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TABLE OF CONTENTS

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FOR at least ninety years, courts and commentators have debated about how to deal with the special issues raised by expert witness testimony. Judge Learned Hand, in a 1901 article, identified the twin problems of expert witnesses: (i) venality; and (ii) authority.[1] In essence, the lure of witness fees will attract a qualified expert willing to testify to almost anything; and the special qualifications and knowledge of the expert, as well as the trial judge's certification that the witness is an

1. Learned Hand, *Historical and Practical Considerations Regarding Expert Testimony*, 15 HARV. L. REV. 40, 50-52 (1901).

expert, may perhaps lend an undue "aura of mystic infallibility"[2] to the expert's testimony.

Because of these risks, the common law imposed a number of constraints on the admissibility of expert witness testimony, thus limiting the issues and the bases on which an expert would be permitted to testify. When it enacted the Federal Rules of Evidence in 1975, Congress was aware of the unique problems expert testimony presents, yet it chose to enact a set of rules that rejected many of the common law's constraints on admissibility. In doing so, Congress relied primarily on the adversarial process to counter-balance the (supposed) tendency of juries to give undue weight to expert testimony of questionable validity.

While the balance that Congress struck has worked reasonably well,[3] recent decisions addressing the use of expert testimony in toxic tort cases[4] have questioned Congress's judgment on this issue. In toxic tort cases, expert testimony plays a crucial role, because it would be difficult for a plaintiff to satisfy his or her burden of proof regarding causation without the specialized knowledge and opinion of an expert. In tension with this necessary element of proof is the perception of both courts and commentators that an expert can be found who will testify to virtually anything. Certain courts and commentators have expressed frustration concerning the liberal standards for admissibility of expert testimony under the Federal Rules of Evidence,[5] because the Rules may allow into evidence expert testimony that is on the fringe, or even expressly repudiated, by mainstream experts in the field.

At the same time, a perception has arisen that the tort system does not work, often leads to ridiculous results, and is in grave need of reform. Some have attributed these problems to gullible, and perhaps irrational,

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2. United States v. Williams, 583 F.2d 1194, 1199 (2d Cir. 1978), *cert. denied*, 439 U.S. 1117 (1979); Addison v. United States, 498 F.2d 741, 744 (D.C. Cir. 1974) ("posture of mythic infallibility"); United States v. Baller, 519 F.2d 463, 466 (4th Cir.) (aura of "reliability"), *cert. denied*, 423 U.S. 1019 (1975).

3. *See, e.g.*, CARNEGIE COMM'N ON SCIENCE, TECHNOLOGY, & GOV'T, SCIENCE AND TECHNOLOGY IN JUDICIAL DECISION MAKING: CREATING OPPORTUNITIES AND MEETING CHALLENGES 13 (1993) ("Our examination of the cases leads to the conclusion that, although such dissatisfaction [with the manner in which the legal system deals with scientific and technological issues] does exist, many of the concerns expressed are greatly exaggerated.").

4. Toxic tort cases generally involve those in which "plaintiffs seek compensation for harm allegedly caused by exposure to a substance that increases the risk of contracting a serious disease, but generally involve a period of latency or incubation prior to onset of the disease. Exposure to radiation and the use of pharmaceutical drugs or products fall within this loose rubric. Although many kinds of injuries are involved, most toxic tort cases involve cancer and the issue of carcinogenesis." Bert Black, *A Unified Theory Of Scientific Evidence*, 56 FORDHAM L. REV. 595, 602 n.29 (1988). Additionally, exposure to drugs during pregnancy that result in birth defects has also been characterized as a toxic tort. Brock v. Merrell Dow Pharmaceuticals, Inc., 874 F.2d 307, 309 (5th Cir.), *modified*, 884 F.2d 166 (5th Cir. 1989), *cert. denied*, 494 U.S. 1046 (1990).

5. Because the evidentiary rules concerning expert testimony were intended to liberalize the admissibility of such testimony by rejecting certain of the common law rules restricting its use, the term "liberal," as used in this article, is intended to describe a plain-meaning interpretation of the Rules, in accordance with the intentions of their drafters.

juries. Fearful that juries will be too willing to find liability on the basis of questionable expert testimony, certain courts have set about to resolve the perceived problems and injustices that may arise in toxic tort cases through two approaches, each of which is designed to keep liability questions from the jury's consideration. First, under the standard for summary judgment established in 1986 by the *Celotex* trilogy,[6] certain courts have ruled that expert testimony of questionable credibility will not create a genuine issue as to whether the exposure to a defendant's product factually caused the plaintiff's injury.[7] Finding no genuine factual dispute with respect to the issue of cause in fact, the trial judge can grant summary judgment in favor of the defendant, thereby keeping the liability issue from the jury.[8] Second, certain courts have "interpreted" the Federal Rules of Evidence to permit the trial judge to exclude an expert's opinion, if the judge is not convinced of the reliability and scientific validity of that opinion.[9] In practice, courts have exercised this authority to restrict the admission of relevant expert testimony on issues, such as causation, that are essential to a plaintiff's prima facie case. Once the trial judge has excluded the proffered testimony of the plaintiff's expert, the plaintiff will often have no evidence to establish causation, making summary judgment in favor of the defendant again appropriate.[10] While these two approaches work together to keep liability decisions from the jury, this article will focus on the increasing willingness of certain courts

6. *See* Celotex Corp. v. Catrett, 477 U.S. 317 (1986); Anderson v. Liberty Lobby, Inc., 477 U.S. 242 (1986); Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574 (1986).

7. *See, e.g.*, Turpin v. Merrell Dow Pharmaceuticals, Inc., 959 F.2d 1349, 1350, 1353 (6th Cir.), *cert. denied*, 113 S. Ct. 84 (1992); *Brock*, 874 F.2d at 313, *as modified*, 884 F.2d at 167; Richardson v. Richardson-Merrell, Inc., 857 F.2d 823, 828 (D.C. Cir. 1988), *cert. denied*, 493 U.S. 882 (1989). In a recent antitrust case, Eastman Kodak Co. v. Image Technical Serv., the Supreme Court seemed to take a step back from the permissive summary judgment standards announced in the *Celotex* trilogy by reversing a grant of summary judgment and remanding for trial an antitrust claim based upon a reasonably implausible set of factual assertions. *See* Eastman Kodak Co. v. Image Technical Serv., 112 S. Ct. 2072, 2078 (1992). It remains unclear, however, whether the *Kodak* decision was primarily meant to shift the standards for summary judgment, or shift the underlying scope of antitrust liability. The fact that the Court in Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2798 (1993), approved the "freer" use of summary judgment in the toxic tort context (citing with approval the *Turpin* and *Brock* decisions), suggests that this approach to keeping the liability decision in the judge's, and therefore out of the jury's, hands is likely to continue. *See* Elkins v. Richardson-Merrell, Inc., 8 F.3d 1068, 1071 (6th Cir. 1993) (affirming grant of summary judgment in favor of defendant in Bendectin birth defect case, the court noted that "the admissibility of Merrell's affidavit under *Daubert* is irrelevant; the district court properly determined that the plaintiffs failed to demonstrate the existence of a genuine factual dispute regarding causation"), *cert. denied*, 114 S. Ct. 1299 (1994). For a discussion of this approach, see 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 (1992).

8. This article will refer to the first approach intended to keep liability questions from the jury's consideration as the "procedural" approach.

9. *See infra* notes 110-41 and accompanying text.

10. This article will refer to the second approach intended to keep liability questions from the jury's consideration as the "evidentiary" approach.

to keep the liability decision from the jury through the use of the evidentiary approach.

The evidentiary approach merits particular attention given the Court's attempt in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[11] to address the extent to which a judge may properly keep relevant evidence from the jury under the Rules. In *Daubert*, the Court addressed both the specific issue of whether relevant scientific evidence must satisfy the general acceptance standard announced in *Frye v. United States*[12] to be admissible under the Federal Rules of Evidence, and the more general issue of the standards that trial judges should apply in determining whether to admit expert scientific testimony. On both issues, the Court faced a choice between a more restrictive approach[13] to the admissibility of such evidence in which the trial judge would more carefully scrutinize the proffered testimony for "correctness" before admitting it, and a less restrictive approach which would rely on the jury's good sense as well as the adversarial process to discredit unreliable scientific evidence.

Instead of facing this choice directly, however, the *Daubert* Court seemed to play to both sides of the issue.[14] First, in addressing whether the enactment of the Federal Rules of Evidence had overruled *Frye*'s general acceptance test, the Court focused on the "liberal thrust" of the Rules and the Rules' emphasis on the adversarial process to discredit unreliable evidence, and concluded that the enactment of the Rules had overruled *Frye*.[15] Yet, in its dicta detailing the standards a trial court should apply in determining whether to admit scientific testimony, the Court emphasized the need for the trial court to screen scientific testimony for accuracy before admitting it. The Court required a trial judge

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11. 113 S. Ct. 2786 (1993).

12. 293 F. 1013 (D.C. Cir. 1923). In *Frye*, the court excluded opinion testimony based upon a systolic blood pressure detection test (a precursor to the polygraph machine) using the following language:

> Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.

Id. at 1014. From this language, later courts have derived the so-called *Frye* requirement that opinion testimony be based upon a technique that is "generally accepted" in the relevant scientific field. *See, e.g.*, Mark McCormick, *Scientific Evidence: Defining a New Approach to Admissibility*, 67 IOWA L. REV. 879, 882-85 (1982).

13. The term "restrictive," as used in this article, is intended to describe those courts and interpretations which limit the introduction of relevant expert testimony to a greater extent than was intended under the Federal Rules of Evidence, as reflected in the legislative history and the plain language of the Rules. *Cf. In re* "Agent Orange" Prod. Liab. Lit., 611 F. Supp. 1223, 1243-45 (E.D.N.Y. 1985) (applying the phrases "restrictive" and "liberal" to describe two approaches for determining the admissibility of expert testimony under Rule 703), *aff'd*, 818 F.2d 187 (2d Cir. 1987), *cert. denied sub nom.* Lombardi v. Dow Chem. Co., 487 U.S. 1234 (1988).

14. *See Daubert*, 113 S. Ct. at 2798 (concluding its opinion by attempting to placate both sides).

15. *Id.* at 2794.

to determine, under Rule 702, that expert testimony was scientifically valid before admitting it,[16] and recognized that *Frye*'s general acceptance test would continue to play an important role in determining such validity.[17] Thus, ironically, the *Daubert* Court, in the course of one opinion, ruled that while *Frye*'s general acceptance test did not survive enactment of the Rules, the Rules had incorporated *Frye*'s general acceptance analysis as a consideration under Rule 702.

Unfortunately, in its attempt to give something to everyone on this highly charged admissibility issue, the Court has only further muddied what has recently become a fairly murky area of evidentiary law.[18] This article examines the applicable legislative history and the historical context of the Rules' enactment to determine the appropriate standard for admission of expert testimony under Rules 702 and 703. This examination demonstrates that the *Daubert* Court, as well as the restrictive courts of appeals, are wrong about the proper role of the trial judge under Rules 702 and 703. By taking the language of these Rules out of their historical context and giving them a purely literalistic interpretation, these courts have misconstrued Congress's intent as well as the meaning of these Rules.

In contrast, the plain meaning and historical context of the Rules' enactment demonstrate that Congress intended to liberalize the admissibility of expert testimony. While Congress recognized the risks that unrestricted admissibility of expert testimony presents, it intended questions concerning the admissibility of relevant, but questionable, scientific evidence to be governed by Rule 403. Under Rule 403's structured balancing requirements, a trial judge has discretion to exclude relevant scientific evidence only if, upon consideration of the case as a whole and with the assumption that all parties are represented by able trial counsel, the judge finds that the probative value of the evidence is substantially outweighed by the danger[19] of admitting it. Because Congress's fundamental presumption in enacting the Rules was that competent cross-examination by able trial counsel would likely discredit questionable scientific evidence, the admission of such evidence will seldom present a

16. *Id.* at 2796 n.9.

17. *Id.* at 2797; *see also infra* note 173. In addition to the possibility of excluding questionable scientific evidence under Rule 702, the Court also directed trial judges to examine the underlying factual basis for expert testimony to ensure that the basis satisfied Rule 703. *Daubert*, 113 S. Ct. at 2797-98.

18. *See Daubert*, 113 S. Ct. at 2799 (Rehnquist, C.J., dissenting) ("'General observations' by this Court customarily carry great weight with lower federal courts, but the ones offered here suffer from the flaw common to most such observations—they are not applied to deciding whether or not particular evidence was or was not admissible, and therefore they tend to be not only general, but vague and abstract.").

19. Under Rule 403, a trial judge has the discretion to exclude relevant evidence if the probative value of the evidence is substantially outweighed by one of three "dangers": "unfair prejudice," "confusion of the issues," or "misleading the jury"; or by one of three "considerations": "undue delay," "waste of time," or "needless presentation of cumulative evidence." FED. R. EVID. 403. This article will refer to all six factors as "dangers" or "danger."

serious likelihood of prejudice. As a result, proper use of Rule 403's balancing test should result in the admission of substantially more relevant evidence than would be permitted under the restrictive interpretations of Rules 702 and 703.

The restrictive courts' refusal to rely on the adversarial process to discredit questionable scientific evidence implicates far more than the question of which evidentiary rule the courts should rely upon in determining the admissibility of such evidence. This dispute is not simply a philosophical one over the efficacy of cross-examination and the adversarial process, or an academic one over the relative merits of an admissibility analysis under Rules 702 and 703, rather than Rule 403. Instead, the restrictive courts have read Rules 702 and 703 as establishing a judge-controlled bottleneck to the admission of questionable scientific evidence that makes it essentially impossible for a wide variety of injured toxic tort plaintiffs to be compensated through the tort system.

Thus, while the issue is framed in terms of the admissibility of questionable scientific evidence, the real dispute is over what role, if any, the tort system should play in compensating a plaintiff who suffers from a serious injury that the defendant's conduct may have caused. By requiring expert testimony to reflect a substantial degree of scientific certainty before admitting it, these courts have substantially increased the toxic tort plaintiff's burden of proof, and have limited recovery for the toxic tort plaintiff to situations where the causal relationship has been scientifically verified, a degree of certainty not generally required of tort plaintiffs. The inevitable result of such a restrictive interpretation is, in practice, to alter the substantive law of torts by limiting, and perhaps precluding, the availability of a tort remedy for the injured toxic tort plaintiff.

I. EVIDENTIARY RULES PERTAINING TO EXPERT TESTIMONY: HISTORICAL CONTEXT

Over the past eight to ten years, certain courts and commentators have become convinced that there is something fundamentally wrong with the tort system, especially in the area of toxic torts. In dealing with the injuries that can result from exposure to toxic substances, a compensation system such as the tort system presents the jury with a choice between a certain and usually serious condition, and an uncertain and often complex relationship between the defendant's conduct and the plaintiff's condition. Some courts and commentators fear that a jury in this situation will too often make the wrong choice, favoring the party who has suffered the certain illness or injury, even if the defendant's responsibility for that condition is less than clear.

Expert witnesses play a central role in this drama by guiding the jury to an understanding of the relationship, if any, between the defendant's conduct and the plaintiff's condition, and by providing the crucial evidentiary link between the conduct and the condition. Some courts and commentators fear, however, that such witnesses often mislead the jury by testifying

to the existence of a causal relationship even when such a causal link has not been adequately established. These courts and commentators have expressed frustration concerning the "hired gun" mentality of many experts,[20] the inability of most lawyers to deal with complex science and technology on cross-examination,[21] and the willingness of experts to express opinions that are contrary to the established and accepted findings of the members in such experts' fields of expertise.[22] To address these concerns, commentators have recommended, among other things, amending the Rules to include such requirements as a judicial analysis of the reliability of the evidence upon which an expert bases his or her opinion;[23] express incorporation of the *Frye* test;[24] incorporation of a relevancy analysis under Rule 702;[25] or implementation of special notice rules for use of expert testimony.[26]

Certain federal courts have expressed the specific concern that the liberal admissibility of expert testimony leads to inconsistent and sometimes inaccurate results in toxic tort cases.[27] Unlike the commentators, who generally seek to amend the applicable evidentiary rules, these courts have simply read the Rules to include many of the suggested revisions, as

20. *See, e.g., In re* Air Crash Disaster, 795 F.2d 1230, 1234 (5th Cir. 1986) ("Second, the professional expert is now commonplace. That a person spends substantially all of his time consulting with attorneys and testifying is not a disqualification. But experts whose opinions are available to the highest bidder have no place testifying in a court of law . . . ."); Black, *supra* note 4, at 598 & n.3.

21. *See* Black, *supra* note 4, at 603 n.31; *cf.* William A. Thomas, *Some Observations by a Scientist*, 115 F.R.D. 142, 144 (1986).

22. *See* Black, *supra* note 4, at 672-74 (discussing medical community's rejection of causation finding in Wells v. Ortho Pharmaceutical Corp., 788 F.2d 741 (11th Cir.), *cert. denied*, 479 U.S. 950 (1986)); E. Donald Elliot, *Toward Incentive-Based Procedure: Three Approaches for Regulating Scientific Evidence*, 69 B.U. L. REV. 487, 489-93 (1989) (discussing rejection by "conventional scientists" of causation findings that "clinical ecologists" made). *See generally* PETER HUBER, GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM (1991).

23. *See, e.g.*, Frederic I. Lederer, *Resolving the Frye Dilemma—A Reliability Approach*, 115 F.R.D. 84 (1986).

24. *See, e.g.*, James E. Starrs, Frye v. United States *Restructured and Revitalized: A Proposal to Amend Federal Evidence Rule 702*, 115 F.R.D. 173 (1986).

25. *See, e.g.*, Margaret A. Berger, *A Relevancy Approach to Novel Scientific Evidence*, 115 F.R.D. 89 (1986).

26. *See, e.g.*, Paul C. Gianelli, *Scientific Evidence: A Proposed Amendment to Federal Rule 702*, 115 F.R.D. 102 (1986).

27. The courts have expressed two fears concerning expert testimony: (i) that juries will put too much faith in the word of an expert; and (ii) that juries have no real basis for deciding between two experts espousing diametrically opposed opinions. *See* Starrs, *supra* note 24, at 92 ("Almost as if it were a shibboleth, it has been said and resaid that trial juries gave overweening deference to scientific evidence, regardless of its validity within the scientific community."); Hand, *supra* note 1, at 53 ("The trouble with all this is that it is setting the jury to decide, where doctors disagree. The whole object of the expert is to tell the jury, not the facts, as we have seen, but general truths derived from his specialized experience. But how can the jury judge between two statements each founded upon an experience confessedly foreign in kind to their own? It is just because they are incompetent for such a task that the expert is necessary at all."). Against these two concerns, some courts believe that the adversarial system has been found wanting. *See, e.g.*, Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1126 (5th Cir. 1991) (Reavley, J., dissenting) (responding to the majority's decision, the dissent laments the "neglected virtues of the adversarial system"), *cert. denied*, 112 S. Ct. 1280 (1992).

well as others, thereby creating a restrictive climate for the admission of expert testimony in toxic tort cases.[28]

To determine whether these restrictive interpretations are warranted, this article begins its analysis with consideration of the Rules themselves and the common law evidentiary problems which the expert testimony Rules were intended to remedy. Consideration of the Rules' historical context, and the assumptions of the Rules' drafters, is essential to determining whether the restrictive courts' interpretation of the Rules fairly implements their drafters' intentions.[29]

A. Promulgation of the Rules: Process of Adoption

The Rules Advisory Committee of the Judicial Conference drafted the Federal Rules of Evidence under the supervision of the United States Supreme Court, pursuant to the authority granted to the Court in the Rules Enabling Act.[30] Congress enacted the Rules into law on January 2,

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28. The courts that have placed restrictive interpretations on the Federal Rules of Evidence concerning expert testimony in toxic tort cases include the United States Court of Appeals for the District of Columbia Circuit, the United States Court of Appeals for the First Circuit, the United States Court of Appeals for the Fifth Circuit, and, most recently, the United States Court of Appeals for the Ninth Circuit. *See* Richardson v. Richardson-Merrell, Inc., 857 F.2d 823 (D.C. Cir. 1988) (limiting Ferebee v. Chevron Chem. Co., 736 F.2d 1529 (D.C. Cir.), *cert. denied*, 469 U.S. 1062 (1984), to novel expert testimony that is at the "frontier" of medical and epidemiological findings), *cert. denied*, 493 U.S. 882 (1989); Lynch v. Merrell-National Labs., 830 F.2d 1190 (1st Cir. 1987); Christophersen v. Allied-Signal Corp., 939 F.2d 1106 (5th Cir. 1991) (en banc) (per curiam), *cert. denied*, 112 S. Ct. 1280 (1992); Daubert v. Merrell Dow Pharmaceuticals, Inc., 951 F.2d 1158 (9th Cir. 1991), *vacated*, 113 S. Ct. 2786 (1992). The restrictive interpretations of these cases are discussed in more detail *infra* notes 110-41 and accompanying text.

29. *Cf.* Hickman v. Taylor, 329 U.S. 495, 518 (1947) (Jackson, J., concurring) (In discussing whether the Federal Rules of Civil Procedure authorized discovery of trial preparation materials, Justice Jackson wrote: "It is true that the literal language of the district court's order [permits the discovery of trial preparation materials] . . . . But all such procedural measures have a background of custom and practice which was assumed by those who wrote and should be by those who apply them."). *See also* Fedorenko v. United States, 449 U.S. 490, 514 (1981) ("It is not the function of the courts to amend statutes under the guise of 'statutory interpretation.'").

30. 28 U.S.C. § 2072 (1966). At the time that the Supreme Court promulgated the Federal Rules of Evidence, § 2072 provided in pertinent part:

> The Supreme Court shall have the power to prescribe by general rules, the forms of process, writs, pleadings, and motions, and the practice and procedure of the district courts and courts of appeals of the United States in civil actions . . . .
>
> Such rules shall not abridge, enlarge or modify any substantive right . . . .

Not everyone believed that the Rules Enabling Act granted to the Court the authority to promulgate the Federal Rules of Evidence, however. Justice Douglas dissented from the Supreme Court's Order transmitting the proposed Rules to Congress, stating:

> I can find no legislative history that rules of evidence were to be included in "practice and procedure" as used in § 2072. . . . The words "practice and procedure" in the setting of the Act seem to me to exclude rules of evidence. They seem to me to be words of art that describe pretrial procedures, pleadings, and procedures for preserving objections and taking appeals.

Order of the Supreme Court of the United States, 56 F.R.D. 184, 185 (November 20, 1972) (Douglas, J., dissenting). Section 2072 was amended in 1988 to provide expressly that the Supreme Court shall have the power "to prescribe general rules of practice and procedure and rules of evidence . . . ." Judicial Improvements and Access to Justice Act, Pub. L. No.

1975.[31] The process of enacting the Federal Rules of Evidence took over thirteen years, and involved a number of steps, including initial drafting, revision, and eventual promulgation of proposed Rules by the Rules Advisory Committee, consideration of the proposed Rules by the Supreme Court, and finally congressional consideration, revision, and enactment of the Rules in their final form.[32] At virtually every step in the process, the proposed Rules were circulated to the public and the bar, and comments regarding the Rules were requested and carefully considered.[33]

B. CENTRAL PURPOSE FOR ENACTING THE RULES: UNIFORMITY

From its enactment in 1937 until its amendment in 1972, Federal Rule of Civil Procedure 43(a) governed the admissibility of evidence and the competency of the witnesses to testify in the federal courts.[34] During this time, Rule 43(a) provided that evidence was admissible if it was admissible under: (i) the statutes of the United States; (ii) the rules of evidence historically applied in equity; or (iii) the rules of evidence of the state in which the federal court was situated.[35] Moreover, Rule 43(a) required

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100-702, Title IV, § 401(a), 102 Stat. 4648 (1988) (codified as amended at 28 U.S.C. §§ 2072-74) (emphasis added). Considerations of whether Congress actually had authority under the Constitution to delegate legislative power to the Supreme Court for the promulgation of the Federal Rules of Evidence are beyond the scope of this article. *See generally* Jack H. Friedenthal, *The Rule-Making Power of the Supreme Court: A Contemporary Crisis*, 27 STAN. L. REV. 674 (1975).

31. Act of Jan. 2, 1975, Pub. L. No. 93-595, § 3, 88 Stat. 1959.

32. The specific steps included an evaluation of the advisability and feasibility of establishing uniform rules of evidence; promulgation of proposed Rules by the Rules Advisory Committee whose members were appointed by the Judicial Conference; the Judicial Conference's submission of the proposed Rules to the Supreme Court; promulgation of the proposed Rules by the Supreme Court; transmittal of the proposed Rules by the Supreme Court for consideration by Congress; congressional hearings concerning the proposed Rules; congressional revisions to certain of the proposed Rules; and congressional enactment of the proposed Rules in final form. For further discussion of the events leading up to Congress's enactment of the Federal Rules of Evidence, *see* S. REP. NO. 1277, 93d Cong., 2d Sess. (1974), *reprinted in* 1974 U.S.C.C.A.N. 7051-52.

33. *See, e.g.*, *Rules of Evidence: Hearings Before the Special Subcomm. on Reform of Federal Criminal Laws of the House Comm. on the Judiciary*, 93d Cong., 1st Sess. 22 (1973) [hereinafter *Rules of Evidence: House Hearings I*] (testimony of Albert E. Jenner, Jr., Chairman, Advisory Committee on Rules of Evidence, Judicial Conference of the United States) ("Thousands, literally thousands, of the first preliminary draft were distributed to the bench and bar throughout this nation in 1969. . . . The same procedure was followed with respect to the 1971 revised draft. Literally, 100,000 copies of the two drafts have been at large in this country for several years.").

34. *See, e.g.*, Faircloth v. Lamb-Grays Harbor Co., 467 F.2d 685, 693 (10th Cir. 1972).

35. Before 1972, Rule 43(a) provided:

> (a) Form and Admissibility. In all trials the testimony of a witness shall be taken orally in open court, unless otherwise provided by these rules. All evidence shall be admitted which is admissible under the statutes of the United States, or under the rules of evidence heretofore applied in the courts of the United States on the hearing of suits in equity, or under the rules of evidence applied in the courts of general jurisdiction of the state in which the United States court is held. In any case, the statute or rule which favors the reception of the evidence governs and the evidence shall be presented according to the most convenient method prescribed in any of the statutes or rules to which reference is herein made. The competency of a witness to testify shall be determined in like manner.

that of these three potential sources of law, the one "which favors the reception of the evidence governs."[36]

While Rule 43(a) sought to bring some conformity to the rules of evidence that the federal courts applied, and to some extent did so,[37] the Rule created a number of ambiguities, most of which were attributable to its admittedly "makeshift" character.[38] The principal question that arose in the admissibility context was whether the "federal equity" provision of the Rule authorized federal courts to create their own federal common law of evidence, or merely authorized the federal courts to continue using the rules of evidence detailed in specific equity precedents.[39] Thus, when a federal court confronted a state law that required exclusion of certain evidence and an absence of federal authority on the issue, some federal courts, under one interpretation of the "federal equity" provision, would follow the state law and exclude the evidence, while others, under a different interpretation of the "federal equity" provision, would craft their own federal common law of evidence and admit the evidence.[40] Of the federal courts that followed the latter approach, they often adopted a federal rule of evidence under the "federal equity" provision with no more authority for the existence of the supposed rule than a citation to Professor Wigmore's treatise.[41] To add to the confusion, the courts considered certain issues, such as testimonial privileges, to be substantive rather than procedural, which necessitated consideration of such issues under the law of the forum state[42] as required by *Erie*.[43]

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36. *Id.*

37. Thomas F. Green, Jr., *The Admissibility of Evidence Under the Federal Rules*, 55 HARV. L. REV. 197, 213 (1941).

38. Committee on Rules of Practice and Procedure of the Judicial Conference of the United States, Rules of Evidence: A Preliminary Report on the Advisability and Feasibility of Developing Uniform Rules of Evidence for the United States District Courts 13 (1962), *reprinted in* 1 JAMES F. BAILEY, III, AND OSCAR M. TRELLES, II, THE FEDERAL RULES OF EVIDENCE: LEGISLATIVE HISTORIES AND RELATED DOCUMENTS (1980) [hereinafter PRELIMINARY REPORT].

39. *See, e.g.*, Hope v. Hearst Consol. Publications, Inc., 294 F.2d 681, 683-89 (2d Cir. 1961); United States v. 60.14 Acres of Land, 362 F.2d 660, 665-68 (3d Cir. 1966).

40. PRELIMINARY REPORT, *supra* note 38, at 21-23.

41. *See, e.g.*, Bailey v. Kawasaki-Kisen, 455 F.2d 392, 397 (5th Cir. 1972) (adopting Professor Wigmore's position as the definitive statement of the rule governing the admissibility of subsequent repair to show defect under the "federal equity" provision of Rule 43(a)). The court's use of Professor Wigmore as authority for establishing a federal common law of evidence is particularly ironic, given that Professor Wigmore believed that the federal equity provision of Rule 43(a) did not authorize the federal courts to invoke any general "Federal common law of evidence." 1 JOHN H. WIGMORE, EVIDENCE § 6(c) (James H. Chadbourn rev. 1978). One of the principal difficulties of applying the "federal equity" provision was that "nobody really knew what rules of evidence the Federal courts had been applying in suits in equity . . . ." *Rules of Evidence: House Hearings I*, *infra* note 33, at 247 (testimony of Henry J. Friendly, Chief Judge, United States Court of Appeals for the Second Circuit).

42. *See, e.g.*, Massachusetts Mutual Life Ins. Co. v. Brei, 311 F.2d 463, 465-66 & n.3 (2d Cir. 1962).

43. Erie R.R. v. Tompkins, 304 U.S. 64 (1938). Justice Douglas, and others, believed that the Rules were unconstitutional because they impermissibly abrogated state law evidentiary privileges. *See* Order of the Supreme Court of the United States, 56 F.R.D. 184, 185 (November 20, 1972) (Douglas, J., dissenting); *Rules of Evidence: House Hearings I*,

To eliminate this state by state, and circuit by circuit, variation in the federal courts' evidentiary rules, commentators and others periodically proposed adopting a uniform set of federal evidentiary rules.[44] Eventually, the need for uniformity led to the thirteen year drafting process which culminated with Congress's approval of the Federal Rules of Evidence.[45] In considering the Federal Rules of Evidence, the overall goal of the codification process was to organize the common law rules of evidence into a coherent, and more easily grasped, set of rules that were to be uniformly applied in the federal courts.[46] As Judge Maris, the Chairman of the Judicial Conference's Standing Committee on Rules of Practice and Procedure, testified: "[T]he basic virtue of the whole task is to have a Code on the desk of the judge and trial lawyer to which he can refer immediately when a question comes up . . . ."[47]

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supra note 33, at 147 (testimony of Arthur J. Goldberg, retired Justice of the United States Supreme Court).

