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CONTROVERSIAL SCIENCE IN THE COURTROOM: DAUBERT AND THE LAW'S HUBRIS

*Paul S. Milich**

Television star Roseanne Arnold's announcement that psychotherapy had enabled her to recall long repressed memories of her parents sexually abusing her from the time she was an infant heightened public attention to the theory that memories of incest could be totally repressed and then accurately recalled decades later. The theory has intuitive appeal. The idea that people repress unpleasant memories and emotions that later can be recalled in therapy goes at least as far back as Sigmund Freud.¹

When a troubled young man similarly recalled repressed memories of being abused by a cardinal of the Catholic Church, only a murmur of skepticism was voiced in the press. When the young man retracted his accusation, doubting the reliability of his own repressed memories, the press finally took notice of the fact that there was very little scientific support, and much skepticism, for the proposition that traumatic memories could be completely repressed for years and then suddenly and accurately recalled.² The scientific skeptics do not claim that all recalled repressed memories are false—there is no proof of that. But nor is there empirical proof that such recollections are generally authentic.³ In short, there is no scientific basis for gauging the probability that a recalled repressed memory in a particular case is substantially true or false.

In light of the absence of scientific support for the accuracy of recalled repressed memories, one would expect trial courts to be most cautious in admitting expert testimony to support the reliability of the alleged victim's recollection. Some courts have been, but many have not, often leaving the unresolved scientific questions of whether recalled repressed memories are

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¹ Gary M. Ernsdorff & Elizabeth F. Loftus, *Let Sleeping Memories Lie? Words of Caution About Tolling the Statute of Limitations in Cases of Memory Repression*, 84 J. CRIM. L. & CRIMINOLOGY 129, 132-35 (1993).

² See Elizabeth Loftus, *The Reality Of Repressed Memories*, 48 AM. PSYCH. 518 (1993) (reviewing the scientific literature). Adding to doubts concerning the reliability of "repressed memories" is the use of sodium amyltal or hypnosis in some cases to facilitate the recollection in therapy. *Id.*

³ Ernsdorff & Loftus, *supra* note 1, at 128.

reliable for the jury to consider and ultimately resolve.⁴

Juries often are asked to resolve technical issues and expert witnesses are used to assist them in those tasks. But it is a whole other matter to ask the jury to also decide whether the underlying principles and methodologies used by the experts are scientifically reliable. In our rush to accept the very latest that modern science has to offer, we risk the absurd scenario of lay judges and juries judging the reliability of novel and controversial scientific evidence before science itself has completed its investigation and reached its own judgment.⁵

The much maligned *Frye* rule stood for a simple proposition: trial courts should not accept scientific evidence unless and until science accepts it.⁶ The conservatism of this proposition was a primary cause in the downfall of the *Frye* rule. But before we say our final good-byes to *Frye*, we should recall the reason for the rule's conservatism and ask whether the new approach outlined by the Supreme Court in *Daubert*⁷ will do a better job than *Frye* of handling the interface between science and the courtroom.⁸

We accept science in the courtroom because we have confidence in the methods and respect for the achievements of science. The law gives science

⁴ See, e.g., *Hewczuk v. Sambor*, 803 F. Supp. 1063, 1065 (E.D. Pa. 1992) ("It is not at all unreasonable to suppose that . . . [the sexual abuse] would be totally repressed and excluded from her consciousness."—issue of reliability left to jury); *Mary D. v. John D.*, 264 Cal. Rptr. 633 (1989); *Olsen v. Hooley*, 865 P.2d 1345 (Utah 1993). But see *Tyson v. Tyson*, 727 P.2d 226 (Wash. 1986). The reported decisions on "repressed memories" primarily concern whether they toll the applicable statute of limitations. But nearly all of the cases allow the issue to survive summary judgment on the statute of limitations issue and leave the scientific question of the reliability of repressed memories to the jury.

⁵ Professor Giannelli cites the example of trial courts "deeming" certain studies as sufficient to validate voice print science, only to have the National Academy of Sciences cast doubt on this conclusion. Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, A Half-Century Later*, 80 COLUM. L. REV. 1197, 1213 (1980). See also Andre A. Moenssens, *Novel Scientific Evidence in Criminal Cases: Some Words of Caution*, 84 J. CRIM. L. & CRIMINOLOGY 1, 1-2 (1993).

