

[40] Despite their focus on the philosophical aspects of deliberation, Gutmann and Thompson (*op. cit.* note 30) avoid this problem by also devoting considerable attention to questions of institutional design, thus ensuring that their theory remains relevant for such questions.

[41] Dewey, *op. cit.* note 33, 121.

ACKNOWLEDGEMENTS

For helpful comments and criticism, many thanks to Matthias Adam, Marvin Brown, Justus Lentsch, two anonymous reviewers, the Editor of *Minerva*, and colleagues at the Institute for Science and Technology Studies, Bielefeld University.

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