44. In the early 1940s, the Rules Advisory Committee considered these arguments, and while recognizing the desirability of such uniform rules, pleaded that it "had not been feasible . . . so far to undertake this important task." FED. R. CIV. P. 43 advisory committee's supplementary notes.

45. As Mr. Jenner explained to the House Subcommittee which considered the Rules, the Rules were intended to remedy problems raised by inconsistent evidentiary rules under the common law that judges who sat by designation in more than one federal district encountered:

> Then there is another problem. It arises from the fact that the Congress has wisely and generously provided that district judges and circuit judges of this Nation may be transferred and assigned from district to district and circuit to circuit to help out those districts and those circuits in which there are tremendously congested calendars, and justice is not being efficiently administered to the citizenry or litigants in those courts.
>
> Consequently, the district judges themselves must wrestle with rules of evidence that differ from district to district.

Rules of Evidence: House Hearings I, *supra* note 33, at 33.

46. *See Rules of Evidence: House Hearings I*, *supra* note 33, at 90-91 (prepared statement of Mr. Jenner, Chairman, Rules Advisory Committee); *id.* at 287 (statement of Donald E. Santarelli, Associate Deputy Attorney General, Administration of Criminal Justice); *id.* at 354, 357 (testimony of Frank F. Jestrab, National Conference of Commissioners of Uniform State Laws).

47. *Rules of Evidence: House Hearings I*, *supra* note 33, at 24 (testimony of Judge Albert B. Maris, Chairman, Standing Committee on Rules of Practice and Procedure); *see also id.* at 32-33.

> [Uniformity] is certainly one of the basic goals that these rules seek to attain, a very widely applied basis. Many, many lawyers, particularly government lawyers, who have to go around the United States, and lawyers in other types of cases, antitrust litigation and others, that go to various districts from time to time, have this problem and complain about it. And they are welcoming the possibility of a uniform rule that they can understand and that they know will be applied in every district court in which they may have occasion to practice.

Id. at 32-33 (testimony of Judge Maris).

> [T]his is what brought about the demand of the American Bar Association, its Special Committee on Rules of Evidence that we must have, in order to administer justice in the Federal courts, uniform rules of evidence that are applicable to all district courts. . . .
>
> *So that this is, in a very real sense, an absolute, that is, that the rules of evidence of the Federal courts must be uniform.*

In addition to increasing the accessibility of the evidentiary rules for both judges and practitioners, uniform application of the Rules was an essential goal of the codification process. As Mr. Albert E. Jenner, Jr., the Chairman of the Rules Advisory Committee, explained: "This [uniformity] is the *sine qua non* of these Rules. It is one of the most, if not *the* most, compelling reason for promulgation of uniform Federal Rules of Evidence."[48] These comments were cited with approval in the House Report that accompanied enactment of the Federal Rules of Evidence,[49] clearly demonstrating that uniformity in the practice and procedure of the federal courts was the fundamental purpose behind adopting the evidentiary code.[50]

C. Principles of Statutory Construction

Because the Federal Rules of Evidence are a legislative enactment, the "traditional tools of statutory construction" are applied in construing them.[51] Accordingly, the Court begins by examining the plain-meaning of the Rules, and then analyzes the Advisory Committee's Notes and legislative history to ensure that the plain-meaning given to the Rule is consistent with these other indications of congressional intent.[52] Finally, in construing statutes, courts are, of course, not entitled to disregard the

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Id. at 33-34 (testimony of Albert E. Jenner, Jr., Chairman, Advisory Committee on Rules of Evidence, Judicial Conference of the United States) (emphasis added).

48. *Rules of Evidence: House Hearings I*, *supra* note 33, at 89 (emphasis in original).

49. *See* H.R. Rep. No. 650, 93d Cong., 2d Sess. (1974), *reprinted in* 1974 U.S.C.C.A.N. 7075, 7075.

50. *But see* Adams v. Fuqua Indus., Inc., 820 F.2d 271, 273 (8th Cir. 1987) (suggesting incorrectly that proponent is entitled to "more favorable [state or federal evidentiary] rule" even after adoption of the Federal Rules of Evidence).

51. Beech Aircraft Corp. v. Rainey, 488 U.S. 153, 163 (1988) (quoting INS v. Cardoza-Fonseca, 480 U.S. 421, 446 (1987)) (construing Rule 803(8)(c)); *see also* Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2793-94 (1993).

52. *See, e.g.*, Huddleston v. United States, 485 U.S. 681 (1988); Owens v. United States, 484 U.S. 554 (1988); Bourjaily v. United States, 483 U.S. 171 (1987). One commentator has stated that these cases demonstrate that "the plain language of the Rules now controls outcomes without regard to policy, history, practical operation of the law of evidence, or new conditions," and predicts that "the plain-meaning standard has the potential to create a new evidence law." Randolph N. Jonakait, *The Supreme Court, Plain Meaning, and the Changed Rules of Evidence*, 68 Tex. L. Rev. 745, 745 (1990). However, these cases may not support this commentator's conclusions. Although it is true that in each of these cases the Court applied a plain-meaning interpretation to the rules in question, the Court considered the legislative history of each rule and the Advisory Committee's Notes in order to determine whether the plain-meaning was in keeping with congressional intent. *See Huddleston*, 485 U.S. at 687 (petitioner's interpretation of Rule 404(b) was inconsistent with the legislative history of this Rule); *Owens*, 484 U.S. at 562 (Congress's choice regarding Rule 801 was "apparent" from the Advisory Committee's Notes and the Rule's legislative history); *Bourjaily*, 483 U.S. at 180 n.2 ("The Advisory Committee Notes show that the Rule was not adopted in a fit of absent-mindedness."). This commentator also failed to consider *Beech Aircraft Corp.*, 488 U.S. at 163, which clearly undertakes a two-step statutory analysis to determine whether congressional intent was consistent with the Court's plain-meaning interpretation of the evidentiary rule in question. Thus, interpretation of the Rules appears to be consistent with general principles of statutory construction: First, the Court looks at the plain-meaning of the language chosen by Congress; and second, the Court considers other indications of legislative intent to ensure that the plain-meaning is reasonable.

intentions of Congress, or ignore Congress's policy choices in favor of their own.[53]

Moreover, because Congress has provided a specific procedure for enacting and amending the Federal Rules of Evidence (and the other rules of procedure) in the Rules Enabling Act,[54] the general principle that courts are not free to disregard Congress's policy choices carries special weight when construing the Federal Rules of Evidence. The procedure that the Rules Enabling Act[55] establishes contemplates a significant degree of judicial involvement in the amendment process, and appears to provide the congressionally approved mechanism for channeling judicial efforts in this area.[56] By creating a specific mechanism to amend the

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53. *See, e.g.*, Fedorenko v. United States, 449 U.S. 490, 514 (1981) ("It is not the function of the courts to amend statutes under the guise of 'statutory interpretation'."); *see also* Potomac Elec. Power Co. v. Director, Office of Workers' Compensation Programs, 449 U.S. 268, 280 (1981). In discussing whether the schedule of benefits provided in a workers' compensation case were exclusive in cases of permanent partial disability, the Court rejected the injured worker's arguments that the schedule was not exclusive with the following language:

> More importantly, a proper understanding of the judicial role in this case reveals that the recent trend actually supports a literal reading of the federal statute. Our task is to ascertain the Congressional intent underlying the scheduled benefit provisions enacted in 1927; we are not free to incorporate into those provisions subsequent state-law developments that we may consider sound as a matter of policy.

Id.

In the context of the Court's ability to construe statutes so that the statute will not run afoul of a constitutional provision, the Court in Lowe v. SEC, 472 U.S. 181 (1985), refused to construe the statute in a manner inconsistent with its literal language, even if such a construction were necessary to make the statute constitutional. Justice White, concurring in the Court's decision, explained:

> These limits on our power to avoid constitutional issues through statutory construction flow from the same principle as does the policy of constitutional avoidance itself: that is, the principle of deference to the legislature's exercise of its assigned role in our constitutional system. The task of defining the objectives of public policy and weighing the relative merits of alternative means of reaching those objectives belongs to the legislature.

Id. at 212-13 (Justices White, Burger, & Rehnquist concurring).

54. 28 U.S.C. § 2072 (1988); *see supra* note 30. Judicial involvement in the promulgation and amendment of the rules of procedure and evidence has been considered desirable because commentators believe that it would be difficult to educate Congress concerning the special needs of the judiciary. Additionally, because the judiciary is more insulated from the pressures of special interest groups, commentators believe that the judiciary is able to avoid producing rules that are the product of compromise between competing lobbyists. Friedenthal, *supra* note 30, at 673-74.

55. The procedure for amending a rule of evidence is set forth in 28 U.S.C. § 2074(a), which provides in pertinent part:

> (a) The Supreme Court shall transmit to the Congress not later than May 1 of the year in which a rule prescribed under section 2072 is to become effective a copy of the proposed rule. Such rule shall take effect no earlier than December 1 of the year in which such rule is so transmitted unless otherwise provided by law.

28 U.S.C. § 2074 (1988).

56. *See Federal Rules of Evidence: House Hearings I*, *supra* note 33, at 12 (testimony of Albert B. Maris, Chairman, Standing Committee on Rules of Practice and Procedure, Judicial Conference of the United States) ("This is the pattern which has been followed in later enabling acts, and its purpose, obviously, is to prevent the Court from putting new rules into effect until after Congress has had an opportunity to consider them and, if it

Rules, Congress intended the judiciary to follow the procedure detailed in the Act to implement changes in the Rules[57] if such changes should appear necessary or desirable.[58] The availability of this specific amendment procedure strongly suggests that reorientation of the Rules through

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thinks proper, to legislate their postponement, amendment or appeal."). As Chief Justice Burger observed in a Message from the Third Branch to the judiciary intended to mollify the judiciary's frustration over how long it was taking Congress to consider the Federal Rules of Evidence:

> [R]ulemaking is a partnership, a joint enterprise, between Congress and the Judicial Branch. It was first carried to successful conclusion in 1938, with the adoption of the Federal Rules of Civil Procedure; then came the Federal Rules of Criminal Procedure. Later on Appellate Rules were adopted. All of these rules are under constant scrutiny of Judicial Conference Advisory Committees.
>
> The rulemaking enterprise has been one of the most successful and fruitful of any joint enterprise between branches of government in history. But, we must always remember that it is a *joint* enterprise, and while Congress has rendered us the compliment of general approval in the past, it does not mean that Congress should accept blindly or on faith whatever we submit.

Rules of Evidence (Supplement): Hearing Before the Subcomm. on Criminal Justice of the House Comm. on the Judiciary, 93d Cong., 1st Sess. 9 (1973) [hereinafter *Rules of Evidence: House Hearings II*] (emphasis in original).

57. As Judges King, Reavley, Johnson, and Weiner observed in their dissent in *Christophersen*: "If the Federal Rules of Evidence are inadequate in [the context of toxic torts], then Congress, who enacted them, is the proper branch to amend or repeal them." Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1137 (5th Cir. 1991) (King, J., dissenting), *cert. denied*, 112 S. Ct. 1280 (1992); *see also Rules of Evidence: House Hearings I*, *supra* note 33, at 525 (testimony of Judge Maris) ("The advantage of a procedure under which changes in particular rules are proposed when it appears important that they should be, in this way to write precise rules, is that they can be studied by the committee, the court, and the Congress, not merely in the context of the facts of a particular case, which is the present procedure, but in the context of the whole experience of the country and of all of the courts."); *id.* at 525-26 (testimony of Mr. Jenner, Chairman, Rules Advisory Committee) ("The whole premise on which these rules were drafted was that the law of evidence should grow and develop under these rules as a format. The history of the rulemaking process under the enabling act has been that the Advisory Committee will, with the input of the bar, the input of the courts, the input of the Congress, revise the civil rules, revise the criminal rules, revise the rules of appellate procedure.").

58. In dissenting from the denial of rehearing in *Brock*, Judge Higgenbotham of the Fifth Circuit explained his belief that the court needed to revisit the role of experts with the following words:

> I doubt that the drafters of the Federal Rules of Evidence foresaw the impact of their changes in the rules for expert witnesses. The changes were seen as enhancing efficiency and adopting in the courtroom standards of reliance sufficient for the [relevant scientific] community in its daily affairs. The actual changes have cut more deeply and indeed, in many ways, have materially changed the dynamics of trial.

Brock v. Merrell Dow Pharmaceuticals, Inc., 884 F.2d 167, 168 n.1 (5th Cir. 1989) (Higgenbotham, J., dissenting from denial of rehearing en banc). Judge Higgenbotham's statement seems a frank expression of the need for, and the Court's authority to draft, revisions in the Federal Rules of Evidence if circumstances change, or the Rules in application generate unforeseen results. Yet, even if such "updating" is ordinarily an appropriate part of legitimate statutory interpretation, Congress's decision to provide a specific procedure for revising the Rules appears to foreclose the availability of such an ad hoc judicial approach. In other words, if Congress had intended the courts to be free to implement changes in the Rules through use of judicial precedent, the amendment procedure set forth in the Rules Enabling Act would be redundant.

statutory construction is particularly inappropriate.[59]

The section that follows considers the Rules applicable to expert testimony and the specific reasons that they were adopted. This historical backdrop provides telling evidence that the restrictive courts, including the *Daubert* Court, have erred in their interpretation of the Rules pertaining to expert testimony.

D. THE BASIC STRUCTURE OF THE RULES: RULES 401 AND 402

Together, Rules 401 and 402 provide the basic structure for the Federal Rules of Evidence: all relevant evidence is admissible, unless "otherwise provided by the Constitution of the United States, by Act of Congress, by these rules, or by other rules prescribed by the Supreme Court pursuant to statutory authority."[60] Under Rule 401, evidence is relevant if it has "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."[61] As the Advisory Committee explained: "The provisions that all relevant evidence is admissible, with certain exceptions, and that evidence which is not relevant is not admissible . . . constitute the foundation upon which the structure of admission and exclusion rests."[62]

E. EXPERT TESTIMONY: RULES 702 AND 703

To look more specifically at Congress's intent with respect to the admissibility of expert testimony requires consideration of the language and legislative history of Rules 702 and 703. During the enactment process, neither of these Rules was debated on the floor of either house of Congress, nor revised in any manner by Congress prior to enactment.[63] Con-

59. The Court has previously been sensitive to its limited role in injecting policy considerations into the Rules of Procedure. For example, in rejecting a proposed interpretation of the joinder rules, the Court wrote: "Even if we were wholly persuaded by these arguments as a matter of policy, acceptance of them would require a rewriting rather than an interpretation of the relevant Rules." Martin v. Wilks, 490 U.S. 755, 767 (1989).

60. FED. R. EVID. 402.

61. FED. R. EVID. 401.

62. FED. R. EVID. 402 advisory committee's notes.

63. While Congress did not debate these rules openly, all of the rules were the "product of plenary legislative deliberation, including the careful consideration by this subcommittee in full and open proceedings." *Rules of Evidence: House Hearings II*, *supra* note 56, at 280 (letter from Charles R. Halpern, Center for Law and Social Policy, to William L. Hungate, Chairman, Subcommittee on Criminal Justice); *see also* H.R. REP. NO. 650, *supra* note 49, at 7076 ("H.R. 5463 [the bill containing the Rules of Evidence] constitutes the Committee's . . . view as to what should be the content of a uniform code of evidence."). It should not be interpreted that Congress's failure to revise the expert testimony rules was merely a rubber stamp of these rules. The legislative history reveals that if a rule, as drafted, did not comport with Congress's intent, Congress was not reticent about revising it. *See, e.g.*, S. REP. NO. 1277, *supra* note 32, at 7052-53 ("Clearly, the most far-reaching House change in the rules as promulgated, was the *elimination* of the Court's proposed rules on privilege.") (emphasis in original); H.R. REP. NO. 650, *supra* note 49, at 7078 ("In some instances, the Committee has deleted entire rules or parts of rules proposed by the Supreme Court; in other instances, rules have been retained but significantly amended.").

gress did receive several comments and suggestions for revisions to these Rules from law professors and attorneys, the tone of which, in general, expressed enthusiasm for the proposed admissibility standards.[64] As will be discussed below, the enthusiasm was related to the fact that Rules 702 and 703 were designed to remedy specific problems that had developed in the common law, and to establish more liberal standards for the introduction of expert testimony. Most importantly, although it was recognized that enactment of the proposed liberalized standards was not without risk, the prevailing attitude at the time was that the adversarial process, in particular, effective cross-examination, would provide an adequate check on the liberal admissibility standards.[65]

1. *Rule 702: Scope of the Issues on Which Expert Testimony Will Be Permitted*

In at least some jurisdictions[66] prior to enactment of Rule 702, the common law would permit introduction of expert testimony only if the testimony addressed an issue that was "not within the common knowledge of the average layman."[67] Under this standard, sometimes referred

64. *See infra* notes 81-82, 102-05 and accompanying text.

65. *See infra* notes 100-07 and accompanying text.

66. As discussed, before the enactment of the Federal Rules of Evidence, a federal court would either look to the forum state's law to determine the rules governing the admissibility of evidence, or craft its own federal common law of evidence. *Compare* Wise v. George C. Rothwell, Inc., 496 F.2d 384, 391 n.11 (3d Cir. 1974) (state law governs the admissibility of an expert's testimony) *and* Southern Pac. Co. v. Libbey, 199 F.2d 341, 348-49 (9th Cir. 1952) (same) *with* Haddigan v. Harkins, 441 F.2d 844, 851-52 (3d Cir. 1971) (admitting expert testimony under federal common law of evidence where there was no state law on point) *and* Jones v. Goodlove, 334 F.2d 90, 94 & n.5-6 (8th Cir. 1964) (admitting expert testimony under federal common law of evidence even though testimony was not admissible under applicable state law). As a result, federal courts applied differing standards to determine the admissibility of expert testimony depending on the applicable state law, or their interpretation of federal law. *See* Goldman v. Piedmont Fire Ins. Co., 198 F.2d 712, 716-17 & n.6 (3d Cir. 1952) (noting "conflict of authority as to whether an insurance expert may testify to his opinion as to the materiality of a particular representation or a particular increase of risk"). As examples of these varying state standards, consider the results in the following cases: *Compare* Missouri P. R.R. v. Fox, 83 N.W. 744 (Neb. 1900) (admitting expert testimony to show improper construction of part of the coupling device on a railroad car) *with* Texas & N.O.R.R. v. McCoy, 117 S.W. 446 (Tex. 1909) (such expert testimony not admissible); *compare* Dardanelle Pontoon Bridge & Turnpike Co. v. Croom, 129 S.W. 280 (Ark. 1910) (admitting expert testimony to show the safety of a bridge guardrail) *with* McDonald v. City of Duluth, 100 N.W. 1102 (Minn. 1904) (such expert testimony not admissible); *compare* Indiana Bituminous Coal Co. v. Buffey, 62 N.E. 279 (Ind. 1901) (expert testimony admissible to show that a certain pulley was not suitable to do certain specified work) *with* Harley v. Buffalo Car Mfg. Co., 36 N.E. 813 (N.Y. 1894) (such expert testimony not admissible); *compare* Powers' Adm'r. v. Wiley, 44 S.W.2d 591 (Ky. 1931) (allowing expert testimony to establish the likely cause of auto accident) *with* Koenig v. Union Depot Ry., 73 S.W. 637 (Mo. 1903) (such expert testimony not admissible).

67. Bridger v. Union Ry., 355 F.2d 382, 387 (6th Cir. 1966); *see also* Steinberg v. Indemnity Ins. Co. of N. Am., 364 F.2d 266, 274 (5th Cir. 1966) ("If the question is one which the layman is competent to determine for himself, the opinion testimony is excluded; if he reasonably cannot form his own conclusion without the assistance of the expert, the testimony is admissible."); Duff v. Page, 249 F.2d 137, 140 (9th Cir. 1957); *Rules of Evidence: House Hearings II*, *supra* note 56, at 55 (letter from Frank Martel, President, Defense

to as the "need" standard, trial judges had considerable discretion[68] to exclude expert testimony even though the testimony might well have assisted the jury to understand the issues and reach a verdict.

For example, in *Schille v. Atchison, Topeka & Santa Fe R.R.*,[69] the plaintiff proffered expert testimony on whether "a two-foot-wide steel batter post with a flange on each side and only rivet heads for footholds, inclined upward at an angle of 53 degrees, was reasonably safe for workmen to climb."[70] Applying the "need" standard, the trial court ruled that this issue was within the jury's common knowledge, and excluded the proffered testimony. The Eighth Circuit affirmed.[71] Similarly, in *Duff v. Page*,[72] a party proffered expert testimony from "a witness who had long experience as an operator of a towing truck in the area where the accident occurred" on whether "it would have been practicable to remove the automobile and trailer from the snow bank without placing the wrecker on the highway."[73] The trial court excluded the evidence as being within the common knowledge of the jury, and the Ninth Circuit affirmed.[74]

As these two decisions reflect, the common law of certain forum states limited the admissibility of expert testimony to situations in which the testimony was essential to resolve or understand a disputed issue.[75]

Lawyers Association to William H. Hungate, Chairman, House Subcomm. on Criminal Justice) (commenting that the settled law in Virginia was that expert evidence was inadmissible on matters of common knowledge or those as to which the jury was as competent to form an intelligent and accurate opinion as the witness); *Rules of Evidence: Hearings on P.L. 93-595 Before the Senate Comm. on the Judiciary*, 93d Cong., 2d Sess. 247 (1974) [hereinafter *Rules of Evidence: Senate Hearings*] (reprint of article by Paul F. Rothstein, *Some Themes in the Proposed Federal Rules of Evidence*, 33 FED. B.J. 21 (1974)). The rule was so common at one time that it was described as "all but unanimous." J.E. Macy, Annotation, *Admissibility of Opinion Evidence as to the Cause of an Accident or Occurrence*, 38 A.L.R.2d 13, 21 (1954).

68. Generally, the pre-Rules admissibility decisions concerning expert testimony were principally characterized by the extreme deference given the district court. *See, e.g.*, Engle v. Stull, 377 F.2d 930, 935 (D.C. Cir. 1967). The district court admitted expert testimony concerning the cause of a motorboat accident. In affirming the decision, the court of appeals wrote: "We cannot say that the district judge erred in admitting this testimony as the expert's opinion. By the same token, had the district judge excluded the testimony, we should undoubtedly not have reversed." *Id.*; *see also* Bridger v. Union Ry., 355 F.2d 382, 388 (6th Cir. 1966); Schille v. Atchison, T. & S.F.R.R., 222 F.2d 810, 814 (8th Cir. 1962). In affirming the trial court's decision to exclude expert testimony, the Eighth Circuit wrote: "We would have reached a different conclusion [as to whether the issue was within the common knowledge of the jury], but the area of discretion on the part of the trial judge is such that the cause would not be reversed for that reason." *Id.*

69. 222 F.2d 810, 814 (8th Cir. 1962).

70. *Id.* at 814.

71. *Id.*

72. 249 F.2d 137 (9th Cir. 1957).

73. *Id.* at 140.

74. *Id.*; *see also* Spokane & I. R.R. v. United States, 241 U.S. 344, 347 (1916) (expert testimony on whether railroad cars had adequate handholds or grab-irons upon the ends of each car was properly excluded as the issue was within the common knowledge of the jury).

75. *See* JONES, BLUE BOOK OF EVIDENCE §§ 372, 374, at 908, 910 (1913).

> Expert testimony being an exception to the general rule of law excluding opinions from evidence, and trenching, as it does, upon the province of the jury, is not to be extended beyond the necessities of the case. . . .

Under this test, expert testimony was not admissible unless the trier of fact would be unable to comprehend or resolve a material issue without the testimony.[76]

The Rules Advisory Committee drafted, and Congress enacted, Rule 702,[77] in part, to overrule the "need" standard of the common law, and to expand the scope of issues on which expert testimony would be admissible. Two aspects of Rule 702 define the proper scope of expert testimony and demonstrate that Congress intended to reject the "need" standard. First, as a general standard of admissibility, Rule 702 provides that expert testimony is admissible so long as the specialized knowledge of the expert will "assist the trier of fact."[78] By using the "assist the trier of fact" lan-

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> It is the general disposition of the courts to restrict the admission of expert testimony within the strict bounds of the necessity on which it is founded.

Id.; *see also* M. C. Dransfield, Annotation, *Safety of Condition, Place, or Appliance as Proper Subject of Expert or Opinion Evidence in Tort Actions*, 146 A.L.R. 5, 8 (1943) (stating "the opinion of witnesses possessing peculiar skill or knowledge may be received whenever the facts are such that inexperienced persons are likely to prove incapable of forming a correct judgment without such assistance, but when the necessity of the case ceases the operation of the exception also ceases").

76. *See* People v. Zimmerman, 189 N.W.2d 259 (Mich. 1971) (question was whether a trial court properly excluded an expert's testimony concerning the speed of a vehicle based upon skid marks and other evidence of stopping distance; in affirming the trial court's decision, the court rejected an "assistance" standard that focused on whether the opinion would assist the trier of fact, in favor of a "need" standard that focused on whether the opinion "[was] both necessary and unavoidable"); *see also* Padgett v. Buxton-Smith Mercantile Co., 262 F.2d 39, 41-42 (10th Cir. 1958) (finding abuse of discretion to admit police officer's testimony concerning the location of a collision based upon skid marks because such conclusion was equally well within the competence of the lay juror); Grayson v. Williams, 256 F.2d 61, 63 (10th Cir. 1958) (expert testimony of police officer as to cause and location of a traffic accident based upon physical evidence at the scene properly excluded because the physical facts "were such as are within the experience of ordinary intelligent persons"); Kenney v. Washington Properties, Inc., 128 F.2d 612, 613-14 (D.C. Cir. 1942) (In a wrongful death action where the decedent fell out of a hotel window to his death, the trial court properly excluded expert testimony as to whether the window was properly designed because the issue "was a matter of observation and common judgment, in which the man of ordinary experience in looking at the window or hearing it described, was as capable of forming an opinion as an architect or builder."); Ennis v. R.B. Little & Co., 55 A. 884 (R.I. 1903) (Where an eyebolt had broken, plaintiff sought to introduce expert testimony that a change in position of the eyebolt had increased the weight acting upon the eyebolt and caused the eyebolt to break. The trial judge ruled that the testimony was inadmissible because the jury was fully capable of recognizing that the change in the bolt's position would increase the leverage, and consequently the stress, acting upon the bolt.).

77. Rule 702 provides as follows:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

FED. R. EVID. 702.

78. The Advisory Committee Notes concerning Rule 702 explain that "[w]hether the situation is a proper one for the use of expert testimony is to be determined on the basis of assisting the trier. . . . When opinions are excluded, it is because they are unhelpful and therefore superfluous and a waste of time." FED. R. EVID. 702 advisory committee's notes. This "helpfulness" standard for admissibility had been applied by some courts, and had been advocated by Professor John Wigmore, since the turn of the twentieth century. *See* 7 WIGMORE, *supra* note 41, § 1923. To illustrate the sharp difference between the helpfulness standard and the need standard, consider a discussion from 1954 that implicitly compares the two standards:

guage in Rule 702, Congress rejected the common law rule that expert testimony was admissible only if the trier of fact would be unable to understand or resolve a disputed issue without the testimony. With the adoption of Rule 702, expert testimony became admissible if the issue was one on which an expert's testimony would help the trier of fact to understand more appreciably the evidence or resolve more accurately a disputed issue. Thus, expert testimony is admissible under Rule 702 even on matters within the common understanding of the ordinary juror or layman if the expert's testimony would help the trier of fact to understand the issue more appreciably.[79]

Second, the common law's focus on whether the issue was beyond the understanding of the average or common juror often proved to be a nearly impossible standard for a skilled witness's testimony to satisfy. When such testimony was proffered, trial judges would often decide, as they did in *Schille* and *Duff*, that the issue was one within the common experience of the average juror, and exclude the skilled witness's testimony, despite the substantial assistance that the testimony might provide. To ensure that this sort of limitation did not reappear in the law after the adoption of Rule 702, Congress broadly defined the sorts of individuals who would be qualified to offer expert testimony to include anyone with "scientific, technical, or other specialized knowledge."[80]

Evidently, there was little disagreement with the generous scope for permissible expert testimony in the proposed Rule, because there were virtually no comments addressed to Congress during the enactment pro-

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> A rule sometimes proposed, reversing nearly all restrictions . . . on the use of opinion evidence, would admit any opinion which the trial judge should deem of assistance to the jury. This has long been the rule in New Hampshire, but it seems to be without other definite support than that of Professor Wigmore.

Macy, *supra* note 67, at 21.

79. *See, e.g.*, Morvant v. Construction Aggregates Corp., 570 F.2d 626, 630-34 (6th Cir.) (holding pursuant to Rule 702, that it was error for the trial court to exclude the expert testimony of an economist on the impact of inflation on the earning potential of decedent even though inflation was within the common experience of most jurors), *cert. dismissed*, 439 U.S. 801 (1978); *see also* DAVID W. LOUISELL & CHRISTOPHER B. MUELLER, FEDERAL EVIDENCE § 382, at 640 (1979). The "appreciable help" or "assist the trier of fact" standard was adopted by some courts, and recommended by commentators, as an alternative to the "need" standard before the final adoption of Rule 702. *See, e.g.*, United States v. Jackson, 425 F.2d 574, 576-77 (D.C. Cir. 1970) (admitting expert testimony on pick-pocket modus operandi because "the jury could 'receive appreciable help'" from such testimony); 7 WIGMORE, *supra* note 41, § 1924; Mason Ladd, *Expert Testimony*, 5 VAND. L. REV. 414, 418 n.18 (1952).

80. FED. R. EVID. 702; *see also* FED. R. EVID. 702 advisory committee's notes (noting that "The rule is broadly phrased. The field of knowledge which may be drawn upon are not limited merely to the 'scientific' and 'technical' but extend to all 'specialized' knowledge."); *Rules of Evidence: House Hearings I*, *supra* note 33, at 96 (statement of Albert E. Jenner, Jr., Chairman, Rules Advisory Committee) (stating "The category of expert includes not only the true specialist but also others who can contribute in the area, sometimes called 'skilled witnesses.' (Rule 702)").

cess,[81] nor any untoward reactions by the commentators at the time.[82]

2. *Rule 703: Permissible Bases for an Expert's Testimony*

Prior to enactment of the Federal Rules of Evidence, the common law limited the permissible bases for an expert's opinion to the expert's firsthand knowledge, or evidence already in the record at the time the expert stated his or her opinion.[83] If the expert had firsthand knowledge, the expert generally had to "narrate in detail the perceived facts upon which his opinion testimony is based."[84] Alternatively, the necessary facts for the opinion could be presented to the expert in the form of a hypothetical question.[85] Either approach presented difficulties.

