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The Bar on Science

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Reviewing: SHEILA JASANOFF,† SCIENCE AT THE BAR: LAW, SCIENCE, AND TECHNOLOGY IN AMERICA (Harvard University Press, 1995)

The final cause of law is the welfare of society.[1]

Law and social science have benefited from an enduring relationship. Roundtables on "The Role of Social Science in the Courtroom" or such similar topics frequent bar association meetings. Panels on "Law and Society" or "The Impact of Judges' Socioeconomic Background on Decision Making: X, Y, Z Regression Model Findings" make a regular appearance at social science conferences. This is the age of blurred academic boundaries in which not only the social sciences but other disciplines as well inform and shape our understandings of law and the legal process. As an interdisciplinarian myself, I have courted the somewhat foreign yet akin fields of political science, public health, and law. An appreciation of the culture of science is crucial to those who litigate toxic torts, for example, or those who participate in the formation of environmental law and policy. Scholars searching for understanding of how law and the legal system shape science have added terms such as "junk science"[2] and "trans-science"[3] to our lexicon. This may explain the lore of Sheila Jasanoff's work. Jasanoff is a prolific scholar in the area of research that may

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1. BENJAMIN N. CARDOZO, THE NATURE OF THE JUDICIAL PROCESS 66 (1921).

2. PETER W. HUBER, GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM (1991).

3. Alvin M. Weinberg, *Science and Trans-Science*, 10 MINERVA 209 (1972).

broadly be described as environmental policy-making.[4] This nomenclature characterizes both a process and nascent research group consisting of engineers,[5] psychologists,[6] political scientists,[7] economists,[8] and among others, attorneys and legal scholars.[9] Since environmental consciousness and regulation entered the mainstream political agenda of American life,[10] academics have studied the unique attributes of policy-making relevant to the natural environment and health of its denizens. In the process sci-

4. *See, e.g.*, RONALD BRICKMAN ET AL., CONTROLLING CHEMICALS: THE POLITICS OF REGULATION IN EUROPE AND THE UNITED STATES (1985); SHEILA JASANOFF, THE FIFTH BRANCH: SCIENCE ADVISERS AS POLICYMAKERS (1990); SHEILA JASANOFF, RISK MANAGEMENT AND POLITICAL CULTURE (1986); Sheila Jasanoff, *Acceptable Evidence in a Pluralistic Society*, *in* ACCEPTABLE EVIDENCE: SCIENCE AND VALUES IN RISK MANAGEMENT 29 (Deborah G. Mayo & Rachelle D. Hollander eds., 1991); Sheila Jasanoff, *American Exceptionalism and the Political Acknowledgment of Risk*, 119 DAEDELUS 61 (Fall 1990); Sheila S. Jasanoff, *Contested Boundaries in Policy-Relevant Science*, 17 SOC. STUD. SCI. 195 (1987); Sheila Jasanoff, *Cultural Aspects of Risk Assessment in Britain and the United States*, *in* THE SOCIAL AND CULTURAL CONSTRUCTION OF RISK 359 (Branden B. Johnson & Vincent T. Covello eds., 1987); Sheila Jasanoff, *EPA's Regulation of Daminozide: Unscrambling the Messages of Risk*, 12 SCI., TECH., & HUM. VALUES, Summer-Fall 1987, at 116; Sheila Jasanoff, *Introduction: Learning from Disaster*, *in* LEARNING FROM DISASTER: RISK MANAGEMENT AFTER BHOPAL (Sheila Jasanoff ed., 1994); Sheila Jasanoff, *Judicial Gatekeeping in the Management of Hazardous Technologies*, 25 J. MGMT. STUD., Oct. 1986, at 353; Sheila Jasanoff, *Managing India's Environment*, 28 ENV'T 12 (1986); Sheila Jasanoff, *Negotiation or Cost-Benefit Analysis: A Middle Road for U.S. Policy?*, 2 ENVTL. F., July 1983, at 37; Sheila Jasanoff, *Norms for Evaluating Regulatory Science*, 9 RISK ANALYSIS 271 (1989); Sheila Jasanoff, *Peer Review in the Regulatory Process*, 10 SCI., TECH., & HUM. VALUES, Summer 1985, at 20; Sheila Jasanoff & Dorothy Nelkin, *Science Technology, and the Limits of Judicial Competence*, 214 SCI. 1211 (1981); Sheila Jasanoff, *The Bhopal Disaster and the Right to Know*, 27 SOC. SCI. & MED. 1113 (1988); Sheila Jasanoff, *What Judges Should Know About the Sociology of Science*, 32 JURIMETRICS J. 345 (1992).

