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TEN

The Practices of Objectivity in Regulatory Science

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Objectivity and Public Reason

Of all the noteworthy features of modernity, one of the most remarkable, yet least remarked, is our reliance on policy makers to know what is good for us. "We," after all, are not children or persons who through age, infirmity, or accident of heredity have lost the ability to think for ourselves. It is "we the people" of mature democracies who have delegated the task of public knowledge making to policy makers who serve us, in this regard, almost in loco parentis. These anonymous guardians know, as we do not, when our air is safe to breathe, what speeds are tolerable on our roadways, where to install our fire alarms and light switches, which drugs to take without intolerable side effects, and what counts as malpractice in medicine or stock trading. Not only do we, as adult citizens of democratic societies, not know the answers to such questions, but for the most part, we do not even know how answers are produced or why we should rely on them. Citizens delegate such issues to unelected policy makers and trust the policy system on the whole to make the right choices.

But why do modern societies rely on policy makers' epistemic expertise and good sense? What makes policy knowledge credible? That question deserves a great deal more attention than it has received in the social sciences. Even the field of science and technology studies (STS), which takes as its problematic all aspects of knowledge production and use, has devoted less energy to studying knowledge making in policy environments than in laboratories or other scientific workplaces. It is well established that knowledge created to serve policy needs—especially regulatory science—is socially distinct from other forms of knowledge. Knowledge for policy is produced in institutional settings and under criteria of validity that differ from those of "basic" or "research" science (Jasanoff 1990). It is equally well

understood that such knowledge is contingent, vulnerable to criticism, and tends to unravel under adversarial challenge (Collins 1985; see also Nelkin 1992). The puzzle is how such weakly institutionalized knowledge withstands partisan attacks and manages to keep the engines of policy humming without paralyzing conflict or stifling dissent.

That problem becomes even thornier when we look at policy making above the level of the nation-state. Unlike national governments, which certify their knowledge claims through relatively well-established administrative processes, global policy making unfolds in a zone of tacit knowledge and implicit rules. Norms, including the epistemic norms that underpin all public knowledge, are constituted at the global scale through practices that are rarely exposed to critical scrutiny from citizens or social scientists. As a result, it is not known, for instance, whether global policy systems manufacture autonomous rules of reasoning, superseding those of nation-states and substate entities, or whether particular national ways of knowledge making become hegemonic in global institutions at the expense of other possible approaches.

In this chapter, I address both sets of puzzles: how policy-relevant knowledge attains stability at all and how global knowledge transcends national particularities. I argue that the authority of such knowledge rests on a highly sought-after and hard-won epistemic achievement, namely, objectivity. The term "objective" means, in its dictionary definition, "not influenced by personal feelings, interpretations, or prejudice; based on facts; unbiased."¹ Objectivity, in other words, partakes of the neutrality and impartiality of science itself, and demonstrations of objectivity can insulate the claimant against charges of arbitrariness or self-interest. In the skeptical modern world, objectivity is therefore a priceless adjunct to governmental power. But how are objectivity claims sustained when arguments for any significant policy position can be (and often are) opposed by strong counterarguments, and huge stakes ride on the resolution? The short answer is that making objectivity takes hard work. That work, as described in this chapter, is culturally situated, contested, and enacted at multiple sites and organizational levels. In other words, the ideal of policy objectivity is differently articulated in disparate political cultures and is performed and reproduced by diverse actors operating only in loose concert with one another. Objectivity reflects, in this sense, locally powerful ideologies of public reason.

To elaborate this argument, I review the institutionalized practices of

1. See definition 5 of "objective" (adjective) online at <http://dictionary.reference.com/browse/objective> (accessed April 11, 2011).

policy making from three angles to show how the objectivity of policy knowledge is operationally constructed. My first analytic lens is comparative, across national policy cultures. Here, I draw on the literature of comparative regulatory policy, including my own prior work, to illustrate how national styles of epistemic legitimation constitute the objectivity of policy-relevant knowledge. Focusing on risk regulation, I show that American law and policy have favored a type of objectivity that I call (borrowing a phrase from the philosopher Thomas Nagel) the "view from nowhere."² This approach to claims making achieves power by ostensibly detaching knowledge from potentially biased standpoints and from the distortions that any perspective or viewpoint necessarily entails. Regulatory objectivity in America, in short, rests on the kind of purification that scientists have historically aimed for in making representations of nature (Daston and Galison 2007; Latour 1993).

My second lens is procedural. I examine in microdetail three U.S. administrative practices—quantitative risk assessment, expert peer review, and judicial review of administrative decisions—that have worked in tandem to produce what passes as objective knowledge for purposes of risk management. This analysis directly confronts the problem of stability in the contested environment of high-stakes policy making. It illustrates deeply institutionalized modes of achieving pragmatic closures around epistemic claims and controversies that science alone could not have settled.

My third analytic tool is a mini-case study through which I look at the construction and maintenance of objectivity in one global regulatory body, the World Trade Organization (WTO). Here, in a first-person narrative voice, I analyze the WTO as a knowledge-producing institution through a proceeding in which I played a substantial personal role. This was a procedurally successful attempt to present an *amicus curiae* (friend of the court) brief to the WTO to expand that body's use of social science knowledge. The shift of voice and method in this section underscores one of my prime

2. Thomas Nagel (1986) uses the phrase the "view from nowhere" to characterize objective scientific knowledge, which he distinguishes from standpoint-based subjective perceptions of reality. While he concedes that these two standpoints are in tension, he does not denigrate or deny the possibility of constructing more and more objective representations of the world as it is. Donna Haraway (1988, 589) rejects the idea of a view-from-nowhere objectivity in favor of "situated knowledges," which she equates with the objectivity of an embodied, feminist perspective: "I am arguing for the view from a body, always a complex, contradictory, structuring, and structured body, versus the view from above, from nowhere, from simplicity." While my essay is broadly sympathetic toward Haraway's position that all objectivities are situated and embodied, my analytic focus is not on objectivity per se, nor on the relationship between subjectivity and objectivity, but on the role of objectivity as a cultural resource in collective knowledge making, institutional legitimation, and the construction of public reason.

theoretical arguments about the robustness of policy-relevant knowledge. It is constituted, in my view, by a cluster of highly specialized, routinized, opaque, and unreflexive micropractices, which may add up to hegemonic formations at the national and global levels because no one is studying (let alone intervening in) them. There is little analytic literature on the ways in which global policy knowledge—for example, what the WTO accepts as good science about risk—gets formed or articulated. By narrating this story, I show how the American understanding of objectivity, itself not universal but situated, has become embedded in the WTO to the point where it is difficult for new perspectives to find a way in or for critique to make a difference.

Through these sequenced moves across national, international, and global institutional scales, I not only display the complex and contested practices that produce and certify the objectivity of policy-relevant knowledge but also suggest that a multisited, indeed multivocal, approach is best suited to the sociological exploration of knowledge-power dynamics in a globalizing world.

Objectivity in Science and Policy

Objectivity in itself is not a new topic for students of science. Historians and sociologists of science have long contended that the most taken-for-granted features of scientific knowledge, such as objectivity, intelligibility, and truth itself, are social achievements that can be documented through careful inquiry (Dear 2006; Shapin 1994; Shapin and Schaffer 1985). In their social history of objectivity, Lorraine Daston and Peter Galison (2007) trace the concept's evolution through the production of scientific atlases in the nineteenth century. They discern three stages in the formation of what they evocatively call the "blind sight" of objectivity: truth to nature, in which the experienced observer represents an ideal of reality; mechanical objectivity, in which recording instruments remove the bias of the observer; and trained judgment, for which the observer's eye is disciplined by shared professional norms.

The periodicity of this development has been questioned (Porter 2007), and the three modalities of objectivity identified by Daston and Galison are more interdependent, both temporally and in practice, than the authors acknowledge. More constraining for our purposes, however, is their narrow focus on scientific atlases, which cannot do justice to the wide circulation of objectivity as an ordering concept in society. Histories of scientific practices, concentrating as they do on representations of na-

ture, overlook the dual role that objectivity plays whenever knowledge is invoked as a rationale for power—as a legitimator of knowledge and also of the knowledge maker. Once scientific claims reach past conversations among scientists into contexts of use and empowerment, what matters is not only how truly the scientific observers have rendered nature but also how objectively decision makers have resolved the interpretive flexibility of available knowledge. This double hermeneutics of objectivity is always on the line in policy conflicts: questions center not only on the right way to read nature's manifestations but also on the right ways to translate ambiguous observations into policy.