⁶ *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923) (party offering scientific evidence must show "general acceptance in the particular field in which it belongs.").

⁷ *Daubert v. Merrell Dow Pharmaceuticals*, 113 S. Ct. 2786 (1993).

⁸ Giannelli, *supra* note 5, at 1224 ("The question is not whether *Frye* embodies a conservative approach to the admissibility of scientific evidence (which it does) but rather whether such conservatism is justified. Thus, the critical issue is whether other approaches can better achieve the *Frye* objective . . .").

a special status in the courtroom, one denied to astrologers, mystics, and others who practice alternative modes of knowledge. Moreover, much of what science gives us we do not fully understand. Like a black box whose inner workings are a mystery, we see only the results; and even the results sometimes must be explained to us before we understand their significance.

The law, in short, places great faith in scientific knowledge; the same kind of faith each of us shows when we step onto an airplane or drive across a long bridge with little fear or doubt. Our faith in science is qualified by the recognition that there is a difference between established or proven science and scientific work that is still under review. Few of us would volunteer to be the first to fly in an airplane or cross a bridge that was so "experimental" that experts still were debating whether it would work. The *Frye* rule asserted that the law's faith in science must not race ahead of science itself. If we trust science's claims of reliability in most cases, we should heed its expressions of hesitation and doubt in others.⁹

Of course, "science" is not a monolithic institution but a wide assembly of diverse, and sometimes quarreling, disciplines. This was one problem with the *Frye* rule; it presumed an identifiable, pertinent scientific community whose consensus views on any issue could be easily tapped.¹⁰ This unrealistic view of science made the *Frye* rule seem unnecessarily conservative, out of touch with the increasingly specialized world of science in which the development and dissemination of new ideas and techniques does not always take the traditional scientific path.¹¹

Dissatisfaction with *Frye* led courts in two different directions. One approach, the so-called "relevancy approach," lowered the hurdles to the admission of novel and controversial scientific evidence. Such evidence need not be generally accepted in the scientific community but only sup-

⁹ See Moenssens, *supra* note 5, at 4-5 ("I urge caution because its absence is the antithesis of the scientific method; lack of caution leads to grievous error that tends to bring forensic science into disrepute.").

¹⁰ See Giannelli, *supra* note 5, at 1208.

¹¹ For example, should a court applying the *Frye* rule to the issue of repressed memories look to opinion in the greater psychological community where experimental and clinical psychologists have long debated the nature of and need for traditional empirical validation of psychological theories? Or should the court look to the subgroup of clinicians who specialize in treating incest survivors? For a summary of the problems in applying *Frye*, see Giannelli, *supra* note 5, at 1208-23.

ported by a qualified expert. Questions concerning the reliability of the evidence are left to the jury.¹²

The relevancy approach has been the main target of those campaigning against "junk science" in the courtroom.¹³ By requiring so little in the way of proven reliability or general scientific acceptance before admitting the testimony of an expert, the relevancy approach allows hired experts to pitch intuitively persuasive but scientifically unreliable theories and techniques to a nonscientist jury. Ill-equipped to actually judge science on its own terms, the jury is left with two choices: (1) ignore the scientific issues and decide the outcome of the case based on other factors;¹⁴ or (2) resolve the technical issues by siding with the expert who has the greatest credibility.¹⁵ Yet even when evaluating the credibility of experts, nonscientist jurors may have little knowledge as to what makes an expert in a particular field a credible scientist.

In contrast to the more lenient versions of the relevancy approach, some courts modified *Frye* by inviting trial judges to go beyond "merely counting heads in the scientific community" in a search for "general acceptance," and instead to make a preliminary determination, based on all the evidence and the judge's own resources, of whether the evidence is sufficiently reliable to be admitted at trial.¹⁶ Implied in this approach is the assumption that the trial judge is better able to evaluate novel or controversial scientific evidence than jurors and thus should handle more of the work in this area.

