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Scientific Evidence under Daubert.

John H. Mansfield

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SCIENTIFIC EVIDENCE UNDER *DAUBERT*

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I. INTRODUCTION

The controversy over the proper standard for the admissibility of scientific evidence is an argument over the value of jury trial compared with trial to a judge or decision by scientists.¹ The argument

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1. This is an old argument and anyone who supposes he has something new to say on the subject should first consult the excellent article written by New Hampshire Judge William Foster almost a century ago, in which virtually every consideration put forward in the

has both a constitutional dimension in the provisions relating to jury trial, compulsory process and due process, and a nonconstitutional dimension in the ordinary law of Evidence. Discussion on this subject ought to be conducted with an eye to the law of Evidence as a whole and with a full appreciation of the history of the jury as an agency of popular government.² In the recent case of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,³ the United States Supreme Court took a different approach, basing its decision almost entirely on an interpretation of the particular words used in Rule 702 of the Federal Rules of Evidence.⁴ That this approach is unsatisfactory and fails to come to grips with what truly is in controversy—the value of jury trial compared with other methods of decision-making—can be made clear only by a careful examination of the terms and ideas employed in the Court's opinion.

Daubert holds that under the Federal Rules of Evidence, "scientific" evidence is not admissible unless it is "scientifically valid" and "reliable."⁵ The "primary locus" of the obligation to satisfy this standard, according to the Supreme Court, is found in Federal Rule of Evidence 702,⁶ which provides: "If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or 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." The Court also suggested that, under certain circumstances, scientific evidence might be kept out under Federal Rule of Evidence 403, which provides that evidence may be excluded if its "probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury. . . ."⁷ However, the

mass of literature that has accumulated since that time was touched upon. See William L. Foster, *Expert Testimony: Prevalent Complaints and Proposed Remedies*, 11 HARV. L. REV. 164, 175, 177 (1897); see also James Fitzjames Stephen, *On Trial by Jury and the Evidence of Experts*, 2 JURID. SOC'Y PAPERS 236, 241-49 (1858-63). Even the suggestion made a few years ago by Professor Langbein, that we adopt the German way of dealing with experts, was considered by Foster. See John H. Langbein, *The German Advantage in Civil Procedure*, 52 U. CHI. L. REV. 823, 835-40 (1985).

2. See JAMES BRADLEY THAYER, *A PRELIMINARY TREATISE ON EVIDENCE AT THE COMMON LAW* 2 (1898) (noting "the deep political significance of the jury").

3. 113 S. Ct. 2786 (1993).

4. *Daubert*, 113 S. Ct. at 2794-96.

5. *Id.* at 2799.

6. *Id.* at 2795.

7. *Id.* at 2798.

Court did not elaborate on this ground for exclusion.⁸ Additionally, language in the Court's opinion suggested the possibility that Federal Rule of Evidence 703 includes a standard for the admissibility of scientific evidence,⁹ but here again the Court failed to develop the suggestion. Rule 703 provides:

The facts or data in the particular case on which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

The decision in *Daubert* was directed to the question of the admissibility of evidence, not to the question of sufficiency.¹⁰ The plaintiffs claimed that the defendant's product, Bendectin, had caused their birth defects.¹¹ Attention focused on the admissibility of the testimony of an expert witness called by the plaintiffs that he had undertaken a "reanalysis" of published epidemiological studies and that this reanalysis showed a relationship between Bendectin and birth defects.¹² The lower courts held this reanalysis evidence inadmissible under what is called the *Frye* test.¹³ The *Frye* test requires that before evidence based upon a scientific technique or principle may be admitted, the technique or principle must be found to have "gained general acceptance in the particular field in which it belongs."¹⁴

In *Daubert*, the Supreme Court held that the Federal Rules of Evidence do not adopt the *Frye* test.¹⁵ Instead, the Court stated that Rule 702 requires scientific evidence to be scientifically valid and reliable.¹⁶ Therefore, the Court reversed the judgment of the

8. *Daubert*, 113 S. Ct. at 2798; see also *United States v. Sherlin*, 67 F.3d 1208, 1217 (6th Cir. 1995) (sustaining exclusion of polygraph evidence under Rule 403 while holding that Rule 403 provides independent ground for exclusion and that *Daubert* is not controlling).

9. *Daubert*, 113 S. Ct. at 2796-98.

10. See *id.* at 2792 (noting that Supreme Court granted certiorari for purpose of determining admissibility of expert testimony).

11. *Id.* at 2791.

12. *Daubert*, 113 S. Ct. at 2791.

13. *Id.* at 2792; see *Daubert v. Merrell Dow Pharms., Inc.*, 727 F. Supp. 570, 572 (S.D. Cal. 1989); *Daubert v. Merrell Dow Pharms., Inc.*, 951 F.2d 1128, 1130 (9th Cir. 1991).

14. *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923).

15. See *Daubert*, 113 S. Ct. at 2793-94.

16. *Id.* at 2799.

court of appeals and remanded the case to that court so that the correct standard might be applied.¹⁷ Although in remanding the case the Court implied that the standard it set forth governed the plaintiffs' reanalysis evidence, its discussion of the standard remained at the level of the general and abstract, since, as the dissenters pointed out, the Court did not apply the standard to the evidence in the case.¹⁸ On remand, the court of appeals held that the plaintiffs' reanalysis evidence did not satisfy the standard for scientific evidence announced by the Supreme Court, found the remaining evidence insufficient, and dismissed the plaintiffs' suit.¹⁹ Since *Daubert*, the lower courts have struggled to understand what the Court meant by "scientific" evidence and what it meant by "scientifically valid" and "reliable."²⁰

II. PURPORTEDLY SCIENTIFIC EVIDENCE

In *Daubert*, the Court distinguished scientific evidence from non-scientific evidence, focusing on the word "scientific" in Rule 702.²¹ The Court held that this word created a separate legal category for purposes of admissibility.²² In taking this view, the Court had some support from the *Frye* decision, which also had marked off scientific evidence as a distinct category.²³ Chief Justice Rehnquist, writing for the dissenters in *Daubert*, doubted that this was the legislative intent of Rule 702 and suggested that the words "scientific, technical or other specialized knowledge" were intended simply as "general descriptive language covering the sort of expert testimony which courts have customarily received."²⁴ Certainly there have been many discussions of scientific evidence that have used the term in this way.²⁵

17. *Id.*

18. *Id.*

19. *Daubert v. Merrell Dow Pharms., Inc.*, 43 F.3d 1311, 1322 (9th Cir. 1994), *cert. denied*, 116 S. Ct. 189 (1995).

20. See Thomas J. Mack, *Scientific Testimony After Daubert: Some Early Returns from Lower Courts*, TRIAL, Aug. 1994, at 23.

21. *Daubert v. Merrell Dow Pharms., Inc.*, 113 S. Ct. 2786, 2795 (1993).

22. *Daubert*, 113 S. Ct. at 2795.

23. *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923).

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

25. See William L. Foster, *Expert Testimony: Prevalent Complaints and Proposed Remedies*, 11 HARV. L. REV. 169, 177 (1897) (quoting state of New Hampshire decision); James Fitzjames Stephen, *On Trial by Jury and the Evidence of Experts*, 2 JURID. SOC'Y

The aim of the Court in *Daubert* was to lay down a standard for the admissibility of evidence falling into the category of scientific evidence. It expressly disclaimed addressing the question of the standard applicable to nonscientific expert evidence: “Rule 702 also applies to ‘technical, or other specialized knowledge.’ Our discussion is limited to the scientific context because that is the nature of the expertise offered here.”²⁶ Thus, the standard for nonscientific expert evidence remains undecided: it could be the same as that for scientific evidence or it could be different.²⁷

The Court’s holding in *Daubert* appears to have two parts: First, a distinction is drawn between scientific evidence and nonscientific expert evidence;²⁸ second, a standard is laid down for the admissibility of evidence that falls into the scientific category.²⁹ That this is so even though the Court at times seems to conflate the two questions into a single question of whether evidence is “scientific knowledge” is suggested by the Court’s reference at one point to “purportedly scientific evidence,”³⁰ and also by its disposition of the case: the case was remanded for the purpose of determining whether the reanalysis evidence satisfied the standard applicable to scientific evidence, implying that it fell into the category to which that standard applied.³¹

What is it about an item of evidence that leads to its classification as scientific evidence and so subjects it to a special rule of admissibility? What does the Court mean when it says: “Our discussion is limited to the scientific context because that is the nature

PAPERS 236, 236–37 (1858–63) (discussing “scientific evidence,” but not necessarily intending to indicate separate legal category).

26. *Daubert*, 113 S. Ct. at 2795 n.8.

27. See *Thomas v. Newton Int’l Enter.*, 42 F.3d 1266, 1270 n.3 (9th Cir. 1994) (noting testimony of longshoreman with 29 years experience that condition on ship was unusual and dangerous not scientific and so not subject to *Daubert*); Edward J. Imwinkelried, *The Next Step After Daubert: Developing a Similarly Epistemological Approach to Ensuring the Reliability of Nonscientific Expert Testimony*, 15 CARDOZO L. REV. 2271 *passim* (1994); David L. Faigman et al., *Check Your Crystal Ball at the Courthouse Door, Please: Exploring the Past, Understanding the Present, and Worrying About the Future of Scientific Evidence*, 15 CARDOZO L. REV. 1799, 1832 (1994).

28. *Daubert*, 113 S. Ct. at 2795–96.

29. *Id.* at 2799.

30. *Id.* at 2795.

31. *Id.* at 2795, 2799.

of the expertise [the reanalysis evidence] offered here.”³² Before answering these questions, it is necessary to put aside what surely must be an irrelevant consideration: In determining whether evidence is classified as scientific or nonscientific, it cannot be important that it is accompanied by some circumstance that ordinarily may not be given evidential value, such as a statement by counsel, a question to a witness, or an argument to the jury in which the evidence is characterized as scientific. Yet a remark by the Court in *Daubert*, that the “proffer of expert scientific testimony” requires a determination of whether the special rule for admissibility is satisfied, might suggest this idea.³³ Characterization of evidence by counsel as scientific may involve an attempt to have treated as evidence that which may not be, such as the unsworn and uncross-examined statements of counsel. The proper response to such an attempt is to repel it, and if the jury has been exposed to counsel’s statement, to instruct the jury to give the statement no evidential value. Furthermore, if it is claimed that the nonevidential circumstance has had the effect of turning into scientific evidence that which would otherwise not be, and thereby subjecting it to a special requirement for admissibility, the simple answer for the party offering the evidence would be to avoid characterizing it as scientific or to withdraw such a characterization if it has been made. It is another matter if a witness on the stand calls himself a scientist or says that what he has to say is scientific, for such a statement would be part of the evidence offered and so affect the nature of what is offered.

Since there is no reason to attach significance to nonevidential circumstances attending the evidence sought to be introduced, we are returned to the question of what there might be about the evidence that is offered that would lead to its classification as “scientific” and so subject it to a heightened rule of admissibility. The

32. *Daubert*, 113 S. Ct. at 2795 n.8. In another place the Court speaks of “such evidence.” *Id.* at 2795. The difficulty of distinguishing between scientific and nonscientific expert evidence has also been pointed out by Robert Schwartz in an article written before *Daubert*. See Robert L. Schwartz, Comment, *There is No Archbishop of Science—A Comment on Elliott’s Toward Incentive-Based Procedure: Three Approaches for Regulating Scientific Evidence*, 69 B.U. L. REV. 517, 518 n.4 (1989); see also Michael S. Jacobs, *Testing the Assumptions Underlying the Debate About Scientific Evidence: A Closer Look at Juror “Incompetence” and Scientific “Objectivity,”* 25 CONN. L. REV. 1083, 1102–05 (1993).

33. *Daubert*, 113 S. Ct. at 2796 (emphasis added).

Court's opinion in *Daubert* gives little help in answering this question.