5. *See, e.g.*, Baruch Fischhoff, *Risk Perception and Communication Unplugged: Twenty Years of Process*, 15 RISK ANALYSIS 137 (1995) (the author is a faculty member of Carnegie Mellon University's Department of Engineering and Public Policy).

6. *See, e.g.*, Paul Slovic, *Perceived Risk, Trust, and Democracy*, 13 RISK ANALYSIS 675 (1993); Paul Slovic, *Perception of Risk*, 236 SCI. 280 (1987) (the author is a professor of psychology at the University of Oregon).

7. *See, e.g.*, DANIEL MAZMANIAN & DAVID MORELL, BEYOND SUPERFAILURE: AMERICA'S TOXICS POLICY FOR THE 1990S (1992) (Daniel Mazmanian is a political science professor at the Claremont Graduate School).

8. For example, William H. Desvousges, an economist, coauthored *Nevada's Predicament*, 30 ENV'T 17 (1988), with Howard Kunreuther and Paul Slovic.

9. *See, e.g.*, Peter H. Schuck, *Multi-Culturalism Redux: Science, Law, and Politics*, 11 YALE L. & POL'Y REV. 1 (1993).

10. In the 1970s Americans became interested in environmental issues. *See* Robert Cameron Mitchell, *Public Opinion and the Green Lobby: Poised for the 1990s?*, *in* ENVIRONMENTAL POLICY IN THE 1990S: TOWARD A NEW AGENDA 81, 81-99 (Norman J. Vig & Michael E. Kraft eds., 1990).

ence and technology have fulfilled important functions, defined natural phenomenon, identified causes of degradation to ecological and human health, and proposed intervention and cleanup strategies. Many have come to believe that in the environmental context, science and technology are not value-neutral but necessarily involve making judgments about allocation of limited resources and even stressing some cultural concerns to the exclusion of others.[11] How science advances knowledge, therefore, warrants attention. *Science at the Bar: Law, Science, and Technology in America (Science at the Bar)*[12] focuses on the role American courts play in the development of what becomes accepted as scientific, technical, and medical knowledge.

Science at the Bar is an excellent contribution to the environmental policy dialogue as legislatures revisit the scope of environmental regulation and in the process, demarcate the role of science in meeting contemporary conceptions of the public good.[13] Tort reform, festered by perceptions of unconscionably high verdicts[14] and escalating malpractice insurance rates, further support critical inquiry into the relationship between law and science.[15] Different ideas about what constitutes evidence and causation contribute to the frustration generated by the perceived unfairness in tort litigation. At the same time, public confidence in scientific and technical expertise continues to wane, as does faith in public officials' credibility.[16] Underlying the dissatisfaction with the status quo is the struggle over who will participate and make decisions about what is acceptable science, in particular, whether or to what extent the public will have a voice in the creation of scientific knowledge.

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11. *See, e.g.*, Robert R. Kuehn, *The Environmental Justice Implications of Quantitative Risk Assessment*, 1996 U. ILL. L. REV. 103; Robert B. Reich, *Public Administration and Public Deliberation: An Interpretive Essay*, 94 YALE L.J. 1617 (1985).

12. SHEILA JASANOFF, SCIENCE AT THE BAR: LAW, SCIENCE, AND TECHNOLOGY IN AMERICA (1995) [hereinafter SCIENCE AT THE BAR].

13. *See, e.g.*, Comprehensive Wetlands Conservation and Management Act of 1995, S. 352, 104th Cong., (1995). This Bill is a proposed amendment to the Federal Water Pollution Control Act, 33 U.S.C. § 1362 (1996).

14. *See* Catherine Yang, *Commentary: Tort Reform Needs Reforming*, BUS. WK., Apr. 15, 1996, at 67.

15. *See* Mike Austin, *Tort Reform Hasn't Delivered Promised Economic Benefits, Consumer Group Says*, CHI. DAILY L. BULL., Mar. 26, 1996, at 1.

16. *See* Daniel J. Fiorino, *Environmental Risk and Democratic Process: A Critical Review*, 14 COLUM. J. ENVTL. L. 501 (1989); Peter M. Sandman et al., *Agency Communication, Community Outrage, and Perception of Risk: Three Simulation Experiments*, 13 RISK ANALYSIS 585 (1993).

