Daubert v. *Merrell Dow Pharmaceuticals, Inc.*: The Battle Over Admissibility Standards for Scientific Evidence in Court

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On June 28, 1993, the U.S. Supreme Court handed down a landmark decision on *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*[1] in which it resolved the twentieth century debate over admissibility rules for scientific evidence in court. The Supreme Court ruled unanimously that the more liberal standard of the 1975 Federal Rules of Evidence superseded the more restrictive standard of the 1923 common law *Frye* rule. By the time *Daubert* reached the Supreme Court, it had come to embody a challenge to traditional legal views of science, its compatibility with legal truth, and the role it would play in resolving courtroom disputes. Until these issues were addressed it would be difficult to design practical rules to guide the cooperation of science and law in the search for truth in the courtroom. Thus, in 1993, the scientific and legal communities, as well as government and business interests, looked to the Supreme Court to negotiate an enduring admissibility standard which would welcome the use of scientific evidence in dealing with technical issues, but prevent the jury from being unduly persuaded by charlatans who masquerade as experts. What follows is a discussion of how the Supreme Court was influenced by the arguments put forth by two influential groups of expert scientists, physicians, historians, and philosophers of science who filed "friend of the court" briefs on the case. While over twenty such briefs were filed by various government, business, legal, and scientific interests, two of them took center stage and figured prominently in the justices' explication of the decision. One group wrote on behalf of Daubert, the other on behalf of Merrell Dow. Each used the philosophy of science to support its arguments for different admissibility standards. What became apparent is that the history and philosophy of science formed the framework in which the Supreme Court resolved the debate over admissibility standards and recast the relationship between science and law.

In the twentieth century, courts have generally welcomed scientific expertise but have turned to admissibility rules to insure that scientific evidence is relevant, reliable, and not unduly prejudicial.[2] However, even by the early 1990s, there was still disagreement as to the proper standard on which to base such rules. The more stringent admissibility standard, known as the common law *Frye* rule, stemmed from the 1923 case *Frye* v. *United States*[3] in which Justice Van Orsdel set "general acceptance" in the scientific community as a prerequisite for admitting scientific evidence in court. The more liberal standard is set forth in Rule 702 of the 1975 Federal Rules of Evidence whereby expert scientific or technical opinions are admissible in evidence if they are relevant and helpful to the judge or jury in determining the facts of the case.[4]

We turn now to consider *Daubert* v. *Merrell Dow*, the 1993 products liability case in which the Supreme Court resolved the debate over admissibility standards for scientific evidence in court. The plaintiffs, two children and their parents, sued Merrell Dow in California state court alleging that the children's limb defects were caused by their mothers' use of Bendectin. Bendectin is a drug which was manufactured by Merrell Dow and prescribed routinely to alleviate "morning sickness" during pregnancy. Science could not identify a precise causal mechanism linking Bendectin to birth defects. Statistical evidence derived from epidemiological studies were offered in lieu of more "concrete" evidence, but it was vulnerable to manipulation and produced contradictory conclusions. Merrell Dow claimed that because there was no epidemiological evidence linking Bendectin to birth defects, then the plaintiffs would not be able to offer any kind of "good" (i.e. "generally accepted") scientific evidence that it did. Daubert countered this by offering a reanalysis of the same epidemiological data as well as several other types of evidence. In doing so, Daubert implicitly argued that the more liberal admissibility standard applied. However, the lower courts sided with Merrell Dow and invoked the more stringent *Frye* rule. The Daubert plaintiffs then appealed the case to the U.S. Supreme Court, asking the Court to resolve the long-standing controversy over whether or not the Federal Rules of Evidence superseded the common law *Frye* rule as the admissibility standard for scientific evidence in court.

What lay beneath the technical legal controversy, however, was a host of larger issues pertaining to the relationship of science and law. The crisis ignited by the scientific uncertainty on causation challenged traditional notions of the nature of scientific inquiry, the certainty of its conclusions, and, ultimately, its utility in resolving courtroom conflicts. It is not surprising, then, that when the Supreme Court finally agreed to hear a case pertaining to admissibility standards for scientific evidence, both sides carried their arguments to an extraordinary level. To settle the ongoing debate over admissibility standards, Daubert and Merrell Dow called upon yet another cadre of experts. But these experts were neither more epidemiologists nor chemists, nor even statisticians. They were the physicians, scientists, and historians of science who filed "friend of the court" briefs to the Supreme Court to show how the philosophy of science legitimized their positions on admissibility standards. As we will see, these briefs had a profound impact on the way in which the Court framed its decision.