The first led to a detailed, and often repetitive, narration of facts, quibbling between the attorneys over whether the facts stated provided a sufficient basis for the opinion or whether more detail was required, and pointless reversals if an appellate court should later decide that the expert's factual statement omitted some essential factual predicate.[86] The hypothetical question, on the other hand, encouraged partisan bias, afforded an opportunity for summing up in the middle of the case, and was often confusing and time consuming.[87] In addition, by restricting the expert to firsthand knowledge or evidence in the record, the common law excluded much of the information on which experts relied in their day-to-

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81. One Senator, speaking generally, noted that "[i]n the main, [Article VII's rules concerning opinion evidence] . . . promise[d] to increase the knowledge that will be available to the triers of fact. Consequently, it may be expected to enhance the system of justice." *Rules of Evidence: House Hearings II*, *supra* note 56, at 55 (statement of Senator John L. McClellan).

82. The discussions in the law journals concerning Rule 702 indicate that Congress intended to liberalize the admissibility of expert testimony, and that a liberal interpretation was to be applied to this new Rule. *See, e.g.*, Carroll E. Metzner, *Article VII Opinions and Expert Testimony*, 23 FED'N INS. COUNS., Spring 1983, at 83, 87-88. The main concern that the commentators expressed about Rule 702 involved the fact that the new rule allowed experts to testify in the form of a "dissertation or exposition," rather than being limited to opinion testimony. *Id.* at 87.

83. EDWARD CLEARY, MCCORMICK ON EVIDENCE § 14, at 31 (2d ed. 1976); *see also* Sears, Roebuck & Co. v. Penn Cent. Co., 420 F.2d 560, 562-63 & n.4 (1st Cir. 1970).

84. Ladd, *supra* note 79, at 422.

85. *Id.* at 425.

86. *See* United States v. Stephens, 73 F.2d 695, 704 (9th Cir. 1934) (finding hypothetical question that asked a physician's opinion whether a war veteran was permanently disabled was reversible error because it required an assumption concerning available, alternative occupations that was not disclosed in the hypothetical); Ladd, *supra* note 79, at 426; *see also* Paul D. Rheingold, *The Basis of Medical Testimony*, 15 VAND. L. REV. 473, 475-77 (1962).

87. FED. R. EVID. 705 advisory committee's notes; *see also* Ladd, *supra* note 79, at 425-27; Edmund M. Morgan, *Suggested Remedy for Obstructions to Expert Testimony by Rules of Evidence*, 10 U. CHI. L. REV. 285, 294, 296 (1943); Hubert W. Smith, *Scientific Proof and Relations of Law and Medicine*, 10 U. CHI. L. REV. 243, 246 n.6 (1943).

> In the Tuckerman will contest, tried before Judge McKim in Suffolk Probate Court (Mass.), attorney Robert M. Morse put to Dr. Jelley, a psychiatrist, what is reputed to be the longest hypothetical on record. It concerned the mental condition of the testator, contained twenty thousand words and required three hours to propound. The witness answered: "I don't know."

Id.

day practice.[88]

Rule 703[89] substantially liberalized the common law rule by providing an additional source of information upon which an expert's opinion could be founded: the type of facts or data that experts in the particular field would reasonably rely upon in forming opinions, even if those facts were not independently admissible into evidence.[90] This Rule was intended to do away with the cumbersome hypothetical question that both practitioners and judges had found so disagreeable,[91] and to recognize that the informational sources that were adequate for the day-to-day work of an expert were also adequate for the courtroom.[92]

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88. *See, e.g.*, Harris v. Smith, 372 F.2d 806, 811-12 (8th Cir. 1967) (involving hypothetical question asked and answered on whether treatment that physician provided was appropriate given that the patient "seemed to be mentally alert" and that his "pulse and temperature [and other physical symptoms] . . . were ordinary for the type of injury that the young man had"; on appeal, the court ruled the hypothetical improper because it "called for expert opinion based upon previously expressed expert opinion rather than upon the plain facts"; in other words, the question was improper because it described the patient's symptoms as "ordinary" rather than as, for example, a temperature of 98.6 degrees Fahrenheit); *see* FED. R. EVID. Rule 703 advisory committee's notes; *see also* Morgan, *supra* note 87, at 292 (noting that the common law rule prohibiting an expert from testifying on the basis of hearsay "is particularly annoying to the medical expert, since it often compels him to disregard data which no physician or surgeon would dream of neglecting"); Rheingold, *supra* note 86, at 527. Rheingold notes that:

> Even a hurried survey of the various bases [for medical testimony] indicates that hearsay in one form or another pervades all of medical testimony, just as it pervades the whole medical routine and practice. And, by the very exclusion of material deemed hearsay, often as the result of rather legalistic, technical reasoning, much that is of value to the doctor in his practice and to the court in the determination of the medical facts of the case is lost.

Id.

89. Rule 703, as enacted and as proposed, provides as follows:

> 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 him 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.

FED. R. EVID. 703.

90. 3 JACK B. WEINSTEIN & MARGARET A. BERGER, WEINSTEIN'S EVIDENCE ¶ 703[03], at 703-15. As with the "helpfulness" standard, some courts had adopted this Rule under the "federal equity" provision of FED. R. CIV. P. 43(a). *See, e.g.*, United States v. Williams, 447 F.2d 1285, 1290-91 (5th Cir. 1971) (noting that "[t]he rationale for this exception to the rule against hearsay [permitting an expert to testify based upon inadmissible records and data] is that the expert, because of his professional knowledge and ability, is competent to judge for himself the reliability of the records and statements on which he bases his expert opinion").

91. *See supra* note 87; *see also* Twin City Plaza, Inc. v. Central Sur. & Ins. Corp., 409 F.2d 1195, 1201 (8th Cir. 1969) ("The [proposed Federal Rules of Evidence] are obviously designed to remove stereotyped, long, belabored, and nonsensical hypothetical questions from the arena of trial.").

92. FED. R. EVID. 703 advisory committee's notes:

> The third source [of facts or data upon which expert opinions are based] contemplated by the rule consists of presentation of data to the expert outside of court and other than by his own perception. In this respect, the rule is designed to broaden the basis for expert opinions beyond that current in many jurisdictions and to bring the judicial practice into line with the practice of the experts themselves when not in court.

In exchange for allowing an expert to rely on inadmissible evidence, the Advisory Committee imposed two checks on the underlying basis of an expert's opinion. First, under Rule 703, if an expert relied on inadmissible evidence in forming his or her opinion, the court was entitled to consider the underlying basis to determine if it was of a "type" reasonably relied upon by experts in the field.[93] Second, under Rule 705, if an expert relied on otherwise inadmissible evidence in forming his or her opinion, the opposing party could require the expert to disclose on cross-examination the underlying facts or data upon which the expert based his or her opinion.[94]

To explain the proper interpretation of the "of a type reasonably relied upon" language of Rule 703, the Advisory Committee gave three examples: (i) a physician who relies on statements by patients and relatives; reports and opinions from nurses, technicians and other doctors; hospital records; and X-rays; (ii) a public opinion poll that relies on the answers to the poll's questions given by selected members of the public; and (iii) a police officer ("accidentologist") who relies on the statements of bystanders to determine the point of impact in an automobile collision. In evaluating these examples, the Advisory Committee stated that the basis in the first example would satisfy the Rule because it was the sort of information upon which a "physician makes life-and-death decisions."[95] The ba-

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Id.; *see also Rules of Evidence: House Hearings I*, *supra* note 33, at 96 (prepared statement of Edward W. Cleary, Reporter, Rules Advisory Committee); Rheingold, *supra* note 86, at 532 ("As has been repeatedly pointed out, the expert is competent to ascertain the reliability of statements and reports of others and to use only what is relevant and trustworthy. The concept, simply put, is that *the doctor validates what he uses.*") (emphasis in original).

93. *See, e.g.*, Ferebee v. Chevron Chem. Co., 736 F.2d 1529, 1535 (D.C. Cir.) (observing that the experts on both sides relied on essentially the same diagnostic methodology, but arrived at different conclusions from the test results, making the case "a classic battle of the experts, a battle in which the jury must decide the victor"), *cert. denied*, 469 U.S. 1062 (1984).

94. Rule 705 provides in pertinent part: "The expert may in any event be required to disclose the underlying facts or data on cross-examination." FED. R. EVID. 705. For a discussion of the relation between Rules 703 and 705, see *Rules of Evidence: House Hearings I*, *supra* note 33, at 88-89 (statement of Albert E. Jenner, Jr., Chairman, Rules Advisory Committee). After Jenner states that Rule 703 permits an expert to rely upon inadmissible data, he explains that "the expert may be required, in any event, to disclose the underlying facts or data on cross-examination" under Rule 705. *Rules of Evidence: Senate Hearings*, *supra* note 67, at 155 (prepared statement of Richard H. Keatinge & John T. Blanchard). "Rule 703 must also be related to Rule 705. *Rule 705* deals with the question of 'disclosure of facts or data underlying expert opinion.'" (emphasis in original); *id.* at 247 (reprint of Paul F. Rothstein article). As Paul Rothstein explained:

> Rules 703 and 705 do away with the stilted requirement of a hypothetical question, allowing expert testimony based on a hypothetical set of facts presented to the expert before trial, as well as on an at-trial hypothetical question, or on testimony heard, or on personal observations. These rules dispense with the requirement that the bases of expert opinions be given on direct; and they allow expert opinions rationally based on otherwise inadmissible evidence, contrary to the ostensible rule in some jurisdictions.

Id.

95. The Advisory Committee also recognized that much of this evidence would be independently admissible "with the expenditure of substantial time in producing and examining various authenticating witnesses." FED. R. EVID. 703 advisory committee's notes.

sis in the second example would also satisfy the Rule, but only if the opinion survey was properly designed so as to avoid the risks that the admission of such hearsay would otherwise present. The basis in the third example would not, however, satisfy the Rule because a reasonable investigator would determine the point of impact from the physical evidence at the scene, rather than upon the statements of the parties to the accident and witnesses at the scene.[96]

Significantly, in evaluating each of these examples, the Advisory Committee focused solely on the *type* of data upon which the expert relied, and did not examine the reliability of specific data or facts contained in the medical reports, the public opinion surveys, or the statements of the bystanders. As these examples demonstrate, Rule 703 did not instruct courts to evaluate the reliability or validity of the underlying data, only to determine whether the data was of a *type* that other experts in the field[97] would reasonably rely upon in forming opinions.[98]

The Advisory Committee imposed an additional check to safeguard against evidence that satisfies Rule 703's "of a type reasonably relied upon" requirement, yet may nevertheless be unreliable. In Rule 705, the Advisory Committee authorized opposing counsel to force disclosure on cross-examination of the otherwise inadmissible evidence that formed the basis for the expert's opinion, ensuring that opposing counsel would have an adequate opportunity to establish, in the presence of the jury, any flaws in the underlying data.[99] Thus, the combination of the "of a type

96. While the Advisory Committee's Notes are admittedly cryptic on the precise reason why the basis in the third example is insufficient under the Rule, the Notes do cite to the work of the California Law Review Commission on a similar rule. *See* FED. R. EVID. 703 advisory committee's notes (citing to the California Law Review Comm'n, Recommendation Proposing an Evidence Code 148-50 (1965)). In its discussion of the point of impact example, the California Law Review Commission explained: "an expert on automobile accidents may not rely on extrajudicial statements of others as a partial basis for an opinion as to the point of impact, whether or not the statements would be admissible evidence." California Law Review Comm'n, *supra*, at 148 (citing as authority Hodges v. Severns, 20 Cal. Rptr. 129 (1962); Ribble v. Cook, 245 P.2d 593 (1952)). In both of these cases, the courts ruled that a police officer's testimony as to the point of impact would be admissible to the extent it was based upon the officer's personal observations at the scene, but was not admissible to the extent it was based upon the statements of others. *See Hodges*, 20 Cal. Rptr. at 135; *Ribble*, 245 P.2d at 594-95. The California Law Review Commission goes on to explain that "a police officer can analyze skid marks, debris, and the condition of vehicles that have been involved in an accident without relying on the statements of bystanders." California Law Review Comm'n, *supra*, at 149.

97. Thus, Rule 703 does not contemplate an evaluation of the reliability of the facts or data upon which the expert relied. *See, e.g.*, Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1119 (5th Cir. 1991) (Clark, C.J., concurring) (Rule 703 instructs the court to evaluate only the "type" of data relied upon by an expert in forming his opinion, not the reliability of the particular facts and data used), *cert. denied*, 112 S. Ct. 1280 (1992).

98. By its express terms, Rule 703's inquiry into whether the expert relied upon a reasonable type of data applies only if the expert relied upon inadmissible evidence in forming his or her opinion. *Cf. id.* at 1118 (Clark, C.J., concurring) (if the facts or data that form the basis of an expert's opinion are admissible, then the inquiry ends, and Rule 703 does not authorize exclusion of the expert's opinion).

99. *See* United States v. A & S Council Oil Co., 947 F.2d 1128, 1134 (4th Cir. 1991); *see also Rules of Evidence: House Hearings I, supra* note 33, at 437-38 (statement of Alan B. Morrison, Director of Litigation, Public Citizen, Inc.) ("The basis of [an expert's] opinion

reasonably relied upon" language of Rule 703, and the cross-examination provision of Rule 705, ensures that expert testimony whether based on admissible, or inadmissible, evidence will receive nearly identical treatment. Rule 703 ensures that an opinion is based on either admissible evidence, or a reliable type of inadmissible, usually hearsay, evidence. Rule 705 ensures that opposing counsel will have an adequate opportunity to cross-examine an expert concerning the facts or data forming the basis of the expert's opinion, regardless of whether the facts or data are independently admissible.

While Rule 703's proposed expansion of the permitted bases for an expert's testimony raised the possibility that an expert might rely on unreliable data, the Advisory Committee intended that cross-examination would be the check on the potential prejudice that may arise in such cases.[100] It appears that, in general, this was the assumption of those who introduced comments at the congressional hearings as well.[101]

Although Congress received few comments concerning Rule 703, one commentator stated that the changes to the common law rules concerning expert testimony were a "welcome change" that would "breath fresh air into courtroom proceedings."[102] In expanding the permissible bases for an expert's testimony, Congress was not unaware of the possibility that Rule 703 could create the opportunity for an expert to rely on unreliable

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may be stated on direct and will almost certainly be inquired into on cross, thus permitting a full inquiry into its basis, but in a more sensible manner.").

100. *See, e.g., The Proposed Rules of Evidence for the United States District Courts and Magistrates*, 37 INS. COUNS. J. 565, 577 (1970) (statement of Dean Charles Joiner, member of the Advisory Committee) (discussing Rule 703, Dean Joiner noted that "[p]rior disclosure of the underlying data is not required [under Rule 703], but the testing device here is cross-examination and cross-examination as to the underlying data is encouraged if some problem is raised").

101. *See id.* With respect to Rule 703, Dean Joiner observed:

> I have great faith in the American jury and I believe that the American jury can take evidence and sort it out in their own mind with the help of competent counsel and that it provides harm to lawsuits and bad results in judicial administration to have too many reversals for admitting evidence and so my job on this committee has been as a gadfly to keep the committee reminded of the fact that the American juror is a fairly responsible guy when guided by responsible lawyers and with this in mind I think these rules are going to be a great improvement in the process of trying lawsuits.

Id. at 577.

102. *Rules of Evidence: House Hearings I, supra* note 33, at 437-38 (statement of Alan B. Morrison, Director of Litigation, Public Citizen, Inc.). In discussing the expert testimony rules, Mr. Morrison further noted that:

> An expert will now be free to testify even as to the ultimate fact at issue, and the basis of his opinion need not be admissible evidence. Most important is that under Rule 703 an expert is no longer required to state the factual premise of his opinion on direct examination, thus eliminating the excruciatingly long hypothetical question, which served primarily as a pitfall for the attorney posing it and a source of boredom for the trier of fact listening to it. The basis of the opinion may be stated on direct and will almost certainly be inquired into on cross, thus permitting a full inquiry into its basis, but in a more sensible manner.

Id. at 438.

evidence as the basis for his or her opinion.[103] A report prepared by the Subcommittee on the Use of Hearsay Evidence by Experts of the Committee on Complex and Multi-District Litigation warned that:

> [Rule 703] leaves open the door for *reliance by the expert on incompetent evidence*, in forming and expressing an opinion which is itself inadmissible . . .
>
> *It is our view that, unless properly qualified and limited, the rule permitting the expert to rely on incompetent data carries with it the potential for grave abuse . . .*[104]

This report further warned Congress that the "venality of experts is unfortunately a fact more common than one would like to have to acknowledge."[105]

Congress did not respond to these comments, or revise Rule 703 to address these concerns, however. It appears that in adopting a liberalized standard for the admissibility of expert testimony, Congress, like the Advisory Committee, was relying on the adversarial process, in particular cross-examination, to ameliorate most of the prejudice that might result from the admission of expert testimony based on unreliable data.

F. Summary of the Purpose and Plain-Meaning of the Rules

In enacting the evidentiary rules concerning expert testimony, Congress intended to liberalize the admissibility of such evidence by overruling certain common law limitations on the use of expert testimony, and to establish a uniform code of evidence to simplify practice in the federal courts. As Mr. Jenner explained to Congress:

> The Advisory Committee is especially proud of the rules dealing with expert testimony. This area has become encrusted with a heavy and suffocating layer of technicalities wholly inconsistent with the simple facts of life and the intelligence of American jurors . . . .
>
> *As practical and experienced trial lawyers, we knew and, in fact, have long known that intelligent jurors realize that an expert is only stating his opinion, that his testimony is to be treated as an opinion and is not binding upon the jurors and is to be judged in the light of all*

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103. In addition to Learned Hand's warning concerning the misuse and abuse of expert testimony, a number of other writers addressed the issue decades before the enactment of the Rules. *See, e.g.*, Morgan, *supra* note 87, at 292-94:

> In litigation involving personal injuries, death by accident, and alleged mental irresponsibility and the like, the medical expert has become a stench in the nostrils of upright judges. He disgraces his own profession and the legal profession which uses and tolerates him. Combinations between crooked doctors and shyster lawyers impose upon honest jurors and defraud public service companies and insurance corporations. . . .
>
> So long as corrupt men are permitted to practice law and venal men are able to qualify as expert witnesses, this evil cannot be entirely eradicated.

Id.

104. *Rules of Evidence: House Hearings II*, *supra* note 56, at 230 (Report to the Committee on Complex and Multi-District Litigation of the Subcommittee on Use of Hearsay Evidence by Experts) (emphasis added).

105. *Id.* at 232.

the evidence in the case, to be accepted or rejected by a juror as he sees fit.[106]

In liberalizing the admissibility of expert testimony, the drafters contemplated a jury-oriented system in which effective cross-examination would remedy most of the prejudice that may result from the admission of unreliable expert testimony.[107] Rule 702 allowed expert testimony if the court, in its discretion, found that the testimony would assist the trier of fact in evaluating a relevant issue, overruling the common law's "need" standard which would admit expert testimony only in situations beyond the ordinary understanding of jurors. Rule 703 allowed experts to base their opinions on inadmissible hearsay evidence, so long as the evidence was of the type reasonably relied upon by experts in the field, overruling the common law limitation that expert testimony could be based only on firsthand knowledge, or evidence already in the record.

II. THE RESTRICTIVE EVIDENTIARY APPROACH: PRELUDE TO DAUBERT

In evaluating the admissibility of expert testimony in toxic tort cases, the fundamental issue is whether a trial judge can evaluate the reliability of an expert's testimony and choose to bar its admission if the court finds the expert's methodology or underlying data to be unreliable. The easy question arises when an expert's opinion is fundamentally unsupported by the expert's underlying data or methodology.[108] If the expert's underlying data or methodology completely fails to support the expert's opinion, then the expert's opinion would be unlikely to make an issue in controversy either "more probable or less probable," and therefore, would be excludable under Rule 401's definition of relevancy.[109]

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106. *Rules of Evidence: House Hearings I, supra* note 33, at 88 (prepared statement of Albert E. Jenner, Jr., Chairman of the Rules Advisory Committee) (emphasis added).

107. *See* Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2794 (1993) ("'The Rules were designed to depend primarily upon lawyer-adversaries and sensible triers of fact to evaluate conflicts.'") (quoting Jack B. Weinstein, *Rule 702 of the Federal Rules of Evidence is Sound; It Should Not Be Amended*, 138 F.R.D. 631, 631 (1991)); *Rules of Evidence: House Hearings I, supra* note 33, at 363 (testimony of Frank. F. Jestrab, National Conference of Commissioners of Uniform State Laws); *Rules of Evidence: House Hearings I, supra* note 33, at 437-38 (prepared statement of Alan B. Morrison, Director of Litigation, Public Citizen, Inc.).

108. *See* Slaughter v. Southern Talc Co., 919 F.2d 304, 307 (5th Cir. 1990) (affidavit purporting to establish causal link was based on data that was "replete with so many obvious errors"); Viterbo v. Dow Chem., 826 F.2d 420, 422 (5th Cir. 1987); Thompson v. Southern Pac. Transp. Co., 809 F.2d 1167, 1169 (5th Cir.) (expert who testified that exposure caused injury had no knowledge of amount or duration of exposure, and had failed to exclude other causes for the plaintiff's injury), *cert. denied*, 484 U.S. 819 (1987).

109. Significantly, however, even when the courts properly exclude such evidence, they often mistakenly rely on Rule 703, rather than Rule 401. *See, e.g., Slaughter*, 919 F.2d at 306-07 & n.3; *Viterbo*, 826 F.2d at 422; *In re* "Agent Orange", 611 F. Supp. at 1243-55. Alternatively, as will be discussed below, even if fundamentally unsupported evidence satisfies Rule 401's exceedingly low threshold for relevancy, the trial court may properly exclude such evidence under Rule 403.

The harder question arises when a court evaluates an expert's testimony which, while not fundamentally unsupported, is based on data that is less than ideal, or a methodology that lies outside the mainstream of the scientific community. Before the Supreme Court's decision in *Daubert*, courts had become increasingly willing to step in to bar the admission of scientific evidence in toxic tort cases in a determined attempt to keep questionable scientific evidence from the jury, rather than rely on the adversarial process to discredit it. Because these cases provide the context in which the *Daubert* decision arose and, in some instances, represent the current thinking of several courts of appeals on some of these evidentiary issues, this article will examine the pre-*Daubert* restrictions on the admissibility of expert testimony.

Before *Daubert*, the restrictive courts had developed two basic evidentiary approaches that were used to limit the admissibility of relevant expert testimony. First, the restrictive courts would exclude an expert witness's testimony because the testimony was based on incomplete or less than ideal data. Second, the restrictive courts would exclude an expert witness's testimony because the testimony was based on an unreliable methodology, either because: (a) the expert's methodology was not generally accepted in the relevant scientific community; (b) the expert attempted to establish a causal link without epidemiological[110] evidence of causation; or (c) the studies on which the expert's opinions were based were not subjected to the rigors of peer review.[111]

While some courts tried to tie these two approaches to specific language in Rules 702 and 703,[112] the restrictive courts disagreed over which

110. Epidemiology is the statistical study of disease in human populations. Michael Dore, *A Commentary on the Use of Epidemiological Evidence in Demonstrating Cause-In-Fact*, 7 HARV. ENVTL. L. REV. 429, 431 (1983). "Epidemiological evidence, like other generalized evidence, deals with categories of occurrences rather than particular individual occurrences. Epidemiological studies address questions such as 'Does exposure to this chemical increase the incidence of cancer in a population?' but not 'Did exposure to this chemical cause a particular person's cancer?'" *Id.* at 436.

111. While none of the courts have precisely defined what sort of review process would satisfy the requirement of "peer review," the American Association for the Advancement of Science and the National Academy of Sciences, in their joint amicus brief to the Supreme Court in *Daubert*, explained that "[p]eer review, in its broadest sense, represents the scientific community's effort to police itself and to assure a certain minimum level of quality so that scientists and others can rely on the results of reported scientific research." Amicus Brief for the American Association for the Advancement of Science & the National Academy of Sciences, Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2072 (1992) (No. 90-102) (brief filed Jan. 19, 1993). These two groups go further to define "informal peer review" as occurring when the work is discussed among scientists, and "formal peer review" as occurring when the work is published in a scientific journal. Such formal peer review involves examination and criticism of a manuscript by an outside team of neutral "referees." Both the review process and the resulting publication of the work are intended to screen, disseminate, and preserve new research results, and to provide an opportunity for clarification and refinement of the new research.

112. *See, e.g.*, DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 954 (3d Cir. 1990) (stating that Rule 702 requires court to evaluate the reliability of the expert's methodology in order to determine whether expert's testimony will "assist the trier of fact"); Richardson v. Richardson-Merrell, Inc., 857 F.2d 823, 829 (D.C. Cir. 1988) (stating that

of these two Rules authorized either of these approaches.[113] The Third Circuit, for example, interpreted Rule 702 to authorize the trial judge to examine an expert's underlying data *and* methodology, while finding that Rule 703 authorized the trial judge to examine neither.[114] Other circuits arrived at the exact opposite conclusion concerning these two Rules. These courts interpreted Rule 703 to authorize an examination of the reliability of both methodology and data in determining admissibility, without undertaking any sort of Rule 702 analysis.[115] Moreover, in some cases, the restrictive courts excluded scientific testimony because of perceived weaknesses in underlying data or methodology without specifying any rule as a basis for the exclusion.[116]

Despite disagreements as to the legal bases for excluding questionable scientific testimony, all of the restrictive courts authorized, and indeed required, the trial judge to scrutinize an expert's underlying data and methodology for reliability, and to exclude relevant scientific testimony if the trial judge determined either that the expert's methodology or data failed to support adequately the expert's proffered testimony. As a result, pre-admission screening of both methodology and data for reliability, rather than any particular interpretation of the Rules, was the defining characteristic of the pre-*Daubert* restrictive evidentiary approach. Therefore, this article will consider the two restrictive evidentiary approaches themselves, and postpone until Section IV a discussion of the specific rules the restrictive courts have identified as authority for these approaches.

Rule 703 requires court to evaluate the adequacy of the "grounds relied on by the expert"), *cert. denied*, 493 U.S. 882 (1989).

113. For example, in Christophersen v. Allied-Signal Corp., the Fifth Circuit tried to tie one of these two approaches to the language of Rule 703, 939 F.2d 1106, 1114 (5th Cir. 1991) (en banc) (noting that Rule 703 authorizes trial judge to examine for reasonableness the underlying data of an expert's opinion), *cert. denied*, 112 S. Ct. 1280 (1992), and when the court found itself unable to do so, rewrote Rule 703 to include the "assist the trier of fact" language of Rule 702. *See Christophersen*, 939 F.2d at 1114 (court justifies taking a hard look at the underlying facts that support an expert's opinion under Rule 703 to satisfy the "assist the trier of fact" language of Rule 702).

114. *See DeLuca*, 911 F.2d at 952-57 (noting that the "assist the trier of fact" language of Rule 702 authorizes a trial judge to screen an expert's underlying facts and methodology for reliability; Rule 703 authorizes a trial judge to ensure only that an expert relied upon a reasonable type of data, but does not authorize a trial judge to evaluate the reliability of the specific data that the expert used).

115. *See* Lynch v. Merrell-National Labs., 830 F.2d 1190, 1196-97 (1st Cir. 1987) (stating that Rule 703 incorporates an examination of the reliability of the expert's methodology; no discussion of Rule 702); Ealy v. Richardson-Merrell, Inc., 897 F.2d 1159, 1161-62 (D.C. Cir.), *cert. denied*, 498 U.S. 950 (1990) (stating that Rule 703 incorporates an examination of the reliability of an expert's methodology; no discussion of Rule 702). *Cf. In re* "Agent Orange," 611 F. Supp. at 1243-45 (E.D.N.Y. 1985) (noting that both Rule 703 *and* Rule 702 authorize a trial judge to examine an expert's underlying data and methodology for reliability).

116. For example, in *Christophersen*, the Fifth Circuit held that for expert testimony to be admitted, aside from any requirements that the Federal Rules of Evidence impose, the testimony must also be based on a methodology or reasoning that is generally accepted within the relevant scientific community. *Christophersen*, 939 F.2d at 1110, 1115-16.

A. Reasonableness of Underlying Data

Certain circuits have authorized trial courts to exclude an expert witness's testimony in toxic tort cases if the trial court determines that the testimony is based on what the *court* perceives to be an inadequate factual foundation.[117] In *Christophersen*, for example, the trial court excluded the testimony of plaintiff's expert witness, Dr. Lawrence Miller, who was prepared to testify that occupational exposure to nickel and cadmium had caused the death of the plaintiff's husband. (The plaintiff's husband had died from small cell colon cancer.) In forming this opinion, Dr. Miller obtained the data for his exposure determination primarily from the affidavit of one of Christophersen's co-workers.[118] The affidavit stated that over a fourteen year period Christophersen was regularly exposed to "many fumes and gases" which "included heated fume and airborne particles of cadmium and nickel alloys."[119] The affidavit contained factual inaccuracies concerning the amount and length of Christophersen's exposures, and the co-worker admitted in his deposition that he did not know the chemical composition of the fumes.[120] Dr. Miller considered these deficiencies in rendering his opinion, however. Dr. Miller concluded that while dose and exposure levels were important, his opinion as to causation remained valid, so long as the exposure occurred in general as described to him.[121]

The trial court disagreed with Dr. Miller's confidence in the basis for his causation opinion, and in excluding the testimony, the trial court ruled that the exposure data upon which Dr. Miller relied could not reasonably support his opinion. On appeal, the Fifth Circuit, sitting en banc, af-

117. *See id.* at 1114 (excluding expert's testimony that exposure to heavy metals in fumes caused small-cell colon cancer where such testimony was based upon an uncertain determination of exposure levels); Slaughter v. Southern Talc Co., 919 F.2d 304, 307 (5th Cir. 1990) (excluding expert's testimony that exposure to asbestos caused pulmonary disease where such testimony was based upon examination reports that were "replete with 'so many obvious errors as to be of no value to the trier of fact'"); Washington v. Armstrong World Indus., Inc., 839 F.2d 1121, 1123-24 (5th Cir. 1988); *Viterbo*, 826 F.2d at 422 (5th Cir. 1987) (excluding expert's testimony that exposure to chemical herbicide caused high blood pressure, rash, and mental impairment where such testimony was based upon incomplete oral medical histories, test results that pointed to some other factor as the cause of plaintiff's condition, and animal testing); Thompson v. Southern Pac. Transp. Co., 809 F.2d 1167, 1168 (5th Cir.) (excluding expert's testimony that exposure to dioxin allegedly caused porphyria where such testimony was made in the absence of "any knowledge about the amount or duration of [the plaintiff]'s exposure"), *cert. denied*, 484 U.S. 819 (1987); *In re* "Agent Orange," 611 F. Supp. at 1243-45 (excluding experts' testimony that exposure to Agent Orange had caused plaintiffs' injuries where such testimony was based, in part, upon unverified checklists prepared by the plaintiffs, rather than physical examination or thorough review of medical records); *see also* Shatkin v. McDonnell Douglas Corp., 727 F.2d 202 (2d Cir. 1984) (in a wrongful death action, court found expert's assumptions so unrealistic and contradictory as to suggest bad faith); Wilder Enters. v. Allied Artists Pictures Corp., 632 F.2d 1135, 1143-44 (4th Cir. 1980).