In turn, this strongly influences the future directions of scientific research, a subject of particular import in an age of scientific change, uncertainty, and budgetary constraints. In this light, the need to understand the role that courts may play in scientific development is paramount. Jasanoff is to be commended for cutting through to some of the more fundamental issues: Are judges a positive force in the dynamic of searching for what passes as factual conclusions or scientific evidence? How do the courts and the law interact with scientific and technical experts?

Jasanoff systematically supports her main premise: the culture of law and science are each unique and both cause tensions among the respective camps while at the same time mutually complimenting each other's shaping of scientific research and knowledge. Her methodology is select case law analysis. Unfortunately, little justification is provided for isolating a few dozen cases for study; one should not conclude that they are representative of the thousands of cases litigated each year. It is, then, a qualitative study and should be read with this understanding. In the future quantitative studies would add to the rigor of Jasanoff's work as would a more detailed discussion of the rationale for choosing select cases, considering such factors as the year they were filed, litigated, and decided; the level of court that entertained the decision highlighted; whether the court was a state or federal court and from what region of the country; and the judicial philosophy of the judge who determined the matter. Considering the type of law that is at issue should also prove insightful. Statutory law, it has traditionally been argued, leaves less room for judicial maneuvering than does common law.[17] In short, the validity of Jasanoff's findings on a broad scale should be tested using other methodologies.

It would also be informative to test Jasanoff's theory using other legal doctrines in addition to the limited number presented. The doctrine of *res ipsa loquitur*, for example, allows fact finders to infer facts. The culture of science is more parsimonious with the use of inference; repeated observations generalizable on a large scale are the accepted methodological norm.[18] In the context of *res ipsa loquitur*, one might question whether this might have had or

17. *See* CARDOZO, *supra* note 1, at 113, 119-20.

18. *See* SCIENCE AT THE BAR, *supra* note 12, at 214. Law does not have to see; moreover, one specific occurrence is not only sufficient but is all that is essentially important in any given trial.

will have an impact on waste management or other decisions that will impact the environment: What inferences are courts willing to make about injury, environmental hazards, and culpability? Other legal doctrines may have the same impact. The legal system is unlikely to undergo a radical transformation in the next twenty years. Thus, the role of many legal principles must be accounted for in attempting to describe and explain the dynamic between law and science. Jasanoff has, however, provided the ground work for such future studies and invites further research to explore the relationship between "legal process, scientific authority, and political culture."[19]

Science at the Bar highlights the topics of products liability, toxic torts, evidence, reproductive and biomedical rights, and euthanasia. Jasanoff successfully uses the development of products liability law—particularly the evidentiary standards used in products liability cases—to illustrate the influence judicial decisions and the law have had on contemporary standards of scientific fact-finding and the creation of knowledge. The law has not required absolute certainty of an event in order to assess liability. Thus, manufacturers whose product, in part or *per se*, was *a* cause of injury have been deemed liable. If science had determined causation in these cases, a precise cause or *the* cause would have been tested and found to a high degree of probability as demonstrated by repeated performances. Had that been the case, it is unlikely that product safety would have developed as rapidly, if at all, and with as high standards. The same judicial philosophy that governed products liability passes to the generation of judges who consider toxic torts and hazardous exposure cases. By not establishing a standard of absolute certainty, courts have been able to push the envelope of scientific and technological responses to modern environmental hazards. If, therefore, one sees a less risky environment as beneficial, the law has been a positive force in guiding scientific and technological inquiry.

Jasanoff does not address the issue of the cost of these developments. Perhaps a future piece would consider the trade-offs involved in a litigious society yearning to maintain economic prosperity. *Science at the Bar* does, however, shed light on the issue of how Americans confront and abate or control health risks posed by the environment and the alterations made to it by modern soci-

19. *Id.* at 225.

ety. If only the science that is well-accepted in the scientific community is privileged or accepted as valid, then incentives to develop new theories and practical applications of those theories is controlled and limited by peer groups of scientists. Law steps in to ensure the inclusiveness of public health and safety demands into the incentive matrix. Jasanoff provides invigorating insight into the ongoing debate over incentives to engage in environmentally conscious behavior. While placing herself in the camp that believes that business and industry must not be left unbridled to make decisions that affect the environment, she adds a depth of understanding that has been shadowed by regulatory research. Indeed, courts are proactive players in establishing incentives for business and industry to scrutinize their policies more carefully with an eye toward public health and safety.