Might it be said that evidence is "scientific" or "purportedly scientific" if it claims to embody a theory about how the world works and a claim of empirical support for this theory? The trouble with this approach, of course, is that it sweeps in the whole realm of expert testimony and so fails to provide the distinction that the *Daubert* decision seems to assert.³⁴ All expert testimony embodies, expressly or impliedly, a theory about the world or some aspect of it and a claim of empirical support for the theory. For instance, the testimony of an experienced river pilot as to why a boat went aground relies upon a theory supported by experience as much as does the testimony of an epidemiologist regarding the cause of a birth defect. So also does the testimony of a handwriting expert identifying a disputed document and the testimony of psychiatrists and psychologists about human mental states.³⁵

Might a distinction be drawn between situations in which the theory or hypothesis is expressly stated by the witness and those in which it is only to be inferred? The river pilot may find it difficult to articulate the principles on which his opinion is based, even though he is quite convinced of its correctness. But why should such a distinction make a difference for purposes of admissibility? Might a distinction be drawn between cases in which the evidence indicates an organized attempt to gather and record information and cases in which knowledge has been acquired in the course of engaging in a practical activity? The river pilot may never have undertaken any sort of systematic study of shoals, currents, and so forth. But, again, why should this distinction make a difference? In a recent handwriting identification case, the court classified the evidence as nonscientific and so not subject to *Daubert*, seemingly because the handwriting experts did not explain very well the principles upon which they relied and because there was a comparative lack of organized empirical studies to determine the reliability of

34. See *id.* at 2795 n.8 (asserting that *Daubert* applies to scientific but not other technical evidence).

35. See, e.g., *United States v. Starzeczpyzel*, 880 F. Supp. 1027, 1035 (S.D. N.Y. 1995) (discussing scientific evidence in handwriting identification); *State v. Cressey*, 628 A.2d 696, 697 (N.H. 1993) (evaluating expert testimony in behavior of child in sexual abuse case); *Gier v. Educational Serv. Unit*, 845 F. Supp. 1342, 1351-53 (D. Neb. 1994), *aff'd*, 66 F.3d 940 (8th Cir. 1995).

handwriting identifications.³⁶ Paradoxically, what might have been seen as features of the evidence suggesting probative weakness succeeded in having it classified as nonscientific and so admissible without much difficulty.³⁷

We may put aside as of no help to our present purpose—which is distinguishing scientific from nonscientific expert evidence—a possible distinction between what might be called metaphysical evidence and empirical evidence. Some hypotheses by their very terms exclude the possibility of support or refutation by ordinary human experience, relying instead entirely upon faith. Other hypotheses may not concern metaphysical realities, but be so vaguely worded that as a practical matter they cannot be confirmed or refuted by observation or experiment. But evidence in these categories is not offered in courts of law, at least not in the United States at the end of the twentieth century. If the interest in *Daubert* is in

36. *Starzecpyzel*, 880 F. Supp. at 1028. In *Starzecpyzel*, after determining that the evidence was not scientific and, therefore, not subject to *Daubert*, the court applied a standard for nonscientific evidence of a lower but unspecified degree of reliability, and found that the evidence satisfied that standard. *Id.* Remarkably, the court went on to announce that it would instruct the jury that forensic document examiners offer practical rather than scientific expertise. *Id.* at 1049–50. The court also stated that it would consider restricting the testimony of these witnesses “as regards their degree of certainty in determining the genuineness of a signature.” *Id.*; see also D. Michael Risinger et al., *Exorcism of Ignorance As a Proxy for Rational Knowledge: The Lessons of Handwriting “Expertise,”* 137 U. PA. L. REV. 73 *passim* (1989) (tracing Anglo-American courts’ treatment of handwriting evidence from late 18th century to present day).

How should testimony by behavioral and social scientists be classified? See *Cressey*, 628 A.2d at 698–702 (under state rule similar to Federal Rule 702, seeming to apply *Daubert* standard to testimony of psychologist that behavior of child was consistent with sexual abuse and finding it wanting); David L. Faigman, *The Evidentiary Status of Social Science Under Daubert*, 1 PSYCHOL. PUB. POL’Y & L. 960, 965 (1995); James T. Richardson et al., *The Problems of Applying Daubert to Psychological Syndrome Evidence*, 79 JUDICATURE, July-August 1995, at 10, 15.

State v. Foret is a decision out of *Alice in Wonderland*:

We will assume for purposes of argument that, as Dr. Janzen’s testimony [that the juvenile had been sexually abused and that he believed the juvenile when the juvenile said that she had been sexually abused] is based upon the science of clinical psychology and psychodynamic theory, it will qualify as ‘scientific’ expert testimony.

State v. Foret, 628 So. 2d 1116, 1123 n.7 (La. 1993). The assumption for the sake of argument that the evidence qualified as scientific led to its exclusion for failure to satisfy the *Daubert* requirement, without the necessity of explaining why the evidence was scientific.

What of the testimony of a historian? See *Denson v. Stack*, 997 F.2d 1356, 1366 (11th Cir. 1993). An anthropologist? See *Dang Vang v. Vang Xiong X Toyed*, 994 F.2d 476, 480–82 (9th Cir. 1991).

37. *Starzecpyzel*, 880 F. Supp at 1027.

distinguishing between two types of evidence actually offered in courts, each of which claims empirical content, the distinction between metaphysical and empirical, or between vague and precise, does not help.

Another possibility might be to classify as scientific any evidence that has a specified probative value. Evidence that has less than this probative value would be considered nonscientific. The factors mentioned above—whether the hypothesis is expressed or only to be inferred, whether information has been systematically gathered or acquired simply in the course of a practical activity—might affect probative value, but would not necessarily be correlated with it. Epidemiological testimony that sets forth an elaborate body of principles and gives an account of systematic data-gathering might not have greater probative value than the testimony of a river pilot who has an opinion but cannot explain it. In any case, even if we can understand a distinction between evidence that is merely relevant and evidence that has a specified probative value and are willing to call the former nonscientific and the latter scientific, it needs to be explained why this distinction should become the basis for a special requirement for admissibility.

III. SCIENTIFIC VALIDITY AND EVIDENTIARY RELIABILITY

To the subclass of expert evidence identified as scientific, the *Daubert* decision applies a special requirement for admissibility. This requirement is stated to be one of “scientific validity”: Invalid science is not “scientific knowledge” within the meaning of Rule 702.³⁸ Although the Court apparently thought the reanalysis evidence was scientific evidence, it was not necessarily scientifically valid. Indeed, on remand the Court of Appeals found that it was not.³⁹ Thus, in addition to the problem of the nature of the evidence to which the special requirement for admissibility applies, *Daubert* also presents us with the question of what that special requirement is.

The Court seems to suggest that the requirement of scientific validity is not merely a requirement that evidence have a certain probative value. In an ambiguous sentence the Court states: “In a

38. See *Daubert v. Merrell Dow Pharms., Inc.*, 113 S. Ct. 2786, 2795 n.9 (1993).

39. *Daubert v. Merrell Dow Pharms., Inc.*, 43 F.3d 1311, 1318–19 (9th Cir. 1995).

case involving scientific evidence, *evidentiary reliability* will be based upon *scientific validity*.”⁴⁰ This sentence could mean that there is only one requirement—scientific validity—or that there are two requirements—scientific validity and evidentiary reliability.⁴¹

What might be the meaning of “scientific validity”? Chief Justice Rehnquist asked this same question in his dissent. No doubt many meanings can and have been attached to this term. One prominent student of these matters, whose work is cited by the Court, was Karl R. Popper, a philosopher of science.⁴² Popper attempted to identify science or valid science or scientific knowledge and to distinguish it from what he called pseudo-science. Popper was concerned in the first place with establishing a boundary between empirical knowledge and metaphysics. He included in the latter category both propositions of a transcendent or religious nature and propositions so vaguely stated that as a practical matter they have no empirical implications and so cannot be refuted by any conceivable experience. At one time, Popper included Marxism and psychoanalysis in this metaphysical/vague category; as he saw it, their hypotheses were not empirically “testable.” As stated above in discussing the question of what falls into the category of science, the distinction between the metaphysical and the empirical is of no use when it comes to distinguishing between types of evidence actually offered in courts. It is also of no use in distinguishing between valid and invalid science.

In addition to distinguishing the empirical from the metaphysical, Popper was also interested in laying down rules that would encourage a kind of thinking that, in his opinion, had led to progress and good results in the past. He was concerned to mark off this kind of thinking from other kinds of thinking that he believed could make no such claim. He encouraged the development of hy-

40. *Daubert*, 113 S. Ct. at 2795 n.9.

41. *Id.* If the Court intended to hold that there are two distinct requirements—scientific validity and reliability—it may have been influenced by an article by Bert Black. Bert Black, *A Unified Theory of Scientific Evidence*, 56 *FORDHAM L. REV.* 595, 599 (1988).

42. See *Daubert*, 113 S. Ct. at 2797 (citing KARL R. POPPER, *CONJECTURES AND REFUTATIONS: THE GROWTH OF SCIENTIFIC KNOWLEDGE* 37 (5th ed. 1989)). Although the *Daubert* Court cited Popper's *Conjectures and Refutations: The Growth of Scientific Knowledge*, Popper is better known for an earlier work, *The Logic of Scientific Discovery*. See KARL R. POPPER, *THE LOGIC OF SCIENTIFIC DISCOVERY* (1934; trans. ed. 1992).

potheses about the world that from the point of view of prevailing beliefs would be considered far-fetched or, as Popper put it, easily falsified. In developing his concept of valid science, Popper stressed this notion of "falsifiability." He emphasized falsifiability rather than simply testability because of his view regarding what logic could contribute to scientific discovery. A hypothesis that all crows are black can be conclusively falsified by the statement that there is one white crow, whereas the same hypothesis cannot be conclusively verified by the statement that there is one or any number of black crows. Conclusive falsification is possible by logical deduction, but conclusive verification is not. Some have criticized Popper's emphasis on falsifiability and suggested that sometimes confirmation or simply explanation is the aim of science.⁴³ Indeed, if a hypothesis survives an attempt at falsification, it is to some degree corroborated. Popper himself recognized this, but chose to emphasize falsifiability in order to encourage a skeptical attitude toward hypotheses.

In *Daubert*, the Court quotes Popper to the effect that "the criterion of the scientific status of a theory is its falsifiability, or refutability, or testability."⁴⁴ It also relies upon a statement in a article by Professor Michael Green, a law professor: "Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry."⁴⁵ These references oversimplify Popper's views and also leave a mistaken impression as to the authoritative position they hold among scientists and philosophers of science. In regard to falsifiability, Popper did not believe it could be conclusive. It is true that, as a matter of deductive logic, the hypothesis that all crows are black can be conclusively falsified by the statement that there is one white crow. But, strictly, Popper was of the view that it is not possible to move from a logical conclusion to a statement about the real world. Finally, falsification and verification stand on the same footing insofar as true knowledge of reality is concerned: a hypothesis about

43. See Hilary Putnam, *The "Corroboration" of Theories*, in *THE PHILOSOPHY OF KARL POPPER* 221 (Paul Arthur Schlipp ed., 1974).

44. *Daubert*, 113 S. Ct. at 2797.

45. See *id.* at 2796 (quoting Professor Michael Green, *Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of Agent Orange and Bendectin Litigation*, 86 Nw. U. L. REV. 643, 645 (1992)).

reality is in the last analysis, according to Popper, a metaphysical statement based on faith. At the same time, Popper distanced himself from the positivists because he continued to believe in objective truth, and he attempted to distance himself from the pragmatists for the same reason—that he believed in objective truth and not simply usefulness. Popper stressed falsifiability because he thought that the framing and testing of hypotheses that *prima facie* seemed easily falsifiable would continue the progress of knowledge, even though that there was any progress at all must finally be a matter of faith.⁴⁶

It must be clear from the foregoing that Popper's ideas about valid scientific knowledge do not readily lend themselves to adoption in a legal rule. Popper's distinction between science and metaphysics and his criticism of vague hypotheses are of no service in the present context. His urging that hypotheses be developed that are *prima facie* easily falsified does not lead to any view as to when a hypothesis should be considered scientifically valid. It is simply an exhortation to a way of thinking, not the erection of a classification. Popper was not interested in passing judgment on degrees of corroboration of hypotheses. He was aware that in different contexts different degrees of corroboration are necessary because different costs and benefits are at stake. In other words, he was aware, as lawyers would put it, that the burden of proof varies with the type of case. Even if Popper had laid down a criterion of scientific acceptability tied to a particular degree of corroboration, there still would be the question of why such a criterion should be carried over and incorporated into a rule of law.