The majority opinion in *Daubert v. Merrell Dow Pharmaceuticals*¹⁷ is in sympathy with this latter approach. The trial judge must determine

¹² See Giannelli, *supra* note 5, at 1232-45. See, e.g., *Ferebee v. Chevron Chem. Co.* 736 F.2d 1529, 1534 (D.C. Cir. 1984), *cert. denied*, 469 U.S. 1062 (1984).

¹³ See generally Peter Huber, *Medical Experts and the Ghost of Galileo*, LAW. & CONTEMP. PROBS., Summer 1991, at 119.

¹⁴ In a case with highly technical issues, the side with the weaker technical case has some incentive to "blow smoke" over the technical issues, hoping the jury will despair of understanding those issues and decide the case on nontechnical factors.

¹⁵ It is no secret that trial attorneys seek experts who are not only knowledgeable, but look and sound like "experts." Gray hair and an English accent are most preferred.

¹⁶ *Harper v. State*, 292 S.E.2d. 389, 395-96 (Ga. 1982). See Giannelli, *supra* note 5, at 1219-21.

¹⁷ 113 S. Ct. 2786 (1993). The unanimous portion of the *Daubert* opinion held that the *Frye* rule did not survive the enactment of the Federal Rules of Evidence. The majority portion of the opinion, to which two Justices dissented, made some "general observations" about how trial courts should apply FED. R. EVID. 702 to scientific evidence offered at trial. *Id.* at 2796, 2799.

whether novel or controversial scientific evidence has that level of reliability required to pass as "scientific knowledge" under Federal Rule 702.¹⁸ Although general acceptance in the scientific community is "an important factor" in establishing the required degree of reliability, it is not necessary.¹⁹ It is enough if the offered evidence is derived from the scientific method. "Proposed testimony must be supported by appropriate validation—*i.e.*, 'good grounds,' based on what is known."²⁰ In making this reliability assessment, the trial judge may use any sources, including of course, the testimony of experts. Ultimately, however, it is the trial judge's decision whether the evidence is sufficiently reliable.²¹

While *Daubert* expresses a clear bias in favor of the rigorous empirical methods of the traditional "hard sciences," it is not clear whether this was due to the hard science nature of the issues in the underlying case or reflects a broader approach. The *Daubert* opinion never mentions the psychological sciences, for example, where much of the data is subjective and many of the theories are empirically difficult, if not impossible, to verify. An experimental psychologist, for example, would demand "hard" evidence of the reliability of repressed memories, while a psychoanalyst might require much less or rely more heavily on anecdotal evidence.²² It is unclear whether the *Daubert* Court's emphasis on traditional methods of testing and validation means the Court would side with the experimental psychologists in a dispute over the reliability of repressed memories or whether the Court would adjust its notion of what is sufficient scientific validation when dealing with the softer sciences.²³

I have two main concerns about the *Daubert* opinion: (1) it requires nonscientist trial judges to evaluate science in a way that may exceed their scientific abilities; and (2) it is too vague on the degree of reliability that the trial judges are supposed to be looking for.

¹⁸ *Id.* at 2795. The underlying scientific issue in *Daubert* was the scientific validity of the principles and methods used by plaintiffs to prove that the drug Bendectin, taken by pregnant mothers to control nausea, could cause birth defects. *Id.* at 2789-90.

¹⁹ *Id.* at 2797.

²⁰ *Id.* at 2795.

²¹ *Id.* at 2796.

²² See Ersndorff & Loftus, *supra* note 1, at 134.

²³ See *Tyson v. Tyson*, 727 P.2d 226, 229 (Wash. 1986).

Judges As Amateur Scientists

There is a significant difference between the question, "Is X scientifically reliable?" and the question, "Do scientists consider X scientifically reliable?" The first is asking a scientific question and demands a scientific answer; *i.e.*, the kind of evidence, proof, and explanation required by scientists in the pertinent field. Thus a judge asking the first question must review the evidence "internally," evaluating the principles and methodologies underlying the evidence.