118. *Christophersen*, 939 F.2d at 1113.

119. *Id.* at 1123 (Reavley, J., dissenting).

120. *Id.* at 1113.

121. *Id.* at 1125 (Reavley, J., dissenting).

firmed.[122] After detailing a four-part test that expert witness testimony must pass before it can be admitted in toxic tort cases,[123] the Fifth Circuit agreed with the trial court that the expert had relied upon unreliable data in forming his opinion, and that this unreliable data "tainted" his ultimate conclusion. As a result, the Fifth Circuit held that the expert's testimony was properly excluded.[124]

Significantly, in reaching its decision, the Fifth Circuit necessarily concluded that both the reliability of the underlying data, and the validity of the expert's conclusion based upon that data, went to the admissibility of the evidence, rather than to its weight. Both questions were therefore for the trial judge to resolve, rather than the jury. As a result, the fact that the weaknesses in the expert's basis and resulting conclusion could have (and would have) been exposed through the adversarial process was not relevant, in the court's view, to the decision of whether the expert's testimony was sufficiently "good" science to be admissible.

B. REASONABLENESS OF METHODOLOGY: *Frye*; Epidemiology; and Peer Review

1. *Frye: Exclusion of Evidence Based Upon Theories or Principles That Are Not Generally Accepted*

Despite the adoption of the Federal Rules of Evidence, certain pre-*Daubert* courts excluded novel scientific evidence on the basis that the evidence did not satisfy *Frye*'s requirement that the technique upon which a proffered opinion is based be generally accepted in the relevant scientific community.[125] Several courts seized on the *Frye* requirement to

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122. *Id.*

123. The Fifth Circuit devised a test combining the Federal Rules of Evidence with *Frye* to arrive at the following requirements before expert testimony can be admitted:

(1) Whether the witness is qualified to express an expert opinion, FED. R. EVID. 702;
(2) whether the facts upon which the expert relies are the same type as are relied upon by other experts in the field, FED. R. EVID. 703;
(3) whether in reaching his conclusion the expert used a well-founded methodology, *Frye*; and
(4) assuming the expert's testimony has passed Rules 702 and 703, and the *Frye* test, whether under FED. R. EVID. 403 the testimony's potential for unfair prejudice substantially outweighs its probative value.

Christophersen, 939 F.2d at 1110.

124. *Id.* at 1114.

125. Prior to the *Daubert* decision, the United States Circuit Courts of Appeals had split on the issue of whether *Frye* survived the adoption of the Federal Rules of Evidence. The Third and Fourth Circuits expressly rejected *Frye*, while six other circuits continued to apply the *Frye* test. *See Toxic Fumes: U.S. Supreme Court Asked to Clarify Evidentiary Rule on Expert Witnesses*, 6 TOXICS L. RPTR. 809 (1991). When first faced with the issue, the Court refused to grant certiorari to resolve the conflict. *See* Mustafa v. United States, 479 U.S. 953 (1986) (presenting the issue of whether *Frye* survived the adoption of the Military Rules of Evidence, which are worded identically to the Federal Rules). Justices White and Brennan dissented from the denial of certiorari, stating that the Court should "grant certiorari to resolve this conflict on an obviously recurring and important issue." *Mustafa*, 479 U.S. at 953.

exclude relevant evidence of causation in toxic tort cases.[126]

In *Christophersen*, for example, the plaintiff's expert, Dr. Miller, concluded that Christophersen's small cell colon cancer was caused by exposure to nickel and cadmium based upon the pathogenesis of small cell cancer.[127] Dr. Miller noted that small cell cancer was an unusual form of cancer that had been linked to changes in the genetic material in cells caused by exposure to toxic substances.[128] Dr. Miller indicated that small cell cancer of the lung had been associated with nickel and cadmium exposure, and suggested that "[b]ased on what's known about the biochemical nature of small-cell [cancer] the same sorts of chemicals and exposures that are associated with small-cell carcinoma of the lung are likely to be associated with small-cell carcinoma elsewhere in the body."[129] Dr. Miller arrived at this conclusion notwithstanding his own testimony that causal relationships are most often established through human epidemiological studies, live animal (or *in vivo*) testing, and *in vitro* (or test-tube) testing.[130] The defendant's experts, on the other hand, stated that proof of causation *required* one of these three types of studies.[131] Rather than finding that this discrepancy went to the weight of the evidence, the court concluded that Dr. Miller's testimony should be excluded on the basis that his methodology was not generally accepted in the relevant scientific community.[132]

2. *Epidemiology: Exclusion of Evidence Not Based on Human Epidemiological Studies*

In the context of causation in toxic tort cases, some pre-*Daubert* courts went further than simply requiring an approach to causation that was generally accepted in the relevant scientific community. These courts held that to be admissible, an opinion must be based on an epidemiological study which demonstrated a statistically significant causal link between the toxic exposure and the resulting injury.[133]

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126. *See* Daubert v. Merrell Dow Pharmaceuticals, Inc., 951 F.2d 1128, 1130-31 & n.1 (9th Cir. 1991), *vacated*, 113 S. Ct. 2786 (1993); *Christophersen*, 939 F.2d at 1115 & n.16; *Lynch*, 830 F.2d at 1193-96 (holding *in vitro* and *in vivo* testing inadmissible because the relevant scientific community did not generally accept these approaches as a proper method, on their own, to establish causation).

127. *Christophersen*, 939 F.2d at 1115 & n.16.

128. Christophersen v. Allied-Signal Corp., 902 F.2d 362, 365 (5th Cir. 1990), *rev'd*, 939 F.2d 1106 (5th Cir. 1991) (en banc) (per curiam), *cert. denied*, 112 S. Ct. 1280 (1992).

129. *Christophersen*, 902 F.2d at 366.

130. *Christophersen*, 939 F.2d at 1115.

131. *Id.*

132. *Id.* at 1116.

133. *See Daubert*, 951 F.2d at 1130; Lynch v. Merrell-National Labs., 830 F.2d 1190, 1194 (1st Cir. 1987); *cf.* Richardson v. Richardson-Merrell, Inc., 857 F.2d 823, 830 (D.C. Cir. 1988) (causation opinion based on chemical structural analysis, *in vivo* tests, and *in vitro* tests did not provide a sufficient basis for a reasonable jury to find causation in the face of overwhelming epidemiological evidence suggesting no statistically significant causal relationship), *cert. denied*, 493 U.S. 882 (1989); Brock v. Merrell Dow Pharmaceuticals, Inc., 884 F.2d 166, 167 (5th Cir. 1989) (same), *cert. denied*, 494 U.S. 1046 (1990); *In re* "Agent Orange" Prod. Liab. Lit., 611 F. Supp. 1223, 1231 (E.D.N.Y. 1985) (excluding

In *Lynch v. Merrell-National Laboratories*,[134] the plaintiff's expert, Dr. Alan K. Done, based his opinion that Bendectin caused Margo Lynch's birth defects on: (i) a study of the effects of structurally similar chemicals; (ii) *in vivo* animal studies; and (iii) *in vitro* studies.[135] The court ruled that, even if an expert in the field was willing to testify to a causal relationship based on these studies, the relevant scientific community did not generally accept such studies as an adequate method of establishing causation, in the absence of epidemiological evidence.[136] In fact, the *Lynch* court ruled that a causation opinion would be admissible into evidence in a Bendectin case only if it were based on "a new [epidemiological] study coming to a different conclusion and challenging the consensus."[137] Therefore, the court excluded Dr. Done's testimony on the causation issue.

3. *Peer Review: Exclusion of Evidence Not Subjected to Peer Review*

In response to these courts' requirement that opinions on causation be based on epidemiological studies, a number of toxic tort plaintiffs offered the testimony of an expert that was based on a statistical reanalysis[138] of existing epidemiological studies.[139] The restrictive courts concluded, however, that these studies, too, provided an inadequate basis for the expert's causation opinion because the reanalysis itself had not been subjected to adequate peer review.[140] While the notion that courts will be especially skeptical of unreviewed expert opinions surfaced some time

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plaintiffs' experts' testimony based, in part, on animal studies and industrial accidents, where no epidemiological evidence supported plaintiffs' claims that Agent Orange had caused their injuries), *aff'd*, 818 F.2d 187 (2d Cir. 1987), *cert. denied sub nom.* Lombardi v. Dow Chem. Co., 487 U.S. 1234 (1988).

134. 830 F.2d 1190 (1st Cir. 1987).

135. *Lynch*, 830 F.2d at 1194.

136. *Id.*

137. *Id.*; *see also Brock*, 874 F.2d at 315 (observing that the court's decision would not serve as a bar to future Bendectin cases "in the event that *new* and *conclusive* studies emerge which would give a jury a firmer basis on which to determine the issue of causation") (emphasis added). *Contra In re* Bendectin Prods. Liab. Litig., 732 F. Supp. 744, 749 (E.D. Mich. 1990) (refusing to grant summary judgment on causation issue in case where plaintiffs proposed to establish Bendectin's alleged teratogenicity primarily through *in vitro* testing, structure activity analysis, sales chart analysis, and animal studies, noting that "divergent views" existed among medical experts over whether epidemiological data was the only kind of proof which could conclusively link Bendectin exposure to birth defects).

138. A statistical reanalysis re-examines existing data from previously performed epidemiological studies by combining data from several existing studies or using different control considerations to create larger sample populations. Such reanalyses use existing epidemiological data to discover causal relationships not examined in the original studies, and may detect causal relationships that become statistically significant only with a larger sample population.

139. *See* Daubert v. Merrell Dow Pharmaceuticals, Inc., 951 F.2d 1128, 1130 (9th Cir. 1991), *vacated*, 113 S. Ct. 2786 (1993); *Lynch*, 830 F.2d at 1194-96.

140. *See Daubert*, 951 F.2d at 1130-31; *Lynch*, 830 F.2d at 1195-96; *Brock*, 874 F.2d at 313; *cf.* Perry v. United States, 755 F.2d 888, 892 (11th Cir. 1985) ("Despite appellant's protestations, the examination of a scientific study by a cadre of lawyers is not the same as its examination by others trained in the field of science or medicine."). On the other hand, the Third Circuit has ruled that the Federal Rules of Evidence contain no peer review requirement. *See In re* Paoli R.R. Yard PCB Litig., 916 F.2d 829, 857-58 (3d Cir. 1990),

ago,[141] the Ninth Circuit's decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* represented the first time a court had upheld the exclusion of evidence on that basis alone.

C. Summary of the Evidentiary Hurdles

Using the above described approaches, the restrictive courts interposed a trial judge's judgment between the jury and relevant scientific evidence. If the trial judge did not find an expert's testimony convincing, either because the trial judge was uncertain whether the underlying data would reasonably support the expert's opinion, or because the trial judge believed that the expert's methodology did not reflect "good" science, then the restrictive construction of the Rules permitted the trial judge to exclude the evidence, and in effect, allowed the trial judge to substitute his or her own judgment on the merits for that of the jury.

III. THE TWO FACES OF *DAUBERT*

In 1992, the Supreme Court granted certiorari in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,[142] leading some to hope that the Court would take the opportunity to clarify the Rules surrounding the admissibility of expert testimony, and to explain the respective roles of the judge and jury in evaluating questionable scientific evidence.

A. The Background

In *Daubert*, the plaintiffs, Jason Daubert and Eric Schuller, two minor children, sued Merrell Dow Pharmaceuticals alleging that their mothers' ingestion of Bendectin, a prescription anti-nausea drug that Merrell Dow marketed, had caused their limb reduction birth defects.[143] After extensive discovery, Merrell Dow moved for summary judgment, alleging that the plaintiffs had not presented "any admissible evidence"[144] that their exposure to Bendectin had caused the defects. In response to the motion, the plaintiffs presented the opinion testimony of eight qualified experts.[145] On the basis of *in vitro* and *in vivo* testing, chemical structure activity analysis, and a statistical reanalysis of previously published epidemiological studies, these experts were willing to testify that Bendectin can cause birth defects.

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cert. denied sub nom. General Elec. v. Knight, 499 U.S. 99, (1991); DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 954 (3d Cir. 1990).

141. *See, e.g., Richardson*, 857 F.2d at 831 & n.55 (quoting *Perry*, 755 F.2d at 892, for the proposition that "examination of a scientific study by a cadre of lawyers is not the same as its examination by others trained in the field of science or medicine."); *Brock*, 874 F.2d at 313.

142. 113 S. Ct. 320 (1992).

143. Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2791 (1993).

144. *Id.* at 2791-92.

145. The plaintiffs' experts included well-credentialed experts in the field of statistics and epidemiology, medicine, veterinary medicine (for evaluation of animal studies), and chemistry. *See Daubert*, 113 S. Ct. at 2791 n.2.

Relying on the requirement that evidence of causation be based on human epidemiological studies showing a statistically significant causal link, the trial court ruled that the testimony of the eight experts based on *in vivo*, *in vitro*, and pharmacological studies lacked "the sufficient foundation under FRE 703."[146] With respect to the reanalysis of previously published studies, the trial court noted that such reanalysis had never been published or subjected to peer review, and did not, in any event, establish a statistically significant causal link between Bendectin and birth defects.[147] Because of these perceived weaknesses in the reanalysis, and because of the numerous published epidemiological studies which failed to find a causal link, the trial judge concluded that the opinion evidence based upon the reanalysis, even if admitted, would not create a genuine issue of fact on the issue of causation.[148] Therefore, the trial judge found the plaintiffs' evidence to be insufficient to create a genuine issue of fact on causation, and granted the defendant's motion for summary judgment.[149]

On appeal, the Ninth Circuit affirmed the trial court's decision.[150] In its decision, the Ninth Circuit agreed with the trial court that the *in vivo*, *in vitro*, and chemical structure studies did not provide an adequate basis for an opinion as to causation.[151] However, in discussing the plaintiffs' statistical reanalysis, instead of deciding as the trial court had that the reanalysis, even if admitted, was insufficient to create a genuine issue of fact, the Ninth Circuit ruled that the reanalysis was inadmissible *per se* because it had not been subjected to the rigors of a scientific peer review process.[152] According to the Ninth Circuit, peer review was essential before the evidence would satisfy *Frye*'s general acceptance test.[153] The Supreme Court granted certiorari to determine whether *Frye*'s general acceptance test had survived the enactment of the Federal Rules of Evidence.

B. *FRYE* IS DEAD

In the first half of its opinion, the Supreme Court vacated the Ninth Circuit's opinion and found the court's exclusive reliance on *Frye*'s general acceptance standard to be an improper basis for excluding the plaintiffs' statistical reanalysis. The Court ruled that evidence can satisfy the admissibility standards of the Federal Rules of Evidence even though the

146. Daubert v. Merrell Dow Pharmaceuticals, Inc., 727 F. Supp. 570, 575 (S.D. Cal. 1989), *aff'd*, 951 F.2d 1128 (9th Cir. 1991), *vacated*, 113 S. Ct. 2786 (1993).
147. *Id.* at 575.
148. *Id.* at 576.
149. *Id.* In so ruling, the *Daubert* trial court used both the procedural approach mentioned in the Introduction, *see supra* notes 6-8 and accompanying text, and the evidentiary approach discussed in this article, to prevent the liability issue from reaching the jury.
150. 951 F.2d 1128 (9th Cir. 1991), *vacated*, 113 S. Ct. 2786 (1993).
151. *Id.* at 1131.
152. *Id.* at 1130.
153. *Id.* The Ninth Circuit panel used only the evidentiary approach to prevent the liability issue from reaching the jury.

scientific basis of the expert's testimony was not generally accepted in the relevant scientific community.[154] According to the Court, by enacting Rule 702, which details the general standards for the admission of expert testimony without referring to *Frye*'s general acceptance standard, Congress had intended to displace *Frye*.[155] In reaching this conclusion, the Court emphasized that the Rules were intended to liberalize the admissibility of expert testimony, and relied upon "'lawyer-adversaries and sensible triers of fact'" to evaluate and discredit relevant scientific evidence.[156] Thus, a failure to obtain peer review on its own was not enough to justify *per se* exclusion of the evidence.

C. LONG LIVE *FRYE*

However, after putting *Frye* to rest in the first half of its opinion, the Court, over the dissent of Chief Justice Rehnquist and Justice Stevens, proceeded in the second half of its opinion to resurrect the trial judge's authority to examine the reliability and validity of an expert's testimony in determining the opinion's admissibility. Indeed, while the *Daubert* Court rejected *Frye*'s "austere standard" as inconsistent with the "liberal thrust" of the Rules,[157] the *Daubert* admissibility analysis may prove, in practice, to exclude relevant expert testimony under far more circumstances than did the *Frye* standard. In dicta,[158] the *Daubert* Court stated that for scientific expert testimony to be admissible under Rule 702, the trial judge must first determine by a preponderance of the evidence[159] that the testimony consists of (i) scientific knowledge that will (ii) assist the trier of fact to understand or determine a fact in issue.[160] In its discussion of this two part-standard, the Court provided both a brief description of what each of these requirements entails, and a general discussion of four factors[161] that would be relevant in determining whether specific evidence has satisfied the standard.

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154. *See Daubert*, 113 S. Ct. at 2794.

155. *Id.*

156. *Id.* (quoting Jack B. Weinstein, *Rule 702 of the Federal Rules of Evidence is Sound; It Should Not Be Amended*, 138 F.R.D. 631, 631 (1991)).

157. *Daubert*, 113 S. Ct. at 2794.

158. As Chief Justice Rehnquist noted in his separate opinion, the petition for certiorari presented only two questions: first, whether *Frye*'s general acceptance standard survived the enactment of the Rules; and second, if it did, whether scientific evidence must be subjected to peer review to satisfy *Frye*'s general acceptance standard. *Daubert*, 113 S. Ct. at 2799 (Rehnquist, C.J., concurring in part, dissenting in part). Because an interpretation of Rule 702 was not required by the questions presented, nor had it been relied upon as a basis for excluding the evidence in either the trial court or the Ninth Circuit, *see Daubert*, 727 F. Supp. 570, 575 (S.D. Cal. 1989) (excluding evidence because it lacked a reasonable basis under Rule 703), *aff'd*, 951 F.2d 1128, 1130-31 (9th Cir. 1991) (excluding evidence because it was not generally accepted under *Frye*), *vacated*, 113 S. Ct. 2786, 2796-98 (1993) (interpreting Rule 702), the Court's pronouncements concerning Rule 702 are dicta.

159. *Daubert*, 113 S. Ct. at 2796 n.10.

160. *Id.*

161. In its discussion, the *Daubert* Court referred to the four variously as "factors," "considerations," and "general observations." *Id.* at 2796-97.

In describing the type of evidence that will qualify as "scientific knowledge," the Court required the evidence to be "derived by the scientific method,"[162] and ruled that the evidence "must be supported by appropriate validation—*i.e.*, 'good grounds,' based on what is known."[163] This validation, the Court went on to explain, requires that the testimony satisfy a standard of "evidentiary reliability" or "trustworthiness," which the Court, in a footnote, equated with the evidence being "scientifically valid."[164]

The Court further explained that, for evidence to "assist the trier of fact," it must be relevant.[165] To be relevant under Rule 702, however, it is not enough that the evidence satisfy the "liberal" relevancy standard detailed in Rule 401.[166] Instead, for expert testimony to be relevant under Rule 702's "assist the trier of fact" language, there must be a "valid scientific connection to the pertinent inquiry."[167] In the toxic tort causation context, this aspect of the Court's two-part standard would apparently require the trial judge to find a valid scientific connection between the basis of the expert's testimony (the expert's principles and methodology, such as *in vivo*, *in vitro*, pharmacological, or epidemiological studies) and the pertinent issue, causation (the expert's ultimate conclusion).[168] Thus, the Court has seemingly injected a heightened relevancy standard into the Rule 702 inquiry.

In addition to its brief description of the two-part standard, the Court also provided four "general observations"[169] to guide trial judges in determining whether particular expert testimony will satisfy the Court's two-part standard.[170] As its first observation, the Court identified the question of whether the expert had used the "scientific method," defined

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162. *Id.* at 2795.
163. *Id.*
164. *Id.* at 2795 n.9.
165. *Id.* at 2795 ("This condition goes primarily to relevance.").
166. *Id.* at 2794 ("[Rule 401's] basic standard of relevance thus is a liberal one.").
167. *Daubert*, 113 S. Ct. at 2796.
168. *Cf. id.* at 2795-96. In explaining its interpretation of relevancy under Rule 702, the Court gave an example of expert testimony, based upon the phases of the moon, concerning two "pertinent inquir[ies]": (i) darkness at night; and (ii) individual behavior patterns. *Id.* at 2796. Testimony with respect to the first would generally be admissible because the phase of the moon has a valid scientific connection to the pertinent issue, darkness at night. In contrast, testimony with respect to the second based upon the phase of the moon would not be admissible, unless "creditable grounds" supported a valid scientific connection between the two events. *Id.* If one applies this reasoning directly to the causation issue in toxic tort cases, causation testimony based upon animal studies, for example, would be admissible only if the trial judge concludes by a preponderance of the evidence that there is a valid scientific connection between the incidence of disease in animals and the incidence of disease in humans. *Id.* at 2706 n.10.
169. The Court suggested that its list was not exhaustive, and that other factors might be relevant in particular cases. *Daubert*, 113 S. Ct. at 2796 ("Many factors will bear on the inquiry, and we do not presume to set out a definitive checklist or test. But some general observations are appropriate.").
170. It is somewhat unclear whether the Court intended the four considerations to illustrate both aspects, scientific "validity" and "connection," of its two-part standard, *see id.* at 2796 (Court identified testing of the methodology as a key consideration in determining whether the evidence "is scientific knowledge that will assist the trier of fact"), or just

as the formation and testing of a hypothesis, as "a key" to determining whether particular evidence ("theory or technique") satisfied the Court's standard.[171] Additional considerations included whether the "theory or technique" had been subjected to peer review and publication, whether a "particular scientific technique" had a significant rate of error, and whether the methodology was generally accepted in the relevant scientific community.[172] Through this discussion, the Court incorporated *Frye*'s general acceptance test[173] as one of four factors that a trial judge should consider in determining whether expert testimony is sufficiently reliable and relevant under Rule 702 to be admitted.

The Court failed to consider, however, that the *Frye* test historically applied only when an expert had relied upon a "novel scientific" device or technique, but did not otherwise encompass a reliability examination of the expert's reasoning or analysis.[174] Yet, the *Daubert* standard authorizes, and indeed requires, a trial judge to examine the reliability, not only of novel devices or techniques specifically, but of an expert's reasoning and methodology more generally.[175] As with the *Daubert* standard itself, this substantial expansion of the general acceptance inquiry is not sup-

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validity, *see id.* at 2797 (in discussing peer review as one of the four considerations, the Court stated that the consideration was not dispositive of "scientific validity").

171. *Id.* at 2796-97.

172. *Id.* at 2797.

173. While the *Daubert* Court did not mention *Frye* by name in discussing general acceptance as one of the four considerations relevant to determining scientific validity and connection, the Court introduces the general acceptance consideration by referring back to its discussion of the *Frye* test in the first half of its opinion. *Daubert*, 113 S. Ct. at 2797 ("Finally, 'general acceptance' can yet have a bearing on the inquiry."). Additionally, the *Daubert* Court, in discussing general acceptance as one of its considerations, did cite United States v. Downing, 753 F.2d 1224, 1238 (3d Cir. 1985), which expressly adopted *Frye*'s general acceptance standard as a central part of its "more flexible" Rule 702 reliability analysis.

> In many cases, however, the acceptance factor may well be decisive, or nearly so. Thus, we expect that a technique that satisfies the *Frye* test will usually be found to be reliable as well [under our interpretation of Rule 702]. On the other hand, a known technique which has been able to attract only minimal support within the community is likely to be found unreliable [under our interpretation of Rule 702].

Downing, 753 F.2d at 1238.

174. *See* Christophersen v. Allied Signal Corp., 939 F.2d 1106, 1133 (5th Cir. 1991) (Reavley, J., dissenting) ("Until today, we soundly limited the *Frye* doctrine to particular techniques, 'novel scientific evidence,' that reflect the factual context of *Frye*.") (footnote omitted), *cert. denied*, 112 S. Ct. 1280 (1992); United States v. Hadley, 918 F.2d 848, 853 (9th Cir. 1990); *see also* Gianelli, *supra* note 26, at 189-90 (noting that *Frye* test has been applied to the polygraph test, use of sodium pentothal, the Kell-Cellano blood grouping test, spectroscopic analysis, the drunkometer, sound spectrometry (voiceprints), neutron activation analysis, gun-shot residue tests, bite-mark comparisons, scanning electron microscope analysis, ion microprobic analysis, psycholinguistics, trace metal detection, multi-system enzyme blood testing, the battered wife syndrome, fingernail comparisons, astronomical calculations, gas chromatographic/FID/FPD analysis, the rape trauma syndrome, psychological profile of rapists and other techniques).

175. *Daubert*, 113 S. Ct. at 2796 n.11; *see also Christophersen*, 939 F.2d at 1115 (expanding *Frye*'s general acceptance standard from historical usage to encompass an examination of the expert's reasoning for reliability).

ported by citation to any legal authority.[176]

In reaching its conclusion that a trial judge should carefully scrutinize the reliability and relevance of scientific evidence under Rule 702, the Court seemed to step back sharply in the second half of its opinion from its earlier emphasis on the "liberalizing thrust" of the Rules and the importance of the adversarial process in discrediting questionable scientific evidence. Indeed, in the second half of its opinion, the Court attempted to justify its reading of Rule 702 by suggesting that the liberal admissibility standards set forth in the Rules were "[p]resumably premised on an assumption that the expert's opinion will have a reliable basis in the knowledge and experience of his discipline."[177]

While the *Daubert* Court ruled that *Frye*'s general acceptance test did not survive the enactment of the Rules, the Court in the second half of its opinion read something very much like *Frye* into the language of Rule 702. Indeed, by the end of its opinion, the Court had not only read into the language of Rule 702 a standard very much like *Frye*, but had also expanded *Frye* far beyond its historical use, thereby creating a standard that will give trial judges considerable discretion to keep relevant scientific evidence from the trier of fact. Under this standard, a trial judge must exclude the evidence unless the trial judge first determines, by the preponderance of the evidence,[178] that the expert's testimony is both scientifically valid and has a valid scientific connection.

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176. In fact, the Court's decision to subject not merely novel scientific devices, but also expert reasoning, to judge-determined reliability was fobbed off seemingly as an afterthought in a footnote. *Daubert*, 113 S. Ct. at 2796 n.11. A similar expansion of the *Frye* standard in the Fifth Circuit drew a heated dissent. *Christophersen*, 939 F.2d at 1132 (Reavley, J., dissenting) ("Now the Fifth Circuit, without precedent, reaches beyond novel scientific device or technique and subjects expert reasoning to judge-determined reliability.").

177. *Daubert*, 113 S. Ct. at 2796; *see also* Wilson v. City of Chicago, 6 F.3d 1233, 1238-39 (7th Cir. 1993) (citing *Daubert* for the proposition that "[t]he elimination of formal barriers to expert testimony has merely shifted to the trial judge the responsibility for keeping 'junk science' out of the courtroom"), *modified*, 1993 U.S. App. LEXIS 318896, *cert. denied*, 114 S. Ct. 1844 (1994). While this assumption may seem plausible in the abstract, in actuality, the legislative record fails to articulate, or even suggest, such a premise. On the contrary, while the legislative record recognizes the dangers of expanding the scope and bases upon which experts can testify, the record generally reflects confidence that the adversarial system could adequately deal with the potential problems. *See supra* notes 63-107 and accompanying text. Moreover, the Court's logic appears to be fatally flawed. The Court inferred a substantial gatekeeping role for trial judges from Congress's decision to enact a liberal admissibility standard for expert testimony. Yet, a substantial gatekeeping role for judges is inconsistent with a liberal admissibility standard. Whether an admissibility standard is liberal or restrictive is defined by the degree of gatekeeping assigned to trial judges. The more substantial the gatekeeping role for trial judges, or in other words, the more discretion that trial judges possess to exclude relevant evidence, the more restricted the flow of relevant evidence to the jury would be. Thus, if trial judges have a substantial gatekeeping role, then the resulting admissibility standard would be defined as restrictive. Only if trial judges have a limited gatekeeping role, such as minimal or structured discretion to exclude relevant evidence, would the admissibility standard be defined as liberal. Thus, if Congress adopted a "liberal" admissibility standard, as the *Daubert* Court has admitted, the standard, by definition, permits only a limited gatekeeping role for trial judges.

178. *Daubert*, 113 S. Ct. at 2796 n.10.

D. Changes in the Admissibility of Questionable Scientific Evidence after *Daubert*

1. Daubert's new admissibility standard: liberal or restrictive?

As discussed, the *Daubert* opinion, when necessary to bolster its argument, seemed to approve of both the liberal and restrictive approaches to the admissibility of scientific evidence.[179] The Court rejected *Frye* and overturned the Ninth Circuit's decision excluding the evidence.[180] Yet at the same time, the decision incorporated *Frye*'s general acceptance standard into Rule 702 as a consideration relevant to determining the admissibility of questionable scientific evidence.[181] Additionally, in articulating its own restrictive standard for the admissibility of such evidence, the Court recognized that trial judges have an obligation to scrutinize proffered scientific testimony carefully for reliability and relevancy.[182]

Further evaluation of the decision is complicated because of a noticeable lack in the Court's discussion of how the four *Daubert* considerations should be applied to any specific admissibility questions. As the dissent noted,[183] the Court even failed to explain how it would apply its standard to the causation testimony proffered in the *Daubert* case. As a result, a number of critical aspects of the Court's standard are left unclear. For example, while the Court explained that the testing of a hypothesis was a key consideration in determining whether evidence was admissible under Rule 702, the Court failed to make clear whether, in evaluating the *Daubert* evidence, the relevant hypothesis would be: (i) that Bendectin causes birth defects—a hypothesis directed at the ultimate issue of causation; or (ii) that a reanalysis of existing epidemiological studies prepared for litigation can identify causal relationships—a hypothesis directed at the effectiveness of the methodology upon which the expert's opinion is based. In other words, should a trial court examine an expert's methodology or instead examine an expert's conclusion (of course, couched in terms of analyzing the "scientific connection" between the methodology and the conclusion) for consistency with the scientific method?