Thus it would seem that in its reference to Popper, the Court has failed to identify an idea of scientific validity existing independently of the law that is available to be adopted as a legal standard. Nor has it identified any other nonlegal idea of scientific validity. Furthermore, it has not set forth with any clarity a distinctively legal idea of scientific validity. Nevertheless, the Court clearly intended to establish a special rule for the admissibility of evidence

46. The foregoing description of Popper's views is an interpretation of passages on the following pages of two of his books: *Conjectures and Refutations: The Growth of Scientific Knowledge* at 4-5, 36-37, 39-41, 51-52, 216-17, 223, 246-47 (5th ed. 1989); *The Logic of Scientific Discovery* at 32-33, 39-43, 47, 50, 53, 69, 90, 109, 191, 193, 203-04, 247-48, 251, 261-62, 270, 276, 278 (2d Harper Torchbook ed., 1968).

that falls into the category of scientific evidence or purported scientific evidence. The answer to what that rule is could be simply that scientific evidence must have a specified probative value and that in speaking of scientific validity and admissibility the Court is saying no more than that.

The Court gives as an example of evidence that would not be scientifically valid, evidence that suggests a connection between the phases of the moon and human moods:

The study of the phases of the moon, for example, may provide valid scientific “knowledge” about whether a certain night was dark, and if darkness is a fact in issue, the knowledge will assist the trier of fact. However (absent creditable grounds supporting such a link), evidence that the moon was full on a certain night will not assist the trier of fact in determining whether an individual was unusually likely to have behaved irrationally on that night. Rule 702’s “helpfulness” standard requires a valid scientific connection to the pertinent inquiry as a precondition to admissibility.⁴⁷

Reflection on this example supports the suggestion that by “scientific validity” the Court means nothing more than a specified probative value. If the evidence the Court is discussing is simply evidence that the moon was full on a particular night, the question of admissibility would seem to be simply a question of relevance. Federal Rule of Evidence 401 provides: “‘Relevant evidence’ means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence.” There is no need to refer to Rule 702, which deals with expert testimony.⁴⁸ The answer under Rule 401 might be that the evidence is irrelevant because no “reasonable” juror confronted with this evidence would alter probabilities at all on the issue of what mood a certain person was in at a particular time. The question of what would be meant by “reasonable” juror will be discussed below. For

47. *Daubert*, 113 S. Ct. at 2796.

48. The same view might be taken of cases in which a witness remembers an event as a result of being hypnotized, but all that is offered in evidence is testimony of the memory, with or without reference to the fact of the hypnosis, and not any general information about hypnosis or an opinion of a hypnotist regarding the accuracy of hypnotically-induced memory. See *Borawick v. Shay*, 68 F.3d 597, 609–10 (2d Cir. 1995) (finding hypnotically-induced memory of childhood sexual abuse inadmissible under circumstances), *cert. denied*, 116 S. Ct. 1869 (1996).

now it is enough to suggest that the answer may lie in determining whether there exists in the community a group of substantial size that holds a belief about a connection between the moon and human moods under which an alteration of probabilities would be justified.⁴⁹ Seemingly, in its example, the Court believes that the evidence described would be irrelevant to the question of a human being's mood.

But assume that what the Court intended to discuss was not the admissibility of testimony that the moon was full, but the admissibility of testimony that a full moon makes people irrational. Possibly the witness would refer to studies of such a connection. The question of relevance is present here too, of course, although in respect to a different item of evidence—the opinion of the witness regarding a connection between the phases of the moon and human irrationality. This opinion might be irrelevant, but not necessarily so. If testimony about the connection is determined to be relevant, then the question is whether Rule 702 requires more than relevance for admissibility. Whether more than relevance is required, according to *Daubert*, depends upon whether the evidence is scientific. Testimony about a connection between the phases of the moon and human moods is not necessarily metaphysical evidence nor so vague that it has no empirical implications. Without too much difficulty one can think of observations or experiments that might be performed to falsify or corroborate the testimony's hypothesis.⁵⁰ Within the zone of the empirical, the difficulty of classifying evidence as scientific or nonscientific has already been referred to. If the evidence is scientific, then the question is whether it satisfies the *Daubert* requirement. As to the nature of that requirement, this passage from the Court's opinion about the phases of the moon and human moods seems pretty clearly to indicate that the requirement of scientific validity does indeed consist simply in a requirement of a certain probative value: there is not a "valid scientific connection" unless there are "credit-

49. For development of this idea, see John H. Mansfield, *Jury Notice*, 74 GEO. L.J. 395 (1985).

50. The same can be said of the hypothesis that blood-letting cures diseases. Nevertheless, it is stated in James T. Richardson et al., *The Problems of Applying Daubert to Psychological Syndrome Evidence*, 79 JUDICATURE, July–Aug. 1995, at 10, that this hypothesis is impossible to disprove. What the authors probably mean is not that the hypothesis is impossible to disprove, but that it has been disproved.

able grounds” to support such a link.⁵¹ The Court seems to imply that it does not think that there are creditable grounds for believing in a connection between phases of the moon and human moods, not at the present time at least. Recall that what causes evidence to be classified as scientific rather than nonscientific for purposes of imposing a special rule of admissibility itself may be simply that the evidence has a specified probative value. If that is the case, then it would seem that the requirement for the admissibility of such purportedly scientific evidence is simply that it have a specified probative value greater than this.

A requirement for a specified, perhaps considerable, probative value, presents a question as to what background information is to be taken into account in determining whether this probative value exists. Probative value is always relative to some body of background information. Is the probative value of purported scientific evidence to be determined by taking into account the background information that would be possessed by reasonable jurors, or the background information that would be possessed by reasonable judges, or the background information that would be possessed by some group of scientists?

The Court in *Daubert* states that the determination of the validity of scientific evidence is to proceed under Federal Rule of Evidence 104(a).⁵² Rule 104(a) concerns preliminary issues of fact that determine the admissibility of evidence under exclusionary rules such as the hearsay rule and the best evidence rule and under privileges. In assessing probabilities under Rule 104(a), the judge need not consider the background beliefs that might affect a jury’s determination of probabilities. Possibly the judge should consider the background beliefs possessed by reasonable judges. Thus, if the *Daubert* requirement is to be administered under Rule 104(a), and that requirement is that the evidence have a specified probative value, there is a double limitation on trial by jury: the limitation that comes from requiring more than relevance for admissibility and the limitation that comes from assessing

51. *Daubert*, 113 S. Ct. at 2794–96.

52. “Preliminary questions concerning the qualifications of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b). In making its determination it is not bound by the rules of evidence except those with respects to privileges.” FED. R. EVID. 104(a).

probabilities from the point of view of background information other than that possessed by reasonable jurors.

If *Daubert* requires the proffered evidence simply to have a specified probative value, estimated perhaps from the point of view of a reasonable judge, the administration of this requirement, in fact, cannot easily fit under Rule 104(a). Rule 104(a) focuses upon a disputed issue of fact—for example, whether a particular document was kept in the course of a regularly conducted business for the purpose of the business records exception to the hearsay rule—and calls upon the judge to make a finding in respect to that fact.⁵³ As the Court notes in *Daubert*, matters to be admissible under Rule 104(a) should be established by a preponderance of the evidence.⁵⁴ The *Daubert* requirement, however, would not seem to be that a specified level of probability be achieved on a certain issue, such as a preponderance, but that the evidence offered have a specified probative value. In other words, the *Daubert* requirement echoes the idea found in Rule 403, that in order for evidence to be admissible it must have a specified probative value—that is, a certain capacity to alter antecedent probabilities—rather than the idea found in Rule 104(a) that a specified level of probabilities be achieved on a disputed issue. The Court may have been led to think that Rule 104(a) was applicable because in the idea of “scientific validity,” it supposed it had identified a fact to be determined, and so to be determined to a certain probability.⁵⁵ But if scientific validity means nothing more than that evidence should have a specified probative value, there is no distinct issue of fact to be determined. The only question controlling admissibility is whether the proffered evidence has the required probative value in respect to an issue in the case, *e.g.*, whether Bendectin caused the plaintiffs’ birth defects.⁵⁶

53. See FED. R. EVID. 104(a) (requiring judge to make preliminary decisions regarding qualifications of witnesses, existence of privileges, and admissibility of evidence).

54. *Daubert*, 113 S. Ct. at 2796 n.10; see *Bourjaily v. United States*, 483 U.S. 171, 175–76 (1987).

55. The Court in *In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717, 744 (3d Cir. 1994), *cert. denied* sub nom. *General Elec. Co. v. Ingram*, 115 S. Ct. 1253 (1995), in attempting to administer the *Daubert* requirement under rule 104(a), was led to speak incoherently of the plaintiff’s having a responsibility “to demonstrate by a preponderance of evidence that [the expert’s] opinions are reliable.”

56. *Isely v. Capuchin Province*, 877 F. Supp. 1055, 1066 (E.D. Mich. 1995) looks to Federal Rule of Evidence 104(b) in applying *Daubert*.

At the end of its opinion in *Daubert*, in the course of discussing the requirement that evidence be scientifically valid and reliable, the Court attempts to limit the effect of its decision by stating that “the focus, of course, must be solely on principles and methodology, not on the conclusions that they generate.”⁵⁷ Elsewhere the Court speaks of the requirement being directed only to the foundation, procedures, and reasoning underlying scientific testimony.⁵⁸ This appears to be an attempt to avoid seemingly simply to announce a requirement that scientific evidence must have a specified probative value to be admissible. The distinction drawn by the Court may be an effort to distinguish between sorts of considerations that affect probative value: if one sort of consideration explains why evidence has only a certain probative value, the evidence will be inadmissible, whereas if another sort of consideration explains the deficiency, the evidence will be admissible. But what would justify such a distinction? In the absence of specific examples, it is difficult to say. Suppose the reanalysis evidence though relevant has only a modest probative value because the witness did not offer the results of his study for publication. Would that bar his testimony? Suppose he had published the results, but the reanalysis covered only some, but not all of the existing epidemiological studies of a connection between Bendectin and birth defects. Would that bar his testimony? Suppose the probative value of the evidence is reduced by the fact that the witness’s computations included some mathematical errors.⁵⁹ Would this exclude his

57. *Daubert*, 113 S. Ct. at 2797.

58. *Id.* at 2795–96, 2799.

59. See *Paoli*, 35 F.3d at 745 (noting that after *Daubert*, distinction between methodology and application is no longer viable); *United States v. Martinez*, 3 F.3d 1191, 1197–98 (8th Cir. 1993) (applying *Daubert*’s reliability requirement so as to take into account errors in application of methodology), *cert. denied*, 510 U.S. 1062 (1994); *United States v. Galbreth*, 908 F. Supp. 877, 882 n.7 (D.N.M. 1995) (determining that *Daubert*’s language about methodology and principles as opposed to correctness of conclusions is not intended to apply to application of polygraph technique).

This is because the context in which the *Daubert* case arose required the Court to address only the validity of scientific principles in the *abstract*. If such language were applied in the context of the polygraph technique, it would be completely at odds with *Daubert*’s mandate that the proposed scientific testimony be validated, *i.e.* reliable. *Galbreth*, 908 F. Supp. at 882 n.7; see also *Christophersen v. Allied-Signal Corp.*, 939 F.2d 1106, 1111 (5th Cir. 1991) (pre-*Daubert* decision in which the court struggled with the methodology/conclusion distinction). In David L. Faigman et al., *Check Your Crystal Ball at the Courthouse Door, Please: Exploring the Past, Understanding the Present, and Worrying About the Future of Scientific Evidence*, 15 CARDOZO L. REV. 1799, 1831 (1994), the

testimony? The answers to these questions may lie in assessing why the Court imposed the special requirement.

IV. JUSTIFICATION FOR A SPECIAL REQUIREMENT

If it is accepted that the correct reading of *Daubert* is that it establishes as a requirement for the admission of scientific evidence that it have a specified probative value, perhaps a great probative value, then the question must be addressed why this demand should be placed upon this class of evidence when the general rule for admissibility is simply relevance. As we explore this question, it is important to keep in mind the uncertainty surrounding the class of evidence affected: What is scientific evidence or purported scientific evidence? If scientific evidence is evidence in which the hypothesis that it embodies is expressly stated or is based upon systematic empirical study, certain justifications for a special requirement may be suggested. Whereas if scientific evidence is simply evidence that has a specified probative value, other justifications are possible.