The second question, "Do scientists consider X scientifically reliable?" is a *Frye*-type question. Instead of trying to determine whether the offered evidence is good or bad science based on the scientific value of the evidence, the court undertakes an "external" review of whether good scientists who have done an internal review of the evidence, consider it to be scientifically reliable. It involves evaluating the scientific credibility of the experts rather than trying to evaluate the scientific reliability of the evidence directly.

Daubert clearly asks the first question, putting trial judges in the position of making substantive, internal reviews of scientific work. *Daubert* contemplates that trial judges will combine external review (what scientists think) and internal review (the judge's evaluation of the science), but the latter is given primacy.²⁴ The majority in *Daubert* expressed its confidence that "federal judges possess the capacity to undertake this review."²⁵ In dissent, Justice Rehnquist worried that the majority opinion requires trial judges to become "amateur scientists" to fulfill their gatekeeping role.²⁶ Indeed, the federal judiciary appears to be gearing up to perform

²⁴ *Id.* at 2796-97. The inquiry's "overreaching subject is the scientific validity—and thus the evidentiary relevance and reliability—of the principles that underlie a proposed submission. The focus, of course, must be solely on principles and methodology, not on the conclusions that they generate." *Id.* at 2797. The *Daubert* opinion does not bar a trial judge from relying solely on what scientists say concerning the reliability issues. This would seem the most prudent course for judges who feel uncomfortable analyzing science on its own terms.

²⁵ *Id.* at 2796.

²⁶ *Id.* at 2800 (Rehnquist, J., dissenting). This issue is not new. As Judge Learned Hand wrote in *Parke-Davis & Co. v. H. K. Mulford Co.*, 189 F. 95, 115 (C.C.S.D.N.Y. 1911) ("I cannot stop without calling attention to the extraordinary condition of the law which makes it possible for a man without any knowledge of even the rudiments of chemistry to pass upon such questions as these. . . . only a trained chemist is really capable of passing upon such facts . . ."), *modified*, 196 F. 496 (2d Cir. 1912).

that role.²⁷

Most federal judges are bright individuals but we sorely underestimate the complexity of many scientific controversies, particularly those involving complex quantitative analyses, when we presume that nonscientist judges can master the technical issues to the point that they should feel comfortable deciding what is or is not good science in a particular case.²⁸ Scientists who have spent the greater portions of their professional lives wrestling with the complexities and mysteries of their disciplines must be amazed at the law's hubris in thinking that nonscientist judges can "get up to speed" on a scientific dispute and ultimately decide who has the better of the argument.²⁹

Perhaps the *Daubert* court believed that the only way to escape *Frye* was to make scientific validity per se the ultimate question and the opinions of scientists on that question would be merely one of several sources in making that determination. But this was unnecessary³⁰ and a bit self-deceiving. It was unnecessary because one can reject *Frye's* "austere standard"³¹ of general acceptance in the scientific community without rejecting the proposition, implicit in *Frye*, that courts should defer to scientific

²⁷ See Joe S. Cecil & Thomas E. Willging, *Accepting Daubert's Invitation: Defining A Role for Court-Appointed Experts in Assessing Scientific Validity*, 43 EMORY L.J. 995 (1994). Although *Daubert* only spoke to the practice of the federal courts under the Federal Rules of Evidence, Rule 702 has been adopted in 38 states and *Daubert* likely will have significant influence in those states. See, e.g., *State v. Alberico*, 861 P.2d 192 (N.M. 1993) (adopting reasoning of *Daubert*); but see, *Flanagan v. State*, 625 So. 2d (Fla. 1993) (declining to abandon *Frye* for *Daubert*). As inappropriate as it is for federal judges to be consigned the role of amateur scientists evaluating the scientific reliability of evidence on its scientific merits, it may pose even greater challenges for state trial judges who often command fewer resources, such as law clerks, funds for court-appointed experts and the time required to ponder the science, than the federal judiciary.