Contemporary studies of regulatory politics thus provide essential inputs to my analysis of objectivity, supplementing historical and philosophical accounts. According to one well-documented body of research, science produced for policy commands respect because—though deeply enmeshed in politics—it successfully invokes the wider cultural authority of pure science. During regulatory controversies, varied credibility-enhancing mechanisms, such as expert peer review, are used to pull contested claims back into the preserves of certified knowledge. The most common strategy for distinguishing valid policy-relevant knowledge from mere politics is epistemic boundary work: the demarcation process through which official interpretations of relevant evidence are placed on the "good science" side of the margin that separates objective knowledge from illegitimate, politically tainted, or subjective preferences (Gieryn 1995; Jasanoff 1987, 1990).

Another approach to explaining the authority of policy-relevant science stresses the performative dimension of claims making in public fora. Here, the concern is not primarily with how policy actors sort out authority problems when challenged by interested parties but more with how they communicate their decisions to wider audiences. Thus, experts speaking for the National Academy of Sciences tend to present their findings through carefully orchestrated performances, in which certainty and reliability command the action on the frontstage while doubt and uncertainty, even if privately acknowledged, are relegated to the relative obscurity of the backstage (Hilgartner 2000). Performance builds authority even more plainly in the courtroom, that most skeptical of all the spaces in which we see public knowledge making in action. Advocates establish the credibility of their expert witnesses through a series of ritualized moves, as if manipulating pieces on a game board, so that expert testimony carries the ring of objective truth (Jasanoff 1998).

These approaches to analyzing scientific authority reflect the turn toward practice in the social studies of science in recent decades. In contrast

to historical accounts that link scientific success to scientists' styles of work, sociological approaches stress the added work of representation and persuasion that actors must do to project credibility, objectivity, and truth to nonscientific audiences. In this chapter, I follow this line of scholarship by describing the specialized legal and political practices of reasoning that establish the objectivity of policy-relevant knowledge. Much of the "knowledge work" done in policy settings is abstract, nonmaterial, and manifested in habitual forms of argument. Just as a pianist knows without thinking how to dramatize a crescendo or modulate a diminuendo, so habits of reasoning are inculcated into policy actors until they become almost automatic, built into their forms of life or, in Bourdieu's term, their habits. Uncovering the epistemic habits that enter into the making of objectivity calls for the ethnographer's eye, the literary critic's sensitivity to text and discourse, and the sociologist's awareness of organizational structures and dynamics. It also requires sensitivity to the political contexts in which the coin of objectivity is minted.

Objectivity, American Style

Speaking at the National Academy of Sciences in 1990, George Herbert Walker Bush, forty-first president of the United States, neatly summed up the dual role of objectivity as a legitimator of both science and politics:

Science, like any field of endeavor, relies on freedom of inquiry; and one of the hallmarks of that freedom is objectivity.

Now more than ever, on issues ranging from climate change to AIDS research to genetic engineering to food additives, government relies on the impartial perspective of science for guidance. And as the frontiers of knowledge are increasingly distant from the understanding of the many, it is ever more important that we can turn to the few for sound, straightforward advice. (Bush 1990)

This statement from a man not known for eloquence articulates a political philosophy for modern times. Here, Bush acknowledges the specialization of science, the distancing and possible alienation of citizens from technical decision making, and society's reliance on experts. Recognizing the tension for democracy when the incomprehending many must depend on the knowledgeable few, the president offers a simple remedy—objectivity, secured through "sound, straightforward advice." In different words, but expressing a similar faith in objectivity, presidential candidate Hillary Clin-

ton (2007) spoke at another respected forum, the Carnegie Institution for Science, on the fiftieth anniversary of the Soviet Union's launch of *Sputnik*: "Less than two weeks after news of Sputnik swept the globe, President Eisenhower called a meeting of his Science Advisory Committee and asked for recommendations. He would come to rely on that panel for unfinished, evidence-based scientific advice."

A striking feature of both comments, too often echoed in American policy discourse to be dismissed as chance or irony, is the distancing of the advice that policy makers need from the persons charged with providing it. Bush and Clinton both assume that scientific advice, like science itself, can be impartial, sound, straightforward, unvarnished, and evidence based—all terms that depend on impersonal, exogenous standards of validity. Both political leaders take for granted that expert judgments, even in contested policy domains, can be driven by "science" and "evidence," words that effectively erase the stamps of agency and subjectivity. Even evidence relevant to policy, in Bush's and Clinton's telling, can be located in a world in which facts speak for themselves, unmediated by biased and fallible human actors. The personalities and viewpoints of the knowledge producers become irrelevant if they do their job right. It is their objective, evidence-based findings that carry weight, as the best approximations to the facts of the matter.

The cultural particularity of this U.S. insistence on standpoint independence has been persuasively documented through cross-national comparison. Studies of science-based regulation over the past few decades display the persistent strategies of depersonalization that distinguish U.S. policy making from other regulatory cultures (Brickman, Jasanoff, and Ilgen 1985; Jasanoff 2005a; Porter 1995; Vogel 1986). U.S. policy processes include greater reliance on scientific evidence to justify governmental decisions, significantly more polarized debate about the quality of scientific and technical assessments, and a marked preference for quantitative analysis and formal models to manage both what is known and what remains uncertain. The very fact that policy controversies so often play out in a scientific idiom draws attention away from human decision makers, while modeling and quantification hide professional judgment behind the seeming objectivity of formal simulations and mathematical representations.

The contrast between the United States and Britain is especially stark on all these dimensions. For example, far from dissociating policy expertise from personal affiliations, British investigative and advisory commissions are routinely identified with an eminent chairperson, as if the legitimacy of advice depends on the virtue of the orchestrator of the advisory process. In

return, successful handling of such proceedings serves as a stepping stone to higher office and honors for those who, in Othello's words, "have done the state some service." Thus, the 1998–2000 inquiry following Britain's economically and politically wrenching "mad cow" crisis took its name from Lord (Nicholas) Phillips of Worth Matravers, who became a Law Lord during his conduct of the inquiry and subsequently rose to the position of Lord Chief Justice. The Warnock report, possibly the most significant bioethics report produced for a national government in the twentieth century, was named for Mary Warnock, an Oxford philosopher who later became Mistress of Girton College at the University of Cambridge and a peeress in the House of Lords (Warnock 1984; see also Jasanoff 2005a).

Britain's predilection for entrusting the credibility of public knowledge to elite figures, a practice that historians have traced to the gentlemanly culture of the Scientific Revolution in Restoration England (Shapin and Schaffer 1985), does not, however, mean that expert claims are accepted solely on the basis of social capital. As I showed in detail in *Designs on Nature* (Jasanoff 2005a), key to the epistemic authority of men and women like Lord Phillips and Baroness Warnock is that they articulate a plain, commonsense vision: knowledge whose truthfulness anyone in society, from the highest to the lowest, can in theory review and attest to. The result, when successful, is objectivity based on a truly communal viewpoint, a "view from everywhere" that can be contrasted with the impersonal purity and social detachment of America's view from nowhere. For example, the famous distinction that the Warnock report drew between the embryo before and after fourteen days—permitting research before but not after that cutoff date—was founded on the observation of developmental biologists that significant changes in embryonic structure and the formation of the nervous system happen around that time (Jasanoff 2005a, 152–55). It was not elite scientific consensus alone that caused the fourteen-day rule to gain acceptance. Both the Warnock Committee and the British public accepted this line of demarcation as one that made sense, given that some line drawing was essential;³ this one, by virtue of its simplicity, seemed to guard against the slippery slope toward experimentation at later, more con-

3. Baroness Warnock told me in a personal interview that all the committee members were aware of the need to draw a bright line, allowing some embryo research to continue but preventing unregulated intervention. Where exactly to fix the line was less important than that there should be an enforceable line. The fourteen-day solution was proposed by Anne McLaren, a distinguished developmental biologist and herself a peer's daughter. McLaren extrapolated the idea of a fourteen-day limit from her work with nonhuman animals, and it struck the majority of the committee as reasonable.

troversial stages of embryonic development (McLaren 1989). There was no need in Britain's pragmatic policy culture to invoke transcendental concepts such as human dignity, enshrined in article 1 of the postwar German Basic Law.⁴ Nor did the attempt to define a workable rule provoke, as in the United States, a quest for unambiguous scientific answers to the question of when human life begins.