The fact that in certain nonlegal contexts requirements exist that before action may be taken there must be a particular degree of satisfaction in regard to a disputed issue, of course, does not automatically justify carrying over such requirements into a legal context.⁶⁰ This point was already made in the discussion of Popper's

authors observed that a conclusion is an integral function of the methodology used. At the same time, in respect to *Daubert*, the authors drew a distinction between 1) "the general theoretical connection between Bendectin and birth defects," 2) "whether, as a general matter, doctors can identify when specific birth defects are traceable to Bendectin," and 3) "the correctness of the diagnosis that the plaintiffs' birth defects were caused by the drug," and they would apply *Daubert's* requirement only to the first two. However, they also would apply the Rule 403 requirement of probative value to the third. See also Kenneth J. Chesebro, *Taking Daubert's Focus Seriously: The Methodology/Conclusion Distinction*, 15 CARDOZO L. REV. 1745 (1994). Chesebro insists that the methodology/conclusion distinction is crucial because otherwise courts will simply be keeping out evidence with which they disagree. The author does not explain the distinction. On a related matter, it is difficult to keep apart the question of whether a witness is qualified to testify as an expert and the question of whether his opinion on a particular matter is admissible: the question of qualification would seem always to be present with respect to a particular matter.

60. The point is recognized in the following articles: Bert Black et al., *Science and the Law in the Wake of Daubert: A Search for Scientific Knowledge*, 72 TEX. L. REV. 715, 762, 765 (1994); Michael D. Green, *Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of Agent Orange and Bendectin Litigation*, 86 NW. U.L. REV. 643, 696-97 (1992); Vern A. Walker, *The Siren Songs of Science: Toward a Taxonomy of Scientific Uncertainty for Decisionmakers*, 23 CONN. L. REV. 567, 584-93 (1991).

views. The *Frye* rule, which required general acceptance in the relevant scientific field, attempted to establish such a connection, but gave no real guidance as to what acceptance meant, who was supposed to have accepted, or why it should count whether he had accepted or not.

In *Daubert*, there was no lack of scientists to come forward and press upon the Court their views as to what the rule of admissibility should be for scientific evidence. In the large number of amicus briefs filed by eminent scientists and important scientific organizations, arguments were made for the retention of the *Frye* rule, for its abolition and replacement by something like the *Daubert* requirement, and for the abolition of any special requirement.⁶¹ It would appear that the scientists who allowed their names to be put on these briefs believed, possibly at the instance of lawyers, that somehow the fate of science was at stake in the rule of admissibility the Court would adopt and that there is a connection between the admissibility of evidence in courts of law and standards of proof to be satisfied in contexts important to scientists: such as whether a particular line of research will be pursued, whether an investigation will be funded, whether an academic appointment will be made and so forth. Whether there is, in fact, any such connection seems doubtful.⁶² Perhaps if certain evidence is admitted, the verdict will be for a class of injured plaintiffs, and as a result a pharmaceutical company may cease to market a particular product or even go out of business. In consequence, a certain line of research may no longer be pursued. On the other hand, different lines of research may be opened up and research generally intensified in order to increase consumer confidence in the safety of products. Some scientists probably interest themselves in what evidence is admissible in courts on the ground that they have a general teaching re-

61. Some scientific organizations condemn as unethical the giving of unreliable testimony. They are sometimes encouraged to do this by judges. See Jack B. Weinstein, *Rule 702 of the Federal Rules of Evidence Is Sound: It Should Not Be Amended*, 138 F.R.D. 631, 640-42 (1991); *Barefoot v. Estelle*, 463 U.S. 880, 932 (1983) (Blackmun, J., dissenting) (reporting condemnation by American Psychiatric Association of psychiatrists who use diagnosis of sociopathy as basis for predicting future conduct).

62. *But see* Samuel R. Gross, *Expert Evidence*, 1991 Wis. L. REV. 1113, 1116 ("Expert evidence . . . is generated at the intersection between the law and other specialized disciplines, and its use has direct and concentrated effects on these disciplines.").

sponsibility on scientific matters and must do what they can to prevent bad science from being presented in any important forum.

The Court's only statement as to why a special requirement for admissibility should be imposed on scientific evidence is that "[c]onjectures that are probably wrong are of little use . . . in the project of reaching a quick, final, and binding legal judgment—often of great consequence—about a particular set of events in the past."⁶³ This statement gives three reasons for a special requirement: the need for speed, the need for finality, and the importance of the outcome to the parties and perhaps the public. All three of these reasons are applicable to all sorts of evidence and not limited in any way to scientific evidence. They are reasons that could call for the exclusion of the testimony of an ordinary witness that because of doubts about the witness's credibility has little probative value. But no one would suggest excluding such evidence for these reasons.

A reason sometimes asserted for a special requirement for scientific evidence is the supposed incapacity of juries to deal with such evidence.⁶⁴ Because of this alleged incapacity, such evidence should be admitted only if it has a specified probative value. Such a requirement will not eliminate the jury's incapacity, but at least it will give some assurance that if the evidence does affect the outcome of the case, there will have been an informed judgment of its value. In the Court's opinion in *Daubert*, nothing is said about jury incapacity to deal with scientific evidence. To the contrary, the Court rebukes those who doubt the jury's ability, with the assistance of the adversary process, to evaluate such evidence.⁶⁵ But these observations were made in the course of rejecting the contention that the *Frye* rule was adopted by Rule 702.⁶⁶

63. *Daubert*, 113 S. Ct. at 2798. In addition, the Court states: "[Rule 702] clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify." *Id.* at 2795.

64. Cf. Richard Lempert, *Experts, Stories and Information*, 87 Nw. U. L. REV. 1169, 1173 (1993); John W. Osborne, Note, *Judicial/Technical Assessment of Novel Scientific Evidence*, 1990 U. ILL. L. REV. 497, 530-31.

65. See *Daubert*, 113 S. Ct. at 2798 (stating that, "Respondent seems to us to be overly pessimistic about the capabilities of the jury, and of the adversary system generally. Vigorous cross-examination, presentation of contrary evidence, and careful instructions on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.").

66. See *Daubert*, 113 S. Ct. at 2793, 2799.

As noted earlier, although the Court's holding in *Daubert* relates to Rule 702, in passing the Court also makes mention of Rule 403 and the possibility of excluding scientific evidence under that rule.⁶⁷ The Court quotes Judge Weinstein to the effect that "expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it."⁶⁸ Since Rule 403 speaks of "misleading the jury," not the judge, it would appear that in connection with Rule 403 at least, the Court believes there is some danger that juries will be "misled" by scientific evidence. Consequently, it would seem reasonable to think that even though the Court does not specifically discuss jury incapacity, this same consideration influenced its decision to find a special requirement under Rule 702.

A movement in the late 1970s and early 1980s to abolish jury trial in "complex" cases stressed jury incapacity to deal with certain matters.⁶⁹ The cases that juries were thought incapable of dealing with satisfactorily included those that involved scientific and technical issues,⁷⁰ although they also included cases that simply involved a great deal of evidence or took a long time to try.⁷¹ The aim of the movement was not just to keep a certain class of evidence from the jury, but to remove whole cases or at least particular issues from jury trial. It appears that *Daubert* represents a partial victory for that movement.⁷²

67. *Id.* at 2798.

68. *Id.*

69. See, e.g., *In re Japanese Elec. Prods. Antitrust Litig.*, 631 F.2d at 1086; *In re U.S. Fin. Sec. Litig.*, 609 F.2d 411, 427-31 (9th Cir. 1979). The story is set forth in James S. Campbell, *Current Understanding of the Seventh Amendment: Jury Trials in Modern Complex Litigation*, 66 WASH. U. L. Q. 63 (1988); see also Richard Lempert, *Civil Juries and Complex Cases: Taking Stock After Twelve Years*, in VERDICT: ASSESSING THE CIVIL JURY SYSTEM 181 (Robert E. Litan ed., 1993); Kenneth J. Chesebro, *Galileo's Retort: Peter Huber's Junk Scholarship*, 42 AM. U. L. REV. 1637, 1700-02 (1993).

70. See *In re Japanese Elec. Prods. Antitrust Litig.*, 631 F.2d at 1086.

71. See *In re U.S. Fin. Sec. Litig.*, 609 F.2d at 417.

72. There is nothing new about these attacks on the jury. Sir James Fitzjames Stephen refers to a similar attack and its being beaten back in the 1850s. He mentions that whereas in earlier times no criminal trial lasted more than a day, in the time in which he spoke, some had gone on for as long as twelve days! James Fitzjames Stephen, *On Trial By Jury, and the Evidence of Experts*, 2 JURID. SOC'Y PAPERS 236, 236 (1858-63). Nevertheless, even in these "monster trials," as he called them, some of which included large amounts of conflicting scientific evidence, he thought trial by jury the best method that could be employed:

It appears to me that, given uprightness, patience, and such intelligence as most educated members of society may be presumed to possess, a jury constituted as our juries

If an idea of jury incapacity to deal with scientific evidence played a role in the *Daubert* decision, then attention needs to be given to just what is the claimed incapacity.⁷³ Achieving identity between the mind of the expert witness and the mind of the trier of fact surely cannot be an objective of the law.⁷⁴ Even if the expert is an accomplished teacher, is well prepared, and carefully questioned by informed counsel, there will almost always remain a substantial difference between the understanding of the witness and the understanding of the trier of fact. This will be so even when the trier of fact is a judge; indeed it will occur, to a degree, even when the witness is an ordinary witness and not an expert. The only way to eliminate the gap in understanding between witness and trier would be to make the witness the trier, for instance by having a panel of experts decide an issue. However, objections to this procedure have often been discussed.⁷⁵

If identity between the understanding of the jury and the understanding of the witness is not a goal to be sought, neither can it be the aim of the law that the jury should have the same understand-

are, forms the very best tribunal which could be devised for the trial of complicated questions of fact, even if those questions involve delicate scientific considerations.

Id. at 238. It may have been important to Stephen, however, that the jurors were "educated" and that juries were "constituted as our juries are," although at one point he speaks of jurors as representing "the average intelligence of the country." *Id.* It may also have been important that in an English court the judge "points out to the jury what is the relevant and essential part of the evidence, and what part tends to raise immaterial issues." *Id.* at 243. It is interesting to note that Stephen assumed that jurors would tend to be impressed by established scientific views and would disregard those that are idiosyncratic. In other words, although he did not suggest any limitation on the admissibility of scientific evidence, he assumed that jurors themselves would apply something like the *Frye* test.

73. See Ronald J. Allen, *Expertise and the Daubert Decision*, 84 J. CRIM. L. & CRIMINOLOGY 1157, 1159-62, 1174-75 (1994) (speaking of need that jury understand evidence and that its decision be rational and intelligent, but not explaining what these words mean).

74. See *id.* at 1161 n.9 (recognizing that identity of understanding cannot always be achieved: "How well a witness' analytical process can be understood is again clearly a variable. Some can be understood completely, some partially, and some not at all. The legal question is the significance of this variable."); see also Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113, 1182 (pointing to wide range of situations in which we make use of expert opinions even though we do not entirely understand them, for instance, in deciding whether to have operation).

75. They were discussed as early as the article of Sir James Fitzjames Stephen, *On Trial by Jury and the Evidence of Experts*, 2 JURID. SOC'Y PAPERS 236, 242-44 (1858-63). Stephen pointed out, among other things, the difficulty of deciding which experts to choose, what issues to put to them, and how to relate their decision on these issues to the issues to be decided by the jury.

ing of the evidence as a judge. Necessarily the appreciation of evidence by jurors and judges will be different because of differences in their background beliefs, intellectual capacity, and training. Even if one believed that a jury's capacity to evaluate scientific evidence is in some sense inferior and not merely different from that of a judge, it would not necessarily follow that issues should be removed from the jury or that certain evidence should be kept from it. Trial by jury is not intended to be the same as trial by a judge, and what from one perspective might seem an incapacity, from another is the very point of jury trial. Even if, in respect to the accuracy of findings, it could be shown that jurors are inferior to judges, it still can be argued that this is a price worth paying for the advantages of this form of popular participation in government. But, in fact, there are no studies supporting the view that juries are less accurate than judges. This is not surprising in view of the difficulty of obtaining an objective account of the truth by which to measure the accuracy of both judges and juries.