²⁸ When the late Irving Younger summarized the test for novel scientific evidence as whether it rested "upon the laws of nature," (quoted in *Harper v. State*, 292 S.E.2d 389, 395 (Ga. 1982)), he had in mind a simpler scientific world. A good deal of the controversy and complexity of novel scientific evidence concerns not the "laws of nature" but the laws of mathematics and probabilities. Statistics are not only part of the epidemiological evidence in cases like *Daubert* but accompany much of the new generation of forensic evidence such as DNA typing and neutron activation analysis where test results must be extrapolated to determine their significance. See also Joseph Sanders, *From Science to Evidence: The Testimony on Causation in the Bendectin Cases*, 46 STAN. L. REV. 1, 67. (Nov. 1993).

²⁹ See Stephen D. Sugarman, *The Need to Reform Personal Injury Law Leaving Scientific Disputes to Scientists*, 248 SCIENCE 823 (1990).

³⁰ *Daubert*, 113 S. Ct. at 2800 (Rehnquist, J., dissenting).

³¹ *Id.* at 2794.

opinion regarding questions of scientific reliability.³² Moreover, it is rather self-deceiving to pretend that a nonscientist trial judge's conclusions regarding the scientific reliability of novel or controversial scientific evidence are, or should be, anything more than that judge's acceptance of what certain experts think. If a trial judge's amateur scientist review leads to the conclusion that certain evidence is scientifically reliable, but the weight of credible scientific opinion reaches the opposite conclusion, we should hope the judge would question his own scientific reasoning, not the scientists'.

The difficulty of the trial judge's scientific task under *Daubert* depends, in part, on how fine a scientific judgment he must make and this in turn depends on how much the proponent needs to show in order for reliability to be "sufficiently" proved. The *Daubert* Court is intolerably vague on what degree of scientific reliability the trial court should require before admitting the evidence under Federal Rule 702.³³

"Hard" and "Soft" *Daubert*

The *Daubert* Court states that "*evidentiary reliability* will be based upon *scientific validity*"³⁴ and focuses on whether the evidence was "derived by the scientific method."³⁵ But "the scientific method" is not the same for all disciplines of science and in any case does not specify a particular level of "appropriate validation" before a principle or methodology is accepted as reliable.³⁶ There are many different degrees of scientific reliability and whether something is "reliable enough" depends upon the use to which one wants to put it and the risk of error one is willing to accept under those circumstances.³⁷

³² See discussion at notes 48-49, *infra*.

³³ See, e.g., *State v. Bible*, 858 P.2d 1152, 1183 (Ariz. 1993), *cert. denied*, 114 S. Ct. 1578 (1994) (declining to adopt *Daubert* at this time, court observes that the nature of the requirement in *Daubert* "is currently unknown, may vary from case to case, and is to be fashioned by trial judges using an analytical framework as yet unspecified. In application, *Daubert* leaves many questions unanswered.").

³⁴ *Id.* at 2795 n.9 (emphasis in original).

³⁵ *Id.* at 2795.

³⁶ *Id.* at 2795 n.9. Even when a scientific discipline adopts certain conventions, such as the choice in statistics of a p value (Alpha) of .05 as indicating the border of statistical significance, this is of no help if the scientific disputes relate to the principles and methodologies underlying the statistics. See Sanders, *supra* note 28, at 14-16.

³⁷ Designers of nuclear power plants presumably seek extremely high levels of reliability in the

I see *Daubert* receiving two general kinds of interpretations: "hard" and "soft." The hard view will emphasize those portions of the *Daubert* opinion that refer to validation, verification, and adherence to the scientific method. It will tend to reject novel principles and methods that, although promising, still lack comprehensive validation.³⁸ Likewise, controversial scientific evidence will be rejected if the controversy shows problems in methodology or deficiencies in verification that, from a scientific standpoint, classify the evidence as still experimental.