German practices of knowledge making also produce an objectivity that could be called a "view from everywhere," but its political underpinnings are different from those in Britain. Whereas public knowledge in the British empiricist tradition tends to draw its credibility from collective witnessing of demonstrable facts (Ezrahi 1990; Jasanoff 2005a; Shapin and Schaffer 1985), German expert bodies create common knowledge through a process of group reasoning explicitly based on principles of political representation. In effect, German knowledge practices enact the Habermasian model of the public sphere, with its emphasis on neutral deliberative spaces and perfect communication. There is no assumption, as in the United States, that objectivity exists in an impersonal space, divorced from social standpoints. Rather, epistemic authority comes about through the inclusion of all legitimate points of view. Thus, German parliamentary inquiry commissions (*Enquête-Kommission*), appointed by the Bundestag to explore solutions to long-range problems, are formed of legislators, proportionally represented by party, as well as subject-matter experts nominated by the parties and associated in this sense with party positions.⁵ Similarly, advisory committees serving regulatory agencies are broadly representative of all interested constituencies, and procedural rules generally require each member to be represented by an alternate. It is as if the validity of the expert consensus would be weakened by the loss of a single recognizable standpoint, a problem that is not confronted in Britain's epistemic culture of common witnessing or in America's construction of standpoint-free knowledge.

A telling illustration of Germany's inclusive approach to knowledge making comes from the rich history of biotechnology regulation (Jasanoff 2005a). A parliamentary inquiry commission formed to consider the risks and opportunities of the new technology in the late 1980s included rep-

4. Article 1.1 of the Basic Law (*Grundgesetz*) states: "Human dignity shall be inviolable. To respect and protect it shall be the duty of all state authority."

5. The German Wikipedia entry for *Enquête-Kommission* states (in my translation): "In the Inquiry Commission a common position is supposed to be worked out. The goal is to come to a solution to problems of this sort that can be tolerated by the overwhelming majority of the people (even by that portion which does not consider itself represented by the current ruling majority)."

representatives of the Green Party, then enjoying its first election to the Bundestag.⁶ Against the normally consensual approach followed by such commissions, the Greens insisted on producing a long, strident indictment of biotechnology, which they saw (together with nuclear power) as a suspect project enlisting state power to control both nature and citizens. This fifty-page dissent was published as part of the commission report. It ensured that Green concerns, however far-fetched they appeared to other commission members, remained alive in the political debate. One effect was to frame biotechnology as a programmatic undertaking of the German state instead of merely as a new industrial process, as in Britain, or a series of new commercial products, as in the United States (Jasanoff 2005a, 45–61; see also Gottweis 1998).

These necessarily brief comparative sketches, extracted from the voluminous literature on risk regulation, underline this chapter's first argument that the objectivity of policy-relevant knowledge is itself a cultural product. It is related to but more encompassing than objectivity in science pure and simple. Objectivity in policy necessarily confronts and accommodates cultural conceptions of what counts as proper representation not only of nature but also of public interests. This double objectivity, scientific and political, is achieved through institutionalized practices whose tacit epistemological implications remain largely unrecognized by the participants in public knowledge making. We turn now to the epistemic practices through which the U.S. regulatory system produces its "view from nowhere" and, to some degree, exports it beyond the borders of the United States.

Objectivity in Regulatory Science

Objectivity became a talisman for American policy makers well before the middle of the twentieth century. Theodore Porter's (1995) history of quantitative policy analysis in Britain, France, and the United States relates how numbers warded off the appearance of political bias in the cost-benefit analyses carried out by the U.S. Army Corps of Engineers to justify its huge water management projects. British actuaries and French railroad engineers come across in Porter's study as significantly more prepared to admit the influence of professional judgment on their calculations. Quantification,

6. There is no precise analogue to the German inquiry commission in the American policy process, reflecting structural differences between parliamentary and presidential political systems. In the United States, the congressional Office of Technology Assessment, which adopted a bipartisan approach to technical advice giving, was dissolved in 1995 by a resurgent Republican Congress.

Porter suggests, is most likely to be represented as impartial science when other means of producing credibility, such as elite status or professional solidarity, are missing in a policy culture: the strength of quantitative analysis is that "it can permit administrative decisions to be made quietly, discouraging public activism. In a suspicious democratic order, even truth claims depend on the appearance of objectivity in the sense of impartiality" (Porter 1995, 47).

Quantitative Risk Assessment

U.S. regulators extended the use of quantification to new problems in the mid-1970s, particularly to assessing the risk of human cancer from growing numbers of chemical products and pollutants in the environment. The earliest efforts to regulate carcinogens were based on qualitative judgments derived from testing such compounds on nonhuman species. A well-known example was the so-called Delaney Clause of the Federal Food, Drug, and Cosmetic Act, which in 1958 mandated a ban on food additives found to induce cancer in humans or animals. This cut-and-dried rule precluded for a time any need for mathematical extrapolation from test animals to humans. It was enough to demonstrate that a substance had tested positive for cancer in an animal bioassay. That qualitative finding was sufficient to keep the product out of the food supply.

A massive expansion of environmental controls during the 1970s, along with improved technologies for detecting toxic pollutants and residues, drew a much larger array of chemical products into the regulatory net. Impatient with the Delaney standard, now seen as a recipe for overregulation, Congress increasingly asked for regulatory costs to be balanced against benefits to health and the environment. Federal agencies came under pressure to develop a nuanced, yet still objective, basis for imposing burdensome controls on the chemical industry. Gradually and somewhat reluctantly, under mounting legal and political scrutiny, U.S. regulators turned to quantitative risk assessment and the relative safety of numbers (Rushesky 1986). Numerical estimates of probable cancer deaths offered a kind of legitimation that agency officials could no longer claim solely on the basis of institutional expertise and legal authority. The turn from informed, experiential judgment to impersonal objectivity was especially pronounced at the Environmental Protection Agency (EPA), which faced formidable challenges to its competence and credibility from the moment it was created by presidential executive order in 1970.

As we know from the social studies of science, it takes work to detach

judgment from fact, or the knower from the known. Massive forces must be brought into play, and long networks constructed, to make nature speak for itself, whether in science or for policy (Callon 1986; Latour 1988). Risk assessment was no exception. This analytic strategy could not achieve the look of objectivity without enrolling a heterogeneous network of social and nonhuman actors into the project. Federal funds created extensive programs for testing and assessing environmental carcinogens to justify federal policies. Again, comparison sheds light on the cultural uniqueness of these objectivity-building practices. No other national government focused so heavily on cancer risk, which in the United States marginalized almost all other risks to humans and the environment; nowhere else were so many public resources invested in developing animal tests for carcinogens or mathematical models for extrapolating human risk estimates from animal data. Economic analysis of regulation also took on a significantly more elaborate and professional character than in other countries, spurred by legislative mandates, court decisions, and presidential executive orders all calling for explicit balancing of costs and benefits. Put differently, the expert networks created to justify environmental regulatory policies in Europe were thinner and shorter, requiring fewer mathematical modelers, fewer animals, fewer economists, and much less paper. Yet—somewhat paradoxically—in no other regulatory system was the scientific basis for policy decisions subjected to such sustained testing, or taken apart and reexamined so thoroughly, as in the adversarial, legalistic culture of the United States (Brickman, Jasanoff, and Ilgen 1985; Hoberg and Harrison 1994).