There is an ever-expanding body of literature about how juries think.⁷⁶ Some of these studies include information about juries' responses to expert testimony.⁷⁷ Contrary to the opinions sometimes expressed by judges and commentators on this subject,⁷⁸ these studies suggest that, for the most part, juries evaluate expert testimony carefully and are neither over-awed by it nor do they cavalierly reject it.⁷⁹ Of course, the extent to which jurors are able to enter into the thinking of an expert witness varies with the subject

76. See Joe S. Cecil et al., *Citizen Comprehension of Difficult Issues: Lessons from Civil Jury Trials*, 40 AM. U. L. REV. 727, 740-42, 756-60 (1991) (survey of studies).

77. See *id.* at 754-60.

78. See *State v. Cressey*, 628 A.2d 696, 698 (N.H. 1993) (noting that "jury may disproportionately defer to statements of an expert" and attach extra importance to experts' opinions simply because given with air of authority); Richard Lempert, *Civil Juries and Complex Cases: Taking Stock After Twelve Years* (studying judges' views of difficulties jurors have in medical cases and in evaluating damages in personal injury cases), in VERDICT: ASSESSING THE CIVIL JURY SYSTEM 202 (Robert E. Litan ed., 1993).

79. See Richard Lempert, *Civil Juries and Complex Cases: Taking Stock After Twelve Years* (relying on study by Sheri S. Diamond & Jonathan D. Casper, *Blindfolding the Jury to Verdict Consequences: Damages, Experts and the Civil Jury*, 26 L. & SOC'Y REV. 513, 558 (1992)), in VERDICT: ASSESSING THE CIVIL JURY SYSTEM 208 (Robert E. Litan ed., 1993); Joe S. Cecil et al., *Citizen Comprehension of Difficult Issues: Lessons from Civil Jury Trials*, 40 AM. U. L. REV. 727, 754, 760 (1991); Michael S. Jacobs, *Testing the Assumptions Underlying the Debate About Scientific Evidence: A Closer Look at Juror "Incompetence" and Scientific "Objectivity,"* 25 CONN. L. REV. 1083, 1094-98 (1993).

matter. There is little in the way of information that focuses specifically on juries' responses to scientific evidence. It would be difficult to construct such a study because of the ill-defined nature of the category scientific evidence. Thus no correlation is presently possible between the results of existing studies of jury capacity and the matters that are the subject of the *Daubert* requirement.

The clearest indication of the values underlying jury trial, so far as fact-finding is concerned, lies in the criteria established for jury selection. At the present time in the United States, the jury is required to be drawn from a pool that constitutes a representative cross-section of the community.⁸⁰ This is a change from earlier times when educational and property qualifications existed and special juries were used for particular types of cases.⁸¹ In addition, persons may be excluded from the jury for cause, which would include circumstances suggesting partiality. To be a representative cross-section of the community, the jury pool must include persons who hold beliefs about the world that are held by groups of substantial size in the community. It would appear to be a valued feature of jury trial that beliefs so held be used in evaluating evidence formally introduced without the necessity of these beliefs themselves being introduced.

In *In re Japanese Electronics Products Antitrust Litigation*,⁸² one of the leading cases in the effort to remove complex cases or issues from juries, the court's concern appeared not to have been with the background beliefs that the jury might bring to bear in evaluating evidence formally introduced, but with the jury's inability to "understand" certain kinds of evidence.⁸³ The court seemed to have doubted that the jury had the capacity to grasp the concepts involved.⁸⁴ But under the law of jury selection, there may be no absolute requirement of a minimum intellectual capacity, only a requirement that a juror have such capacity as is possessed by a

80. *Taylor v. Louisiana*, 419 U.S. 522, 527 (1975).

81. See generally James Oldman, *The Origins of the Special Jury*, 50 U. CHI. L. REV. 137, 144-64 (1983) (discussing history of property ownership as requirement for serving as juror).

82. 631 F.2d 1069 (3d Cir. 1980).

83. See *In re Japanese Elec. Prods.*, 631 F.2d at 1084.

84. *Id.* at 1079, 1084-88; see also Richard Lempert, *Experts, Stories and Information*, 87 Nw. L. REV. 1169, 1173 n.6 (1993) (illustrating that although two persons may have identical information, one may understand complicated mathematical problems while other remains completely mystified).

group of substantial size in the community. Under this standard, perhaps no one is to be excluded from a jury unless he is of extremely limited intellectual capacity or a genius, in both of which cases he might not belong to any group of substantial size in the community. Thus, intellectual qualification for jury service embodied in the law relating to the constitution of the jury may be parallel to qualification regarding factual beliefs about the world. To exclude scientific evidence that would be relevant to persons qualified for jury service under these criteria would conflict with the purpose of jury trial.

If a belief in jury incapacity and a fear that juries will be “misled” by scientific or other expert evidence has motivated the effort to remove complex cases or issues from jury trial and is one of the considerations underlying the *Daubert* decision, it also would seem to play a part in proposals to “improve” scientific and expert testimony.⁸⁵ If expert testimony is improved in the sense that an opinion may never be put before a jury unless it is accompanied by a full development of the materials and reasons underlying the opinion, there might be less occasion for the perceived jury incapacity to come into play and the jury’s understanding of the evidence will come closer to that of a judge or an ideal fact-finder.

Scientific or expert testimony can be “improved” either by active intervention on the part of the judge or by the application of rules that exclude evidence unless it has a certain form or content. Under the first approach, a judge may require, among other things, a pretrial conference,⁸⁶ an exchange of materials among experts,⁸⁷ and pretrial agreement on the meaning of technical terms.⁸⁸ The court may also appoint or even call expert witnesses or question experts called by the parties.⁸⁹ An expert appointed by the court, it

85. See Jack B. Weinstein, *Rule 702 of the Federal Rules of Evidence Is Sound: It Should Not Be Amended*, 138 F.R.D. 631, 639–41 (1991); Kenneth R. Kreiling, *Scientific Evidence: Toward Providing the Lay Trier with the Comprehensible and Reliable Evidence Necessary to Meet the Goals of the Rules of Evidence*, 32 ARIZ. L. REV. 915, 929 (1990); Rochelle Cooper Dreyfuss, *Is Science a Special Case? The Admissibility of Scientific Evidence After Daubert v. Merrell Dow*, 73 TEX. L. REV. 1779, 1801 (1995).

86. FED. R. CIV. P. 16(a).

87. FED. R. CIV. P. 26(a)(2).

88. FED. R. CIV. P. 16(c).

89. FED. R. EVID. 706. Rule 614 permits the court also to call ordinary witnesses and to interrogate witnesses called by a party. Questioning of witnesses by jurors, permitted by some courts, although always through the judge, could be suggested to be an effective way

may be thought, will be less likely than an expert called by a party to give testimony that will bring into play the jury's claimed incapacity. This power of the court to call expert witnesses in fact is used infrequently and the reasons are not far to seek. In the first place, there are the practical problems of how the expert is to be chosen and how he is to be informed about the case. More important, the calling of an expert by the court conflicts with the idea, which controls most aspects of the procedure and is generally thought to serve the interests of justice, that the parties should decide what evidence is to be considered.⁹⁰ The power of the court to call expert witnesses is, of course, an important feature of the Civil Law system, but it is difficult to assimilate into a predominantly adversarial tradition.

The second way to improve expert testimony is to exclude such testimony unless it has a certain form or content.⁹¹ Unlike the first method of improvement, this approach takes effect only if a party invokes the relevant exclusionary rule. Such a rule might exclude expert testimony that, it is thought, would bring into play the perceived jury incapacity. For instance, if the expert opinion was not accompanied by an explanation designed to enable the jury substantially to enter into the expert's thinking. The Federal Rules, as presently constituted, seem to stand against any such requirement. Federal Rule of Evidence 705 provides: "The expert may testify in terms of opinion or inference and give reasons therefor without

to increase jury understanding of expert testimony, but it is generally recognized to be fraught with danger. See Steven L. Friedland, *The Competency and Responsibility of Jurors in Deciding Cases*, 85 NW. U. L. REV. 190, 211-12, 214-20 (1990).

90. 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, 1018-19 (1994) (reporting results of survey of judges on use of court-appointed experts and discussing associated difficulties); Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113, 1187-1208.

91. See Stephen A. Saltzburg, *Improving the Quality of Jury Decisionmaking* (expert evidence should be excluded unless "submitted in a form that actually assists a jury in understanding a case"), in VERDICT: ASSESSING THE CIVIL JURY SYSTEM 341, 363-64 (Robert E. Litan ed., 1993); Joseph Sanders, *From Science to Evidence: The Testimony on Causation in the Bendectin Cases*, 46 STAN. L. REV. 1, 72 (1993) (noting that "parties have an obligation to structure their case to improve the factfinder's ability to weigh the evidence, but when they are unable to do so, the court must take steps on its own"). But see David H. Kaye, *DNA Evidence: Probability, Population Genetics and the Courts*, 7 HARV. J.L. & TECH. 101, 170 (1993) (expressing view that "courts should permit litigants to advance the combination of reasonably computed statistics or probabilities that they deem most suitable").

prior disclosure of the underlying facts or data, unless the court requires otherwise. The expert may in any event be required to disclose the underlying facts or data on cross-examination.” Although the primary focus of this rule is the information the expert has about the facts of the litigated case, its decision to leave it to the proponent of the witness to determine what to bring out on direct examination seems to extend to data regarding other cases and general principles that, in the mind of the witness, support his opinion. The rule states that the witness may give reasons for his opinion, not that he must do so. It is left to the opponent, on cross-examination, to draw out data and reasons if he thinks it to his advantage to do so. Of course, the rule does say that the witness need not disclose facts and data on direct examination “unless the court requires otherwise.” But if this clause were taken to justify a general requirement that no expert opinion would be admissible unless accompanied by disclosure of data and reasons sufficient to permit the jury to understand the evidence in a particular way, the effect would be to defeat what clearly seems to have been the aim of Rule 705. The words “unless the court requires otherwise” were likely directed to situations in which the opponent has not been informed before trial of the basis of the expert’s opinion, so that he is not in a position to cross-examine the expert effectively.⁹² Another possibility is that the provision was directed to situations in which the expert is relying on some data that he has no special ability to evaluate and there is a danger that the jury will not realize this. Compelled revelation of these data on direct examination will serve the function formerly performed by a hypothetical question requirement. In other cases, an expert’s opinion may not even be relevant unless accompanied by some disclosure of the basis on which it rests.⁹³

The provision in Rule 403 that evidence may be excluded “if its probative value is substantially outweighed by the danger of . . . misleading the jury” might also be invoked to justify exclu-

92. This is a suggestion made in the 1977 Committee Comment to Rule 705 of the Minnesota Rules of Evidence. MINN. R. EVID. 705 1977 committee comment (West 1980).

93. Kenneth R. Kreiling, *Scientific Evidence: Toward Providing the Lay Trier with the Comprehensible and Reliable Evidence Necessary to Meet the Goals of the Rules of Evidence*, 95 ARIZ. L. REV. 915, 944 (1990), interprets Rule 705, along with Rule 611, which gives the court the duty to control the mode and order of interrogating witnesses and presenting evidence, to create a power in the court of the sort questioned here.

sion of expert opinion unaccompanied by disclosure of data and reasons deemed sufficient to overcome a claimed jury incapacity. Perhaps the subject matter of the testimony would make it impossible to overcome the incapacity with any amount of disclosure. To interpret Rule 403 as authorizing exclusion on the suggested ground would be to raise the same question of policy as does the Court's interpretation of Rule 702, if that interpretation is grounded upon an idea of jury incapacity.

V. WHETHER THE *DAUBERT* REQUIREMENT IS UNUSUAL

Aspects of the Court's opinion in *Daubert* suggest that there is nothing unusual about requiring evidence to have a certain probative value in order to be admissible and that relevance alone is not enough. This impression is created, in the first place, by the absence from the opinion of any expressed justification for the requirement that the Court creates for scientific evidence, other than the assertions mentioned above regarding the need for speed, finality, and the importance to the parties and the public of the outcome. But the Court also refers to particular aspects of the law of Evidence that it seems to suggest warrant this view. These references require close scrutiny.