This rather high standard for admission of scientific evidence would have the advantage of insulating the jury, the least scientifically capable component of the trial system, from the task of resolving scientific disputes. One disadvantage of this hard approach is that it requires a trial court to make a rather fine scientific judgment; to decide whether the scientific support a proponent has mustered behind the offered evidence is sufficient to prove that the evidence is "scientifically valid."³⁹

Other courts may take a softer approach to what *Daubert* requires. They might find that as long as the offered evidence is generally based upon scientifically valid principles and methodologies, the evidence should be admitted. In other words, as long as the proponent has some scientific support for the evidence, it will be admitted and disputes concerning its reliability will go to the jury. Answering the concern that a lax rule of admission "would result in a 'free-for-all'" before "befuddled juries" the *Daubert* Court finds this assessment "overly pessimistic about the capabilities of the jury, and of the adversary system generally. Vigorous cross-

principles and methods upon which they rely while a psychiatrist treating a patient, on the other hand, may require less in the way of proof and reliability before using certain new principles or techniques. Arguably the law should be more cautious in admitting disputed scientific evidence against the accused in a criminal case than admitting such evidence in civil cases, see Giannelli, *supra* note 5, at 1245-50, but the *Daubert* Court makes no such distinction. See also Moenssens, *supra* note 5, at 4.

³⁸ See *Daubert*, 113 S. Ct. at 2798-99 ("We recognize that in practice, a gatekeeping role for the judge, no matter how flexible, on occasion will inevitably prevent the jury from learning of authentic insights and innovations."). Critics of "junk science" in the courtroom are praising *Daubert* for "tightening up on standards of scientific evidence." *Phantom Risk: Scientific Inference and the Law—An Interview with the Editors*, CIV. JUST. REP., Jan. 1994, at 7 (Manhattan Institute's Judicial Studies Program). This may be an effort at "spin control" on an opinion so vague that it led another noted scholar to conclude that *Daubert* embraced a "very loose 'general relevancy' test." Moenssens, *supra* note 5, at 4.

³⁹ *Id.* at 2796. See E. Donald Elliott, *Toward Incentive-Based Procedure: Three Approaches For Regulating Scientific Evidence*, 69 B.U. L. REV. 487, 500-01 (1989).

examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence."⁴⁰

But the issue is whether a jury should ever be given "shaky" science. It may be a greater mistake to be overly optimistic than overly pessimistic about the capabilities of juries when it comes to complex scientific issues,⁴¹ particularly those involving sophisticated quantitative analysis. The Bendectin trials, for example, asked jurors to evaluate competing epidemiological and statistical theories and analyses. As Professor Sanders's excellent study of the trials shows, even though the basic scientific issue remained the same, of twenty Bendectin trials that went all the way to jury verdict, plaintiffs won eight and defendants won twelve.⁴² An optimist might point to the fact that the jury got it right 60% of the time.⁴³ A pessimist would say this is not much better than flipping a coin.

The key problem with any soft or lenient approach to the admission of novel and controversial evidence is that it dumps the scientific disputes onto the laps of the jury. The jury's obvious limitations in evaluating complex scientific disputes cannot be overcome by the mythically powerful tools of cross-examination and closing argument. Indeed, the traditional formalisms of trial procedure sometimes inhibit rather than enhance the search for scientific clarity.⁴⁴

The *Daubert* Court focuses its analysis on the term "scientific . . .

⁴⁰ *Id.* at 2798.

⁴¹ See Paul C. Giannelli, *Junk Science: The Criminal Cases*, 84 J. CRIM. L. & CRIMINOLOGY 105, 116 (1993) ("If we are going to make mistakes in assuming the validity of a novel technique, they should be mistakes in delaying the admission of reliable evidence and not mistakes admitting unreliable evidence.").

⁴² Sanders, *supra* note 28, at 9 tbl. 2, 158-60.

⁴³ Professor Sanders shows that the great weight of scientific opinion supports the defense position in the Bendectin cases. Five Bendectin cases were tried before judges and all five resulted in defense verdicts.

⁴⁴ If the jury is asked to resolve disputes concerning the scientific reliability of certain evidence, they must be educated concerning the scientific principles and methods involved. The traditional direct and cross-examination method of presenting evidence is not a highly effective instrument for educating jurors about science. The "teachers" are usually experts hired by the parties and the jury naturally suspects their neutrality. Cross-examination, of course, will attempt to further reduce the experts' credibility in the eyes of the jury. The jurors are usually not allowed to ask the experts questions and courts only recently have grown comfortable with allowing jurors to take notes in complex cases. See AMERICAN BAR ASS'N, SECTION OF LITIGATION, JURY COMPREHENSION IN COMPLEX CASES (1989).

knowledge” in Federal Rule 702 but pays little attention to the other requirement in that Rule that the evidence in question “will assist the trier of fact to understand the evidence or to determine the fact in issue.”⁴⁵ Subjecting a jury to a courtroom scientific debate over the reliability of highly complex evidence neither assists the jury nor leads to a rational determination of the facts at issue.