Once a distinctive analytic approach to risk assessment was in place, knowledge evolved within that framework along complex pathways. Both government (through the National Toxicology Program) and industry (through, *inter alia*, the Chemical Industry Institute of Toxicology) devoted substantial resources to the systematic conduct and refinement of bioassays, especially with rodents. Like any technical tests, these tests for carcinogenicity had to overcome doubt and contention (Pinch 1993; Mackenzie 1990). Controversies arose and persisted about the suitability of animal models as predictors of risk to humans, and regulators were called upon to identify and differentiate, chemical by chemical, the precise mechanisms of cancer induction in animals and humans. Through this dialectic of epistemic challenge and policy response, the principles and techniques of risk assessment evolved from early, almost intuitive judgments, validated by the experiential knowledge of regulators, to more complex, technically sophisticated, and rule-governed—in short, “objective”—methods of uncertainty assessment (National Research Council 1994).

The changes needed to represent risk assessment as impartial and objective entailed far-reaching shifts in academic and private-sector scientific practices as well. A new market opened up for risk analysis, influencing the agendas of epidemiologists and toxicologists and spurring the creation of specialized institutions such as the Center for Risk Analysis at Harvard University's School of Public Health and the Cambridge-based Health Effects Institute.⁷ Other impacts included a boom in industrial testing laboratories, the formation of professional societies for risk analysis, and, more subtly, the emergence of new scientific specialities, such as the mathematical technique of meta-analysis, which sought to draw reliable and objective conclusions from studies that were inconclusive when taken on their own. But bridges were still needed to connect these dispersed knowledge-generating activities to regulatory decisions, and regulatory peer review supplied a crucial component. Unlike advances in testing and modeling, peer review directly addressed the second prong of the paradox of representation in regulatory science: whose claims count as objective? Designed to remove subjectivity from policy knowledge, peer review, as we shall see, proved to be another lightning rod for controversy.

Peer Review: Everybody Wants It

The term “sound science” has acquired sufficient standing to merit its own Wikipedia entry, where its use in policy is helpfully distinguished from its use in acoustic physics. Although some trace the term's first use to the tobacco industry's efforts to discredit the evidence for smoking-linked cancer (Michaels 2008), policy critics of the Left and the Right equally invoked the sound-science label to support their positions by the late 1990s. It has been dismissed as “doublepeak for trouble” (Mooney 2004); yet it endures as a term that confers respectability. Correspondingly, legitimacy is drained from claims whose soundness is successfully questioned. “Sound science” operates in U.S. policy discourse as a powerful signifier that detaches scientific claims from their messy human origins. One practice more than any other serves to distinguish sound science from its unsound and unreliable alternatives. That practice is peer review.

Review by qualified experts has been part of the apparatus of fact making and credibility building from the early years of the Scientific Revolution

7. The Health Effects Institute was jointly funded by the EPA and the automobile industry to sponsor credible scientific research for use in assessing the health risks of air pollutants. In this case, standpoint independence was ensured by making adversaries collaborate in knowledge production. For more on the institute's organization and operations, see Jasanoff 1990.

(Shapin and Schaffer 1985; Zuckerman and Merton 1971). Criticism of scientists' work by knowledgeable others helped validate claims and allowed them to circulate more freely. By the middle of the twentieth century, the "organized skepticism" that Robert Merton ([1942] 1973) named as one of the four constitutive norms of science was thoroughly institutionalized as peer review. Any scientific claim had to pass the screen of more than one pair of observant eyes to be certified as fact. To be sure, the conduct of peer review remained inconsistent, and the doorkeepers of science—journal editors, grant-making agencies, and regulatory authorities—tailored their review procedures to the exigencies of particular situations (Jasanoff 1990). Yet passing through a process called peer review usually sufficed to translate subjective observation into objective knowledge: by the same token, to undermine a study's soundness, it was generally enough to show that it had not undergone peer review.

A controversy during the early years of the George W. Bush presidency illustrates the centrality of peer review in maintaining the view-from-nowhere objectivity of U.S. policy-relevant science. In this case, the process of peer review became intensely political, and yet the power of peer review to deliver objectivity remained unchallenged. The episode did not call into question whether the imagination of impersonal objectivity is philosophically or practically sustainable in political settings; instead, conflict centered on who should manage the review process so as to achieve the desired standard of objectivity. What the controversy threw into relief was not the right representation of nature but the right representation, and resolution, of interpretive plurality.

Historically, the events of the Bush era recapitulated an almost identical controversy in the early Reagan years, though with a different cast of characters. On the earlier occasion, debate centered on the EPA's peer review practices, and pitted agency experts against those of the chemical industry (Jasanoff 1987, 2005b). The later episode positioned one part of the executive branch (the economically minded and deregulatory White House) against others (the health and safety regulatory agencies). In both cases, however, the adversaries understood the political, as well as the epistemic, work done by so-called peers. Whoever controlled the peer position, they saw, would *ipso facto* control the standpoint from which regulatory science would be declared free of bias. In other words, actors saw that the choice of peer reviewers, and therefore the right to make those choices, would define the coordinates of the "nowhere" position.

On August 29, 2003, the Office of Information and Regulatory Affairs (OIRA), an obscure but influential unit within the Office of Management

and Budget (OMB), issued a *Proposed Bulletin on Peer Review and Information Quality* (OMB 2003; hereafter, the *Bulletin*). Its purpose was to ensure "meaningful peer review" of science pertaining to regulation, as part of an ongoing effort to improve the quality, objectivity, utility, and integrity of information disseminated by the federal government" (OMB 2003, Summary). The *Bulletin* singled out the category of "significant regulatory information," which was defined as information that could have "a clear and substantial impact on important public policies or important private sector decisions with a possible impact of more than \$100 million in any year." Any process for reviewing such information, according to the *Bulletin*, would have to be approved by the OMB. According to one estimate, this proposal would potentially have subjected two hundred or more draft technical documents each year to OMB-certified "formal, independent, external" peer review (Anderson 2003).

To take the reins of regulatory peer review into OMB's antiregulatory hands was a highly political move. To neutralize the appearance of a political power grab, OIRA sheathed itself in the language of objectivity, talking its cues from science itself: "Independent, objective peer review has long been regarded as a critical element in ensuring the reliability of scientific analyses. For decades, the American academic and scientific communities have withheld acknowledgment of scientific studies that have not been subject to rigorous independent peer review" (OMB 2003, 54024). If the objectivity of regulatory science was now in doubt, OIRA concluded, the reason must be an erosion of the independence of the review process through capture by pro-regulation interests.

The *Bulletin* described numerous alleged defects in agency practices that kept peer review from functioning as an effective check on the subjectivity of regulatory knowledge.⁸

"Existing agency peer review mechanisms have not always been sufficient to ensure the reliability of regulatory information disseminated or relied upon by federal agencies." (54024)

"Even when agencies do conduct timely peer reviews, such reviews are sometimes undertaken by people who are not independent of the agencies." (54024)

"When an agency does initiate a program to select outside peer reviewers for regulatory science, it sometimes selects the same reviewers for all or nearly all of its peer reviews on a particular topic." (54025)

8. All page citations are to OMB 2003.

- "It is also essential to grant the peer reviewers access to sufficient information." (54025)
- "The results are not always available for public scrutiny or comment." (54025)
- "Experience has shown that they are not always followed by all of the federal agencies, and that actual practice has not always lived up to the ideals underlying the various agencies' manuals." (54025)

These problems, in OIRA's judgment, justified the creation of a new point of authority within OMB from which the integrity of peer review could be restored. By implication, the result would be the elimination of the agencies' standpoint-induced bias.

Even in a period of harmony between science and the state, such a sweeping realignment in knowledge-validating practices might not have passed unchallenged. In a climate of high tension between the Bush administration and the nation's scientific leadership (see, e.g., National Academy of Sciences 2003), OIRA's move raised eyebrows and temperatures. Prominent scientific and professional societies, including the American Association for the Advancement of Science and the National Academy of Sciences, dismissed OMB's position as unfounded and as introducing biases of its own. In response, OMB issued a revised document, considerably toned down its prior claims to objectivity but not altogether relinquishing its watchdog role. OIRA's Web site as of mid-2008 described that role as follows:

Peer review is an important procedure used by the scientific community to ensure the quality of information prior to publication. It involves critical review of a draft report by qualified scientists not involved in developing the report. Peer review includes an exchange of judgments about the appropriateness of methods and the strength of the author's inferences. The "Information Quality Bulletin for Peer Review," issued on December 16, 2004, establishes government-wide guidance aimed at enhancing the practice of peer review of government science.⁹

Though represented as a "practice," and not as a silver bullet, peer review was still advanced as a procedure for aligning "government science" with the judgments of the scientific community. By claiming both the right and

9. Office of Information and Regulatory Affairs (OIRA), http://www.whitehouse.gov/omb/inforeg/qa_062205.html (accessed August 2008). This language was removed from the OIRA Web site during the Obama administration, but peer review continues to be governed by OMB's "Final Information Quality Bulletin for Peer Review" issued in December 2004.

the capacity to enhance regulatory peer review, OIRA implicitly claimed a position of objectivity that it did not concede to regulators themselves.