The Court refers to Federal Rule of Evidence 602, the requirement that a witness have "personal knowledge" of the matter to which he testifies.⁹⁴ Quoting from the Advisory Committee's Note to Rule 602, the Court states:

[T]he rule requiring that a witness who testifies to a fact which can be perceived by the senses must have had an opportunity to observe, and must have actually observed the fact is a "most pervasive manifestation" of the common law insistence upon "the most reliable sources of information" [citation omitted].⁹⁵

At least one court seems to have embraced the notion that the personal knowledge provision in Rule 602 requires that evidence

94. FED. R. EVID. 602 provides:
A witness may not testify to a matter unless evidence is introduced sufficient to support a finding that the witness has personal knowledge of the matter. Evidence to prove personal knowledge may, but need not, consist of the witness' own testimony. This rule is subject to the provisions of rule 703, relating to opinion testimony by expert witnesses.

95. *Daubert v. Merrell Dow Pharms., Inc.*, 113 S. Ct. 2786, 2795 n.9 (quoting FED. R. EVID. 602 advisory committee's note).

be more than relevant so far as concerns a witness's opportunity for observation.⁹⁶ More carefully considered decisions have rejected this idea:

[T]he threshold of Rule 602 is low. . . . Despite the fact that [the witness's] . . . testimony may have been, in large part, unbelievable to some and in spite of the possibility that his perception was sometimes impaired, a reasonable or rational juror could believe that [the witness] . . . and the other prosecution witnesses perceived the course of events to which they testified. . . .⁹⁷

Instead of imposing a requirement of more than relevance, Rule 602 would seem to be nothing more than a repetition of the requirement that evidence be relevant, or that it not violate the so-called opinion rule embodied in Rule 701, or that it not violate the hearsay rule.⁹⁸ Another passage in the Advisory Committee's Note to Rule 602, not quoted by the Court, makes clear that some held the view that the hearsay rule does not bar testimony that rests upon an extrajudicial statement not itself recited in the testimony, so that a special provision was needed to keep out such testimony.⁹⁹ Further, it is clear that the Advisory Committee in speaking of "the common law insistence upon 'the most reliable sources of information'" was only referring to the specific exclusionary rules—the requirement of relevance, the opinion rule, the hearsay rule, as well as to the technical best evidence rule.¹⁰⁰ The Advisory Committee was not advocating a more general doctrine that in order for evidence to be admissible it must be the most reliable available. No matter what may have been advocated in earlier times by some commentators, there never has been a general requirement in our law that in order for evidence to be admissible it must be reliable or the most reliable evidence available.¹⁰¹ In speaking of "the common law insistence upon the 'most reliable

96. *State v. Ranieri*, 586 A.2d 1094, 1098 (R.I. 1991).

97. *United States v. Hickey*, 917 F.2d 901, 904–05 (6th Cir. 1990).

98. FED. R. EVID. 802.

99. Another possible explanation of Rule 602 is that it excludes testimony that may be unobjectionable or objectionable on grounds of irrelevance, opinion or hearsay, but about which there is no way of telling from the form of the testimony.

100. FED. R. EVID. 1002.

101. See JAMES BRADLEY THAYER, *A PRELIMINARY TREATISE ON EVIDENCE AT THE COMMON LAW* 484–507 (1898); see also James H. Chadbourn, *Bentham and the Hearsay Rule: A Benthamic View of Rule 63(4)(c) of the Uniform Rules of Evidence*, 75 HARV. L. REV. 932, 943–44 (1962) (commenting on views of draftsmen of Model Rules of Evidence).

sources of information," the Advisory Committee in fact was quoting from Professor McCormick's treatise on Evidence,¹⁰² and it is clear from the page in the treatise cited by the Committee that McCormick was thinking only of the specific exclusionary rules. Thus, there is no support in Rule 602 or in the Advisory Committee's Note for a general proposition that evidence must be reliable to be admissible.

The other reference by the Court seemingly made to suggest that the *Daubert* requirement for scientific evidence is not unusual is its reference to the hearsay rule and its exceptions.¹⁰³ The Court quotes the Advisory Committee's Note to Article VIII of the Federal Rules of Evidence to the effect that hearsay exceptions are recognized only "under circumstances supposed to furnish guarantees of trustworthiness."¹⁰⁴ This statement lends little support to the notion that there is a broad requirement that evidence must be reliable to be admissible or to the specific idea that there should be such a requirement in the case of scientific evidence. The requirement that extrajudicial declarations coming in under exceptions to the hearsay rule must have a certain probative value is a response to the problem posed by the particular class of evidence of extrajudicial declarations. If it is suggested that the reason for requiring that scientific evidence be reliable is jury incapacity to evaluate such evidence, the rationale for the hearsay rule would seem not to be jury incapacity to evaluate extrajudicial declarations. There is no basis for thinking that juries appraise extrajudicial declarations any differently than judges. Even if they do, the difference may be one of the reasons for a jury trial. The most plausible explanation for the hearsay rule and its exceptions is not mistrust of jury evaluation of extrajudicial declarations, but a historically rooted objection to witnesses not presenting their testimony in person, under oath, and subject to cross-examination.¹⁰⁵ That the reason for the hearsay rule is not jury incapacity to evaluate extrajudicial declara-

102. *Daubert*, 113 S. Ct. at 2795 n.9. The Court in *Daubert* quotes from the Advisory Committee's Note, but then omits the Committee's acknowledgment that the source of its idea is Professor McCormick's treatise. *Id.*; see also CHARLES T. MCCORMICK, HANDBOOK ON THE LAW OF EVIDENCE § 10, at 19 (1954).

103. See *Daubert*, 113 S. Ct. at 2795 n.9.

104. *Id.*

105. See JAMES BRADLEY THAYER, A PRELIMINARY TREATISE ON EVIDENCE AT THE COMMON LAW 498-501, 518-23 (1898).

tions seems clear from the fact that the rule generally is applicable in trial to a judge as well as to a jury.

To make the *Daubert* requirement seem not unusual, the Court might have sought support from other parts of the law of Evidence than those it refers to. It might have cited, for instance, the rule excluding evidence of bad character and evidence of other crimes.¹⁰⁶ This rule, which allows such evidence only when its probative value is sufficient to remove it from the category of mere "character" evidence, in a sense is based upon a perception of jury incapacity and perhaps an incapacity of judges as well. But although some have suggested that the incapacity involved is a tendency to overvalue this sort of evidence,¹⁰⁷ a more convincing reason is the fear that the jury will convict the defendant because he is a bad person or because of the other crime he has committed, rather than confine itself to determining whether he has committed the crime with which he is charged. In other words, this exclusionary rule is founded upon a fear of jury misconduct or lawlessness, rather than on a perception of jury incapacity regarding either intelligence or information. The situation would be similar to jurors' disobeying the court's instructions on the law, rather than simply not understanding them. A rule protecting against the risk of such misconduct does not necessarily lend support to a rule based upon dissatisfaction with jurors' lack of intelligence or information, which may underlie the *Daubert* requirement.

The Court also might have sought support from the fact that evidence may be excluded because its gruesome or horrifying nature can give rise to an emotional state making it difficult for jurors to consider the evidence calmly, to reflect on their background experience, and to follow the instructions of the court.¹⁰⁸ Actually, evidence is rarely excluded on this ground.¹⁰⁹ Nevertheless, it might be said that we do have here an example of relevant evidence being kept out in response to a perception of jury incapacity. However, the incapacity involved here also may be distinguishable from that suggested to justify the *Daubert* requirement. The incapacity

106. FED. R. EVID. 404.

107. See *People v. Zackowitz*, 172 N.E. 466, 468 (N.Y. 1930).

108. See FED. R. EVID. 403.

109. See JACK B. WEINSTEIN ET AL., *CASES AND MATERIALS ON EVIDENCE* 21 (8th ed. 1988).

presumed by *Daubert* pertains to the jurors' lack of intelligence or their having information about the world different from that of judges or an ideal fact-finder, whereas the incapacity that can lead to the exclusion of horrifying or gruesome evidence pertains to an inability to prevent emotion from overwhelming reason. It could be argued that although the policy of jury trial requires a representative group with respect to information and intellectual capacity, it does not necessarily require a representative group with regard to control of emotions. This incapacity could be seen as more akin to the jury misconduct associated with the other crime rule.¹¹⁰

Could the requirement of "authentication" as a condition of admissibility be invoked to support the suggestion, possibly implicit in *Daubert*, that in order for evidence to be admissible it must be reliable? A particular version of this requirement is found in Federal Rule of Evidence 901(a).¹¹¹ Under Rule 901(a), certain evidence is not admissible unless the court determines that reasonable jurors could find more probably than not on a particular issue. What evidence is covered by this requirement and in respect to what issues the specified showing must be made is not entirely clear. Rule 901 sets forth the nature of the requirement, but not the situations in which it applies. One situation in which the requirement applies concerns the authorship of a writing: a writing is not admissible unless reasonable jurors could find more probably than not that the writing is genuine. The reason for imposing this requirement could be a belief that when confronted with a certain kind of evidence, jurors have a tendency to overlook the fact that something about the evidence must be decided before its probative value on an ultimate issue can be determined, and that argument by counsel and cautionary instructions by the court are insufficient to guard against this tendency.¹¹² It might be argued that this is an exclusionary rule based upon perception of a jury incapacity—the

110. William W. Schwarzer & Alan Hirsch, *The Modern American Jury: Reflections on Veneration and Distrust* (raising question about excluding inflammatory evidence compared with excluding scientific or technical evidence because of difficulty of understanding it), in VERDICT: ASSESSING THE CIVIL JURY SYSTEM 399, 402 (Robert E. Litan ed., 1993).

111. FED. R. EVID. 901(a): "Requirement of authentication or identification as a condition precedent to admissibility is satisfied by evidence sufficient to support a finding that the matter in question is what its proponent claims."

112. JOHN HENRY WIGMORE, A TREATISE ON THE ANGLO-AMERICAN SYSTEM OF EVIDENCE IN TRIALS AT COMMON LAW § 2130 (3d ed. 1940) (suggests this reason).

inability to keep in mind the significance for probative value on an ultimate issue of doubt about an intermediate evidential issue—that is very close to the incapacity—lack of intelligence and information—suggested to underlie the *Daubert* rule. But it must be noted that the authentication requirement is not confined to jury trial, and so would not appear to be based upon an incapacity peculiar to jurors. Additionally, the requirement has been persuasively criticized on the ground that the trier is no more likely to overlook the necessity of determining the genuineness of a document than any other fact that needs to be considered in estimating probative value.¹¹³ Perhaps the requirement finds a place in our law not because of a perception of trier incapacity, but simply because, in the early law, disputes over documents were subject to other modes of trial than trial by jury, and when documents were first presented to juries as evidence, traces of the earlier modes remained in the form of special requirements.¹¹⁴

Finally, in regard to particular kinds of evidence, courts have sometimes imposed a requirement of reliability beyond mere relevance. In most of these situations, the requirement works to provide protection for criminal defendants. In some, it responds to special concern with the use of extrajudicial statements, a matter already referred to.¹¹⁵ In *United States v. Hale*,¹¹⁶ the Supreme Court, exercising its supervisory power over the lower federal courts in a situation it found to have “grave constitutional overtones,” held that a defendant’s failure at the time of his arrest to offer a certain explanation of his conduct, could not be used to impeach his testimony at trial, because under all the circumstances

113. Lawrence A. Alexander & Elaine A. Alexander, *The Authentication of Documents Requirement: Barrier to Falsehood or to Truth?*, 10 SAN DIEGO L. REV. 266, 276–77 (1973).