Of course, juries are asked to decide difficult, technical issues all the time in medical malpractice cases, product liability suits, insanity defenses in criminal trials and so forth. But such cases generally involve disputes over the proper application of established and accepted principles and methods. These issues are challenging enough to juries without compounding their complexity by requiring juries to decide whether the underlying principles and methods used by the various experts are scientifically reliable.

The *Daubert* Court saw itself balancing two competing goals: the liberal admission of all relevant evidence, against the concern for the reliability of that evidence.⁴⁶ But the results are more schizophrenic than balanced. On the one hand, the Court speaks of a gatekeeper role for the trial judge that is so strict as to “inevitably” lead to the occasional loss of “authentic insights and innovations.”⁴⁷ On the other hand, the Court insists that airing out the disputes before the jury is “the traditional and appropriate means of attacking shaky but admissible evidence.”⁴⁸

Prosecutors and plaintiffs’ attorneys are eager to use novel and controversial scientific evidence. They do not want to hear that their evidence, if it is in fact reliable, will eventually be proven as such and accepted by courts. They have real cases with real victims right now. Trying to “balance” these interests against the dangers of unreliable scientific evidence, however, does not yield a comfortable middle ground. Science is the only source of its own reliability. Anything less than complete deference to the weight of credible scientific opinion concerning the reliability of scientific evidence means going outside science—to the judge or jury, (or, in *Daubert*, to an unspecified combination of the two)—to resolve a scientific

⁴⁵ The Court states that this part of Rule 702 “goes primarily to relevance,” *i.e.*, whether the expert’s testimony relates to any issue in the case. 113 S. Ct. at 2795.

⁴⁶ *Id.* at 2798-99

⁴⁷ *Id.* at 2799.

⁴⁸ *Id.* at 2798.

dispute. The resulting judgment cannot be scientific and therefore we cannot honestly speak of the evidence as having "scientific" reliability.

Deferring to Science

I would turn *Daubert* on its head. *Daubert* states that while the opinion of good scientists regarding the scientific reliability of the evidence in question is probative, it is not dispositive of the "real" issue: "Is the evidence in fact scientifically reliable?" A better rule, I believe, would state that while a nonscientist trial judge's own understanding of the scientific principles and methods in question may be important and useful, the "real" issue is whether good scientists consider the evidence reliable at this time.

It may seem odd to exalt what scientists think of the reliability of evidence over whether the evidence is "really" reliable. But it is more a case of preferring what we can know over what we cannot know; of nonscientists showing a little humility in the world of science. A courtroom battle of the experts before a nonscientist judge or jury is not a logical, and certainly not a scientific, way of resolving a scientific dispute. The focus instead should be on determining whether the weight of scientific opinion supports one side or another.

Focusing on what scientists think of the evidence is reflective of the *Frye* rule. I do not recommend a return to the general acceptance standard of the *Frye* rule which was too narrowly focused on whether the scientific principles and methods in question had passed successfully through some rather idealized process of scientific review and acceptance. The inquiry must be broader than that. Even if the scientific principles or methods in question have not yet been widely disseminated or reviewed in the scientific community, the court should consider whether good scientists who have reviewed the science believe the evidence is reliable and that "general acceptance" is only a matter of time.

Trying to determine the preponderance of scientific opinion concerning the reliability of a novel principle or technique is not always easy. The parties' experts are biased. Counsel try to select those experts who are willing to be as firm and convincing as possible on their points, a posture more reflective of the adversary process than scientific inquiry. Many experts come to court with professional stakes involved. Getting a trial court

to accept a novel or controversial scientific principle such as “repressed memories” or “clinical ecology” is a professional coup for a scientist who has been fighting for the respectability of the new theory.⁴⁹ It can be difficult for a trial judge to find the weight of good scientific opinion in all this partisan wrangling.