Objectivity in Judicial Review

Like any robust cultural property, policy objectivity is produced by multiple actors at multiple sites, or "fields of practice" (Bourdieu 1987), whose logics and modes of operation reinforce one another. Thus, while performances of objectivity may be situated and contingent, such as OIRA's attempt to hijack regulatory peer review in 2003, the concept's cultural meaning in a given political system tends to remain durable over time. Through repeat performances of practices such as regulatory peer review, a political culture's commitment to a specific form of objectivity is continually reaffirmed, until it operates in effect as a binding norm.

In the United States, such performances occur not only in expert committees and regulatory agencies but also in the courts, which through review of administrative rule making often enjoy the last word on the adequacy of policy makers' knowledge and reasoning. In this section, I show how two Supreme Court justices, Antonin Scalia and Stephen Breyer, representing opposite poles of the liberal-conservative spectrum, have nevertheless reinforced the construction of regulatory objectivity as a view from nowhere. This requires, at the core, strategies for preserving the objectivity of judicial review itself. Both jurists, I will show, operate with similar, role-conditioned discourses of reticence and the need for closure, but where Breyer draws his sense of limits from dominant cultural notions of expertise and objectivity, Scalia takes his cues from interpretations of the law. Despite some local perturbations and disagreements, neither approach fundamentally challenges the possibility of objective judgment.

My analysis of judicial reasoning here parallels the study of judicial discourse and practice proposed by Robert Brishin, drawing on the sociology of Pierre Bourdieu. Judges, Brishin argues, employ shared linguistic repertoires that can nevertheless be tailored to reinforce a consistent set of political or ideological commitments within a single jurist's practices: "The field of practice is a partially autonomous political space relatively independent of external pressures and determinations. It has its own languages for defining political institutional roles and rights and its own methods for addressing problems. The legal struggles about the language of the law within a field of judicial practice represent a political struggle about the construction of the state" (Brishin 1991, 1006). Going beyond Brishin, however, I show that American judicial reasoning, regardless of its orientation toward

state power, reinforces the basic epistemic commitments of the U.S. policy culture. Of particular interest are ways in which shared ideas of deference and restraint, key to the legitimacy of an unelected judiciary, reinforce enduring cultural understandings of objectivity and reason.

Justices Scalia and Breyer have led, in many respects, parallel lives, despite their allegiances, respectively, to the conservative and liberal ends of the American political spectrum. Scalia joined the Supreme Court as a Reagan appointee following a distinguished career in government and academia, including a professorship at Chicago Law School. Breyer, a Clinton appointee, was a Harvard law professor and federal appellate judge before joining the Supreme Court. Articulate and opinionated, they share a longstanding interest in administrative law, the branch of jurisprudence that directly addresses the adequacy of policy makers' knowledge claims. I trace below their roles in sustaining a view-from-nowhere objectivity: from their comments on a landmark administrative law decision before they joined the Supreme Court to their part in one of the most important cases to come before the Court in the first decade of the twenty-first century—a suit against the EPA successfully challenging the agency's failure to regulate greenhouse gas emissions from motor vehicles under the Clean Air Act.

First, some legal background. The most important U.S. law addressing the quality of administrative knowledge and reasoning is a piece of late New Deal legislation dating from just after World War II. The 1946 Administrative Procedure Act (APA) required all federal agencies to open up their reasoning to public review. Under the APA, persons dissatisfied with administrative decisions may sue the decision maker for failure to offer substantial evidence or for arbitrary and capricious action not adequately grounded in the decision-making record. In contested cases, a reviewing court decides whether the challenge is merited and whether the agency must go back and strengthen its arguments. Litigation under the APA serves as a powerful instrument for testing an agency's construction of objectivity. Knowledge claims that do not stand up to legal scrutiny clearly fail the test. Judicial review allows the window of skepticism to open wide, revealing bias and subjectivity, and yet the process leaves agencies room to defend their knowledge claims as views from nowhere. But how? The strategies used by Scalia and Breyer to effect closure offer some insights.

A strict constructionist of legal texts and an accomplished legal technician, Scalia invokes the alleged clarity of legal principles to justify his conclusions. He takes seriously the judge's duty to interpret—not make—the law; for him legal texts and their histories provide all the guidance needed

to formulate unambiguous decisions.¹⁰ As a law professor before he was appointed an appellate judge, Scalia instructively commented on one of the noted administrative law decisions of the late 1970s, *Vermont Yankee Nuclear Power Corporation v. Natural Resources Defense Council*, 435 U.S. 519 (1978). The case involved a challenge to an Atomic Energy Commission (AEC) license to a nuclear power plant operated by Vermont Yankee. The petitioning environmental organization contended that the AEC had not sufficiently considered the technical issues relevant to high-level nuclear-waste disposal; the AEC had relied primarily on a twenty-page report by a member of its own staff, supplemented by an inadequate hearing record, hardly a picture of objectivity. The D.C. Circuit Court of Appeals agreed and asked the agency to adopt additional procedures so as to air its assessment of an exceptionally risky technology more thoroughly. On appeal, the Supreme Court resoundingly upheld the AEC's position. The agency, the Court unanimously concluded, had no obligation to adopt procedures over and above those required by law, that is, the APA and the agency's governing statute. It was not a court's job to "impose upon the agency its own notion of which procedures are 'best' or most likely to further some vague, undefined public good" (435 U.S. at 549). The holding reaffirmed the classical conception of the separation of powers endorsed by both Scalia (Brisbin 1991) and Breyer (1978): Congress makes the law; executive agencies implement it; courts second-guess agencies only if they have deviated from the law's explicit requirements.

Breyer, also a professor at the time, warmly endorsed *Vermont Yankee*, but his defense rested as much on deference to impersonal expertise (view from nowhere) as deference to the executive's discretionary power. He accepted that the gravity of the interests at stake might sometimes demand more rigorous judicial scrutiny of knowledge claims, possibly requiring more procedures. But that was just his starting point. In a rehearsal sounding remarkably like an expert brief for the nuclear industry, Breyer took apart the argument that nuclear energy deserved such heightened scrutiny. His text was sprinkled with statistics, a persistent marker of U.S. regulators' preference for numerical objectivity:

10. I personally witnessed an interesting demonstration of Scalia's *modus operandi* on September 28, 2004, when he delivered the Edwin L. Godkin Lecture at Harvard University's John F. Kennedy School of Government. At a dinner following his lecture, one of my colleagues mentioned that the late Justice Harry Blackmun used to walk to the Lincoln Memorial at night to reflect on what to do with particularly agonizing cases. He asked what Justice Scalia did when faced with similarly agonizing choices. Matter-of-factly and without a moment's hesitation, Scalia answered that he never faced agonizing choices because his role was to be a good lawyer, and as a lawyer, he needed only to carry out what the law and the Constitution said.

- "coal plants are likely to cause seven to twelve times as many deaths as nuclear plants and four to six times as much sickness and injury";
- "few additional power plants are likely to be built. The number of new nuclear plants ordered has fallen from 38 in 1973 to 5 in 1975, 3 in 1976, and 4 in 1977";
- "the average nuclear plant takes ten to twelve years to bring from initial plan to operation—four to six years longer than a comparable coal plant." (Breyer 1978, 1835, 1838)

On the basis of such comparisons, Breyer concluded that the proponents of more process were seeking, not the legitimate goal of better analysis, but rather the untenable political goal of a shift from nuclear power to coal. This move Breyer dismissed as unreasonable on the (numerical) merits.