Despite the Court's caveat that "[t]he focus, of course, must be solely on [the expert's] principles and methodology, not on the conclusions" that the expert reaches,[184] the Court, by requiring a "valid scientific connection," seems to come perilously close to inviting the trial judge to decide the ultimate factual issue to which the testimony pertains in

179. *See id.* at 2798 (Court suggesting that its standard will prove neither so liberal that it will lead to a "free-for-all" in the judicial process, nor so restrictive that it will stifle the search for the truth.).

180. *Id.* at 2794, 2799.

181. *Id.* at 2797 (stating that a trial court must consider the degree of acceptance within the scientific community of, not just novel devices or gadgets, but also of an expert's reasoning); *see also supra* note 173.

182. *Daubert*, 113 S. Ct. at 2794-98, 2799.

183. *Id.* at 2799.

184. *Id.* at 2797.

determining whether to admit the testimony. In other words, determining whether there is a valid scientific connection between the expert's testimony and the pertinent issue may necessarily entail an examination of the expert's conclusions concerning the pertinent issue. Even should a court in good faith attempt to restrict its examination of proffered expert testimony to the scientific connection between an expert's principles and methodology and the expert's conclusions, the court will likely find it difficult to focus solely on the validity of the expert's principles and methodology and not the conclusions drawn therefrom, as the two are inevitably intertwined and the line between the two, as a result, necessarily blurred.

Moreover, the Court failed to provide any guidance on the weight to be accorded its four "considerations." The Court made clear that *Frye*'s general acceptance test did not survive the enactment of the Rules as an "absolute prerequisite for admissibility."[185] Thus, the failure to obtain peer review of the *Daubert* statistical reanalysis, even if such failure would render the study and the conclusions based thereon not generally accepted, would not necessarily justify exclusion of the evidence. While the Court's lack of guidance makes evaluation of its standard difficult,[186] several factors do suggest that the standard will ultimately prove more restrictive than Congress intended. First, the Court required trial judges to evaluate the bases of an expert's opinion for scientific validity, and to examine the opinion itself for a valid scientific connection, under Rule 702. As will be discussed, these requirements do not reflect Congress's intent in enacting Rule 702.[187]

Second, while the Court did not identify the weight that a trial court should accord each of the *Daubert* considerations, the Court vacated rather than reversed the Ninth Circuit's decision. This action suggests that while obtaining peer review might not be a prerequisite for admission, the failure to obtain such review might be a sufficient basis for excluding expert testimony so long as the admissibility decision is made using the four considerations announced in *Daubert*. If, on remand, the Ninth Circuit were to decide that a failure to obtain peer review undermined the scientific validity of the reanalysis or the scientific connection between the reanalysis and causation, then the Ninth Circuit would appear to be free to affirm the exclusion of the reanalysis, so long as it does so applying the correct legal standard.[188]

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185. *Id.* at 2794.

186. In discussing the substantive changes to the evidentiary law that *Daubert* has brought about, this article leaves for another time a critique of those changes. Instead, this article presents these changes and their potential impacts in order to demonstrate the increasingly restrictive view that the Court has adopted on admissibility issues pertaining to scientific expert testimony.

187. *See infra* notes 198-242 and accompanying text.

188. Additionally, the Court seemed to approve the insufficiency of the evidence grounds that the trial court originally relied upon in granting summary judgment. *Daubert*, 113 S. Ct. at 2798. Thus, even if the Ninth Circuit concludes that the testimony is "scientific knowledge," it could affirm the trial court's decision by holding that the reanalysis testimony, even if admitted, did not create a genuine issue of fact.

2. Systemic Changes to the Admissibility Decision

In addition to its specific interpretation of Rule 702, *Daubert* also accomplished two systemic changes in the law concerning the admission of expert testimony by spelling out a general approach to be used in determining the appropriate standards for admissibility decisions. First, by ruling that *Frye*'s general acceptance test did not survive independently the enactment of the Rules, the *Daubert* Court required that a court establish some basis in the Rules before excluding expert testimony. After *Daubert*, the two evidentiary approaches that the restrictive courts have used to exclude expert testimony in toxic tort cases, lack of reasonable underlying data and lack of reasonable methodology, can no longer exist independently of the Rules. Instead, these approaches will survive only if the restrictive courts can tie these approaches to the language of the Rules.

Second, by ruling that *Frye*'s general acceptance standard has survived as a consideration relevant to determining admissibility under Rule 702,[189] the *Daubert* Court made clear that the courts were free to read the Rules creatively, and to impose substantial limitations on the admissibility of questionable scientific evidence as long as each limitation could plausibly be tied to the language of the Rules.[190] Thus, while *Daubert* requires the restrictive approaches to be tied to the Rules, the opinion also makes it fairly easy for a restrictive court to do so.

As a result, the two basic evidentiary approaches that the restrictive courts have used in toxic tort cases should survive *Daubert* largely intact. With respect to the second evidentiary approach, examining the validity of the expert's methodology, the *Daubert* Court expressly held that Rule 702 authorizes trial judges to exclude expert testimony should the trial judge determine that the expert's methodology lacks scientific validity or a valid scientific connection. Further, while the Court did not directly address the first evidentiary approach, examining the reliability of an expert's underlying data, the Court left open the possibility that either Rule 702 or Rule 703 might authorize pre-admission scrutiny of the adequacy of such data.[191]

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189. *See supra* note 173.

190. Thus, while the restrictive courts could no longer exclude expert testimony as to causation based upon, for example, *in vivo*, *in vitro*, or pharmacological studies by determining that such studies did not satisfy *Frye*'s general acceptance test, the restrictive courts could continue to exclude such opinion evidence by finding that these methodologies either are not scientifically valid or do not have a valid scientific connection to the pertinent issue, because they are not generally accepted as an adequate basis for determining causation in the expert's field. *See supra* notes 172-73 and accompanying text.

191. *Daubert*, 113 S. Ct. at 2797-98. The Court noted that Rule 703, by its own terms, was limited to consideration of expert testimony based upon what would otherwise be inadmissible hearsay evidence. *Id.* If the Court follows through on such a reading of Rule 703, it would effectively eliminate the practice of excluding relevant scientific evidence based upon inadequate data under Rule 703, at least insofar as the proffered testimony had been based upon data that was otherwise admissible. *Cf.* Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1114 (5th Cir. 1991) (en banc) (noting that Rule 703, by its own terms, applied only to testimony based upon otherwise inadmissible data, yet applying

IV. SPECIFIC RESTRICTIONS ON THE ADMISSIBILITY OF SCIENTIFIC EVIDENCE: JUDICIAL AMENDMENT VERSUS STATUTORY CONSTRUCTION

The section that follows considers the specific Rules on which the restrictive courts, including *Daubert*, have relied in limiting the admissibility of scientific evidence, and demonstrates that the restrictive courts have misinterpreted the applicable expert testimony rules. Restrictive interpretations of these rules have a disproportionate impact on the toxic tort plaintiff because this plaintiff will virtually always require expert testimony to establish causation. When the toxic tort plaintiff's expert causation evidence is excluded under the threshold "good science" approaches that the restrictive courts have imposed, the plaintiff generally has no other evidence to prove causation. For this reason, the toxic tort plaintiff is particularly vulnerable to restrictive interpretations of the expert testimony rules.

Additionally, as the discussion of the pre-*Daubert* cases will demonstrate, the restrictive interpretations more heavily impacted toxic tort plaintiffs because certain courts used a more restrictive evidentiary standard in toxic tort cases, than was applied in more traditional criminal and civil cases. The dicta in many of these cases reveals that these courts not only misinterpreted the Rules, they manipulated the Rules to control more directly the access of scientific expert testimony to what these courts perceived as potentially irrational juries. Given this historical bias against admitting scientific evidence in toxic tort cases, the selectively restrictive admissibility standard applied in the toxic tort area before *Daubert*[192] seems likely to reappear in post-*Daubert* interpretations of Rule 702, and to continue in admissibility decisions based on Rule 703.[193]

Rule 703 to exclude testimony based upon apparently admissible data), *cert. denied*, 112 S. Ct. 1280 (1992). Significantly, however, even if Rule 703 will not justify excluding proffered scientific testimony based upon questionable, but admissible, data, a trial court might find that such data does not provide a valid scientific connection to the pertinent issue or that reliance on such data does not lead to a scientifically valid opinion, and exclude such evidence under *Daubert*'s Rule 702 standard. *Cf. Christophersen*, 939 F.2d at 1114 (While discussing the standards for admissibility under Rule 703, the court noted that "[d]istrict judges may reject opinions founded on critical facts that are plainly untrustworthy, principally because such an opinion cannot be helpful to the jury.").

192. The *Daubert* decision *should* restore uniformity to Rule 702's admissibility inquiry, as its two-part standard appears to apply whenever a trial court is "[f]aced with a proffer of expert scientific testimony . . . ." *See Daubert*, 113 S. Ct. at 2796.

193. *Compare* Tamarin v. Adam Caterers, Inc., 13 F.3d 51, 53 (2d Cir. 1993) (refusing to apply *Daubert*'s restrictive admissibility standards to expert testimony in labor law case) *and* United States v. Locascio, 6 F.3d 924, 938-39 (2d Cir. 1993) (refusing to extend *Daubert*'s restrictive admissibility standard to Rule 703 for prosecution experts in a criminal case) *and* Lightning Lube, Inc. v. Witco Corp., 4 F.3d 1153, 1175-76 (3d Cir. 1993) (post-*Daubert* decision applying liberal admissibility standard to expert testimony in case involving an alleged breach of contract) *and* United States v. Markum, 4 F.3d 891, 896 (10th Cir. 1993) (post-*Daubert* decision applying liberal admissibility standard to expert testimony presented by prosecutor in criminal case) *and* Petruzzi's IGA Supermarkets, Inc. v. Darling-Delaware Co., 998 F.2d 1224, 1240-41 (3d Cir. 1993) (post-*Daubert* decision applying liberal admissibility standard to expert testimony in case involving alleged antitrust violation) *with* Joy v. Bell Helicopter Textron, Inc., 999 F.2d 549, 569-70 (D.C. Cir. 1993)

A. PLAIN-MEANING, CONTEXT AND THE RESTRICTIVE INTERPRETATIONS OF RULES 702 & 703

By ruling that *Frye*'s general acceptance test did not survive independently of the Rules,[194] the *Daubert* opinion effectively required the restrictive courts to tie their limitations on the admissibility of expert testimony specifically to the language of the Rules. Those restrictive courts, including *Daubert*, that have relied on the Rules in articulating restrictive standard have justified the limitations by pointing to specific language in Rules 702 and 703 that superficially appears to incorporate such restrictions. To date, these courts have focused on three phrases in Rules 702 and 703 to justify their limitations of the admissibility of expert testimony.

First, the *Daubert* Court pointed to the "scientific . . . knowledge" language of Rule 702 in justifying its "scientific validity" hurdle.[195] Second, the *Daubert* Court, and others, have pointed to the "assist the trier of fact" language of Rule 702 to justify exclusion of expert witness testimony when the judge determines that the expert's opinion is questionable, either because the expert relied on questionable data or a questionable methodology. The argument apparently is that if the testimony is questionable, it will not "assist the trier of fact."[196] Third, some courts have read the "if [the evidence is of] a type reasonably relied upon by experts in the particular field" language of Rule 703 to justify a pre-admissibility reliability check on the adequacy of the expert's underlying data used in reaching his or her conclusions.[197]

While each of these interpretations may seem superficially plausible, a closer look at each of these phrases in the context in which they were adopted reveals that none will support the restrictive interpretations suggested for them.

(post-*Daubert* decision applying restrictive admissibility standard to plaintiff's expert testimony in product's liability case). See *infra* note 243 and accompanying text for a discussion of the varying standards applied in determining the admissibility of expert scientific testimony under Rule 703. Varying admissibility standards will continue under Rule 703 because the *Daubert* decision provides no insight into the proper interpretation of this Rule.

194. *Daubert*, 113 S. Ct. at 2794.

195. *Id.* at 2795 ("In short, the requirement that an expert's testimony pertain to 'scientific knowledge' establishes a standard of evidentiary reliability.") & n.9 ("In a case involving scientific evidence, *evidentiary reliability* will be based upon *scientific validity*.").

196. *See, e.g., id.* at 2795-96 (tying valid "scientific connection" requirement to Rule 702's "assist the trier of fact" language); DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 956-57 (3d Cir. 1990).

197. *See, e.g.*, Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1114-15 (5th Cir. 1991) (en banc) (per curiam), *cert. denied*, 112 S. Ct. 1280 (1992); *In re* "Agent Orange" Prod. Liab. Lit., 611 F. Supp. 1223, 1248-50 (E.D.N.Y. 1985), *aff'd*, 818 F.2d 187 (2d Cir. 1987), *cert. denied sub nom.* Lombardi v. Dow Chem. Co., 487 U.S. 1234 (1988).

1. *Rule 702: "Scientific . . . Knowledge That Will Assist the Trier of Fact"*

"Scientific . . . knowledge": The *Daubert* Court, relying on a position advanced by the United States as amicus curiae, ruled that Rule 702's introductory phrase "scientific, technical, or other specialized knowledge," imposed a reliability limitation on the admissibility of relevant scientific testimony.[198] When scientific expert testimony is proffered under Rule 702, the Court stated that the testimony must constitute "scientific . . . knowledge."[199] The Court then proceeded to explain that such evidence can be considered "scientific . . . knowledge" only if the evidence is sufficiently reliable, which in this context, required that the evidence be "scientifically valid."[200] In giving this interpretation of "scientific . . . knowledge," the Court cited to a dictionary and two amicus briefs,[201] but failed to cite any legal authority that might in even an indirect way suggest that Congress intended the "scientific . . . knowledge" language to incorporate such a reliability analysis.

This omission is not surprising given that no court in the eighteen years since the Rules' adoption has ever read "scientific . . . knowledge" to incorporate a reliability analysis. Moreover, nothing in the legislative history or the Advisory Committee's Notes supports such an interpretation.[202] To the contrary, the legislative history establishes that Congress did not use the word "knowledge" in Rule 702 to establish a reliability hurdle on the admission of expert testimony. Instead, the legislative history demonstrates that Congress included the "scientific, technical, or other specialized knowledge" language in this Rule to make clear that a wide variety of educational or experiential backgrounds could provide a witness with specialized information about an issue that might assist the trier of fact.

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198. *Daubert*, 113 S. Ct. 2786, 2795-97 & n.9 (1993).

199. *Id.* In its amicus brief in *Daubert*, the United States stated:

> Rule 702's requirement that the expert witness testify to what is "known" excludes mere unsubstantiated hypotheses or theories, however sincerely the witness may believe them. The concept of "knowledge" about a subject, however, does not necessarily encompass only irrefutable certitudes. It would be sensible in certain contexts to refer more broadly to what is "known," as that which has been satisfactorily established for a given purpose.

Amicus Brief for the United States, Daubert v. Merrell Dow Pharmaceuticals, Inc., No. 90-102 (U.S. brief filed Jan. 19, 1993). Indeed, most aspects of the Court's opinion appear to be adopted in whole or substantial part from the Amicus Brief for the United States, including the need to dispense with *Frye* because it is too rigid, the four considerations that suggest whether given testimony is scientifically valid, the need for the testimony to be "helpful" in a heightened relevancy sense, and the supporting roles that Rules 703 and 403 play.

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

201. *Id.* at 2795.

202. *Cf.* State Farm Fire & Cas. Co. v. Tashire, 386 U.S. 523, 535-37 & n.17 (1967) (rejecting proposed interpretation of interpleader statute because "[t]here is not a word in the legislative history suggesting such a purpose").

By requiring expert testimony to pertain to "knowledge," Congress did not intend trial courts to examine the reliability of that testimony or its bases. Congress described the subject matter of expert testimony as "knowledge" simply to maintain consistency with Rule 602's requirement that witnesses have "personal knowledge" of the facts to which they testify in order to be considered competent.[203] "Knowledge," as used in both Rule 602 and Rule 702, does not, and indeed cannot, require a witness to know the truth of that which he or she testifies. A witness has actual knowledge of the truth only if what the witness believes that he or she saw, heard, or understood accurately reflects what actually happened. Yet, determining the accuracy of the witness's belief is the primary goal of the adversary process. The American judicial system relies on the crucible of trial to test witnesses to determine whether their beliefs as to what they saw, heard, or understood accurately represents what occurred. Under *Daubert*'s interpretation, if the trial judge must first determine the truth or accuracy of a witness's knowledge before the witness will be permitted to testify, there is no need to confirm that "truth" through the farce of a trial. The effect of such a rule is to shift to the trial judge the authority to decide the merits of a case in determining which expert's or witness's knowledge was accurate or true enough to admit into evidence. Therefore, consistency with what actually happened, or substantive validity, cannot serve as the standard for admissibility, because such a standard would eliminate the need for an adversarial truth-finding process.[204] Instead of substantive validity, "knowledge," as an admissibility standard, requires only that a witness have "*some qualification which will make them worth listening to.*"[205]

Historically, the "knowledge" requirement necessitated that the witness have an "*opportunity of observing* what was or has happened and shall have *directed his attention* or observation to the matter."[206] For example, in *Bratt v. Western Air Lines, Inc.*,[207] a farmer living about five miles from the scene of an airplane crash testified as follows:

> [T]hat during the ten years he had lived in this place, he was in the habit of listening to the sounds of the motors of the airplanes which passed over his home daily, and sometimes many times during the day; that on the evening of the accident in question, and at about the time it occurred, his attention was attracted by the sound of airplane motors passing over his home[;] . . . that at about the time this airplane would in the normal course of its flight pass over his home, he heard a noise of engines that was different from the usual and ordinary noise he had heard daily over a period of years[; and t]hat in this particular instance the "motors would come and go off and the

203. FED. R. EVID. 602 ("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.").

204. *See* 2 WIGMORE, *supra* note 41, § 650.

205. *Id.* (emphasis in original).

206. *Id.* (emphasis in original).

207. 155 F.2d 850 (10th Cir.), *cert. denied*, 329 U.S. 735 (1946).

noise would come and go."[208]

The trial judge excluded the farmer's testimony "on the grounds that there was no showing that the motors the witness heard were those of the plane in question, and for the further reason" that the opinion that the "motors would come and go off" was a mere "guess" given the altitude of the plane and the possibility that the sound of the engines was somehow distorted.[209] The court of appeals reversed, however, holding that the farmer's personal observations were "knowledge" sufficient to be admissible given that he had some reasonable opportunity to observe the facts and form an opinion concerning an important issue in the litigation.[210] The fact that the farmer's opportunity to observe was neither perfect nor certain to reflect the truth of the accident did not render his testimony inadmissible.[211]

By requiring expert testimony to reflect "scientific . . . knowledge," Congress did not intend to create a pre-admission validity or reliability check on expert testimony. Instead, Congress substituted the adjective "scientific" for the adjective "personal" to distinguish Rule 702's "scientific . . . knowledge" from Rule 602's "personal knowledge," in recognition of the fact that Rule 702 knowledge will often be founded, in part, upon expertise in a particular field, rather than upon firsthand observation of the facts at issue in the proceeding.

"Knowledge" then, as used in Rule 702, refers not to scientifically accurate testimony, but to testimony based upon an *opportunity* to observe or determine the truth.[212] Upon demonstration that a witness had the opportunity to derive relevant insights or observations on a given issue, defects in the witness's knowledge have traditionally been left to the adversarial system to uncover.[213] *Daubert*'s interpretation of "scientific . . . knowledge" as a reliability standard places the judge in the posi-

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208. *Bratt*, 155 F.2d at 854.

209. *Id.*

210. *Id.*

211. *Id.*; *see also* 2 WIGMORE, *supra* note 41, § 660. As Professor Wigmore explained:

> Thus it is that the law may reject testimony which appears to be founded on data so scanty that the witness' alleged inferences from them may at once be pronounced absurd or extreme. This principle, however, sound as it is in theory, can seldom have frequent application. When the source of knowledge is so insufficient, courts will rarely need to pronounce the formal exclusion of the testimony. Its weakness is self-exhibited. The risk of excluding a useful though small item of testimony is greater than the risk of admitting testimony capable of exaggeration. Cross-examination will usually furnish the exposure.

Id.

212. *See, e.g.*, Twin City Plaza, Inc. v. Central Sur. & Ins. Corp., 409 F.2d 1195, 1201-02 (8th Cir. 1969) (expert testimony held admissible even though "[t]here exists the possibility that one of more of these [several intervening] factors . . . had caused the damage").

213. Evaluation of the reliability of expert testimony is generally thought to be a jury function. *See* Barefoot v. Estelle, 463 U.S. 880, 898, 900-01 (1983); Mitchell v. Lone Star Ammunition, Inc., 913 F.2d 242, 252 (5th Cir. 1990) ("It is the jury's province to determine whether expert testimony rests upon tenuous evidentiary inferences and weak scientific or engineering data."); *see also* DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 956 (3d Cir. 1990) (The Rules "embody a strong and undeniable preference for admitting

tion of weighing the evidence, and therefore, effectively deciding the merits in many science-based cases, such as toxic torts.

Additionally, by phrasing the Rule to include "scientific, technical, or other specialized knowledge," Congress intended to make clear that a wide variety of educational or experiential backgrounds might provide a witness with an adequate opportunity to develop insights into a particular factual issue. As the Advisory Committee's Notes explain:

> The rule is broadly phrased. The fields of knowledge which may be drawn upon are not limited merely to the "scientific" and "technical" but extend to all "specialized" knowledge. Similarly, the expert is viewed, not in a narrow sense, but as a person qualified by "knowledge, skill, experience, training or education." Thus, within the scope of the rule are not only experts in the strictest sense of the word, e.g. physicians, physicists, and architects, but also the large group sometimes called "skilled" witnesses, such as bankers or landowners testifying to land values.[214]

As this discussion suggests, Congress used the "scientific, technical, or other specialized knowledge" language in Rule 702 to identify those individuals who would be competent to offer expert opinions.[215] Such broad language was necessary to make clear that Congress did not intend to permit courts to continue the common law's practice of excluding a skilled witness's testimony by finding that the witness's knowledge was not sufficiently specialized to be beyond the understanding of the average juror.[216] The distinction between "experts in the strictest sense" and "skilled" experts detailed in the Advisory Committee's Notes confirms that Congress intended to reject the common law's tendency to apply the "need" standard to limit the admissibility of expert testimony by skilled witnesses. Given this context, the adjective "scientific" merely identifies people who work in science as one group of individuals who, by virtue of their experience and education, will often have the *opportunity* to possess specialized information that can be admitted in the form of opinion testimony if it will assist the trier of fact in understanding or resolving a fact at issue. Thus, instead of a reliability standard, Rule 702 incorporates an expansive "identification" criterion that is intended to suggest the myriad of persons who may be permitted to testify as experts under the Rules.

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any evidence having some potential for assisting the trier of fact and for dealing with the risk of error through the adversarial process.").

214. FED. R. EVID. 702 advisory committee's note.

215. *See also Rules of Evidence: Senate Hearings*, *supra* note 67, at 154.

> It should be noted that, though an expert's opinion is limited to issues within his area of special expertise, an "expert" is not defined in a narrow sense, but as a person qualified by "knowledge, skill, experience, training, or education." Therefore, the term "expert" encompasses not only physicians, physicists, architects, etc., but also the group of witnesses sometimes termed "skilled."

Id.

216. *See* 7 WIGMORE, *supra* note 41, § 1923; *see also supra* notes 157-58 and accompanying text.

Further support for finding that Rule 702's scientific knowledge language represents an identification, rather than a reliability, criterion can be found by returning the phrase "scientific . . . knowledge" to the context of the Rule. Rule 702 reads: "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue . . . ."[217] By tying the adjective "scientific" to the adjectives "technical, or other specialized," the language of the Rule confirms that the phrase "scientific . . . knowledge" simply describes one category of individuals who, by virtue of their experience and education, will often possess insights into relevant issues such that they should be allowed to testify in opinion form, if such testimony will assist the trier of fact to understand and resolve the case. To suggest that Congress intended the adjective "scientific" to incorporate a substantive requirement of "scientific validity" would necessarily imply that the parallel use of the adjectives "technical" and "other specialized knowledge" was also intended to incorporate similar reliability checks, an argument bordering on the frivolous.[218]

Additionally, in discussing "scientific . . . knowledge" more specifically, the Advisory Committee referred generally to physicians and physicists. By referring to "physicians" and "physicists" generally, rather than to "physicians who hold scientifically valid opinions" or "physicists who practice 'good science,'" the Committee seems to emphasize the use of the adjective "scientific" in the Rule as simply descriptive of a type of knowledge, and appears to reject the *Daubert* Court's argument that the phrase "scientific . . . knowledge" necessarily incorporates the substantive requirement that the expert's opinion satisfy a standard of "scientific validity."

Thus, in context, the phrase "scientific . . . knowledge" represents one aspect of Rule 702's identification criterion, in that it was intended to describe one type of educational or experiential background that would likely provide a witness with an opportunity to know something that could help the trier of fact to understand more appreciably an issue in dispute. Under Rule 702, the opinion of such an expert can be admitted if it will assist the jury. Clearly, *Daubert*'s restrictive interpretation of this phrase is inconsistent with the intentions of Congress.

"Assist the trier of fact": Certain courts, including the *Daubert* Court, have read Rule 702's requirement that proffered expert testimony "assist the trier of fact" to justify pre-admission scrutiny of an expert's underlying data or methodology, and to exclude such expert testimony if the trial judge concludes that the testimony is based upon questionable data or methodology.[219] While exclusion of fundamentally unsupported evi-

217. FED. R. EVID. 702.

218. *Cf. Daubert*, 113 S. Ct. at 2800 (Rehnquist, C.J., dissenting) ("Does all of this dicta apply to an expert seeking to testify on the basis of 'technical or other specialized knowledge' . . . ?").

219. *See, e.g., Daubert*, 113 S. Ct. at 2795-96 (reading the "assist the trier of fact" language to require "a valid scientific connection to the pertinent inquiry"); DeLuca v. Mer-

dence may be appropriate under Rule 401,[220] Congress did not intend this language to authorize exclusion of expert testimony simply because the trial judge concludes that the testimony is questionable, or on the scientific fringe.

The mistake that the restrictive courts have made is to extract the phrase, "assist the trier of fact," from the context of Rule 702 and to use it in undertaking what amounts to a free-form inquiry into the type of expert testimony that might provide the most assistance to a jury.[221] Divorced from its context, it becomes obvious to argue that valid, or substantively correct, expert testimony would provide more assistance to the trier of fact than would invalid expert testimony.[222] Additionally, the restrictive reading of the "assist the trier of fact" language would appear to be facially consistent with the Advisory Committee's explanation that opinions may be excluded if "they are unhelpful, and therefore superfluous and a waste of time."[223] Again, taken out of context, a valid opinion would seem to be more "helpful"[224] than an invalid, or questionable, one.

Yet, if the language is returned to its proper context, several considerations establish that Congress did not intend the phrase, "assist the trier of

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rell Dow Pharmaceutical, Inc., 911 F.2d 941, 954-55 (3d Cir. 1990); Viterbo v. Dow Chem. Co., 826 F.2d 420, 422 (5th Cir. 1987) (citing Rule 702's "assist the trier of fact" requirement, and then explaining that "[i]f an expert opinion is fundamentally unsupported, then it offers no expert assistance to the jury."); *see also* Jonakait, *supra* note 52, at 767 (interpreting "assist the trier of fact" literally to require pre-admissibility screening of the basis of an expert's opinion for reliability); *cf.* Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1114 (5th Cir. 1991) (en banc) (per curiam) (court combines Rules 702 and 703 in holding that careful scrutiny of an expert's underlying data and methodology is appropriate under Rule 703 because an unsupported opinion "cannot be helpful to the jury"), *cert. denied*, 112 S. Ct. 1280 (1992).

220. *See supra* notes 61-62 and accompanying text.

221. This sort of acontextual interpretation of code language has been a recurring problem. *See* Hickman v. Taylor, 329 U.S. 495, 518 (1947) (Jackson, J., concurring) (In discussing whether trial preparation material was discoverable under the Federal Rules of Civil Procedure, Justice Jackson wrote: "It is true that the literal language of the Rules would admit of an interpretation that might sustain the district court's order . . . . But all such procedural measures have a background of custom and practice which was assumed by those who wrote and should be by those who apply them."); *Rules of Evidence: House Hearings I*, *supra* note 33, at 209 (testimony of Robert L. Clare, Jr., New York Trial Lawyers Committee) ("[The new judges] are the ones who get in trouble [with a uniform code of evidence] because they look at the black letters and they have tried to apply it without knowing why they got there or why that rule was in.").

222. *See Daubert*, 113 S. Ct. at 2796 ("Rule 702's 'helpfulness' standard requires a valid scientific connection to the pertinent inquiry as a precondition to admissibility.").

223. The Advisory Committee's Notes to Rule 702 provide in pertinent part: "Whether the situation is a proper one for the use of expert testimony is to be determined on the basis of assisting the trier. . . . When opinions are excluded, it is because they are unhelpful and therefore superfluous and a waste of time." FED. R. EVID. 702 advisory committee's notes.

224. Although the Advisory Committee defined the standard for exclusion in terms of "unhelpful[ness]," courts, including the *Daubert* Court, have instead imposed a "helpfulness" requirement in analyzing the meaning of Rule 702's "assist the trier of fact" language. *Daubert*, 113 S. Ct. at 2796; *see also DeLuca*, 911 F.2d at 954 ("Rule 702's helpfulness requirement implicitly contains the proposition that expert testimony that is based on unreliable methodology is unhelpful and therefore excludable."); *In re* "Agent Orange" Prod. Liab. Lit., 611 F. Supp. 1223, 1242 (E.D.N.Y. 1985), *aff'd*, 818 F.2d 187 (2d Cir. 1987), *cert. denied sub nom.* Lombardi v. Dow Chem. Co., 487 U.S. 1234 (1988).

fact," to authorize a pre-admissibility screening of expert testimony for validity or reliability. As a threshold matter, Congress intended this language to address the very specific issue of whether expert testimony would continue to be governed by the strict "need" standard of the common law, or the more liberal "assistance" standard that Professor Wigmore advocated. In context, the "assist the trier of fact" language reflects Congress's decision to reject the "need" standard in favor of the more liberal "assistance" standard. By choosing the more liberal standard, Congress intended to shift from a standard that admitted expert testimony only when the jury would be *incapable* of understanding or resolving an issue without the aid of an expert, to a standard that permitted such testimony on any issue where the jury would be somewhat *more capable* with the aid of an expert.[225]

Congress's intentions for the "assist the trier of fact" standard become evident when one considers the authorities cited in the Advisory Committee's Notes for Rule 702. These cited authorities are entirely inconsistent with *Daubert*'s interpretation of this phrase.[226] The Advisory Committee's Notes cite the work of Professors Ladd and Wigmore as guides in distinguishing helpful from unhelpful expert testimony under Rule 702.[227] Significantly, in the cited portions,[228] neither Ladd nor Wigmore define helpfulness in terms of the validity or reliability of the expert's opinion. Instead, both discuss and reject the early common law's position that expert testimony was admissible only to the extent necessary for the trier of fact to understand an issue, or in other words, only to the extent the testimony satisfied the common law's "need" standard.[229] These commentators endorsed an admissibility analysis which would admit the expert testimony, even when it was not essential, if the testimony would assist the trier of fact to understand or resolve an issue.[230]

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225. *See supra* notes 66-82 and accompanying text.