Jasanoff's discourse also includes a tour into applied democratic theory. To her mind, courts have played a positive role in democratizing science by forcing scientific experts to explain their findings in terms understandable to laypersons.[20] The court is yet another political institution that provides an avenue to public participation.[21] Thus, Jasanoff opposes the creation of courts whose function is exclusively scientific decision making. These courts would not be "public friendly" but would be another institution of expertise beyond the purview of public involvement. Underlying the belief in public participation is the assumption that science, like any discipline, is fraught with value judgments.[22] In the absence of litigation, Jasanoff asserts, scientists may not question their theories and assumptions, leading to invalid, erroneous, or socially undesirable conclusions. In order to expose these assumptions, lay input is needed. Moreover, if value judgments are inherent in scientific research and such research is for the public good, it is the members of society or their representatives who should hold the decision-making power. Why courtrooms fulfill this function better than laboratories is complex; Jasanoff moves the dialogue forward on this issue.

Part of the tort and environmental reform movement today

20. *See id.* at 214.

21. *See id.* at 215.

22. *See* Nicholas A. Ashford & Karin A. Gregory, *Ethical Problems in Using Science in the Regulatory Process*, 2 NAT. RESOURCES & ENV'T J. 13 (1986); Elaine Vaughan, *The Significance of Socioeconomic and Ethnic Diversity for the Risk Communication Process*, 15 RISK ANALYSIS 169 (1995).

questions the political territory courts have carved out for themselves. Much of tort reform is designed to regain turf taken over by courts. Jasanoff does a fine job of demonstrating the value of court review of scientific decisions. Courts watchdog in the public interest and referee internecine disputes among competing scientific claims. One might question, however, the normative considerations. Is the judiciary the political institution where social judgment, such as policy formation, should be rendered? Perhaps both proponents of tort reform and Jasanoff are avoiding the question of legislatures' abdication of their policy role. Creating policy involves the airing of grievances on a large scale, deliberation, negotiation, leadership, and responsiveness to the public. Query: Can scientists or courts fulfill these needs of American democracy?

Jasanoff also delves into the issue of judicial decision making in the age of scientific uncertainty,[23] highlighted by the much discussed and often maligned Dow breast implant litigation.[24] Here she considers the role of burden of proof. In the laboratory attention is focused on empirical data of a sufficient size and validity. It must pass probability and hypothesis testing. In contrast, courtroom analysis does not focus on the general, but the specific, namely the plaintiff or plaintiffs. A variety of evidence is introduced, but particular emphasis is placed on treating physicians. Although Jasanoff does not highlight personal, subjective testimony, that too plays an important role in litigation, yet it is marginalized by science as anecdotal, atypical, or not relevant. Courts are

> inclined in each case to favor a holistic (or medical) to a reductionist, toxicological model of illness. The holistic view focuses on the suffering individual and asks whether, given the totality of circumstances, this person could have been affected in the stated way by the stated exposure. . . . This view is sharply at odds with the opinion of some toxic tort critics that general causation must be established *prior to* specific causation.[25]

Jasanoff cites *Allen v. United States*[26] to illustrate the dynamic of burden of proof, causation, and scientific uncertainty. In that

23. *See* SCIENCE AT THE BAR, *supra* note 12, at 114-37.
24. *See id.* at 50.
25. *Id.* at 125.
26. 588 F. Supp. 247 (D. Utah 1984).

case plaintiffs claimed that they had developed cancer from federal facility nuclear fallout, a by-product of nuclear testing. Although the testing was found to be covered by the doctrine of sovereign immunity on appeal, the trial court's rulings regarding causation were not reversed. The trial judge ordered that once plaintiffs had met the burden of proving that

> they had been exposed to radiation during the period of atomic testing and that the available epidemiological evidence linked their particular form of cancer with radiation, the judge concluded that radiation had been a "substantial factor" in increasing the plaintiff's [*sic*] risk of cancer. The claimant was awarded damages unless the government could prove that the particular instance of cancer was *not* caused by fallout.[27]

Again, Jasanoff exposes gaps of uncertainty filled with reasonable inferences by the law. In turn, science conforms to political and societal expectations about the state of the environment and the risk it poses to human health.

Environmental policy-making requires bedfellows of a host of characters who tussle and turn and who, in the end, find comfortable positions. In the process each learns from the other, and from this exchange, sometimes feud and fight. Hopefully, decisions that are optimal for society are found. *Science at the Bar* reminds us that neither the legal system nor science and technology can be shielded from the outside world but must learn to listen to its signals and respond to its needs.

27. SCIENCE AT THE BAR, *supra* note 12, at 126 (citations omitted).