Breyer reiterated his faith in expert risk analysis, and the disembodied objectivity it confers, in his 1992 Oliver Wendell Holmes Lectures at Harvard Law School, delivered while he was chief judge in the First Circuit Court of Appeals. There, he addressed a problem that had exercised segments of the risk assessment and administrative law communities, as well as American industry, since the early 1980s, namely, the gap between expert and public risk perceptions. Social psychologists have documented that public appraisals of risk are swayed by cognitive biases, such as a tendency to overvalue unfamiliar and feared events (Slovic 1991). In turn, critics of regulation have argued that such skewed perceptions produce a vicious cycle of irrational regulatory responses, such as the 1980 Superfund Act, which mandates cleanup of abandoned toxic dump sites at unwarranted expense. In his Harvard lectures, Breyer uncritically accepted these arguments and proposed greater centralization of risk analysis as the best antidote to inefficient, fear-driven regulation. He advocated delegating technical decision making to good experts, experienced in rendering sound analytic judgments and avoiding the traps of emotion and fear (Breyer 1993). With this vigorous defense of expertise, Judge Breyer served as both producer and consumer of his policy culture's preferred style of detached objectivity.

Scalia's (1978) article on *Vermont Yankee* in the *Supreme Court Review* also endorsed the decision's formal correctness, but there the similarity with Breyer ended. Where Breyer offered a twelve-page comment, Scalia produced a densely argued sixty-four-page article; where Breyer reached out to technical experts to justify his position, Scalia remained within the four corners of legal analysis; and while Breyer expressed wholehearted support for the Supreme Court, Scalia tempered his approval with grudging

ing admiration for the D.C. Circuit, which in his view had more clearly understood the politics of procedural choice. Scalia deplored the lower court's renegade tendency to take administrative law into its own hands, flouting the Supreme Court's disciplinary authority, and its attempt to create a common law of hybrid administrative procedures that undermined the "proper functioning of a court of appeals in a hierarchical legal system" (Scalia 1978, 371). Yet, unlike Breyer, he rejected the proposition that agencies should be expected to resolve complex regulatory issues "solely on the basis of science and reason" (Scalia 1978, 403). Administrators need a political space in which to strike the compromises and craft the adjustments required to placate powerful political interests. Under these circumstances, procedural choices are bound to serve as political instruments, constraining the agencies' freedom to strike bargains. Congress, Scalia noted, had recognized this method of asserting control over the executive and had enacted multiple statutory procedures that fractured the APA's streamlined approach to rule making. But this unruliness, he wistfully concluded, was how things should be, because it was ultimately up to Congress—not courts or agencies—to determine how the politics of process should play out in diverse regulatory settings. Backhandedly, but no less decisively than Breyer, Scalia too relinquished to regulators the power to craft their knowledges and reasons, including their preferred modes of objectivity, so long as they complied with the (in his view) unambiguous legal constraints imposed by Congress.

Nearly thirty years later, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), Breyer and Scalia, as justices of the Supreme Court, again had the opportunity to articulate their respective views of the right relations between scientific knowledge, regulatory objectivity, and administrative law. Substantively, the issue before the Court was whether the EPA could justifiably refuse to treat greenhouse gases as air pollutants under the Clean Air Act. The two justices differed in their conclusions but, without violating shared canons of judicial practice, reaffirmed their longstanding ideological positions about where objectivity comes from: science or law.

Scalia insisted that the law protects the EPA's reasoning against challenge by the petitioning states. For this conclusion he relied on both his sense of the plain meaning of the statute and the agency's constitutional right to interpret the law within acceptable limits. In oral argument on the case, Scalia tried to draw a distinction between "air pollution"—plainly regulated by the Clean Air Act—and global warming, which he suggested was an effect on an atmospheric system not synonymous with "air." The

following exchange with James R. Milkey, assistant attorney general of Massachusetts, captures Scalia's thinking:

JUSTICE SCALIA: Mr. Milkey, I had—my problem is precisely on the impermissible grounds. To be sure, carbon dioxide is a pollutant, and it can be an air pollutant. If we fill this room with carbon dioxide, it could be an air pollutant that endangers health. But I always thought an air pollutant was something different from a stratospheric pollutant, and your claim here is not that the pollution of what we normally call "air" is endangering health. That isn't, that isn't—your assertion is that after the pollutant leaves the air and goes up into the stratosphere it is contributing to global warming.

MR. MILKEY: Respectfully, Your Honor, it is not the stratosphere. It's the troposphere.

JUSTICE SCALIA: Troposphere, whatever. I told you before I'm not a scientist. (Laughter.)¹¹

When the Supreme Court rendered its 5–4 split decision against the EPA, Scalia filed a separate dissent, even though he agreed with Chief Justice John C. Roberts on the dissenters' argument that the petitioners lacked standing to pursue the case in the first instance. Clearly, he felt that a defense of the EPA's administrative discretion was important enough to merit a separate statement concerning the right way to interpret the law. He again insisted on the plain meaning of the act, which in his view reasonably puts global warming outside the domain of "air pollution." Understandably, neither his mistake about the meaning of "troposphere" nor his admission of scientific illiteracy made an appearance in the official text. Instead, Scalia turned to the dictionary for its communally endorsed monopoly on establishing the "natural" (and hence objective) meaning of language:

We need look no further than the dictionary for confirmation that this interpretation of "air pollution" is eminently reasonable. The definition of "pollute," of course, is "[t]o make or render impure or unclean." Webster's New International Dictionary 1910 (2d ed. 1949). And the first three definitions of "air" are as follows: (1) "[t]he invisible, odorless, and tasteless mixture of gases which surrounds the earth"; (2) "[t]he body of the earth's atmosphere; esp., the part of it near the earth, as distinguished from the upper rarefied part"; (3) "[a] portion of air or of the air considered with respect to physical

11. The full text of the oral argument can be found at the following link: http://www.supremecourt.gov/oral_arguments/argument_transcripts/05-1120.pdf (accessed July 2010).

characteristics or as affecting the senses." *Id.*, at 54. EPA's conception of "air pollution"—focusing on impurities in the "ambient air"—at ground level or near the surface of the earth—is perfectly consistent with the natural meaning of that term.¹²

Breyer sided with the majority in rejecting the EPA's legal interpretation, but he filed no separate opinion and his views are less well documented than Scalia's. Yet even in his relatively limited interventions during oral argument, he displayed his tendency to conceptualize risk in quantitative terms. An exchange with Gregory C. Garre, deputy solicitor general representing the EPA, illustrates the point:

JUSTICE BREYER: Suppose it is not greenhouse gas. Suppose it was Agent Orange. Suppose there [sic] a car is coming down the street and it sprays out Agent Orange. And I come into the Court and I say, you know, I think that Agent Orange is going to kill me with cancer. And the reply is, well, we have some scientists here who say your chance of dying of cancer from Agent Orange is only 1 in 30. Maybe 1 in 50. Maybe 1 in a thousand. Maybe 1 in 10,000. And therefore, you have no standing to require the EPA to regulate this pollutant, Agent Orange, which is in a green cloud all over the city.

Now, would you say that the person who's made that claim has no standing?

MR. GARRE: Your Honor, I think that that is a fundamentally different case, for the simple reason that global climate change is a global phenomenon. I mean one—

JUSTICE BREYER: I was only addressing, using that to—to address your problem that the chances are too small that, in fact, any one individual will be affected by the 7 percent or 6 percent of the material that comes out of the truck—the CO₂.¹³

In disparate styles, and often reaching different conclusions, Scalia and Breyer agree on a point fundamental to their field of practice: that there is a foundation of shared understanding for judges to fall back on in resolving regulatory controversies. Each justice seamlessly integrates the two aspects of policy objectivity: which is the right representation of nature and which the right representation of political authority. For Breyer, it is nature's text that takes precedence, and his reasoning repeatedly draws affirmation from

12. *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007), at 559–60.

13. Oral argument in *Massachusetts v. EPA*, http://www.supremecourt.gov/oral_arguments/argument_transcripts/05-1120.pdf (accessed April 2011).

expert accounts of reality. For Scalia, legal texts provide the unambiguous baseline on which reason is built; the law prescribes who can speak, who can challenge, and, in contested cases, whose reason prevails. Either way, the objectivity of judicial review itself remains beyond question.