226. Because the *Daubert* Court apparently found the "assist the trier of fact" language unambiguous, it did not bother to check its literalist interpretation of this language against the interpretations given in these sources. *See Daubert*, 113 S. Ct. at 2795-96 (interpreting the language out of context, without any reference to the sources that the Advisory Committee actually cited).

227. The Advisory Committee used the phrase "unhelpful" to describe the sort of expert testimony that may be excluded under the "assist the trier of fact" standard. *See* FED. R. EVID. 702 advisory committee's notes ("When opinions are excluded, it is because they are unhelpful and therefore superfluous and a waste of time."). The Rule's "helpfulness" or "assistance" standard is specifically meant to suggest that expert testimony will be admissible upon a lesser showing of need for the testimony than the "need" standard imposed under the common law. *See supra* notes 66-79 and accompanying text.

228. In discussing the requirement that testimony reflect "knowledge," Wigmore required that the testimony "involve rational inferences from adequate data." 2 WIGMORE, *supra* note 41, § 659. Wigmore warned, however, that with respect to expert scientific testimony, trial judges should generally admit such evidence to permit "whatever light can be thrown upon the issue by competent persons and then leaving their credit to the jury." *Id.* § 662. Wigmore advocated this approach even when "the subject is one in which certain and accurate results are difficult to reach and upon which most persons' opinions will be merely notational and conjectural. . . ." *Id.*

229. *See supra* notes 66-82 and accompanying text.

230. WIGMORE, *supra* note 41, § 1918; Ladd, *supra* note 79, at 418 n.18.

Additionally, these commentators provide crucial insight into the Advisory Committee's intentions in defining the "assist the trier of fact" standard in terms of "[ ]helpful[ness]." As Professor Ladd's quoted article explains, helpfulness focused not on the substantive validity or accuracy of the expert's opinion, but on whether "'the untrained layman would be qualified to determine *intelligently and to the best possible degree* the particular issue without enlightenment from those having a specialized understanding of the subject involved in the dispute.'"[231] Similarly, Wigmore, in his discussion of the issue, defined the "helpfulness" issue by examining whether the expert testimony would be "superfluous."[232] As did Ladd, Wigmore made clear, however, that whether testimony should be considered "superfluous," and therefore unhelpful, turned not on the validity or accuracy of the proffered testimony, but instead on whether the trier of fact might better understand an issue with the aid of an expert's testimony:

> *It is not that there is any fault to find with the witness himself or the sufficiency of his sources of knowledge or the positiveness of his impression; but simply that his testimony, otherwise unobjectionable, is not needed, is superfluous.*
>
> Thus the principle of exclusion is in no sense one of testimonial qualifications, but one of auxiliary policy. . . .[233]

In Wigmore's view, this evidentiary principle provides for exclusion of expert testimony as superfluous where the court or trier of fact possesses knowledge and information such that the testimony of an expert would add no further insight into, or understanding of, the issue.[234] As an example of this principle, Wigmore explained that if the deceased's clothes have been admitted into evidence, expert testimony on the issue of whether the clothes "were what is commonly described as black" can be excluded as superfluous.[235] Testimony on such an issue would not give the trier of fact "real help" in resolving or understanding the issue because the average lay juror would be equally capable of determining for himself or herself whether clothing could be described as black. Therefore, expert testimony on such an issue could be properly excluded as

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231. *See* FED. R. EVID. 702 advisory committee's notes (quoting Ladd, *supra* note 79, at 418) (emphasis added).

232. 7 WIGMORE, *supra* note 41, § 1918 (section cited with approval FED. R. EVID. 702 advisory committee's notes).

233. 7 WIGMORE, *supra* note 41, § 1918 (section cited in FED. R. EVID. 702 advisory committee's notes) (emphasis added); *see also* 2 WIGMORE, *supra* note 41, § 679 ("But by the opinion rule . . . the tribunal will not listen to conclusions or opinions from persons who possess no more skill than the tribunal itself in drawing inferences from the premises. . . .").

234. *Id.* ("We are dealing merely with a broad principle that, whenever the point is reached at which the tribunal is being told that which it is itself entirely equipped to determine without the witness' aid on this point, his testimony is superfluous and is to be dispensed with."); *see also* 2 WIGMORE, *supra* note 41, § 679 ("But by the opinion rule (§ 1918 *infra*) the tribunal will not listen to conclusions or opinions from persons who possess no more skill than the tribunal itself in drawing inferences from the premises.").

235. *Id.* § 1918.

"unhelpful."[236]

Thus, Wigmore's discussion would exclude as "superfluous," and therefore unhelpful, expert testimony that concerned an issue on which an expert's insights would not add to the trier of fact's own knowledge or understanding of the issue.[237] Significantly, Wigmore emphasized that this principle of exclusion should not focus on, or find "fault" with, the expert or the expert's "sources of knowledge," but instead on whether the issue is one on which expert testimony could add something to the trier of fact's own thoughts on the issue.[238]

By basing its interpretation of the "assist the trier of fact" standard on an improper, acontextual definition of "unhelpful[ness]," the *Daubert* Court has inappropriately injected a reliability analysis into the admissibility standard. The Advisory Committee's Notes plainly demonstrate that the drafters intended the "assist the trier of fact" language of Rule 702 to permit admission of expert testimony so long as the subject was one on which the jury could expect to receive some insight from the specialized knowledge of an expert. The Advisory Committee intended "assist the trier of fact" to authorize exclusion of expert testimony under Rule 702 only when the testimony would substantially duplicate information already available to, or concern an issue readily understood by, the average trier of fact.

Additional support for rejecting *Daubert*'s analysis can be found in Congress's decision to tie the "assist the trier of fact" language of Rule 702 to Rule 702's introductory phrase concerning the "scientific, technical, or other specialized knowledge" of an expert, rather than to any given expert's testimony.[239] If Congress had intended Rule 702 to encompass a pre-admissibility screening of particular opinions for validity, it would have provided that an expert's opinion is admissible if "the expert's opinion will assist the trier of fact to resolve an issue correctly." Instead, by tying the "assist the trier of fact" language to "scientific, technical or other specialized knowledge," Congress directed courts to examine the matter at issue, and to determine whether that matter is one which the trier of fact might better understand or resolve with the aid of the specialized knowledge of an expert.[240]

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236. *Id.*

237. *See also* 2 WIGMORE, *supra* note 41, § 557 ("Thus, it will often depend on the special qualifications of the witness whether he can add anything valuable which the jury have not already for themselves."). As Wigmore explained, without such a safeguard, the courts could be inundated with repetitive expert testimony that could inappropriately influence a jury by virtue of its sheer volume, rather than by its additional insights.

238. *See also* 2 WIGMORE, *supra* note 41, §§ 557, 679.

239. FED. R. EVID. 702 ("If scientific, technical, or other specialized knowledge will assist the trier of fact . . . .").

240. *See Christophersen*, 939 F.2d 1106, 1116-17 (5th Cir. 1991) (Clark, C.J., concurring) ("The advisory committee's notes make it clear that this rule focuses any question of assistance on the nature of the jury's factual inquiry rather than on the substance of the expert's testimony."), *cert. denied*, 112 S. Ct. 1280 (1992).

Thus, *Daubert*'s incorporation of a reliability check into the "assist the trier of fact" standard is without support. By using the "assist the trier of fact" language and citing to Ladd's and Wigmore's discussions, Congress intended to reject the "need" standard of the early common law, and replace it with a broader standard for the issues on which an expert would be permitted to testify. Under this broader "assistance" standard, Congress intended expert testimony to be admissible so long as it would help the trier of fact to understand more appreciably a matter at issue, even if the testimony was not essential to understanding or resolving the issues.[241] By ignoring the applicable legislative history and historical context of the Rules' drafting and adoption,[242] *Daubert* and the other restrictive courts have substantially reoriented this Rule and increased the burden of proof for plaintiffs who must rely on scientific evidence to prove causation.

As an alternative to the language of Rule 702, some courts have relied upon the language of Rule 703 to justify restricting the admissibility of questionable scientific testimony.

2. *Rule 703: "Of a Type Reasonably Relied Upon"*

Although there is considerable controversy on the issue of whether Rule 703 may be used to restrict the admissibility of questionable scientific testimony, several courts have interpreted Rule 703 to authorize a trial court to exclude expert testimony which the court finds to be based upon questionable underlying data, regardless of whether such underlying data is independently admissible into evidence.[243] In justifying this

241. *See Christophersen*, 939 F.2d at 1116-17 (Clark, C.J., concurring) ("The advisory committee's notes make it clear that this rule focuses any questions of assistance on the nature of the jury's factual inquiry rather than on the substance of the expert's testimony."); Hagen v. Richardson-Merrell, Inc., 697 F. Supp. 334, 337 (N.D. Ill. 1988); *In re* Swine Flu Immunization Prods. Liab. Litig., 533 F. Supp. 567, 579 (D. Colo. 1980).

242. In contrast, the *Daubert* Court considered the Rules' legislative history in determining whether *Frye* had survived enactment of the Rules. *See Daubert*, 113 S. Ct. at 2794. *See also* Hickman v. Taylor, 329 U.S. 495, 518 (1947) (Jackson, J., concurring) (In discussing whether trial preparation material was discoverable under the Federal Rules of Civil Procedure, Justice Jackson wrote: "It is true that the literal language of the Rules would admit of an interpretation that might sustain the district court's order . . . . But all such procedural measures have a background of custom and practice which was assumed by those who wrote and should be by those who apply them."); *Rules of Evidence: House Hearings I*, *supra* note 33, at 209 (testimony of Robert L. Clare, Jr., New York Trial Lawyers Committee) ("[The new judges] are the ones who get in trouble [with a uniform code of evidence] because they look at the black letters and they have tried to apply it without knowing why they got there or why that rule was in.").

243. *Compare* Richardson v. Richardson-Merrell, Inc., 857 F.2d 823, 830 (D.C. Cir. 1988) (Rule 703 requires a sufficient foundation for expert's opinion; "chemical, *in vitro*, and *in vivo* [studies] cannot furnish a sufficient foundation for a conclusion that Bendectin caused the birth defects at issue in this case"), *cert. denied*, 493 U.S. 882 (1989) *and* Viterbo v. Dow Chem. Co., 826 F.2d 420, 423-24 (5th Cir. 1987) (expert opinion based upon laboratory tests and oral history "lacks the foundation and reliability necessary" to be admissible) *and In re* "Agent Orange" Prod. Liab. Lit., 611 F. Supp. 1223, 1246 (E.D.N.Y. 1985) (discussing whether Rule 703 should require trial court to determine whether expert relied upon reliable data, or a reliable type of data, and adopting former view), *aff'd*, 818 F.2d 187 (2d Cir. 1987), *cert. denied sub nom.* Lombardi v. Dow Chem. Co., 487 U.S. 1234 (1988)

interpretation, the *Christophersen* court explained that restricting Rule 703's analysis to expert testimony based solely on inadmissible data would "render Rule 703 impotent as a tool for testing the trustworthiness of the facts and data underlying the expert's opinion in a given trial."[244]

Significantly however, Rule 703 was never intended as a means of testing the trustworthiness of the underlying data, either admissible or inadmissible, upon which an expert relied. As previously discussed, Congress's purpose in enacting Rule 703 was to eliminate the common law rule that an expert's opinion could not be based on hearsay. By eliminating the common law rule, Congress intended to eliminate the "excruciatingly long hypothetical question,"[245] and to provide an additional source of information upon which an expert's opinion could be founded: the type of facts or data reasonably relied upon by experts in the field, even if that information would otherwise constitute hearsay.[246] In exchange for allowing experts to rely upon this additional source of information, Congress imposed the requirement that the inadmissible hearsay evidence be "of the type reasonably relied upon by experts in the particular field," and permitted, under Rule 705, opposing counsel to force disclosure of the underlying hearsay evidence through cross-examination.

As a corollary principle, if the facts or data upon which an expert bases his or her opinion are independently admissible, a judge may not consider whether the facts or data upon which the expert relied "are of the type reasonably relied upon by experts in the particular field."[247] In this situation, Congress depended on the adversarial process to identify and bring to the jury's attention the unreliable nature of the facts upon which an expert relied. For this reason, the "of the type reasonably relied upon" language of Rule 703 only becomes an issue if the facts or data upon which an expert has relied are inadmissible.

Even when proffered expert testimony is based upon inadmissible facts or data, two considerations suggest that the proper role of the trial court

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with DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 953 (3d Cir. 1990) ("Rule 703 is satisfied once there is a showing that an expert's testimony is based on the type of data a reasonable expert in the field would use in rendering an opinion on the subject at issue . . . .") *and In re* Bendectin Prods. Liab. Litig., 732 F. Supp. 744, 748 (E.D. Mich. 1990) (in evaluating proffered testimony on Bendectin causation, court noted that when examining expert testimony under Rule 703 the court "must determine whether the data underlying [the causation opinion] is of the type reasonable relied upon by experts in the field without separately evaluating the trustworthiness of the particular data") *and In re* Swine Flu Immunization Prods. Liab. Litig., 533 F. Supp. 567, 578 (D. Colo. 1980) (held admissible expert testimony based upon laboratory testing of plaintiff's blood even though the medical community had not accepted the expert's conclusions drawn from the testing).

244. *See, e.g., Christophersen*, 939 F.2d at 1114.

245. *See supra* note 91.

246. *See supra* notes 88-93 and accompanying text, concerning the historical development and purpose of Rule 703.

247. *See Christophersen*, 939 F.2d at 1110 n.4. The *Christophersen* majority recognized that the "of the type reasonably relied upon" language of Rule 703 applied only to inadmissible evidence, yet, without explanation, proceeded to evaluate the trustworthiness of apparently admissible evidence under this language. *See id.* at 1118-19 (Clark, C.J., concurring).

under Rule 703 is to determine whether the expert has used a reasonable "type" of data in forming his or her opinion, not whether the data itself reasonably supports the opinion. First, if Congress intended Rule 703 to incorporate a reliability analysis focusing on the specific data an expert uses, rather than the type of data, it could certainly have said so.[248] Instead, Congress chose to focus Rule 703's language on the "type" of data, making it clear that the drafters intended for courts to evaluate the reliability of the category or kind of data, rather than the integrity of the data itself. Moreover, Congress retained language focusing on the "type" of data despite specific warnings that the language would permit experts to rely upon incompetent data.[249]

The Advisory Committee's Notes also reflect that the drafters intended courts to evaluate the type of data relied upon, rather than the data itself.[250] Specifically, the examples in the Notes focus on the types of data on which experts rely, such as a physician's reliance on statements from the patient and the patient's relatives, reports and opinions of other medical personnel, hospital records, and laboratory reports, rather than the specific facts or data that these sources contain in a particular case.[251] Thus as an initial matter, the language of the Rule and the Advisory Committee's Notes which explain the application of the Rule both direct the trial court to examine whether the information upon which the expert has relied is the *type* upon which experts in the field reasonably rely, not whether a reasonable expert would rely upon the *particular* facts or data available in a specific case.[252]

Second, the restrictive reading of Rule 703 leads to disparate treatment of an expert's opinion depending on whether the opinion is based upon admissible or inadmissible data,[253] and also renders Rule 705 largely irrelevant. If an expert's opinion is based on admissible data, Rule 703 does not apply by its own terms[254] and any weaknesses in the underlying

248. For example, Congress could have drafted the second sentence of Rule 703 to read: "If the facts or data would be reasonably relied upon by experts in the particular field in forming opinions or inferences, such facts or data need not be admissible in evidence."

249. *See supra* notes 103-05 and accompanying text.

250. *See supra* notes 95-98 and accompanying text.

251. FED. R. EVID. 703 advisory committee's notes.

252. *Christophersen*, 939 F.2d at 1118 (Clark, C.J., concurring). *See also* DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 953 (3d Cir. 1990) ("Rule 703 is satisfied once there is a showing that an expert's testimony is based on the type of data a reasonable expert in the field would use in rendering an opinion on the subject at issue; it does not address the reliability or general acceptance of an expert's methodology.").

253. Rule 703 intends to treat opinions based upon admissible data differently from opinions based upon inadmissible data in one respect. If data is independently admissible, then it is not hearsay (or is admissible hearsay), and as a result, does not raise hearsay reliability questions. To ensure that the hearsay reliability problems potentially associated with inadmissible data are not excessive, Rule 703 requires that the inadmissible data be "of a type reasonably relied upon by experts in the particular field." FED. R. EVID. 703. Such a requirement addresses the hearsay reliability problems that the introduction of testimony based upon such inadmissible evidence might otherwise present.

254. FED. R. EVID. 703 ("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.").

data must be demonstrated to the trier of fact through effective cross-examination. Alternatively, if the expert has relied upon inadmissible data in forming his or her opinion, then Rule 703 would apply. If a court reads Rule 703 restrictively, to authorize the trial judge to examine the underlying *data* for reasonableness, then the opponent of the evidence could keep the evidence from the trier of fact altogether if he or she can convince the trial judge that the data does not provide a valid basis for the expert's opinion. Such an option is not available to the opponent of expert testimony based upon admissible data.

Moreover, the restrictive interpretation of Rule 703 would render Rule 705's cross-examination provision unnecessary. If the trial judge determines that proffered expert testimony has a reasonable basis and admits it, an attorney would have little interest in bringing to light the admittedly reasonable underlying factual basis through cross-examination under Rule 705. On the other hand, if the testimony lacks a reasonable basis, then it would be excluded, and an attorney would have no need to cross-examine the expert under Rule 705 concerning the factual basis of the excluded testimony. Therefore, in addition to creating unintended disparities in the treatment of opinions depending on whether they are based upon admissible or inadmissible data, the restrictive interpretation of Rule 703 would also render Rule 705 redundant.

In contrast, a reading of Rule 703 that authorizes the trial judge to examine the *type* of data upon which the expert has relied would place expert opinion based upon inadmissible data on essentially the same footing as an opinion based upon admissible data. As a threshold matter, the court would ensure that the inadmissible data on which an expert relied was of a reasonable type, thereby addressing possible hearsay reliability problems associated with the inadmissible data. While such a check is not directly required for opinions based upon admissible data, the fact that the underlying data is independently admissible ensures that the data will not suffer from any *hearsay* reliability problems. Having addressed potential hearsay reliability problems, both opinions would be admitted, and any weaknesses in the underlying data could be brought to the trier of fact's attention through cross-examination, either directly if the underlying data is independently admissible, or under Rule 705's cross-examination provision.

Thus, of the two possible interpretations of Rule 703, only a reading that directs trial courts to focus on the type of data, rather than the data itself, will ensure parallel treatment of expert opinions based on either inadmissible or admissible data. Furthermore, only the "type of data" reading of Rule 703 will ensure that Rule 705 plays the role plainly intended for it.[255] This parallel treatment concern, and the Rule's provision for cross-examination under Rule 705, confirm that Congress intended for the proper check on the use of unreliable data, as opposed to an unre-

255. On the interrelation between Rules 703 and 705, *see supra* note 94.

liable *type* of data, to be cross-examination.[256]

3. *Inconsistency with Rule 403*

In addition to the language and history of Rules 702 and 703, and the interaction between Rules 703 and 705, the restrictive interpretations of Rules 702 and 703 are also inconsistent with the general framework of the Rules which favors admissibility.[257] While the restrictive courts have referred to Rule 403 as an additional basis to exclude expert testimony, their restrictive interpretations of Rules 702 and 703 are likely, as a practical matter, to displace almost entirely Rule 403's balancing test in determining the admissibility of scientific evidence.[258] If the result of the restrictive interpretations of Rules 702 and 703 is to render another apparently applicable Rule[259] irrelevant,[260] this violence to the basic structure of the Rules tends to confirm the conclusion drawn from the plain-

256. *See supra* notes 99-101 and accompanying text; *see also* Ladd, *supra* note 79, at 422 (In dispensing with the common law's requirement that the facts upon which an expert's opinion is based be first admitted into evidence, either directly or through the use of a hypothetical question, "[t]he opportunity of the opponent to cross-examine is looked upon as a sufficient safeguard to faulty testimony.").

257. *See* FED. R. EVID. 401 (generous standard of relevancy), 402 (all relevant evidence is admissible unless otherwise specifically provided), 403 (relevant evidence may be excluded only if the dangers associated with admitting the evidence substantially outweigh its probative value); *see also* Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2793-94 (1993).

258. *See* DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 957 (3d Cir. 1990) ("Moreover, if [an expert's] testimony survives the rigors of Rule 702 and 703 on remand, Rule 403 is an unlikely basis for exclusion."); *see also* Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1116 (5th Cir. 1991) (en banc) (per curiam) (casually dismissing Rule 403 as unnecessary to the court's decision because the court had already concluded that exclusion was proper under Rule 703 or *Frye*), *cert. denied*, 112 S. Ct. 1280 (1992).

259. By its terms, Rule 403 applies to all relevant evidence. FED. R. EVID. 403 ("Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice . . . ."). In a few circumstances, Congress prebalanced the dangers and probative value of specific evidence and displaced Rule 403's general danger versus probative value balance by a more specific Rule. *See* FED. R. EVID. 404 (defining circumstances where character evidence is admissible), 406 (habit), 407 (subsequent remedial measures), 408 (compromise and offers to compromise), 409 (payment of medical and similar expenses), 410 (plea bargains), 411 (liability insurance), 412 (past behavior of victim in sex offense cases), 609 (impeachment by past conviction). Congress has not done so for admissibility decisions concerning questionable expert testimony. *See also supra* notes 66-105 and accompanying text.

260. While the *Daubert* Court did not interpret Rule 702 to require trial judges to balance the reliability and validity of the expert testimony against its dangers, the Court cites with approval the Third Circuit's interpretation of the Rule in United States v. Downing, 753 F.2d 1224 (3d Cir. 1985). *See Daubert*, 113 S. Ct. at 2797. In *Downing*, the Third Circuit interpreted Rule 702 to require consideration both of the reliability of the proffered testimony, and the dangers resulting from its admission. *Downing*, 753 F.2d at 1239. The *Downing* court expressly recognized that its restrictive reading of Rule 702 "incorporates to some extent a consideration of the dangers . . . enumerated in FED. R. EVID. 403," but failed to consider that the overlap that its reading of Rule 702 created would tend to suggest that it had erred in interpreting Rule 702. *Id.* at 1242. Even when a later Third Circuit decision read *Downing*'s Rule 702 standard to displace almost entirely the applicability of Rule 403 to questionable expert testimony, *see* DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 957 (3d Cir. 1990), the Third Circuit failed to recognize that this abrogation of Rule 403 might suggest that it had impermissibly reoriented the basic framework of the Rules.

meaning and legislative history of Rules 702 and 703: the restrictive courts have misread them.[261]

The discussion that follows considers the more rigorous admissibility standards that the pre-*Daubert* courts applied in toxic tort cases, as contrasted with more traditional tort and criminal cases. The restrictive courts' heightened admissibility inquiry in toxic tort cases, as well as the courts' dicta expressing tremendous skepticism concerning scientific expert testimony in such cases, demonstrate that these courts will likely apply even *Daubert*'s apparently even-handed approach in a selectively restrictive manner.

B. Varying Admissibility Standards: Criminal, Traditional Tort, and Toxic Tort Cases

In enacting the Rules, Congress expressly provided in Rule 1101(b) that the Rules were to be applied generally in all federal proceedings (except bankruptcy and summary contempt proceedings).[262] Therefore, if the evidentiary hurdles that the pre-*Daubert* restrictive courts imposed represented a reasonable interpretation of the plain-meaning of the Rules, one would expect that these courts would have applied the same interpretations to both civil and criminal proceedings.[263] Yet, these courts have not done so. In both the criminal context and in more tradi-

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261. *See* Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1120 (5th Cir. 1991) (Clark, C.J., concurring) (expressing confusion at both the majority's and dissent's refusal to weigh expert testimony under Rule 403, noting "Rule 403 is as much a part of the Rules of Evidence that govern this case as Rules 702 and 703"), *cert. denied*, 112 S. Ct. 1280 (1992). Rule 403 has been described as the "cornerstone" on which the Federal Rules of Evidence were built. 22 Charles Alan Wright & Kenneth W. Graham, Jr., Federal Practice and Procedure § 5212, at 250 n.1 (1978) (citing Peterfreund, *Relevancy and its Limits in the Proposed Rules of Evidence for the United States District Courts: Article IV*, 25 Record of N.Y.C.B.A. 80, 81 (1970)). As such, careful consideration must be given to the relationship that Rule 403 has to other Rules, or courts may expand or limit their discretion in ways not intended by the drafters of the Rules. 22 Wright & Graham, *supra*, § 5213 ("The scope of Rule 403 is of some importance. Other rules confer discretion on particular issues; unless careful consideration is given to the relationship of those rules to Rule 403, courts may expand or limit discretion in ways not intended by the drafters of the Evidence Rules.").

262. Federal Rule of Evidence 1101(b) provides as follows:

> (b) Proceedings generally. These rules apply generally to civil actions and proceedings, including admiralty and maritime cases, to criminal cases and proceedings, to contempt proceedings except those in which the court may act summarily, and to proceedings and cases under title 11, United States Code.

Fed. R. Evid. 1101(b). *See also supra* notes 34-50 and accompanying text.

263. When a criminal defendant offers expert testimony as part of his or her defense, the defendant's right under the United States Constitution to establish a defense may justify greater leeway in admitting questionable scientific testimony. *See* 22 Wright & Graham, *supra* note 261, § 5166, at 75; *see also* United States v. Whitetail, 956 F.2d 857, 859-60, 862 (8th Cir. 1992) (admit expert testimony and permit cross-examination with respect to the underlying facts upon which the experts based their opinions). Therefore, this article will limit its consideration to the differences between application of the Rules to scientific expert testimony proffered by toxic tort plaintiffs and by the government in criminal prosecutions.

tional contract and tort cases, the courts refused to apply the restrictive interpretations given the Rules in toxic tort cases.

For example, the difference in the treatment of expert testimony between criminal and toxic tort cases is illustrated by contrasting the admissibility decisions in *United States v. Smith*[264] and in *Christophersen*.[265] Both cases considered whether an expert should be permitted to testify as to a central issue based upon a questionable methodology. In the criminal case, *Smith*, the prosecution's expert, Dr. Hirotaka Nakasone, used a technique known as spectrographic voice identification to identify which of two twin sisters had telephoned various banks and authorized wire transfers of nonexistent funds.[266] While Dr. Nakasone admitted that the technique was "controversial and that some studies had found high error rates,"[267] the court held that the evidence was sufficiently reliable to be admitted even if "the entire scientific community does not support it."[268] In reaching its decision, the court noted that Dr. Nakasone was candid about the limitations of the technique and was subject to "rigorous cross-examination."[269]

Thus, in this criminal case the court admitted expert testimony based upon questionable methodology, so long as the expert admitted the limits of the methodology, and the opposing counsel had the opportunity to cross-examine the witness concerning the reliability of the analysis. In contrast, the *Christophersen* court refused to admit expert testimony as to causation on behalf of a toxic tort plaintiff under similar circumstances. As in *Smith*, the expert in *Christophersen* admitted the limits of his methodology,[270] and the opposing counsel would have had an adequate opportunity to cross-examine the expert concerning the reliability of his analysis, yet the *Christophersen* court refused to permit the jury to hear the expert's testimony.

The Fifth Circuit was similarly willing to admit questionable scientific evidence adverse to a criminal defendant in *United States v. Johnson*.[271] In *Johnson*, the Fifth Circuit permitted an "expert"[272] to testify, over the defendant's objection, that he could identify the origin of marijuana based upon the plant's appearance, its smell, and the effects of smoking

264. 869 F.2d 348 (7th Cir. 1989).

265. Christophersen v. Allied-Signal Corp., 939 F.2d 1106 (5th Cir. 1991), *cert. denied*, 112 S. Ct. 1280 (1992).

266. *Smith*, 869 F.2d at 350.

267. *Id.* at 353.

268. *Id.* at 354.

269. *Id.*

270. *See supra* notes 118-21 and accompanying text. Dr. Miller testified that although the information on which he relied in making his exposure determination contained factual inaccuracies, so long as the exposure occurred in general as described to him, his opinion as to causation remained unchanged. Christophersen v. Allied Signal Corp., 939 F.2d 1106, 1125 (5th Cir. 1991) (Reavley, J., dissenting), *cert. denied*, 112 S. Ct. 1280 (1992).

271. 575 F.2d 1347, 1361-62 (5th Cir. 1978).

272. As his qualifications for identifying the source of the marijuana at issue, the witness referred to his extensive history of using and dealing in the drug. *Id.* at 1360.

it.[273] The only evidence suggesting that the expert could accurately identify the source of the marijuana was the witness's bald assertion that he could do so.[274] In justifying its ruling, the court explained that it could not "say that the claim of an ability to identify Columbian marijuana is so inherently implausible that, as a matter of law, a jury should not be permitted to hear testimony on the identification."[275] The court reached this conclusion despite testimony from a defense expert that such identification was not possible.[276] As was the case in *Smith*, the court was willing to leave the credibility of the expert's testimony to the adversarial process, so long as the jury was made aware of the limitations of the expert's methodology, and the opposing counsel had an opportunity to illustrate the weaknesses of the expert's testimony through cross-examination. The willingness of the courts to trust the adversarial process to deal appropriately with expert testimony in criminal litigation,[277] circumstances under which a defendant runs the risk of forfeiting life or liberty, stands in sharp contrast to the pre-*Daubert* restrictive courts' treatment of such evidence in toxic tort cases.[278]

In addition to the different standard applied in the criminal area, certain courts applied a more restrictive standard to the admissibility of expert testimony in toxic tort litigation than the standard applied in more traditional contract and tort cases.[279] For example, in a product's liability case, the defendant asked a panel of the Fifth Circuit to follow the evi-

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273. *Id.*

274. *Id.*

275. *Id.* at 1362.

276. On the issue of whether the expert's testimony would "assist the trier of fact," the court did not examine the questionable basis for the testimony, nor the helpfulness of this specific expert's testimony. Instead, the court, as Congress intended, examined whether the issue, the origin of the marijuana, was one on which the jury might be helped by the specialized knowledge of an expert. *Id.* at 1361 ("[T]estimony which would identify the source of the marijuana would be of obvious assistance to the jury.").