One of the most influential "friend of the court" briefs in *Daubert* was that filed by a group of twelve physicians, historians, and sociologists of science. Most prominent among this group were Professors Ronald Bayer, Stephen Jay Gould, Gerald Holton, and Everett Mendelsohn.[5] Writing on behalf of Daubert, the Bayer group endorsed the relevancy standard of the Federal Rules of Evidence because they believed a more liberal admissibility standard to be conducive to informed legal decision-making. The Bayer group denounced the Ninth Circuit Appeals Court's rationale for excluding Daubert's evidence—namely its categorical exclusion of research "deemed to be at odds with the prevailing wisdom."[6] This approach did not adequately reflect the nature of the scientific endeavor as they understood it.

Furthermore, the Bayer group identified two fallacious assumptions about science which were implicit in the lower courts' visions of "good science." For example, the Ninth

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Circuit characterized "good science" as that which lies within the consensus of the scientific community and is attended by peer-reviewed publication. The Bayer group thought that the Ninth Circuit assumed "that science always progresses by the continuous accumulation of objective, irrefutable truths, which are gradually incorporated into a consensus reflected in the scientific literature."[7] The Bayer group refuted this traditional view of science and used the writings of Kuhn and Gould to emphasize the truly revolutionary aspect of science. In the words of Kuhn, "A new theory…is seldom or never just an increment to what is already known. Its assimilation requires the reconstruction of prior theory and the reevaluation of prior fact, an intrinsically revolutionary process."[8] Accordingly, "[s]cience advances primarily by replacement, not by addition."[9] The Bayer group also emphasized that scientific facts are socially and culturally constructed. In the words of Gould, scientific facts are not "unsullied, pristine bits of truth because culture influences what we see and how we see it."[10]

Moreover, scientific conclusions, the Bayer group argued, are not as certain as the courts assume. The Bayer group criticized the lower court's assumption that just because the epidemiological studies published *thus far* found no link between Bendectin and birth defects, there could never be a study which indicated such a causal relationship. The Bayer group accordingly downplayed the novelty of the plaintiffs' reanalysis of epidemiological data and compared it to "auditing a previously completed financial report or to submitting medical records and complex test results to another physician to obtain a second opinion."[11]

Finally, Bayer et al. argued against the use of peer review and publication as a litmus test for admissibility. While they understood the temptation for the court to "seize upon what it apparently took to be a quick and easy 'Good Housekeeping Seal of Approval'"[12] for general acceptance, they did not think that peer-reviewed publication was an appropriate litmus test. In short, the Bayer group believed that a more liberal admissibility standard would better reflect science as they understood it.

This, however, was not the last word the Supreme Court would hear on the philosophy of science and how the contemporary understanding of scientific inquiry could be reflected in admissibility standards. Another group of scientists, consisting of Nobel Laureates and Professors Nicolaas Boembergen, Dudley Herschbach, and Jerome Karle among fifteen others, filed a brief on behalf of Merrell Dow in which they responded to Bayer and advocated a more stringent standard or admissibility.[13] The Bloembergen group argued that the scientific scrutiny afforded by peer review and publication is a necessary, although not sufficient, requirement for establishing what is "good science."

Moreover, in one of the most influential portions of their brief, the Bloembergen group argued that the different meaning of truth in the scientific and legal realms underscores the need to carefully screen all scientific evidence which is offered in court. This group agreed with the Bayer group that scientific truth is neither absolute nor constant. They invoked Sir Karl Popper's *The Logic of Scientific Discovery* to make their point that "[a]n hypothesis can be falsified or disproved but cannot, ultimately, be proven true because knowledge is always incomplete…Thus, scientific statements or theories are never final and are always subject to revision or rejection."[14] In other words, while tests may corroborate a hypothesis, they do not confer upon it the stamp of absolute truth.

Further, the Bloembergen group distinguished between the meaning of truth in science and the meaning of truth in law. They emphasized that truth in science is extremely "mutable," but truth in law must "become final and immutable in a relatively short time."[15] Most importantly, Bloembergen argued that truth has different functional definitions in science and law. Consequently, there are important differences "between the purposes of science in the laboratory and scientific testimony in court."[16] The nature and breadth of scientific evidence used for establishing legal truth in court is vastly different from that which is necessary to pursue scientific truth in the laboratory. Moreover, the Bloembergen group emphasized the differences between science and law which circumscribe their relationship. They differ in purpose, with science constructing "descriptive general theories based on particular data" and law consisting of "a system of normative general rules that are individualized to apply to particular cases."[17] The two disciplines also differ in a temporal sense. Science deals with predictive notions, while legal processes deal with unique, unrepeatable past events.