Globalizing Objectivity

The proliferation of international treaties for such matters as trade, environment, human rights, and nuclear security ensures that knowledge making for policy no longer lies wholly within the sovereign control of nation-states. Indeed, varied global recognition systems have come into place to certify policy-relevant expert knowledge as competent and trustworthy. Producing epistemic credibility is an evolving field of practice for international institutions. How do such bodies deal with differences among nationally or culturally specific norms of knowledge making? Do they craft their own practices, including distinctive definitions of objectivity, or do they incorporate and reproduce practices drawn from particular national traditions? In this section, I briefly discuss a dispute at the World Trade Organization (WTO) to show how this powerful global body has in effect adopted the U.S. culture of objectivity. In this case, a handful of close colleagues and I presented an *amicus* brief to the WTO and thus experienced in practice some of the techniques by which this agency, in decisions involving risk, guards itself against radical challenges to its notions of objectivity.

On May 13, 2003, the United States, Canada, and Argentina filed an action against the European Union (EU) for maintaining an illegal moratorium against American-made genetically modified organisms (hereafter *Biotech Products* case). That summer, five of us, all scholars of risk and regulatory science, met together for a week to draft our *amicus* brief. Our aim was to introduce into a policy dispute of global significance a body of social science knowledge on risk assessment that we believed was highly relevant to the case and yet in danger of being ignored. In particular, we wanted to make the WTO aware of the socially constructed character of risk assessment and to adjust its dispute resolution practices accordingly. The fate of our effort sheds light on the high entry barriers against voices questioning established epistemic norms in the world of global policy.

The *Biotech Products* dispute arose under the Agreement on Technical Barriers to Trade (TBT Agreement) and the Agreement on the Application of Sanitary and Phytosanitary Standards (SPS Agreement). Both agreements acknowledge that national governments may legitimately restrict the import of products from other countries if those products threaten their

citizens' health and safety. Both provisions, however, also stipulate that exceptions must be justified through risk assessment. The relevant treaty language represents risk assessment as impersonal and judgment free, and hence as an objective basis for policy.¹⁴ This is consistent with the U.S. understanding of risk assessment as sound science, capable of producing a universal, translocal form of objectivity.

Statements by high-level U.S. politicians left no doubt that what was at stake for the United States went beyond the economic consequences of the EU's reluctance to import genetically modified crops. Centrally implicated as well was the American approach to decision making, a threat to the concept of sound (regulatory) science that underwrote the safety of products made in the United States. American officials intuitively grasped that genetically modified crops would circulate freely in world trade only if the scientific assessments that supported them also enjoyed universal acceptance; these had to be placed, as it were, *hors de combat*. At the 2000 annual meeting of the American Association for the Advancement of Science, Secretary of State Madeleine Albright asserted that Europeans were rejecting not only genetically modified imports but also science: "But science does not support the Frankenstein fears of some, particularly outside the United States, that biotech foods or other products will harm human health."¹⁵

14. The relevant sections of the two agreements read as follows:

TBT Agreement, article 2.2: "Members shall ensure that technical regulations are not prepared, adopted or applied with a view to or with the effect of creating unnecessary obstacles to international trade. For this purpose, technical regulations shall not be more trade-restrictive than necessary to fulfil a legitimate objective, taking account of the risks non-fulfilment would create. Such legitimate objectives are, inter alia: national security requirements; the prevention of deceptive practices; protection of human health or safety, animal or plant life or health, or the environment. In assessing such risks, relevant elements of consideration are, inter alia: available scientific and technical information, related processing technology or intended end-uses of products."

SPS Agreement, article 2.2: "Members shall ensure that any sanitary or phytosanitary measure is applied only to the extent necessary to protect human, animal or plant life or health, is based on scientific principles and is not maintained without sufficient scientific evidence, except as provided for in paragraph 7 of Article 5."

SPS Agreement, article 5.7: "In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information, including that from the relevant international organizations as well as from sanitary or phytosanitary measures applied by other Members. In such circumstances, Members shall seek to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period of time."

15. Madeleine K. Albright, plenary address, AAAS annual meeting, "Science in an Uncertain Millennium," Washington, DC, February 21, 2000, <http://secretary.state.gov/www/statements/2000/000221.html> (accessed July 2010).

In 2003, press releases from the U.S. Trade Representative's office declared that the moratorium was not only illegal but "non-science-based."¹⁶

Procedurally, a controversy of this kind goes before the WTO's Dispute Settlement Body (DSB); this is the WTO's General Council, consisting of ambassadorial representatives of member state governments, meeting together as the DSB. After required attempts at consultation and mediation, the DSB, through a closed process, appoints an ad hoc Dispute Settlement Panel to review the case, consult with appropriate experts, and prepare a preliminary report.¹⁷ Unless an appeal is filed, the DSB adopts the report, which then becomes final. If an appeal is filed, it is heard by the seven-member Appellate Body, which again files a report that the DSB finalizes. The process, as imagined, is supposed to consume no more than a year without appeal and fifteen months with appeal. In the *Biotech Products* case, that period extended to nearly three years. The Dispute Settlement Panel issued its 1,050-page interim report on February 7, 2006, and the DSB adopted the final panel reports on November 21, 2006.

There is no process for allowing parties other than the disputing national governments into the dispute settlement process. The WTO Web site indicates that *amicus* briefs by third parties remain a deeply contested issue and there is no formal procedure for filing these.¹⁸ In part, the lack of agreement reflects the multiplicity of legal cultures represented at the WTO: *amicus* briefs are recognized forms of intervention in common-law systems such as that of the United States but they have no comparable status in civil law. Accordingly, the WTO does not officially sanction the practice but leaves it up to each panel to decide in a given case whether or not to accept *amicus* submissions.

My colleagues and I were convinced that the U.S. position on sound science did not stand up to scholarly scrutiny. As contributors to the social studies of risk, we were in a strong position to communicate the deeply judgmental and culturally situated character of the "science" of risk analysis, but we lacked the practical know-how to make our views known in a forum where clear procedural channels are unavailable. Our team consisted of two trained lawyers, myself and David Winickoff, then a postdoctoral

16. Press release, U.S. Trade Representative, Executive Office of the President, Washington, DC, May 13, 2003, <http://www.ustr.gov/releases/2003/05/03-31.htm> (accessed October 2003).

17. In the *Biotech Products* case, the Dispute Settlement Panel consisted of Christian Häberli (chair, Switzerland), Mohan Kumar (India), and Akio Shimizu (Japan).

18. See Dispute Settlement System Training Module at the WTO Gate's Interactive Course link, which leads to a statement on "*amicus curiae* submissions": http://www.wto.org/english/tratop_e/dispu_e/disp_settlement_cbL_e/c9s3p1_e.htm (accessed July 2010).

fellows in my program at the Harvard Kennedy School; two sociologists, Lawrence Busch, a noted expert on food and agriculture from Michigan State University, and Brian Wynne, a leading sociologist of science at Lancaster University; and a prominent British environmentalist and policy adviser, Robin Grove White, also of Lancaster University. We had no material resources other than our modest research budgets, and so we met at Lancaster, the Americans traveling on their own means and the British team members offering hospitality and a room rented at almost no cost from the Lancaster Friends' Meeting House for us to work in.

Our problem was twofold. In a field without transparent practices, especially for non-state actors, how could we nevertheless intervene as if we were acting in a procedurally legitimate manner? And how could we hope to gain recognition as knowledge bearers who should be heard in a domain where social science expertise seemed profoundly at odds with policy decisions, political interests, and the language of the international agreements—in short, with the governing law? On the first point, we found invaluable allies among a shadow network of nongovernmental practitioners united by a common desire to open up the WTO's much-criticized and nontransparent modes of operation.¹⁹ On the second point, we had to compromise, translating our expertise and epistemic concerns into terms that the Dispute Settlement Panel might accept as sufficiently "legal" and thus allow into its deliberations.