Whatever the practical difficulties the trial judge faces in trying to determine the weight of scientific opinion on the issue, it still is easier than a trial judge trying to reach his or her own scientific opinion on the subject. While most trial judges are not capable of doing science, they are quite experienced in evaluating issues of credibility.⁵⁰ Moreover, the trial judge is not restricted to the testimony of the parties’ experts but may include two other potentially very useful sources of help. The first is any research or publication on the scientific issue by other experts who have not been hired to testify. The trial judge would not be reviewing the research and publications for their scientific content, but only for their conclusions and the scientific credibility of those behind the conclusions.

The best source of help on these issues, however, is the court-appointed expert who is hired, not to give a “third opinion” on the individual merits of the case, but only to present a neutral review of the research and literature and an assessment of the scientific reliability of the underlying principles and methods at issue.⁵¹ The court-appointed expert also could assist the trial judge in evaluating the credentials and relevant expertise of the various scientists involved.

Finally, in deciding how much evidence of reliability a trial judge should require before admitting novel or controversial scientific evidence, the standard should not be static but should adjust to the nature and complexity of the scientific dispute in question. The purpose of the trial

⁴⁹ See Dan L. Burk, *When Scientists Act Like Lawyers: The Problem of Adversary Science*, 33 JURIMETRICS J. 363, 368-70 (1993).

⁵⁰ Focusing on credibility does not mean that a trial judge should ignore what she knows about the scientific issues involved. To the extent that the judge’s own scientific knowledge aides her in critically evaluating what the experts are saying, it substantially assists in her evaluation of the experts’ scientific credibility. The general, external factors a trial court should consider in evaluating the scientific credibility of an expert include the expert’s training, education, current position, publication and grant record, and experience as peer reviewer, conference participant or similar roles that reflect recognition by fellow scientists. Finally, the degree to which the expert’s position has been supported in the scientific community is an important factor in evaluating the expert’s scientific credibility.

⁵¹ See Elliott, *supra* note 39; FED. R. EVID. 706.

judge's gatekeeping role is twofold. First, and easiest, is to screen out evidence based upon principles and methods so untested and unsupported that no reasonable factfinder could or should rely upon them. Second, the trial court should screen out evidence that although it has some scientific support, substantial questions remain regarding its scientific reliability *and* resolving those questions is not something nonscientist jurors can rationally accomplish. Thus if the scientific disputes in a particular case are not too technical, but relatively narrow and within the realm of a lay person's comprehension, the trial judge can be comfortable admitting such evidence upon a modest showing of scientific support and letting the jury hear and resolve the disputes.⁵² But if the scientific disputes concern highly technical⁵³ or complicated issues that a jury will not comprehend, let alone master, the trial judge should require a strong showing of established scientific support before admitting the evidence.

Conclusion

Daubert is not likely to be of much help to trial courts trying to manage the flow of new scientific theories and techniques into the courtroom. While it is a relief to some that *Daubert* did not adopt a "let-it-all-in" general relevancy standard, and a relief to others that *Daubert* did not embrace the strict *Frye* rule, the result is a rather vague standard of "scientific reliability" that may put trial judges and even juries in the inappropriate position of trying to evaluate disputed science on its own terms. The fact that the *Frye* standard of "general acceptance" was unnecessarily strict does not detract from its premise that the courts must defer to the weight of scientific opinion in regards to matters of science. In obscuring this basic premise, the *Daubert* Court invites the rather Orwellian prospect of law judges "deeming" what is and is not good science.

⁵² An example is using bite mark identification evidence. While there are reliability issues concerning use of such evidence, the issues are not extremely technical. See Robert A. De La Cruz, Note, *Forensic Dentistry and the Law: Is Bite Mark Evidence Here to Stay?*, 24 AM. CRIM. L. REV. 983 (1987).

⁵³ The Bendectin trials, for example, involved "five general categories of scientific evidence . . . : structure-activity, *in vitro*, *in vivo*, epidemiology, and secular trend data." Sanders, *supra* note 28, at 18.