277. *See also* United States v. Hickey, 596 F.2d 1082, 1089 (1st Cir.) (Expert testimony on whether hair samples taken from a ski mask and sweater found in the getaway car implicated the defendant properly admitted where the "jury was made well aware of the limitations of the evidence" and "the link between the sweater and mask and the robbery was strong, and the similarity of hairs, while not affirmatively implicating [the defendant], 'enhanced the probability of guilt' and was therefore probative."), *cert. denied*, 444 U.S. 853 (1979); United States v. Hollman, 541 F.2d 196, 200-01 (8th Cir. 1976) (court held admissible expert testimony that the drug seized was heroin based upon comparison with a substance that a government official had told the prosecution's expert was heroin, even though there was no proof that the substance to which the seized heroin was compared actually was heroin).

278. In one quite cynical sense, the varying treatment of questionable scientific evidence can be understood. If one assumes that conservative judges desire defendants to be exonerated in toxic tort cases, and defendants to go to jail in criminal cases, and if one further assumes that questionable evidence will more often be of benefit to the plaintiff in toxic tort cases and to the district attorney in criminal cases, then to achieve the desired outcomes, such evidence would not be admitted in toxic tort cases, but would be admitted in criminal cases.

279. *See* Mitchell v. Lone Star Ammunition, Inc., 913 F.2d 242, 252 n.17 (5th Cir. 1990); Breidor v. Sears Roebuck & Co., 722 F.2d 1134, 1138-39 (3d Cir. 1983) (expert permitted to testify as to probable cause of fire "by eliminating all but one reasonable potential cause").

dentiary standards that that Circuit announced in *Brock v. Merrell Dow Pharmaceuticals, Inc.*,[280] a toxic tort case. Specifically, the defendant asserted that the underlying data on which an expert had based his opinion was "egregiously skimpy."[281] Drawing on the reasoning and holding of the court in *Brock*, the defendant asked the court to examine the adequacy of the underlying data, find the data insufficient to support the expert's testimony, and reverse a jury's award of damages against the defendant that had been based on the expert's testimony.[282] The *Mitchell* panel responded to this request in the following manner:

> [The defendant] argues that *Brock* permits appellate courts to look behind the conclusions of expert witnesses in determining the sufficiency of the evidence. *By its express language, the holding in Brock at least arguably applies only to "mass toxic tort" cases*, because of the "growing realization among academics, lawyers, and judges that cases such as this present special problems and challenges to traditional ideas regarding the role of the jury as a decisionmaker."[283]

Significantly, the Fifth Circuit's seeming proposal to create a special body of evidentiary law for toxic tort cases did not go unnoticed by the judiciary. As the Third Circuit explained:

> We understand and sympathize with the concerns expressed in *Brock* over the costs and inequities that flow from inconsistent outcomes in Bendectin cases, the potential effect erroneous verdicts have on the availability of useful medicines, and the wastefulness of continued reconsideration of an identical scientific issue in the courts . . . .
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> However, our concern over these issues is tempered by our recognition that *we do not have the authority to create special rules to address the problems posed by continued Bendectin litigation. . . . Moreover, we may not manipulate our interpretation of the Federal Rules of Evidence to exclude expert testimony that on the record before us may satisfy the normal standards of admissibility*. Nor are we at liberty, especially in a case to be decided under our diversity jurisdiction, to impose different burdens of proof on Bendectin plain-

280. 874 F.2d 307 (5th Cir.), *modified*, 884 F.2d 166 (5th Cir. 1989), *cert. denied*, 494 U.S. 1046 (1990). For a discussion of this case, see *infra* notes 288-95 and accompanying text.

281. *See Mitchell*, 913 F.2d at 252. In *Mitchell*, injured servicemen and survivors of other servicemen killed in an explosion of a mortar shell brought a products liability action against the manufacturers of the shell. *Id.* at 243-44. The plaintiffs' experts had investigated and discovered cracks in four shell casings from the same lot as the exploding shell, as well as a number of shells with voids in the explosive filler. *Id.* at 244, 250. Based upon this evidence and the fact that the shell had exploded, the plaintiffs' experts concluded that either a crack in the shell casing, a void in the explosive filler, or some combination thereof was the most likely cause of the explosion. *Id.* at 250-52. Based upon this evidence, the jury held both the manufacturer of the shell casing and the manufacturer of the explosive filler liable.

282. *Id.* at 252 n.17.

283. *Id.* (emphasis added); *see also In re* "Agent Orange," 611 F. Supp. 1223, 1260 (E.D.N.Y. 1985) ("[s]uch careful scrutiny of proposed [scientific] evidence is especially appropriate in the toxic tort area"), *aff'd*, 818 F.2d 187 (2d Cir. 1987), *cert. denied sub nom.* Lombardi v. Dow Chem. Co., 487 U.S. 1234 (1988).

tiffs than those that would apply in analogous products liability suits.[284]

The differences in the pre-*Daubert* standards for admission of expert testimony suggest that the restrictive courts were not simply engaging in legitimate statutory interpretation, but were instead attempting to implement tort reform by manipulating the Federal Rules of Evidence. In addition, the restrictive courts' special evidentiary rules in the toxic tort area seemed to create a distinct body of evidentiary law applicable to this area, an express violation of Rule 1101(b).

C. The Restrictive Courts & Tort Reform

While it is generally difficult to catch red-handed a court engaging in judicial lawmaking (since it can so easily be cloaked as mere statutory construction, if a court is motivated enough to do so),[285] the pre-*Daubert* restrictive courts in the area of toxic torts supported their interpretations of the Rules with what amount to declarations of public policy. These public policy declarations are especially telling, in view of the fact that these statements were generally accompanied by "notice provisions" (which bordered on warnings)[286] that seemed intended to send a message

284. DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 951-52 (3d Cir. 1990) (emphasis added).

285. Thus, accusations of "judicial lawmaking" usually come from the dissent as a vain attempt to remind fellow justices of their proper role. *See, e.g.*, County of Washington v. Gunther, 452 U.S. 161, 183-84 (1981) (Justices Rehnquist, Berger, Stewart and Powell, in dissent, accuse the majority of following its own policy choice instead of the will of Congress: "The Court is obviously more interested in the consequences of its decision than in discerning the intention of Congress. In reaching its desired result, the Court conveniently and persistently ignores relevant legislative history and instead relies on what it believes Congress *should* have enacted.") (emphasis in original).

286. The Fifth Circuit has stated:

> In sum, we adhere to the deferential standard for review of decisions regarding the admission of testimony by experts. Nevertheless, we take this occasion to caution that the standard leaves appellate judges with a considerable task. We will turn to that task with a sharp eye, particularly in those instances, hopefully few, where the record makes it evident that the decision to receive expert testimony was simply tossed off to the jury under a "let it all in" philosophy. *Our message to our able colleagues: It is time to take hold of expert testimony in federal trials.*

In re Air Crash Disaster, 795 F.2d 1230, 1234 (5th Cir. 1986) (emphasis added). This warning was repeated in Slaughter v. Southern Talc Co., 919 F.2d 304, 307 n.3 (5th Cir. 1990). In response to the philosophical shift in the Fifth Circuit's position, Chief Judge Clark observed:

> The majority opinion distorts or ignores the letter and spirit of the Federal Rules of Evidence. Today's case ought to be decided based on the plain language of the three applicable rules. By overlaying these rules with its *own agenda for exclusion* the majority disserves our trial judges in this difficult area of their work.

Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1122 (5th Cir. 1991) (Clark, C.J., concurring) (emphasis added), *cert. denied*, 112 S. Ct. 1280 (1992). Judges King, Reavley, Johnson and Weiner, in dissent, noted the following: "Lest anyone misunderstand, at the root this is not a case about the Federal Rules of Evidence, albeit that two of them may have been mangled in the process. *It is instead about the outcomes in toxic tort cases.*" *Id.* at 1136 (emphasis added). *See also* Turpin v. Merrell Dow Pharmaceuticals, Inc., 959 F.2d 1349, 1352 (6th Cir. 1992) (court justifies taking "hard look" at "scientific cases based pri-

to the lower courts that the rules with respect to toxic tort litigation had changed.[287]

The Fifth Circuit's decision in *Brock v. Merrell Dow Pharmaceuticals, Inc.*,[288] for example, provides an express declaration of the restrictive courts' toxic tort reform agenda. In *Brock*, the Fifth Circuit upheld the trial court's decision to grant judgment notwithstanding the verdict in a case where the jury awarded the minor plaintiff $550,000 for her congenital limb reduction defect which the jury attributed to her mother's ingestion of the prescription anti-nausea drug, Bendectin. In upholding the j.n.o.v., the court explained that the plaintiff had presented insufficient evidence on the issue of whether Bendectin had caused her limb reduction defect to enable a reasonable jury to conclude that causation existed. The court found the plaintiff's evidence insufficient because she failed to introduce statistically significant epidemiological proof as to the cause of her injury.[289] While the court did not require epidemiological evidence in all cases, the court described such evidence as "certainly a very important element."[290]

In reaching its decision, the *Brock* court appears to have tipped its hand that it was manipulating the Rules in order to achieve toxic tort reform when the court admitted that under the "traditional approach" of evaluating such evidence, "courts would not peer beneath the reasoning of medical experts to question their reasoning."[291] The *Brock* court explained the basis for its rejection of the "traditional approach" by observing that in the area of "mass toxic torts," there was a "growing realization among academics, lawyers, and judges that cases such as this present special problems and challenges to traditional ideas regarding the role of the jury as decisionmaker."[292]

The *Brock* panel went on to explain that confronted as it was with "difficult medical questions, courts must critically evaluate the reasoning process by which experts connect data to their conclusions in order for courts to consistently and rationally resolve the disputes before them."[293] The

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marily on expert testimony" because of the potential for "juror misunderstanding" and because expert witnesses "are not necessarily always unbiased scientists"); *In re* "Agent Orange," 611 F. Supp. at 1260 (noting that "[t]he uncertainty of the evidence in [toxic tort] cases, dependent as it is upon speculative scientific hypothesis and epidemiological studies, creates a *special need for robust screening of experts* and gatekeeping under Rules 403 and 703") (emphasis added).

287. *See, e.g.*, *Christophersen*, 939 F.2d at 1122 (Reavley, J., dissenting) ("The judges of this court have in recent years been sending warning signals about their displeasure with expert testimony. Today the court 'takes hold' of expert testimony by taking over.").

288. 874 F.2d 307 (5th Cir.), *modified*, 884 F.2d 166 (5th Cir. 1989), *cert. denied*, 494 U.S. 1046 (1990).

289. *Brock*, 874 F.2d at 313. The plaintiffs' experts had based their causation opinions upon statistical reanalysis of existing epidemiological data and upon *in vitro* testing. While the statistical reanalysis did demonstrate some possibility that Bendectin causes birth defects, the causal relationship was not statistically significant. *Id.* at 312-13.

290. *Id.*

291. *Id.* at 309.

292. *Id.*

293. *Id.* at 310.

court based the need for this judicial intrusion on public policy considerations implicated by the tort system. As the court explained:

> [I]n mass torts the same issue is often presented over and over to juries in different cases, and the juries often split both ways on the issue. The effect of this is to create a state of uncertainty among manufacturers contemplating the research and development of new, and potentially life-saving drugs. Appellate courts, if they take the lead in resolving those questions upon which juries will go both ways, can reduce some of the uncertainty which can tend to produce a sub-optimal amount of new drug development.[294]

Other restrictive courts also justified their interpretations of the Rules on the basis that drug companies would not otherwise be able to maintain their research and development activities unless the courts provided some level of certainty as to the outcomes in toxic tort cases.[295]

As an alternative to the *Brock* justification,[296] some courts restricted the admissibility of expert testimony in toxic tort cases because of their fear that a jury would not consider the evidence in a rational or fair manner given the usually serious nature of the alleged injury, and the possibility of holding somebody (anybody?) liable.[297] As the *Lynch* court, for example, observed, "[t]he sight of a helpless mutilated youngster may evoke emotion along with the corresponding wish to make somebody pay for his or her plight . . . [creating the] very real possibility of runaway emotion overcoming judgment."[298] To avoid that possibility, the restrictive courts authorized trial judges to step in and substitute their, appar-

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294. *Id.* (footnotes omitted). Other courts have rejected the *Brock* panel's reasoning: "We understand and sympathize with the concerns expressed in *Brock* over the costs and inequities that flow from inconsistent outcomes in Bendectin cases, [but] . . . we do not have the authority to create special rules to address the problems posed by continued Bendectin litigation." DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 951-52 (3d Cir. 1990).

295. *Cf.* Turpin v. Merrell Dow Pharmaceuticals, Inc., 959 F.2d 1349, 1349 (6th Cir.) ("For a judicial system founded on the premise that justice and consistency are related ideas, the inconsistent results reached by courts and juries nationwide on the question of causation in Bendectin birth defect cases are of serious concern."), *cert. denied*, 113 S. Ct. 84 (1992).

296. Actually, both justifications that the restrictive courts give in describing the need for toxic tort reform are grounded upon a perception that corporate defendants need to be protected from American juries.

297. DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 952 (3d Cir. 1990) (stating that the need for scrutiny of expert testimony "is naturally heightened when an expert is testifying on behalf of a plaintiff as sympathetic as a child crippled by serious birth defects"); Richardson v. Richardson-Merrell, Inc., 857 F.2d 823, 832-33 (D.C. Cir. 1988) ("The circumstances of the case are tragic and Carita Richardson's plight evokes the utmost sympathy. It would be foolhardy to expect members of the jury to be without compassion for the catastrophe that befell this family. That is a natural response of the human spirit, and is without legal consequence so long as it is properly controlled. But in a case such as this it not only is appropriate but indeed imperative that the court remain vigilant to ensure that neither emotion nor confusion has supplanted reason. . . . The scientific issues are complex, the trial was lengthy, and the evidence and testimony were often difficult to understand. There was an emotional factor at play, a circumstance we are not at liberty to ignore."), *cert. denied*, 493 U.S. 882 (1989); Lynch v. Merrell-National Labs., 830 F.2d 1190, 1196 (1st Cir. 1987).

298. *Lynch*, 830 F.2d at 1196.

ently more rational, judgment concerning the credibility and reliability of an expert's testimony, for that of the jury. These policy justifications, when considered in conjunction with the strained reading of the Rules necessary to justify such a shift and the failure to adopt consistently restrictive admissibility standards in non-toxic tort cases, demonstrate that "tak[ing] hold" of expert testimony was one of the methods the restrictive courts chose to accomplish their agenda of tort reform.[299]

D. Judicial Amendment of the Rules in the Toxic Tort Area

In authorizing a substantial gatekeeping role for the trial judge, the restrictive courts have taken specific language of Rules 702 and 703 out of context and given it a meaning that Congress never intended. In doing so, these courts have ignored the historical common law limitations on the admissibility of expert testimony that the Rules were intended to remedy,[300] and distorted the relationship between Rules 702 and 703 and the remaining Rules.[301] Additionally, and perhaps more importantly, the restrictive courts have fundamentally reoriented the testing of expert testimony away from a system that relies on the adversarial system and the good sense of jurors towards a system that relies primarily on the judge to test the reliability and validity of expert testimony.

It goes almost without saying that such "reinterpretation" of Rules 702 and 703 is impermissible, both as a general matter of statutory interpretation[302] and more particularly because of the special nature of the Federal Rules of Evidence. The availability of the specific amendment procedure in the Rules Enabling Act[303] suggests that reorientation of the Rules' basic philosophy[304] without benefit of amendment is particularly

299. As discussed in the Introduction, courts can accomplish their goal of toxic tort reform in one of two ways: First, through the evidentiary approach discussed in this article, or second, by admitting the evidence at trial, but finding the evidence insufficient to establish causation as a matter of law. Although *Brock* turned on the sufficiency of the plaintiff's evidence at trial, rather than the exclusion of the plaintiff's evidence under the Rules, the court's opinion foreshadows the court's future restrictive interpretation of the Rules in *Christophersen*, discussed *supra*. Further, while the *Brock* panel used the procedural approach to prevent the plaintiff's case from reaching the jury, the *Brock* panel also approved of the evidentiary approach: "[C]ourts must critically evaluate the reasoning process by which the experts connect data to their conclusions in order for courts to consistently and rationally resolve the disputes before them." Brock v. Merrell Dow Pharmaceuticals, Inc., 874 F.2d 307, 310 (5th Cir.), *modified*, 884 F.2d 166 (5th Cir. 1989), *cert. denied*, 494 U.S. 1046 (1990).

300. *See supra* notes 66-105 and accompanying text.

301. *See supra* notes 257-61 and accompanying text.

302. *See supra* notes 51-53 and accompanying text.

303. *See supra* notes 54-59 and accompanying text.

304. Even in a criminal case in which the defendant's life was at stake, the Supreme Court observed:

> The rules of evidence generally extant at the federal and state levels anticipate that relevant, unprivileged evidence should be admitted and its weight left to the fact finder, who would have the benefit of cross-examination and contrary evidence by the opposing party.
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> . . .
>
> If [those psychiatrists who are willing to testify as to the probability of future dangerousness of a criminal defendant] are so obviously wrong and

inappropriate.

Moreover, this reorientation is unnecessary given that Congress authorized trial judges to evaluate relevant, but questionable, scientific evidence under the structured balancing test of Rule 403. The following Section explores the application of this Rule to the admissibility of scientific expert testimony.

V. RULE 403: BALANCING PREJUDICE AND PROBATIVE VALUE FOR QUESTIONABLE SCIENTIFIC EVIDENCE

While the restrictive courts have exaggerated to some extent the dangers associated with expert testimony, there is little reason to doubt that certain risks attend a decision to admit questionable scientific testimony. As the legislative record reflects, Congress was aware of the risks that expert testimony may present, and provided two limitations on the admission of unreliable or invalid expert testimony. These reliability checks are found not in the language of Rules 702 and 703, but in two more general provisions: Rule 401 and Rule 403.

Under Rule 401, Congress provided that only relevant evidence may be admitted.[305] While Rule 401's relevancy standard is exceedingly generous,[306] expert testimony that "is 'almost entirely unreliable,' [relies] upon 'assumptions devoid of any basis in the real world,' . . . '[abuses] known facts' or '[contradicts] proven facts,' or [is] so manifestly wrong as to offend common sense" could appropriately be excluded under even Rule 401's broad relevancy standard.[307]

Furthermore, even when questionable expert testimony satisfies Rule 401's relevancy standard,[308] Rule 403 gives the trial judge discretion to

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> should be discredited, there should be no insuperable problem in doing so by calling members of the [American Psychiatric] Association who are of that view and who confidently assert that opinion in their amicus brief.
>
> . . .
>
> We are unconvinced, however, at least as of now, that the adversarial process cannot be trusted to sort out the reliable from the unreliable evidence and opinion about future dangerousness, particularly when the convicted felon has the opportunity to present his own side of the case.

Barefoot v. Estelle, 463 U.S. 880, 898, 900-01 (1983); *see also* DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 956 & n.18 (3d Cir. 1990) ("[The Federal Rules of Evidence] embody a strong and undeniable preference for admitting any evidence having some potential for assisting the trier of fact and for dealing with the risk of error through the adversary process."); *cf.* Edward W. Cleary, *Preliminary Notes on Reading the Rules of Evidence*, 57 Neb. L. Rev. 908, 910 (1978) ("A further underlying assumption is that the Rules will operate within the framework of an adversary system, with professional lawyer representation of the parties as the norm.").

305. *See supra* notes 60-62 and accompanying text.

306. *See, e.g.*, 22 WRIGHT & GRAHAM, *supra* note 261, § 5165.

307. Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1127 (5th Cir. 1991) (Reavley, J., dissenting) (citations to previous Fifth Circuit cases upholding exclusion of expert testimony) (footnotes omitted), *cert. denied*, 112 S. Ct. 1280 (1992).

308. *See Christophersen*, 939 F.2d at 1119 (Clark, C.J., concurring) (discussing "fundamentally unsupported but relevant expert opinions"). More generally, expert testimony that is "merely controversial, debatable, questionable, unsettled, or suspicious," if ad-

exclude relevant evidence if the trial judge first determines that the dangers of admitting the evidence substantially outweigh its probative value. This article proposes Rule 403's structured balancing test as the appropriate guide for determining the admissibility of questionable scientific evidence.

A. RULE 403: A TOXIC TORT STEP-CHILD TO RULES 702 & 703

As a starting point, it seems odd that the restrictive courts have strained to examine questionable scientific evidence under Rules 702 and 703, when Rule 403 would seem to provide an ideal vehicle by which courts could determine the admissibility of such evidence. By its own terms, Rule 403 grants the trial judge discretion to exclude evidence "[a]lthough relevant . . . if its probative value is substantially outweighed by the danger[s]" associated with admitting it.[309] Given that the drafters defined the scope of the Rule to include all "relevant evidence," this Rule appears to encompass admissibility decisions concerning expert testimony.[310] Additionally, Rule 403's focus on whether the probative value of testimony is substantially outweighed by the potential dangers associated with admitting it seems, on its face, to address directly the sorts of concerns that the admission of questionable scientific evidence may raise.

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dressed to a material issue, should satisfy Rule 401's relevancy standard. *See Christophersen*, 939 F.2d at 1127 (Reavley, J., dissenting).

309. Rule 403 provides as follows: "Although relevant, 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, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence." FED. R. EVID. 403.

310. *See* Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2798 (1993); *see also* 1 WEINSTEIN & BERGER, *supra* note 90, ¶ 403[01]; MICHAEL H. GRAHAM, FEDERAL PRACTICE AND PROCEDURE: EVIDENCE §§ 6641, 6644, at 244-45, 273 (interim ed. 1992); *see also* FED. R. EVID. 403 advisory committee's notes ("The rules which follow in this Article are concrete applications evolved for particular situations. However, they reflect the policies underlying the present rule [(Rule 403)], which is designed as a guide for the handling of situations for which no specific rules have been formulated."); *Rules of Evidence: Senate Hearings*, *supra* note 67, at 139 (statement of Richard H. Keatinge & John T. Blanchard) ("*Rule 403* is one of the broadest provisions qualifying Rule 401 and providing for the exclusion of relevant evidence.") (emphasis in original). An argument might be made that Rule 702's "assist the trier of fact" requirement is intended to displace Rule 403's balancing test in the context of expert testimony. *Cf.* 3 WEINSTEIN & BERGER, *supra* note 90, ¶¶ 702[02]-702[03], at 702-18 to 702-22, 702-36 to 702-41 (referring to the "relevance and prejudice analyses implicated in Rule 702's helpfulness standard"). However, as discussed, Congress did not intend Rule 702's "assist the trier of fact" to encompass an inquiry into whether the expert's opinion is helpful in some abstract sense, a standard that might well encompass such a reliability and prejudice analysis, but to overturn the limitation sometimes expressed in the common law that the expert testimony had to concern an issue beyond the understanding of the average juror. *See supra* notes 66-82 and accompanying text. Moreover, when Congress intended to displace Rule 403's balancing test, it specifically said so. *See* FED. R. EVID. 403 advisory committee's notes (recognizing that Rules 404-412, "[t]he rules which follow in this Article . . . are concrete applications evolved for particular situations"); FED. R. EVID. 609(a)(1) (expressly providing for application of Rule 403's balancing to certain types of impeachment evidence, but not others). Congress added the Rule 403 language in Rule 609(a)(1) to address the interrelation between the two Rules after Judge Friendly raised the issue. *See Rules of Evidence: House Hearings I*, *supra* note 33, at 252 (testimony of Henry J. Friendly, Chief Judge, United States Court of Appeals for the Second Circuit).

Yet despite the seeming fit between the standard and scope of Rule 403, Rule 403 has not played a central role in determining the admissibility of expert testimony in the toxic tort area. To the contrary, the restrictive courts have chosen to rely almost entirely upon their restrictive interpretations of Rules 702 and 703 to bar the admission of questionable scientific testimony, and have thereby largely eliminated any role for Rule 403.[311] As a result, in most cases the restrictive courts have assigned Rule 403 what can, at best, be described as a background role. These courts have relied principally on Rule 702 or 703, while mentioning Rule 403 only in passing if at all.[312] In some cases, the restrictive courts have gone further and expressly stated that if testimony is admissible under the restrictive interpretations of Rules 702 and 703, then "Rule 403 is an unlikely basis for exclusion."[313]

Of those courts that have directly addressed the applicability of Rule 403 to expert testimony, two basic positions have emerged. The differing views of the concurring and dissenting judges in *Christophersen v. Allied-Signal Corp.*[314] well illustrate these two positions. While both the concurring and dissenting judges in *Christophersen* agreed that neither Rule 702 nor Rule 703 authorized a trial court to exclude an expert's opinion because it was based upon questionable data,[315] the concurrence read Rule 403 to permit the trial judge to consider the adequacy of the expert's underlying data in determining whether to exclude the expert's testimony.[316] The dissenters would not.[317]

At the heart of this disagreement lies two questions over the proper application of Rule 403 to questionable expert testimony: (i) whether a

311. *See supra* notes 257-61 and accompanying text.

312. *See* Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2798 (1993) (mentions in passing the possibility that Rule 403 might also bar the admission of questionable scientific testimony); Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1116 (5th Cir. 1991) (en banc) (per curiam) ("Because we find that Dr. Miller's testimony failed to clear either the Rule 703 or the *Frye* hurdle, we need not consider the district court's application of Rule 403."), *cert. denied*, 112 S. Ct. 1280 (1992); Lynch v. Merrell-National Lab., 830 F.2d 1190, 1196-97 (1st Cir. 1987) (a causation opinion that is not based upon epidemiological data is inadmissible under Rules 703 and 403 because of the "very real possibility of runaway emotion overcoming judgment").

313. DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 957 (3d Cir. 1990); *see also In re* Paoli R.R. Yard PCB Litig., 916 F.2d 829, 859 (3d Cir. 1990), *cert. denied sub nom.* General Elec. v. Knight, 499 U.S. 99 (1991).

314. *Christophersen*, 939 F.2d at 1120-22 (Clark, C.J., concurring), at 1134-35 (Reavley, J., dissenting).

315. *Christophersen*, 939 F.2d at 1116-20 (Clark, C.J., concurring), at 1126-34 (Reavley, J., dissenting). Both Chief Judge Clark and the dissenters also agreed that *Frye*'s general acceptance test did not bar the admission of the expert's testimony, either because *Frye* did not survive enactment of the Rules, *id.* at 1120 (Clark, C.J., concurring), or because the *Frye* standard did not reach "beyond novel device[s] or technique[s] [to subject] expert reasoning to judge-determined reliability." *Id.* at 1132 (Reavley, J., dissenting).

316. *Christophersen*, 939 F.2d at 1120-22 (Clark, C.J., concurring); *see also In re* "Agent Orange," 611 F. Supp. 1223, 1241-45 (E.D.N.Y. 1985) (Rule 403 permits trial judge to consider the adequacy of underlying data in determining whether to admit the expert's testimony under Rule 403's probative value versus dangers standard), *aff'd*, 818 F.2d 187 (2d Cir. 1987), *cert. denied sub nom.* Lombardi v. Dow Chem. Co., 487 U.S. 1234 (1988).

317. *Christophersen*, 939 F.2d at 1134-35 (Reavley, J., dissenting).

trial court can consider the weaknesses in an expert's underlying methodology and data in determining the "probative value" of the testimony; and (ii) whether the testimony of an expert creates any danger of "unfair prejudice."[318] The concurring judge, Chief Judge Clark, answered both of these questions affirmatively,[319] while Judge Reavley, writing for the dissent, answered both negatively.[320]

In considering the probative value aspect of Rule 403's balancing test, Chief Judge Clark suggested that an expert's opinion "based on such erroneous facts or data, such proven unsound methodology, or such internally inconsistent reasoning" will have "minimal" probative value under Rule 403.[321] On the issue of unfair prejudice, Chief Judge Clark explained that the combination of an "arcane and speculative" subject matter and the "expert" qualifications of the witness may lead the jury to base its decision on the fact that a particular witness has been labelled an "expert."[322] Chief Judge Clark considered that the jury's reliance on the label "expert," rather than the evidence presented, would be an improper basis for decision.[323] As a result, Chief Judge Clark found the admission of questionable scientific testimony to create a distinct risk of unfair prejudice within the meaning of Rule 403. Together with the minimal probative value of an opinion based upon questionable data or methodology, this risk of unfair prejudice could justify excluding questionable scientific testimony under Rule 403.[324]

Judge Reavley, on the other hand, expressed concern that permitting the trial court to evaluate an expert's underlying data or methodology for weaknesses in determining the probative value component of Rule 403's balancing test would inevitably lead the trial judge to "weigh contradictory testimony," and substitute his or her "opinion about the contested evidence" for that of the jury.[325] Judge Reavley also disagreed with Chief Judge Clark's view that expert testimony presents any special risk of un-

318. Chief Judge Clark discusses the basic danger that questionable scientific testimony presents in terms of "unfair prejudice." *Christophersen*, 939 F.2d at 1120 (Clark, C.J., concurring). As will be discussed, *see infra* notes 344-53 and accompanying text, questionable scientific testimony may present other dangers recognized in Rule 403 as well.

319. *Christophersen*, 939 F.2d at 1120 (Clark, C.J., concurring).

320. *Id.* at 1134-35 (Reavley, J., dissenting).

321. *Id.* at 1120 (Clark, C.J., concurring).

322. *Id.*; *see also* United States v. Solomon, 753 F.2d 1522, 1526-27 (9th Cir. 1985) (aura of scientific reliability creates risk of undue prejudice that justifies excluding testimony of questionable reliability); United States v. Fosher, 590 F.2d 381, 383 (1st Cir. 1979) (the "aura of special reliability and trustworthiness" associated with expert testimony creates risk of undue prejudice that justifies excluding testimony of questionable reliability); United States v. Addison, 498 F.2d 741, 744 (D.C. Cir. 1974) (expert testimony may "assume a posture of mystic infallibility in the eyes of a jury of laymen" that justifies excluding testimony of questionable reliability).

323. FED. R. EVID. 403 advisory committee's notes ("'Unfair prejudice' within its context means an undue tendency to suggest decision on an improper basis, commonly, though not necessarily, an emotional one.").

324. *Christophersen*, 939 F.2d at 1121-22 (Clark, C.J., concurring) (given that Dr. Miller "relied on erroneous factual assumptions," district court could properly exclude Dr. Miller's opinion testimony under Rule 403).