The detailed story of how to insert an *amicus* brief into a system that does not officially tolerate such interventions will have to be told elsewhere. Within the constraints of this chapter, however, it is important to note that our record was one of mixed (and limited) success and failure: success in inserting a new text into the body of materials that the panel and, to some extent, the parties accepted and officially acknowledged; failure in disrupting the dominant global discourse around the objectivity of policy-relevant science. On the advice of experienced trade lawyers, environmental nongovernmental organizations (who submitted a separate *amicus* brief), and knowledgeable individuals at the Center for International Environmental Law, we notified the parties in advance of our desire to submit a brief, and we eventually sent the brief to the WTO with the support of the EU. Privately, persons working in the EU's legal and policy offices

19. The first public meeting of the WTO Appellate Body was held on July 28 and 29, 2008, in the controversial and long-running *Hormones* case, involving trade in meat treated with growth hormones. The public could observe the proceedings on closed-circuit television in a designated observation room. See CIEL report, http://www.ciel.org/De/WTO_Hormones.html (accessed July 2010).

assured us that our brief had been read and noticed and made an impression; publicly, the panel report made only the most glancing references, as follows, to our brief (that of "a group of university professors") in all of its thousand plus pages:²⁰

7.10 In the course of these proceedings, we received three unsolicited *amicus curiae* briefs: on 6 May 2004 we received an *amicus curiae* brief from a group of university professors; on 27 May 2004 we received an *amicus curiae* brief from a group of non-governmental organizations represented by the Foundation for International Environmental Law and Development (FIELD); and on 1 June 2004 we received an *amicus curiae* brief from a group of non-governmental organizations represented by the Center for International Environmental Law (CIEL). These briefs were submitted to us prior to the first substantive meeting of the Panel with the Parties, and the Parties and Third Parties were given an opportunity to comment on these *amicus curiae* briefs.

7.11 We note that a panel has the discretionary authority either to accept and consider or to reject any information submitted to it, whether requested by a panel or not, or to make some other appropriate disposition thereof. In this case, we accepted the information submitted by the amici curiae into the record. However, in rendering our decision, we did not find it necessary to take the *amicus curiae* briefs into account.

The panel concluded, in summary, that the EU had violated the SPS Agreement by failing to complete approval procedures without undue delay. In addition, several individual member states had violated the agreement by adopting discriminatory measures that, in defiance of article 2, were not based on scientific principles of risk assessment and thus were maintained without sufficient scientific evidence.²¹ The panel's logic had more to do with its construal of its legal responsibilities as a reviewing body than with upholding a particular norm of scientific objectivity. The result, however, left standing treaty language that, on its face, runs counter to significant bodies of social science scholarship on the nature of risk assessment.

Did our intervention make a difference to global policy-relevant knowledge or practice? Formally, it was accepted by the panel, receiving a docket

20. The numbers refer to paragraphs 7.10 and 7.11 in the panel's Interim Report. Footnotes are omitted, including one listing us by name.

21. For a summary of the panel's own preliminary summary report, see the International Economic Law and Policy Blog: http://worldtradelaw.typepad.com/ielpblog/2006/02/from_800_pages_.html (accessed July 2010).

number that gave it official status. Informally, it began circulating as part of the material culture of knowledge making, in which individual items may eventually join up with others to produce unexpected effects. It was published as an article in the *Yale Journal of International Law* and thus achieved academic recognition (Winickoff et al. 2005). In a more personal display of the power of networking, Lawrence Busch in 2008 accepted a professorship at Lancaster University, continuing the collaboration with Brian Wynne begun in 2003. As an attempt to reshape global policy discourse on risk assessment, however, our brief was at best a drop in a bucket of slowly accumulating scholarship contesting the U.S. narrative of regulatory science and its decontextualized objectivity.²²

Conclusion

Policy makers earn our trust through demonstrations of epistemic virtue, which include in the modern world the capacity to produce and act on objective knowledge. I have argued in this chapter that the practices of knowledge production for public policy are culturally inflected, institutionally dispersed, distributed across time and space, and involve the making of epistemic norms that are not given in logic or nature. Nevertheless, through entrenched institutional practices, such norms become naturalized and taken for granted. Objectivity is an especially powerful norm, a claim of authority that commands respect in Enlightenment societies because it mirrors reality without distortion and hence is not contestable, even in the conflict-ridden territory of political judgments. By claiming objectivity, decision makers also claim reason, transcending standpoints and interests. There can be no higher form of rationality than acting on the strength of objective knowledge.

Objectivity is easy to claim but hard to accomplish "in practice," and that is the entry point for the analysis undertaken in this chapter. Policy objectivity, like all social norms, is painstakingly constructed, contested, reaffirmed, and performed in routine practices of social actors and institutions. As research in science and technology studies has repeatedly shown, these modes of construction and affirmation become most visible at moments of controversy, when opposing actors challenge each other's assumptions and so reveal the interpretive flexibility of concepts such as

22. On July 13, 2010, the European Commission announced that it would hand greater freedom to member nations to decide whether or not to grow genetically modified plants (Kanter 2010). This move is consistent with the tenor of our argument.

objectivity. To controversy studies I add *comparision*—across space, time, actors, and decisions—as another potent method for revealing the cultural specificity of seemingly universal epistemic norms such as objectivity. Through cross-national comparisons of regulatory practice, historical studies of peer review, divergent practices of judicial reasoning, and a case study of global policy, I have tried to show how the view-from-nowhere objectivity prized by the American policy process is achieved, held in place, and internationally disseminated by one of the modern world's most contentious policy cultures.

The WTO case strikingly illustrates the importance of looking at epistemic practices in close detail. Here is a global body with power to determine the fates of nations and industries but whose ways of gathering facts and accumulating knowledge have fallen almost entirely outside the scope of social analysis. Our group's attempt to inject current social science knowledge into the WTO's thinking failed in many respects, but even the small wedge of an academic *amicus* brief may have done its bit to demonstrate that the objectivity of policy judgments on the world stage is anything but a standpoint-neutral achievement. Our experience highlighted yet again the inseparable connections between speaking for nature and speaking for institutional positions (e.g., nation-state, nongovernmental organization, academic) in the manufacture of policy-relevant objectivity.

I would like to end by stressing the need for greater institutional breadth as well as ethnographic thickness in our analyses of epistemic practices. It is not, after all, a single expert body or court decision or legislative enactment that determines how U.S. policy makers go about making their knowledge claims seem objective. Instead, we see through decades of history how diverse actors in disparate institutional settings strategically deploy the resources of reason and argument, observation and evidence, models and materiality, as well as divergent discursive forms—from academic articles to laws and judicial opinions—to open up some aspects of knowledge making while keeping others under wraps. We see how locally specific disagreements, such as that between two levels of the U.S. court system, are ironed out in practice so as to reinforce dominant epistemic norms. Analyses of single actors, institutions, or events can provide micro-insights into particular knowledge controversies and exercises of epistemic power. But to understand something as pervasive and of *longue durée* as the norms of objectivity in a regulatory culture, we need to adopt a sidelong gaze from alternative temporal and spatial worlds. Others' practices offer in the end the clearest windows on the strangeness that so often hides behind the familiarity of our own present.

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How Claims to Know the Future Are Used to Understand the Present

Techniques of Prospection in the Field of National Security

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It might be assumed that when political officials and experts try to envision the future, they do so in order to predict the outcomes of their actions in the present. And indeed this is often the case. For instance, in a press briefing given in the aftermath of the 2002 U.S. invasion of Afghanistan, U.S. Defense Secretary Donald Rumsfeld said about the results of the American military action: "There are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we now know we don't know. But there are also unknown unknowns. These are things we do not know we don't know."¹ In this sense, imagining the future helps national leaders not only find out how "known unknowns" might play out but also perhaps discover some "unknown unknowns." It can help them transform unknown uncertainty into known risk. When national leaders seek to anticipate the likely consequences of their actions in the face of identifiable threats, imagining the future serves a "predictive" purpose.

But there are other purposes served by what we call "techniques of prospection," by which we mean a set of practices for envisioning an unknown future. In this chapter, we analyze techniques of prospection when they are used in the field of national security for a second purpose, which can be termed "constitutive" rather than predictive. Techniques of prospection are used for a constitutive purpose when national leaders develop scenarios of the future to help them understand whether or not ambiguous

1. Donald Rumsfeld, Department of Defense press briefing, February 12, 2002, <http://www.defense.gov/transcripts/transcript.aspx?transcriptid=2636> (accessed December 14, 2010).