The Bloembergen group agreed with Bayer that it would be inappropriate in science to automatically exclude a piece of evidence just because it is deemed unorthodox at the time. Nonetheless, they argued that because science is brought to court to resolve a particular legal dispute, not to develop a new scientific theory, the admissibility standards for scientific evidence cannot be expected to mirror the criteria used to accept or reject evidence in the laboratory. They thus suggested that a much narrower range of information should be considered to resolve conflicts in court. The Bloembergen group defended the lower courts' efforts to accomplish this by using peer review as a litmus test for reliability. However, they qualified this by saying that peer review should be used to determine the general acceptance of the principles and methodology used, but not the conclusions reached. All of this led the Bloembergen group to conclude that a more stringent admissibility standard is warranted.

These friend of the court briefs had a profound impact on the way the Court explained the *Daubert* decision. First, while the Court ruled unanimously that the FRE superseded the *Frye* rule, they felt compelled to address the concerns over the reliability of evidence admitted under the more liberal relevancy standard. Justice Blackmun recommended a gatekeeping role for the judge to ensure the reliability of scientific evidence. He directed federal judges to evaluate reliability in terms of the validity of the scientific methodology involved, not on the general acceptance of the conclusions generated. He even went so far as to invoke Popper's *Conjectures and Refutations* to say that the science offered in court must be testable. Agreeing with the friends of Daubert, Blackmun also said that peer review can be used as an indicator, but not a determinant, of reliability.

Finally, Blackmun and the majority agreed with the friends of Merrell Dow who argued that the differences between science and law necessitate a more selective admissibility standard. Reiterating Bloembergen's point almost verbatim, Blackmun noted that "there are important differences between the quest for truth in the courtroom and the quest for truth in the laboratory. Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly."[18] Blackmun argued that it may be useful to consider a wide range of information in the scientific process, bun not necessarily in the legal process. Given the vastly different objectives of science and law, Blackmun agreed with the Bloembergen group that some form of adaptation is necessary to make scientific evidence useful in the legal realm. Indeed,

this is how he characterized "the balance struck by Rules of Evidence designed not for the exhaustive search for cosmic understanding but for the particularized resolution of legal disputes."[19] These realizations did not preclude the cooperation of science and law, but rather formed the basis for their alliance in court.

While the Supreme Court was unanimous in its decision that the *Frye* rule was dead, a minority declined to endorse Blackmun's recommendations and observations on the relationship between science and law. Chief Justice William Rehnquist and Justice John Paul Stevens preferred not to venture beyond the technical legal question, noting that the briefs in the case dealt not with familiar things like legal precedents or statutory language, but rather with that Rehnquist described as "definitions of scientific knowledge, scientific method, scientific validity, and peer review—in short, matters far afield from the expertise of judges."[20] By refusing to address the philosophical and functional differences between science and law, the minority ignored the deeper issues embedded in the debate over admissibility standards and left the majority to recast the relationship between science and law.

Admittedly, the *Daubert* guidelines may prove difficult to implement. Moreover, it may be that the differences between science and law will necessitate the perpetual revision of admissibility criteria to reflect contemporary jurisprudence and contemporary understanding of science. In the meantime, *Daubert* offers an optimistic vision of how science and law can cooperate in the resolution of courtroom conflicts. To Justice Blackmun's credit, he did not shy away from the unique friend of the court briefs in this case. Nor was he unduly influenced by either one of the philosophical arguments made by the friends of the court. Rather, Justice Blackmun and the majority braved the battleground of the experts and found that the history and philosophy of science illuminated the way in which they could formulate an admissibility standard which would facilitate the cooperation of science and law in the search for truth in the courtroom.

References

(1) *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, 113 S.Ct. 2786 (1993).

(2) Mueller, C. B., and L. C. Kirkpatrick. 1990. *Federal Rules of Evidence* (Boston: Little, Brown, and Co.): 37-8.

(3) *Frye* v. *United States*, 293 F.1013 (D.C. Cir. 1923).

(4) Rule 702 states: "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise." Cited from Mueller and Kirkpatrick, 110 (P.L. 93-595, S1, 88 Stat. 1937, Act of Jan 2, 1975).