114. See JAMES BRADLEY THAYER, A PRELIMINARY TREATISE ON EVIDENCE AT THE COMMON LAW 526–27 (1898) (listing historical requirements for production of written documents). It is interesting to note that the authentication requirement, like the exclusionary rules administered under Rule 104(a), and unlike the requirement in Rule 403 and, seemingly, in *Daubert*, that evidence have a certain probative value, makes admissibility turn on whether a specified level of probability—more probable than not—is achieved on a particular issue. See FED. R. EVID. 901. The authentication requirement corresponds with the “conditional relevance” requirement in Rule 104(b). As pointed out earlier, if the *Daubert* requirement is simply a requirement that proffered evidence have a certain probative value, it does not fit under Rule 104. *Id.*

115. See *supra* notes 110–112 and accompanying text.

116. 422 U.S. 171 (1975).

the failure to explain had insufficient probative value.¹¹⁷ In some jurisdictions, testimony about a memory induced by hypnosis is inadmissible unless there is a finding of reliability.¹¹⁸ Likewise it is sometimes required in child sex-abuse cases that if the child has been questioned about the incident before the trial, his testimony will not be admitted unless found to be reliable.¹¹⁹ The creation of requirements of reliability in these cases often has been under the influence of the Supreme Court's lineup decisions regulating the admissibility of identification testimony resulting from pretrial identification procedures,¹²⁰ to be discussed shortly in connection with the constitutional problems suggested by *Daubert*.¹²¹ Some of the opinions in these cases recognize that imposing a requirement of reliability beyond mere relevance is out of the ordinary.¹²² Obviously a close connection exists between the cases just referred to and the requirement of "corroboration" that exists for certain kinds of evidence, for instance the confession of a criminal defendant and the testimony of an accomplice.¹²³

The foregoing review does not purport to be exhaustive of all instances of exclusion under the law of evidence.¹²⁴ It may be sufficient, however, to cast doubt on the correctness of the *Daubert* opinion's implication that there is in our law of Evidence a general authority to screen out unreliable evidence. To the contrary, it would appear that more than relevance is demanded only in specific circumstances and for particular reasons. Rule 402's provision that "[a]ll relevant evidence is admissible, except as otherwise provided" and Rule 601's provision that "[e]very person is competent

117. *Hale*, 422 U.S. at 176-77.

118. See *Borawick v. Shay*, 68 F.3d 597, 608 (2d Cir. 1995), *cert. denied*, 116 S. Ct. 1869 (1996).

119. *State v. Michaels*, 642 A.2d 1372, 1382 (N.J. 1994).

120. *Gilbert v. California*, 388 U.S. 263, 272 (1967); *United States v. Wade*, 388 U.S. 218, 237 (1967).

121. See *infra* Part VI.

122. See *Michaels*, 642 A.2d at 1381 ("assessing reliability as a predicate to the admission of in-court testimony is a somewhat extraordinary step").

123. See 1 MCCORMICK EVIDENCE 555-64 (4th ed. 1992) (discussing confessions); W.E. Merritt III, Annotation, *Corroboration of Accomplice Witness by Objective Evidence Authenticated by Same Accomplice*, 96 A.L.R.2d 1185, 1185 (1964) (commenting on accomplice testimony).

124. It might be suggested that the requirement that all witnesses take an oath or affirm—Federal Rule of Evidence 602—is a requirement additional to relevance and has the purpose of assuring reliability.

to be a witness except as otherwise provided" support this proposition.

VI. CONSTITUTIONAL DIMENSION

At the beginning of this Article reference was made to the constitutional dimension of the question presented by *Daubert*. Although the primary focus of the Article is the ordinary law of Evidence, because that is all the *Daubert* decision was directly concerned with, a brief consideration of related constitutional issues may contribute to understanding the *Daubert* requirement and determining whether it is justified.

Scientific evidence can present both the question of whether constitutionally it must be excluded and the question of whether constitutionally it must be admitted. The argument that it must be excluded unless it has a certain probative value, which possibly is the *Daubert* requirement, would be made under the Due Process Clause.¹²⁵ The argument that it must be admitted even though it is only relevant would be made under either the Due Process Clause,¹²⁶ the Compulsory Process Clause of the Sixth Amendment,¹²⁷ or the jury trial provisions of the Sixth and Seventh Amendments.¹²⁸ We have already seen constitutional arguments being made in connection with the complex-cases movement, one side arguing that due process requires keeping such cases from the jury because of its inability to understand them, the other side arguing that the right to jury trial overrides this objection. As noted, although in the complex-cases dispute the question was whether whole cases or issues should be removed from the jury, that debate had implications for the rule of admissibility for scientific evidence. Exclusion of evidence that is relevant but lacks a specified probative value on the ground that admission would violate the Confrontation Clause of the Sixth Amendment is not directly pertinent to the present inquiry. The reason is the same as that given earlier for denying that the hearsay rule and its exceptions provide support

125. See U.S. CONST. amend. V (providing that "[n]o person shall be . . . deprived of life, liberty, or property, without due process of law").

126. *Id.*

127. See U.S. CONST. amend. VI (providing that "in all criminal prosecutions, the accused shall . . . have compulsory process for obtaining witnesses in his favor").

128. U.S. CONST. amends. VI, VII.

for imposing a special requirement on scientific evidence: The prohibition against the use of extrajudicial statements derives from a particular history focusing on a requirement that witnesses testify in person, under oath, and subject to cross-examination.

In the Supreme Court's lineup decisions,¹²⁹ the Court recognized a right based on the Confrontation Clause and the right to counsel in the Sixth Amendment to exclude identification evidence when certain pretrial identification procedures had been employed. Exclusion applies both to evidence of pretrial extrajudicial identifications and in-court identifications possibly influenced by them. A distinct due process right to exclude the results of identification procedures that are "unnecessarily suggestive and conducive to irreparable mistaken identification"¹³⁰ was also recognized. Both these rights were for the protection of criminal defendants. The degree to which the Court has limited these rights since they were first announced¹³¹ suggests an ambivalent attitude toward the adequacy of the protection afforded by the adversary system and the ordinary trial procedure in the case of identification evidence. It is interesting to note that in his dissent to the recognition of the due process right referred to above, Justice Black specifically pointed to the tendency of such judicial regulation of the admission of evidence to undermine jury trial.¹³²

Directly relevant to *Daubert* is the case of *Barefoot v. Estelle*,¹³³ which presented the question of whether it violates the Due Process Clause to admit psychiatric testimony regarding future dangerousness against a criminal defendant in the penalty phase of a capital case.¹³⁴ The United States Supreme Court held that the admission of such evidence is not unconstitutional.¹³⁵ The Court was "not persuaded that . . . [the] testimony . . . [was] almost entirely unreliable and that the factfinder and the adversary system will not be competent to uncover, recognize, and take due account of its

129. See *Gilbert v. California*, 388 U.S. 263, 272 (1967); *United States v. Wade*, 388 U.S. 218, 239-43 (1967).

130. *Stovall v. Denno*, 388 U.S. 293, 302 (1967).

131. See *Neil v. Biggers*, 409 U.S. 188, 198 (1972); *Simmons v. United States*, 390 U.S. 377, 384 (1968).

132. *Simmons v. United States*, 390 U.S. 377, 395-96 (1968) (Black, J., concurring and dissenting); *Foster v. California*, 394 U.S. 440, 444-49 (1969) (Black, J., dissenting).

133. 463 U.S. 880 (1983).

134. *Barefoot*, 463 U.S. at 896.

135. *Id.* at 904-05.

shortcomings,”¹³⁶ and it embraced the proposition that the “fundamental premise of our entire system of criminal jurisprudence [is] that the purpose of the jury is to sort out the true testimony from the false. . . .”¹³⁷ If *Barefoot* does not necessarily conflict with *Daubert*, it certainly is in tension with it.¹³⁸ Even if constitutional values differ from those of ordinary Evidence law, it needs to be explained why they are so different as to lead to such dramatically opposed views of jury competence, the adequacy of the adversary system, and the function of the Rules of Evidence.

Justice Blackmun, the author of the *Daubert* opinion, dissented in *Barefoot*. His dissent contains all the important elements of the Court’s position in *Daubert*: that there is a distinct category of “scientific” evidence, that the jury is likely to be misled by such evidence, that the adversary system is inadequate to avoid such a result, and that there is nothing unusual about excluding evidence that is unreliable.¹³⁹ Indeed, but for the distinction between constitutional law and the ordinary law of Evidence, one would be justified in saying that *Daubert* represents the triumph of the thinking that was rejected in *Barefoot*. It is interesting to consider what will be the fate of psychiatric evidence of the sort involved in *Barefoot* when offered against a criminal defendant in a post-*Daubert* federal prosecution. Will it be classified as scientific? Will it pass the *Daubert* test?

In *Barefoot*, the question was whether it was constitutional to admit evidence that although relevant was of questionable reliability.¹⁴⁰ Other constitutional cases that might have been discussed in *Daubert* concerned whether it is permissible to keep out such evidence. In *Washington v. Texas*,¹⁴¹ the Court held invalid under the Compulsory Process Clause of the Sixth Amendment a state rule that prevented a criminal defendant from introducing into evidence the testimony of any person charged as a principal, accomplice, or accessory to the same crime with which the defendant is

136. *Id.* at 899.

137. *Id.* at 902 (quoting lower court).

138. See Paul C. Giannelli, *Daubert: Interpreting the Federal Rules of Evidence*, 15 CARDOZO L. REV. 1999, 2021 (1994) (asserting that *Barefoot* is inconsistent with *Daubert*).

139. *Barefoot*, 463 U.S. at 920–38 (Blackmun, J., dissenting).

140. *Id.* at 881–82.

141. 388 U.S. 14 (1967).

charged.¹⁴² The Court stated, however, that its decision was based on the "arbitrary" nature of the state rule and that nonarbitrary rules, even if they excluded evidence offered by a criminal defendant, would be permissible.¹⁴³

In *Rock v. Arkansas*,¹⁴⁴ cited by the Court in *Daubert* but not for the point discussed herein, the Court struck down a state rule that flatly excluded all memories induced by hypnosis.¹⁴⁵ The Court thought that such a per se rule conflicted with a criminal defendant's constitutional right to testify on his own behalf.¹⁴⁶ It suggested, however, that the exclusion of such testimony following a particularized inquiry into reliability might be permissible.¹⁴⁷ The question in *Rock* was the admissibility of the defendant's recollection of the circumstances surrounding the shooting of her husband, not the admissibility of expert testimony about hypnosis or the probative value of hypnotically induced recollection.¹⁴⁸ But a remark in the Court's opinion strongly suggested that such expert testimony would be admissible. Indeed, the Court gave the availability of such testimony as one reason why the state's per se exclusionary rule was unconstitutional.¹⁴⁹ But how would such evidence fare under *Daubert*? Would it be scientific evidence, and if scientific, would it pass the *Daubert* requirement? If the Court in its *Daubert* opinion had discussed *Rock*, it would have been compelled to consider whether the *Daubert* requirement could constitutionally be applied against a criminal defendant, and if there was doubt about this, whether the *Daubert* requirement generally rests upon adequate justification.

VII. A DIFFERENT PERSPECTIVE ON SCIENTIFIC EVIDENCE UNDER THE FEDERAL RULES

It may be useful in conclusion to view the problem presented by the *Daubert* case from a somewhat broader perspective than that

142. *Washington*, 388 U.S. at 22-23.

143. *Id.* at 23, 23 n.21.

144. 483 U.S. 44 (1987).

145. *Rock*, 483 U.S. at 62.

146. *Id.*

147. *Id.* at 59 n.16.

148. For the same distinction, see the analysis of the Court's discussion regarding the phases of the moon and human irrationality at *supra* Part II.

149. *Rock*, 483 U.S. at 60-61.

provided by the Court's opinion. This perspective may clarify the different functions performed by the principal Federal Rules concerned—Rule 701, which embodies what is usually referred to as the opinion rule; Rule 702, which concerns expert testimony, the rule the Court interprets in *Daubert*; and Rule 703, which deals with the basis of expert opinion—and relate these rules to evidentiary principles generally. Viewing the *Daubert* problem from this perspective again calls into question the adequacy of a justification for a special requirement in the case of scientific evidence.

In the laws establishing jury trial and determining the qualifications for jury service, there is an implicit judgment concerning the information that is permitted to influence the outcome of a case through the informal process of jury notice—the jurors taking account of what they already know when they enter the jury box—and through the formal process of introducing evidence, calling and examining witnesses, displaying objects to the jury, and so forth. Which process is to be used for what information would appear to depend upon considerations such as whether the information is possessed by a substantial number of people in the community, whether there is fair notice to the parties of the information that will be taken into account, and whether beliefs held by groups of a certain size in the community should have the advantage over beliefs held by smaller groups of influencing the outcome of a case without the trouble and expense of formal proof. Some information, perhaps, may come through either the informal or the formal process. The relevance of evidence formally introduced, its probative value, and its sufficiency all depend upon this threshold judgment regarding the information by which the trier of fact may allow himself to be influenced even though not formally introduced. If information of a certain kind is allowed to be taken into account, an item of evidence offered through the formal process may justify a change in the probabilities on a disputed issue when otherwise it would not.¹⁵⁰

Federal Rule of Evidence 701, which states the opinion rule, provides:

If the witness is not testifying as an expert, the witness' testimony in the form of opinions or inferences is limited to those opinions or

150. See John H. Mansfield, *Jury Notice*, 74 *GEO. L.J.* 395 *passim* (1985) (expounding the foregoing ideas).

inferences which are a) rationally based on the perception of the witness and b) helpful to a clear understanding of the witness' testimony or the determination of a fact in issue.

This rule seeks to enforce the standard that allocates information between the informal and the formal processes. It does so by prohibiting a witness from testifying in a manner that unnecessarily exposes the jury to information that is not permitted to influence the outcome of the case through the formal process. So far as this information is concerned, it may only influence the outcome of the case through the informal process: only the beliefs of the jurors selected to try the case are to count. The prohibition usually is against a witness drawing an inference or characterizing what he has observed in a certain way. At the same time, Rule 701 does not prohibit testimony that contains information that should not come through the formal process if such a prohibition would create the risk that information that is permitted to come through that process will not be communicated. If what the witness observed is admissible through the formal process and he cannot communicate it in any other way than by opinion or inference, he will be permitted to speak in this form. Of course, the jury then will be instructed not to allow itself to be influenced by those ideas and beliefs of the witness that should not come through the formal process, but to look only to its own ideas and beliefs about these matters.

Recently a lower court, influenced by *Daubert*, found that Rule 701 creates a class of witnesses whose testimony must have a certain reliability in order to be admissible.¹⁵¹ The court held that although the requirement is not so severe as that imposed by *Daubert* on scientific evidence, it is a requirement of more than relevance.¹⁵² Thus, if we believe that there is a requirement for nonscientific expert testimony that it have a specified probative value, although somewhat less than that required of scientific evidence, we have the remarkable spectacle of a three-tier system with increasingly heavy demands. The Court's reference in

151. *Asplundh Mfg. Div. v. Benton Harbor Eng'g*, 57 F.3d 1190, 1201 (3d Cir. 1995) (stating that evidence must be "reasonably reliable" and trial judge must "rigorously examine the reliability of the lay opinion").

152. *See Asplundh Mfg. Div.*, 57 F.3d at 1202.

Daubert to “an ordinary witness, see Rule 701,”¹⁵³ lends support to this view. But the purpose of Rule 701 is not to create a class of witnesses and impose upon the testimony of witnesses in this class a requirement of more than relevance. The purpose of Rule 701, as stated, is simply to enforce the rule allocating information between the informal and the formal processes.

Federal Rule 702, like Rule 701, accepts, possibly repeats, the standard allocating information between the informal and the formal processes.¹⁵⁴ It also calls attention to the fact that there will be a wide range of information that may come through the formal process even though it concerns general principles and cases other than the litigated case. This is so because this sort of information often will not be possessed by any group of substantial size in the community and yet it will be relevant when combined with background information, available through the informal process, that is possessed by a group of substantial size in the community. This proposition assumes that whether information is possessed by a group of substantial size in the community is a correct statement of the standard that allocates information between the informal and formal processes. As stated above, often the only way for a witness effectively to communicate a wide range of relevant information that he has is through an opinion about an issue in the litigated case. If the witness is restricted to stating his knowledge of other cases or general principles, there is a risk of his not fully communicating his special knowledge. On the other hand, a witness is not required to give an opinion on an issue in the litigated case. He is permitted to testify simply about other cases and general principles. Making this clear was one of the purposes of Rule 702’s provision: “a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in *the form of an opinion or otherwise*.”¹⁵⁵ The Court in *Daubert*, by leaving out the emphasized words, obscured this purpose. The result is that it became easier for the Court to argue that Rule 702 had another

153. *Daubert v. Merrell Dow Pharms., Inc.*, 113 S. Ct. 2786, 2796 (1993).

154. See Paul C. Giannelli, *Daubert: Interpreting the Federal Rules of Evidence*, 15 CARDOZO L. REV. 1999, 2016 (1994) (“Rule 702 was directed at [the] boundary . . . distinguishing expert testimony from the commonplace”).

155. FED. R. EVID. 702 (emphasis added).

purpose, namely, to create a distinct class of scientific evidence and to erect a special exclusionary rule for this class:

The primary locus of this obligation [that scientific evidence be reliable to be admitted] is Rule 702, which clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify. “*If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue*” an expert “*may testify thereto.*” [unnoted omission].¹⁵⁶

Rule 702 would not seem to provide an exception to the policy embodied in Rule 701. Thus, if an epidemiologist attempts to testify in a form that unnecessarily runs a risk of supplying the jury with information that under the allocation standard is not permitted to come through the formal process—perhaps because it is possessed by a group of substantial size in the community—he may not do so. Ordinarily he will be able fully to communicate his special information without combining it with impermissible information. However, if he cannot avoid such a combination then, as in the case of any witness, under the principle of 701 itself, the risk may be run, but the jury will be instructed not to allow itself to be influenced by the impermissible information.

The *Daubert* Court twice refers to Rule 703 in its opinion.¹⁵⁷ One of these references¹⁵⁸ could be taken to support the view adopted by some lower courts¹⁵⁹ that Rule 703, either instead of or in addition to Rule 702, requires scientific evidence to have a cer-

156. *Daubert*, 113 S. Ct. at 2795.

157. *Id.* at 2796, 2797–98.

158. *Id.* at 2796.

That these requirements are embodied in Rule 702 is not surprising. Unlike an ordinary witness, see Rule 701, an expert is permitted wide latitude to offer opinions, including those that are not based on first-hand knowledge or observation. See Rules 702 and 703. Presumably, this relaxation of the usual requirement of first-hand knowledge—a rule which represents “a ‘most pervasive manifestation’ of the common law insistence upon ‘the most reliable sources of information,’” Advisory Committee’s Notes on Fed. Rule Evid 602 (citation omitted)—is premised on an assumption that the expert’s opinion will have a reliable basis in the knowledge and experience of his discipline.

Id. (emphasis added); see also *Daubert*, 113 S. Ct. at 2795 (holding that “[t]he primary locus of this obligation [that expert testimony be reliable] is Rule 702”) (emphasis added).

159. See *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 747–49 (3d Cir. 1994); see also *Christophersen v. Allied-Signal Corp.*, 939 F.2d 1106, 1110 n.4, 1113–15 (5th Cir. 1991).

tain probative value to be admissible. This suggestion, however, is not supported by the text of Rule 703:

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences on the subject, the facts or data need not be admissible in evidence.

This rule addresses the particular problem posed by the presence in the basis of expert opinion of material ordinarily made inadmissible by an exclusionary rule, most frequently the hearsay rule. Rule 703 provides that the presence of such material in the basis of an expert opinion does not render the opinion inadmissible if the material is of a type reasonably relied upon by experts in the particular field.¹⁶⁰ Rule 703, like Rules 701 and 702, does not impose upon expert opinions as such a requirement that they have a certain probative value in order to be admissible, nor does it impose a requirement upon those materials in the basis of expert opinion that do not conflict with any exclusionary rule.¹⁶¹

160. See FED. R. EVID. 703.

161. See *Christophersen*, 939 F.2d at 1117–18 (Clark, J., concurring). Some language in the Committee Comment to Minnesota Evidence Rule 703(a), which is the same as Federal Rule of Evidence 703, suggests that the rule is addressed to “the sufficiency of facts or data in establishing an adequate foundation for receiving [an expert] . . . opinion.” MINN. R. EVID. 703 1977 committee comment (West 1980). The provision in the California Evidence Code parallel to Federal Rule of Evidence 703, is more susceptible than Rule 703 to the interpretation that the rule is addressed not only to the question of material in the basis prohibited by some other exclusionary rule, but also to the probative value of the expert’s opinion as affected by its basis:

If a witness is testifying as an expert, his testimony in the form of an opinion is limited to such an opinion as is . . . (b) [b]ased on matter (including his special knowledge, skill, experience, training, and education) perceived by or personally known to the witness or made known to him at or before the hearing, whether or not admissible, that is of a type that reasonably may be relied upon by an expert in forming an opinion upon the subject to which his testimony relates, unless an expert is precluded by law from using such matter as a basis for his opinion.

CAL. EVID. CODE § 801. See also Edward J. Imwinkelried, *Development of a Coherent Theory of the Structure of Federal Rule of Evidence 703*, 47 MERCER L. REV. 447 (1996). Professor Imwinkelried’s analysis of Rule 703 is based upon an assumption that Rule 703 goes beyond providing exemption from otherwise applicable exclusionary rules and imposes a requirement of reliability on the basis of expert opinion.

VIII. CONCLUSION

Returning to Rule 702 and to the claim that the rule creates a special requirement for a particular class of relevant evidence, several questions remain: what is the nature of the class to which the requirement applies, what is the nature of the requirement that is imposed, and what is the justification for imposing it? As noted, the category "science" is difficult to discern, as are justifications for special treatment of evidence in this category. If the concern is with jury incapacity to deal with a certain kind of evidence, the Court has not made the case that such an incapacity exists or that exclusion of evidence because of this claimed incapacity does not conflict with the reasons for jury trial.

In applying *Daubert*, if the lower courts find it difficult to discern the category "science," they may drift to the broader category "expert" and impose a requirement of reliability on that whole category.¹⁶² But here, as in the case of "science," we have a problem of definition. One might equate the term "expert" with any information that is permitted to come through the formal process. Thus, the witness who testifies that the light was red when the car entered the intersection is as much an expert as the epidemiologist who testifies to the results of studies of a large number of instances and to general principles.

One might attempt to distinguish between witnesses who testify to the facts of the litigated case and those who testify about other cases or general principles.¹⁶³ But this distinction is hard to maintain. Which of the following witnesses is testifying to "the facts of the litigated case" and which to "the facts of other cases or general principles": A witness who looks at the defendant in the courtroom and testifies that that is the man who held him up? A witness

162. *State v. Cressey*, 628 A.2d 696, 698-702 (N.H. 1993), speaks broadly of the requirement that expert testimony be reliable, applies the requirement to the testimony of a psychologist that a child's behavior was consistent with sexual abuse and finds the testimony wanting. *Gier v. Educational Serv. Unit*, 845 F. Supp. 1342 (D. Neb. 1994), *aff'd*, 66 F.3d 940 (8th Cir. 1995), seems to assume that testimony of the same sort as that in *Cressey* is scientific and also finds it wanting.

163. The distinction is drawn in Edward J. Imwinkelried, *The "Bases" of Expert Testimony: The Syllogistic Structure of Scientific Testimony*, 67 N. CAR. L. REV. 1 (1988), the "specific facts of the pending case" being referred to Fed. R. Evid. 703 and other information to Rule 702, but the difficulty of applying the distinction is recognized. *Id.* at 10, 23 n.170.

who was not present at the holdup, but who has seen the defendant on a number of occasions, who examines a bank surveillance camera photo of the holdup man and testifies that the man in the photo is the defendant?¹⁶⁴ A witness who has seen the defendant's brother on a number of occasions, who examines the photo and testifies that the man in the photo is not the defendant's brother? A witness who has examined a large number of human faces, indeed has systematically studied wherein they are alike and wherein they are different, who looks at the defendant in the courtroom and at the photo, and testifies that the person in the photo is the defendant?

Even if we can somehow draw a line between testimony about the facts of the litigated case and testimony about other cases and general principles, will it be possible to explain why this line should be used as a basis for a special rule of admissibility? If the distinction is entirely arbitrary, the tendency may be for the requirement imposed on the class of evidence about "the facts of other cases and general principles" to be extended to the whole class of relevant evidence, just as the tendency may be to extend a requirement imposed on scientific evidence to the whole class of expert evidence. Requiring all evidence to have a certain reliability in order to be admissible, rather than simply to be relevant, seems contrary to Rules 402 and 601, which, as stated above, provide that all relevant evidence is admissible and all witnesses are competent unless otherwise provided.

It probably will be some time before the Supreme Court addresses the subject of scientific evidence again. For now, the Court may consider that it has done its job by laying down general principles. But the concepts the Court has announced are so vague and unsatisfactory that it cannot be long before wide disparities in the admission of evidence among the different circuits become obvious. When the time for reconsideration does arrive, it will be necessary to see whether the *Daubert* concepts survive the test of application to specific evidence. It also will be important to examine the subject of the admissibility of scientific evidence in the context of the law of Evidence as a whole, rather than treat it in isolation, and to explain what justification there may be for the

164. See *State v. Benton*, 567 So. 2d 1067, 1068 (Fla. App. 1990).