(5) These friends of the court were identified in a lengthy appendix to their brief as: Professor Ronald Bayer of Columbia University School of Public Health, Division of Sociomedical Sciences; Alexander Agassiz Professor of Zoology, Professor of Geology, and Professor of the History of Science Stephen Jay Gould of Harvard University; Mallinckrodt Professor of Physics and Professor of the History of Science Gerald Holton of Harvard University; Epidemiologist and Doctor of Dental Surgery Peter F. Infante; Ethel H. Wise Professor of Community Medicine Philip Landrigan of Mount Sinai School of Medicine; Professor of the History of Science Everett Mendelsohn of Harvard University; Physician and Assistant Professor of Epidemiology and Biostatistics Robert Morris of the Medical College of Wisconsin; Professor of Child Psychiatry and Pediatrics Herbert Needleman of the University of Pittsburgh School of Medicine; University Professor in Sociology and Law Dorothy Nelkin of New York University; Professor of Medicine William Nicholson of Mount Sinai School of Medicine; Assistant Professor of Biostatistics Kathleen Joy Propert of the Harvard School of Public Health; and Professor of History David Rosner of Baruch College, CUNY Graduate Center, and the Department of Community Medicine of Mount Sinai School of Medicine. *Daubert* v. *Merrell Dow*, 113 S.Ct. 2786 (1993), *Amici Curiae* Brief filed by Physicians, Scientists and Historians of Science on behalf of Daubert (hereafter, "Bayer Brief"), Doc. No. 92-102, A1-A5.

(6) Bayer Brief, 5.

(7) Ibid., 7.

(8) Ibid., quoting Kuhn, T. 1970. *The Structure of Scientific Revolutions*, 2nd ed. (Chicago: University of Chicago Press): 7. According to the lawyer representing the Bayer group, Brian Stuart Koukoutchos, Professor Kuhn "graciously spent a good deal of time with [him] discussing the brief and the topic generally." (Koukoutchos, B. S. 1994. "Solomon Meets Galileo (And Isn't Quite Sure What To Do With Him)." *Cardozo Law Review* 15 (April): 2237, n.2.)

(9) Bayer Brief, 7, quoting Gould, S. J. 1981. *The Mismeasure of Man* (New York: W. W. Norton Co.): 322.

(10) Ibid., 8, referring to *The Mismeasure of Man*, 21-2.

(11) Ibid., 10.

(12) Ibid., 19.

(13) The friends of Merrell Dow were identified in a lengthy appendix to their brief as: Nobel Laureate (Physics 1981) and Professor Emeritus Nicolaas Bloembergen of Harvard University; Physician and Pharmacologist Erminio Costa of the Fidia-Georgetown Institute for Neurosciences; Nobel Laureate (Chemistry 1986) and Baird Professor of Science Dudley Herschbach of Harvard University; Nobel Laureate (Chemistry 1985) and Chief Scientist of the Laboratory for the Structure of Matter Jerome Karle of the Naval Research Laboratory; Director of Environmental Sciences Laboratory and Professor of Geology Arthur M. Langer of Brooklyn College of the City University of New York; Nobel Laureate (Economic 1973), University Professor of Economics, and Director of the Institute for Economic Analysis Wassily Leontief of New York University; Alfred P. Sloan Professor of Meteorology Richard S. Lindzen of M.I.T.; Nobel Laureate (Chemistry 1976), Abbott and James Lawrence Professor Emeritus, and former Chairman of the Chemistry Department William N. Lipscomb of Harvard University; James Stevens Simmons Professor of Radiobiology and Director of the Kresge Center for Environmental Health John B. Little of Harvard University; Professor and Chairman of the Department of Preventive Medicine and Community Health and Professor of Medicine Donald B. Louria of the New Jersey Medical School; Assistant Vice President for Environmental Health and Safety and Research Professor A. Alan Moghissi of the University of Maryland School of Medicine; Professor of Pathology Brooke T. Mossman of the University of Vermont; Associate Director of the Environmental Sciences Laboratory Robert Nolan of the City University of New York; Nobel Laureate (Physics 1978) and Vice President of Research at AT&T Bell Laboratories Arno A. Penzias; President Emeritus Frederick Seitz of Rockefeller University; Executive Director of the American Geophysical Union A. Frederick Spilhaus, Jr.; Chairman of the Department and Professor of Epidemiology Dimitrios Trichopoulous of the Harvard School of Public Health; and Mallinckrodt Professor of Physics and Director of the Regional Center for Global Environmental Change Richard Wilson of Harvard University. *Daubert* v. *Merrell Dow*, 113 S.Ct. 2786 (1993), *Amici Curiae* Brief filed by Nicolaas Bloembergen, et al., on behalf of Merrell Dow (hereafter, "Bloembergen Brief"), Doc. No. 92-102, A1-A10.

(14) Bloembergen Brief, 14, invoking Popper, K. 1959. *The Logic of Scientific Discovery* (New York: Basic Books).

(15) Ibid., 19.

(16) Ibid., 17.

(17) Ibid., 15.

(18) *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, 113 S.Ct. 2786, 2798 (1993).

(19) Ibid., 2799.

(20) Ibid.