325. *Id.* at 1135 (Reavley, J., dissenting).

fair prejudice. Without specifically addressing Chief Judge Clark's concern that the "expert" label might become a substitute for evaluating the substance of the expert's testimony, Judge Reavley expressed the view that the only possible risk of unfair prejudice that questionable scientific testimony presents is the danger that the expert's opinion might be substantively incorrect.[326] Because the risk that evidence is untrue or inaccurate is not the sort of risk that the danger of unfair prejudice encompasses, Judge Reavley rejected the proposition that Rule 403 authorizes a trial judge to scrutinize more carefully the substantive correctness of an expert's testimony and to exclude the testimony if the trial court determines that the testimony is based on potentially inaccurate data or methodology.[327]

By suggesting opposing definitions of "probative value" and "unfair prejudice," these two opinions delineate the boundaries of the dispute over the proper application of Rule 403 to questionable scientific evidence. Once it is acknowledged that Congress did not intend either Rule 702 or 703 to encompass a pre-admission reliability check on an expert's underlying data and methodology, the dispute over the proper application of Rule 403 becomes paramount to determining the admissibility of questionable scientific evidence. The following section attempts to resolve this dispute by examining the legislative record and other indications of congressional intent to determine, first, whether a trial court may consider the reliability or validity of an expert's underlying data and methodology in determining the probative value of the expert's testimony under Rule 403, and second, whether there are any special risks associated with expert testimony that create a danger of unfair prejudice within the meaning of Rule 403.

B. Rule 403: "Probative Value" and "Unfair Prejudice"

Before enactment of the Rules, a trial judge had authority under the common law to exclude evidence on collateral issues that, while relevant, tended to mislead, distract, or confuse the jury, or unduly prolong the litigation.[328] In addition to the specific risk of confusion or distraction, the evidence might also be unexpected, and its admission would therefore find "the opponent unprepared to answer."[329] When Congress enacted Rule 403, it recognized some of these concerns and granted the trial court discretion to exclude relevant evidence under certain circumstances if the evidence had the potential to interfere with the just resolution of the issues.

For that reason, Rule 403 was thought, by some, to be a codification of

326. *Id.*
327. *Id.*
328. 2 Wigmore, *supra* note 41, § 443.
329. *Id.*

the common law.[330] Yet, the discretion granted the trial judge under Rule 403 differs from that of the common law in several important ways. Most obviously, though not of substantial importance here, Rule 403 does not recognize unfair surprise as an adequate basis for excluding evidence.[331] Of more significance here, Rule 403 established: (i) a test that balanced the probative value of relevant evidence against the potential dangers of admitting it in a far more structured manner than did the common law[332] and (ii) a presumption in favor of admitting relevant evidence by requiring that the probative value of relevant evidence be "substantially outweighed by" the dangers associated with admitting it before the trial judge had discretion to exclude the evidence.[333]

While there is no legislative history that directly discusses Rule 403 in

330. *See Rules of Evidence: House Hearings II*, *supra* note 56, at 48 (letter from Senator McClellan to Judge Maris) ("Rule 403 codifies the familiar principle that evidence, even though relevant may be excluded if its probative value is substantially outweighed by such dangers as unfair prejudice, confusion of issues, delay, etc.").

331. As initially drafted, Rule 403 provided for *mandatory* exclusion of relevant evidence if its probative value was substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, and *discretionary* exclusion if the probative value was outweighed by considerations of undue delay, waste of time, or needless presentation of cumulative evidence. FED. R. EVID. 403, 46 F.R.D. 161, 225 (Proposed Draft 1969), *reprinted in* 2 BAILEY & TRELLES, *supra* note 38, at 53. The distinction between mandatory and discretionary exclusion was criticized, however. *See Rules of Evidence: House Hearings II*, *supra* note 56, at 48 (letter from Senator John L. McClellan to Judge Albert B. Maris) ("Rule 403 also draws a distinction between those situations thought to require mandatory rather than discretionary exclusion. In my judgment, this distinction is without foundation either in prior case law or in reason .... I see no reason to purport to draw a hard and fast line that no one will be able to trace in practice. The adoption of the present draft would only provide criminal defendants with another standard ground for appeal and lead to more needless reversals and retrials in criminal cases."). The Rules Advisory Committee rewrote the proposed Rule to make exclusion discretionary under each of the listed circumstances.

At the congressional level, Rule 403 was labelled "controversial." *See Rules of Evidence: House Hearings I*, *supra* note 33, at 191 (letter from the Washington Council of Lawyers to the House Subcommittee on Criminal Justice). The rule was considered controversial because it failed to include "unfair surprise" as a basis for exclusion and because certain critics wanted to reintroduce the mandatory-discretionary distinction to the Rule. *See Rules of Evidence: House Hearings II*, *supra* note 56, at 310 (letter from Bar Association of the City of New York to the House Subcommittee on Criminal Justice); *Rules of Evidence: Senate Hearings*, *supra* note 67, at 312 (supplemental memorandum of the Washington Council of Lawyers). These comments and suggestions for revisions, however, appear to have generated little or no interest at the congressional level, and Congress ultimately enacted the Rule without further revision.

332. *See* 22 WRIGHT & GRAHAM, *supra* note 261, § 5212.

333. *See Rules of Evidence: Senate Hearings*, *supra* note 67, at 206 ("[The philosophy of the Advisory Committee was] that all relevant evidence should be admitted, subject of course, to the restraints of the Constitution and of the statutes of the Congress of the United States combined with the public policy considerations. However, the burden should be on him who seeks to exclude evidence to demonstrate that relevant evidence should not be admitted."). By requiring that the potential dangers substantially outweigh the probative value of the evidence, Rule 403 adopts that philosophy. *Id.* at 246 (reprint of Paul F. Rothstein article) ("Perhaps the predominant theme is a 'bias' in favor of admissibility.... Rule 403 provides for exclusion on an ad hoc balancing, but in order for there to be such exclusion, probative value must be 'substantially' outweighed by certain dangers, including unfair prejudice."); *see also* 22 WRIGHT & GRAHAM, *supra* note 261, § 5221.

connection with expert testimony,[334] the history does provide some indication of the meaning that Congress intended for the phrases "probative value" and "unfair prejudice." This history suggests that a trial judge can consider the reliability or validity of questionable expert testimony in determining the "probative value" of such evidence and can consider as a type of "unfair prejudice" the risk that the label, "expert," may become a substitute for evaluating the substance of the expert's testimony.

As a starting point, while Rule 403 does not itself define the phrase "probative value," Rule 401 implicitly defines "probative value" as the tendency of an item of evidence to prove or disprove a matter at issue.[335] Under Rule 401, an item of evidence has sufficient probative value to be considered relevant if it is has "any tendency to make the existence of any [material][336] fact . . . more probable or less probable than it would be without the evidence."[337] Thus, probative value reflects the relationship between the existence of one fact, which the proponent attempts to establish by introducing an item of evidence, and the existence of a legally material issue, such as causation. The probative value of proffered evidence will vary depending on the tendency of the proffered evidence to establish the matter at issue.[338]

Based on the plain language of the Rules, the phrase "probative value" would appear to encompass an evaluation of every facet of the evidence that affects the tendency of the evidence to prove or disprove the exist-

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334. As discussed, *see supra* note 331, most of the discussion before Congress related to the mandatory-discretionary distinction and whether unfair surprise should be one of the factors that would justify exclusion.

335. To derive this definition of probative value from Rule 401, one begins with the language of Rule 401 that defines as relevant "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." FED. R. EVID. 401. Then, one combines this definition of relevance with the Advisory Committee's Notes that explain that relevance determines "whether an item of evidence, when tested by the processes of legal reasoning, possesses sufficient probative value to justify receiving it in evidence." FED. R. EVID. 401 advisory committee's notes. By equating the two definitions of relevance, "probative value" becomes the tendency of an item of evidence to "make the existence of any fact that is of consequence . . . more probable or less probable." *See also* M. C. Slough, *Relevancy Unraveled*, 5 KAN. L. REV. 1, 5 (1956) (equating probative value with relevancy and the logical tendency of "Fact A" to prove "Fact B").

336. "Material" is defined in this context as a fact "that is of consequence to the determination of the action." FED. R. EVID. 401.

337. FED. R. EVID. 401.

338. *See* FED. R. EVID. 401 advisory committee's notes; *see also* George F. James, *Relevancy, Probability and the Law*, 29 CAL. L. REV. 689, 699-700 (1941). Specifically, the Advisory Committee recognized that some evidence will have more probative value than other evidence, but to be admissible under Rule 401, an item of evidence is judged not by whether it establishes on its own the matter at issue, but on whether it tends to suggest the existence of the matter at issue. *Id.* ("The standard of probability under the rule is 'more . . . probable than it would be without the evidence.' . . . As McCormick says, 'A brick is not a wall,' or as Falknor quotes Professor McBlaine, '. . . [I]t is not to be supposed that every witness can make a home run.'") (citations omitted); *see also* Herman L. Trautman, *Logical or Legal Relevancy — A Conflict in Theory*, 5 VAND. L. REV. 385, 388-89 (1952) ("Thus Fact A will be said to be relevant to Fact B when, according to human experience, it is so related to Fact B that Fact A, considered either by itself or in connection with other facts[,] renders probable the past, present or future existence or nonexistence of Fact B.").

ence of a matter at issue. If this definition is applied to determine the probative value of an expert's opinion in a toxic tort case, it seems plain that an expert's opinion based on questionable data or methodology will generally have less tendency to establish the issue to which the expert's opinion is addressed than an expert's opinion based on flawless data and methodology. In toxic tort cases, even the plaintiff's experts often recognize that more accurate data on length and extent of exposure,[339] for example, or that epidemiological data rather than *in vivo*, *in vitro*, or chemical structure analysis,[340] would provide a more certain basis for the expert's opinion on causation. Given that an opinion is usually only as reliable as its underlying basis, it would seem quite extraordinary to say that the adequacy of the opinion's basis has no bearing on the degree to which the resulting opinion would tend to make the existence of a matter in issue either more probable or less probable. Thus, in terms of the plain language of Rule 403, a determination of "probative value" would seem to require the trial judge to consider the adequacy of an expert's underlying basis.

Judge Reavley does not directly dispute the relationship between the adequacy of the underlying basis and the tendency of the resulting opinion to establish the existence of the matter at issue.[341] Instead, he argues that permitting trial judges to evaluate the adequacy of an expert's underlying basis under Rule 403 would authorize trial judges to "weigh contradictory evidence and exclude *any* proffered evidence considered unreliable."[342] Yet, evidence cannot be excluded under Rule 403 solely because it is unreliable. If evidence is unreliable, but still relevant, it may be excluded only if the trial judge first identifies one of the dangers identified in Rule 403 associated with admitting it *and* determines that the danger of admitting the evidence substantially outweighs its probative value.[343] The second question in a Rule 403 admissibility analysis is whether the admission of scientific evidence raises any of the dangers recognized under this Rule.

Without question, the admission of expert testimony can, at some point, cause such "undue delay, waste of time, or needless presentation of cumulative evidence" that the district court will have discretion under

339. *See* Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1113 (5th Cir. 1991) (en banc) ("Dr. Miller testified at his deposition that the level and duration of the patient's exposure are important considerations when evaluating the effect of exposure to a toxic substance."), *cert. denied*, 112 S. Ct. 1280 (1992). While Dr. Miller did agree that the level and duration of exposure played an important role in identifying causal relationships, he felt sufficiently comfortable with the data available to express a causation opinion to a reasonable degree of medical certainty. *Id.* at 1125 (Reavley, J., dissenting).

340. *See* Brock v. Merrell Dow Pharmaceuticals, Inc., 874 F.2d 307, 314 (5th Cir.), *modified*, 884 F.2d 166 (5th Cir. 1989), *cert. denied*, 494 U.S. 1046 (1990); Richardson v. Richardson-Merrell, Inc., 857 F.2d 823, 830 (D.C. Cir. 1988), *cert. denied*, 493 U.S. 882 (1989).

341. Judge Reavley appears more willing than either the majority or Chief Judge Clark to accept the expert's own determination that he or she has an adequate basis for rendering an opinion. *Christophersen*, 939 F.2d at 1131-32 (Reavley, J., dissenting).

342. *Id.* at 1135 (Reavley, J., dissenting) (emphasis in original).

343. FED. R. EVID. 403.

Rule 403 to exclude the additional testimony.[344] Aside from this time management concern, which is present with any sort of repetitive or cumulative evidence, the principal dangers identified in Rule 403 that may be associated with the admission of questionable expert testimony are the dangers of: (i) misleading the jury or confusion of the issues and (ii) unfair prejudice.

While sometimes mentioned as a basis for excluding questionable scientific testimony,[345] the dangers of misleading the jury or confusion of the issues will seldom provide an appropriate basis for exclusion. As with the "assist the trier of fact" language of Rule 702, the courts misinterpret the phrase "mislead the jury" by taking it out of historical context and interpreting it in the abstract. When divorced from its historical context, an argument can easily be made that a substantively incorrect expert's opinion will mislead the trier of fact by leading it to the wrong substantive outcome. While this may appear in the abstract to be a plausible interpretation of the plain-language of this Rule, the legislative history suggests that Congress used the words "misleading the jury" to address the danger that certain evidence, if admitted, "may create a side-issue that will unduly distract the jury from the main issue."[346]

Both Professors McCormick and Trautman[347] discussed the scope of the trial judge's authority to exclude evidence that would confuse the issues or mislead the trier of fact in terms of the danger of distraction that the evidence would create if it were to be admitted.[348] In discussing this

344. As Justice Holmes explained, "so far as the introduction of collateral issues goes, that objection is a purely practical one, a concession to the shortness of life." Reeve v. Dennett, 11 N.E. 938, 943 (Mass. 1887); *see also Rules of Evidence: Senate Hearings*, *supra* note 67, at 139 (statement of Richard H. Keating & John T. Blanchard) ("Rule 403 . . . merely codifies traditional concessions to the human limitations of jurors and recognizes that mortal time is finite.").

345. *Cf.* United States v. Downing, 753 F.2d 1224, 1239 (3d Cir. 1985) (in crafting a balancing test under Rule 702, court identifies need to prevent scientific testimony from confusing or misleading the jury as the central justification for excluding unreliable testimony).

346. *See* MCCORMICK ON EVIDENCE, *supra* note 83, at 319 (cited with approval by Rules Advisory Committee, FED. R. EVID. 403 advisory committee's notes); *see also* 1 WEINSTEIN & BERGER, *supra* note 90, ¶ 403[04], at 403-68 to 403-692; WIGMORE, *supra* note 41, § 443, at 529; 22 WRIGHT & GRAHAM, *supra* note 261, § 5217, at 295.

347. The Advisory Committee's Notes to Rule 403 cite these two commentators with approval. FED. R. EVID. 403 advisory committee's notes.

348. MCCORMICK ON EVIDENCE, *supra* note 83, at 319; Trautman, *supra* note 338, at 392-93 ("Thus, where Fact A is offered for the purpose of proving Fact B, and the existence of Fact A is itself disputed, an additional issue is raised. If the probative value of Fact A and its importance to the proponent for the purpose of establishing Fact B is slight, and the time required to hear the evidence for and against the existence of Fact A would be so much as to be out of proportion to the probative value of Fact A, the courts have always considered it proper to exclude such evidence, not only because of the undue consumption of time, but also because of the tendency to confuse the issues.") (citation omitted). The cases that these two commentators cite reveal a similar focus on the degree to which the evidence concerns a material issue as compared to the evidence's relationship with an immaterial collateral issue. *See* Reeve v. Dennett, 11 N.E. 938, 943-44 (Mass. 1887) (Holmes, J.) (cited by Trautman as a leading case) (issue was whether the defendant's compound was effective at mitigating pain caused by filling teeth; the defendant sought to introduce the testimony of a number of his patients who testified that after administration of the com-

issue, neither McCormick nor Trautman endorsed the exclusion of evidence simply because the trial judge believed it might be substantively incorrect. Instead, they focused on the possibility that evidence of slight probative value to a material issue might be of substantial probative value to an immaterial one.[349] If such evidence were admitted, it would create the risk that the substantial relationship between the admitted evidence and an immaterial issue could lead the jury to decide the case on the immaterial issue rather than the material one. For this reason, such evidence presents a danger of confusing the issues or misleading the jury and may therefore be excluded.[350]

It appears, then, that Congress intended the "confusion of the issues" and "misleading the jury" language of Rule 403 to address the risk that admission of certain evidence will distract the jury from the legally material issues in a case. In most toxic tort cases, the admission of questionable expert testimony will seldom present these dangers because, whatever else may be said about the expert's opinion, it is usually directed towards establishing a central element of the plaintiff's case.[351] As a result, while

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pound, the defendant's operations on their teeth were "practically painless"; over the plaintiff's objection, the testimony was admitted; the evidence related directly to the issue at hand, and while the evidence might introduce collateral issues, it was admissible); Jones v. Terminal R.R. Ass'n, 242 S.W.2d 473, 477-78 (Mo. 1951) (cited by Trautman) (issue was what caused the plaintiff's injury while riding a freight elevator; plaintiff claimed that it was due to a defect in the elevator or the negligence of a fellow employee that caused the elevator to jerk; the defendant proffered the testimony of two witnesses who stated that they, on separate occasions, had seen the plaintiff "monkey" around on the elevator and had warned him that the elevator was dangerous; over the plaintiff's objection the testimony was admitted because it went directly to a material issue in the case); Kurn v. Radencic, 141 P.2d 580, 581-82 (Okla. 1943) (cited by Trautman) (issue was whether punitive damages should be awarded against company for an intentional assault by one of its employees; in determining the appropriate award of punitive damages from the company, the court ruled that the company's knowledge of the likelihood that their employee would commit such an assault was material; plaintiff sought to introduce testimony that the same employee had previously committed similar assaults; over the defendant's objection, the testimony was admitted because it suggested in a fairly direct fashion the likelihood that the company was aware of its employee's violent propensity).

349. *See also* James, *supra* note 338, at 701.

350. *See* Veer v. Hagemann, 165 N.E. 175, 177 (Ill. 1929) (cited by McCormick on confusing the jury issue) (issue was whether testator was sound of mind; plaintiffs sought to introduce testimony that testator had purchased a farm for his son-in-law, that son-in-law still owed testator $4000 on this farm, and yet testator had devised the farm to another in his will; court excluded the testimony finding that the evidence was of marginal relevance to the testator's soundness of mind, but would strongly tend to establish the "equities of the [son-in-law], if any, in this land").

351. For example, in essentially all of the toxic tort cases discussed herein, the expert's testimony was addressed to the issue of causation, a prima facie element of the plaintiff's case. *See, e.g.*, Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786 (1993) (expert's opinion addressed whether exposure to an allegedly toxic substance caused the plaintiff's medical condition); Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1126 (5th Cir. 1991) (en banc) (per curiam) (same), *cert. denied*, 112 S. Ct. 1280 (1992); Slaughter v. Southern Talc Co., 919 F.2d 304 (5th Cir. 1990) (same); DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941 (3d Cir. 1990) (same); Ealy v. Richardson-Merrell, Inc., 897 F.2d 1159 (D.C. Cir.) (same), *cert. denied*, 498 U.S. 950 (1990); Richardson v. Richardson-Merrell, Inc., 857 F.2d 823 (D.C. Cir. 1988) (same), *cert. denied*, 493 U.S. 882 (1989); Lynch v. Merrell-National Lab., 830 F.2d 1190, 1196-97 (1st Cir. 1987) (same); Viterbo v. Dow Chem. Co., 826 F.2d 420 (5th Cir. 1987) (same); Thompson v. Southern Pac. Transp.

an expert's opinion on an issue such as causation may, and often will, lead to a side issue over the validity and reliability of the opinion's bases,[352] this side issue will seldom mislead the jury within the meaning of Rule 403 because it does not distract the jury from the material issues. Instead, resolution of this side issue bears directly on the validity of the expert's resulting conclusion, and thereby, implicates a central element of the plaintiff's cause of action.[353]

In view of the foregoing, if questionable expert testimony is to present a danger that may justify its exclusion under Rule 403, the danger must arise from a risk of "unfair prejudice." The Advisory Committee's Notes explain that "'unfair prejudice' within its context means an undue tendency to suggest decision on an improper basis, commonly, though not necessarily an emotional one."[354] The words "improper basis" appear to be intentionally broad and would seem to encompass both of the principal risks commonly associated with expert testimony: (i) authority and (ii) venality.[355]

As others have recognized,[356] expert testimony may carry an undue "aura of mystic infallibility." If a jury were to decide a case based solely on this "aura," such a basis would seem to be improper.[357] While the fact that a witness is qualified as an expert may provide some basis to believe that the expert's conclusions are correct, labelling a witness as an "expert" is based not upon the substantive correctness of the expert's opin-

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Co., 809 F.2d 1167 (5th Cir.) (same), *cert. denied*, 484 U.S. 819 (1987); *In re* "Agent Orange" Prod. Liab. Lit., 611 F. Supp. 1223 (E.D.N.Y. 1985) (same), *aff'd*, 818 F.2d 187 (2d Cir. 1987), *cert. denied sub nom.* Lombardi v. Dow Chem. Co., 487 U.S. 1234 (1988).

352. *See, e.g.*, *Christophersen*, 939 F.2d at 1134 (Reavley, J., dissenting) ("True, defense attorneys confronted Dr. Miller with all varieties of skepticism about Christophersen's exposure.").

353. For similar reasons, the difficulties the jury may encounter in understanding the "ins and outs" of epidemiology and other forms of scientific evidence sufficiently to resolve the question of causation intelligibly and the confusion that will no doubt be engendered by requiring the jury to understand and resolve complex scientific issues on which experts often disagree also do not implicate any danger recognized under Rule 403. Indeed, such confusion is an inevitable result of the states' decisions to resolve these liability questions through a litigative rather than an administrative system. *Christophersen*, 939 F.2d at 1126 (Reavley, J., dissenting) (reminding the majority that "[w]e properly entrust determinations of evidentiary weight and credibility to the jury—even in 'scientific' cases—because of our faith in the adversarial process").

354. FED. R. EVID. 403 advisory committee's notes. "Unfair prejudice" as used in Rule 403, however, should not be equated with testimony that is simply adverse to an opposing party since virtually all evidence is prejudicial in that sense, or it would not be material to a case. 1 WEINSTEIN & BERGER, *supra* note 90, ¶ 403[03], at 403-29. The issue is thought to turn on whether the proponent has adopted an "illegitimate method of persuasion" either because it appeals to "inappropriate logic" or "undesirable emotion." 22 WRIGHT & GRAHAM, *supra* note 261, § 5215. Thus, courts have excluded evidence under Rule 403 where it appealed to the jury's sympathies, aroused its sense of horror, provoked an instinct to punish, or triggered other "mainsprings of human action" that might cause a jury to base its decisions on something other than the established propositions in the case. 1 WEINSTEIN & BERGER, *supra* note 90, ¶ 403[03].

355. *See supra* notes 1-2 and accompanying text.

356. *See supra* note 2.

357. *See, e.g.*, Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1120 (5th Cir. 1991) (Clark, C.J., concurring), *cert. denied*, 112 S. Ct. 1280 (1992).

ion but on the expert's qualifications.[358] Because there may be a substantial gap between qualifications and substantive correctness, the label, "expert," would seem to be too indirectly related to the matter at issue to serve as a proper basis for deciding a case.

This potential gap between qualification and correctness is exacerbated by the fact that an expert is not generally a neutral party.[359] Because an expert witness will generally be retained by one side of the dispute or the other, the witness may have substantial incentive to emphasize a particular point of view at the expense, perhaps, of accurate science.[360] Again, if the jury were to rely on an expert's opinion that was in turn motivated or influenced substantially by the payment of an expert witness fee, such a basis would also be improper and, therefore represent a danger of unfair prejudice.

Questionable expert testimony can present a risk of "unfair prejudice" that may justify its exclusion if that risk of unfair prejudice substantially outweighs the probative value of the testimony. This interpretation need not stand on its own, however, as there are two sources that demonstrate that the drafters intended questionable scientific evidence to be evaluated under Rule 403. Edward W. Cleary, the Reporter for the Rules, expressly stated in an article published just after the Rules' enactment that the drafters intended the "common law experience [with] . . . purportedly scientific evidence in an insufficiently established field" to be applied through the "relevancy/prejudice" balance of Rule 403.[361] In addition, Professor Trautman, whose discussion of the probative value-unfair prejudice balance under the common law is cited in the Rules Advisory Committee's Notes to Rule 403, uses the admissibility of lie detector testing as his first example of proper application of the balance.[362]

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358. *Christophersen*, 939 F.2d at 1120 (Clark, C.J., concurring).

359. *But see* FED. R. EVID. 706 (authorizes trial court to appoint independent expert).

360. *See, e.g., In re* Air Crash Disaster, 795 F.2d 1230, 1234 (5th Cir. 1986) ("First, many experts are members of the academic community who supplement their teaching salaries with consulting work. We know from our judicial experience that many such able persons present studies and express opinions that they might not be willing to express in an article submitted to a refereed journal of their discipline or in other contexts subject to peer review. . . . Second, the professional expert is now commonplace. That a person spends substantially all of his time consulting with attorneys and testifying is not a disqualification. But experts whose opinions are available to the highest bidder have no place testifying in a court of law, before a jury, and with the imprimatur of the trial judge's decision that he is an 'expert.'").

361. Cleary, *supra* note 304, at 915-16.

362. Trautman, *supra* note 338, at 395-96. In his discussion of the lie detector test, Trautman identifies the "unfair prejudice" as "resulting from a lack of proper administrative standards for controlling the competency of the operator, the type of machine used and the circumstances under which it is used." *Id.* at 396. While flawed application of scientific principles might be considered an improper basis for resolving an issue, courts should not recognize an expert's questionable basis as a type of "unfair prejudice" within the meaning of Rule 403. If a court were to consider substantive weaknesses in the testimony to establish both unfair prejudice *and* minimal probative value, then courts would exclude such evidence solely because of the questionable nature of its underlying basis. Such an approach would lead, as Judge Reavley feared, to the trial judge substituting his or her opinion on an issue for that of the jury.

These two sources confirm that Congress intended the probative value-unfair prejudice balance that Rule 403 establishes to apply to determining the admissibility of questionable scientific evidence. Together with the plain language of the Rules, these sources suggest that a trial judge may evaluate the underlying bases of an expert's opinion for adequacy and exclude the evidence if the resulting probative value of the opinion is substantially outweighed by the danger of unfair prejudice that such expert testimony may present. The fact that such testimony may be evaluated under Rule 403 does not suggest, however, that the restrictive courts have simply used the wrong Rules as authority for excluding questionable scientific evidence. The proper approach to questions of admissibility under Rule 403 differs fundamentally from the threshold "good science" approach that the restrictive courts have adopted under Rules 702 and 703 as the next two sections demonstrate.

C. Applying the Rule 403 Analysis to Toxic Tort Issues

In determining the admissibility of questionable scientific evidence under Rule 403, a trial judge must determine (i) the probative value of the proffered testimony; (ii) the danger of unfair prejudice that admitting the testimony would present; and (iii) whether the danger of admitting the testimony substantially outweighs its probative value. If, and only if, a trial judge determines that the dangers substantially outweigh the probative value of the evidence, does the trial judge then have the discretion to exclude the proffered evidence. Rule 403 requires the trial judge to go through a "conscious process of balancing the cost of the evidence against its benefits."[363] Unless the trial judge concludes that the probative value is "substantially outweighed" by one of the countervailing dangers listed in the Rule, the judge has no discretion to exclude relevant evidence, and the evidence must therefore be admitted.[364] If, however, the balance is in favor of one of the countervailing dangers, the judge may, but need not, exclude the evidence.[365]

In approaching this "conscious process of balancing," the trial judge must first determine the probative value of proffered scientific testimony. As discussed, a determination of probative value will require an examination into the tendency of the testimony to establish a matter in issue. Such an examination might entail consideration of the four *Daubert* factors and would likely be somewhat broader and certainly more flexible than *Frye's* general acceptance standard.[366]

After determining the testimony's probative value, the trial judge must then consider the danger of unfair prejudice that the admission of a paid

363. 22 Wright & Graham, *supra* note 261, § 5214.
364. *Id.*
365. *Id.*
366. Thus, even when Professor Cleary discussed the consideration of questionable scientific evidence under Rule 403, he did not refer to *Frye*'s general acceptance standard specifically but to "purportedly scientific evidence in an insufficiently established field" more generally. Cleary, *supra* note 304, at 916.

expert's testimony may create. While the admission of questionable scientific testimony does create some danger of unfair prejudice, Congress premised the Rules on an underlying belief in the effectiveness of the adversarial process.[367] Therefore, the trial judge should evaluate the potential for unfair prejudice within the context of the adversarial process as well as the entire lawsuit.[368] The Advisory Committee, for example, suggested that in determining the danger of unfair prejudice, a trial judge must consider whether a limiting instruction would mitigate the potential dangers associated with admission of the evidence and whether the proffered testimony is the only available means of proof.[369]

More generally, the adversarial process will often reveal the weaknesses of questionable scientific evidence and thereby mitigate or eliminate the potential danger of unfair prejudice. As a result, dangers that may seem substantial in the dark night of abstract possibilities may be revealed as insubstantial when exposed to the bright light of the adversarial process. The danger that a jury will resolve a case based solely on the label expert, while plausible in the abstract, appears much less so when placed in the context of litigation where both parties are presenting witnesses bearing the expert label. Similarly, the use of effective cross-examination to reveal the venality of an expert can go far towards discrediting an expert before the jury.

In view of Rule 403's underlying assumptions, the trial court must not determine the unfair prejudice of proffered testimony in a vacuum. In determining unfair prejudice, the trial judge must consider the effects of aggressive and able cross-examination,[370] the introduction of testimony from opposing experts, and other aspects of the litigation process that will limit or reduce the unfair prejudice that might appear substantial in the

367. *See* Barefoot v. Estelle, 463 U.S. 880, 898-99 (1983) ("[T]he rules of evidence generally extant at the federal and state levels anticipate that relevant, unprivileged evidence should be admitted and its weight left to the factfinder, who would have the benefit of cross examination and contrary evidence by the opposing party. Psychiatric testimony predicting dangerousness may be countered not only as erroneous in a particular case but as generally so unreliable that it should be ignored."); DeLuca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 956 (3d Cir. 1990) (The Rules "embody a strong and undeniable preference for admitting any evidence having some potential for assisting the trier of fact and for dealing with the risk of error through the adversarial process.").

368. *See In re* Paoli R.R. Yard PCB Litig., 916 F.2d 829, 859-60 (3d Cir. 1990) ("However, a court cannot fairly ascertain the potential relevance of evidence for Rule 403 purposes until it has a full record relevant to the putatively objectionable evidence. We believe that Rule 403 is a trial-oriented rule. . . . [W]e hold that in order to exclude evidence under Rule 403 at the pretrial stage, a court must have a record complete enough on the point at issue to be considered a virtual surrogate for a trial record."), *cert. denied sub nom.* General Elec. v. Knight, 499 U.S. 99 (1991); 22 WRIGHT & GRAHAM, *supra* note 261, § 5214.

369. FED. R. EVID. 403 advisory committee's notes ("In reaching a decision whether to exclude on the grounds of unfair prejudice, consideration should be given to the probable effectiveness or lack of effectiveness of a limiting instruction. . . . The availability of other means of proof may also be an appropriate factor.").

370. As Professor Cleary explained: "A further underlying assumption is that the Rules will operate within the framework of an adversary system, with professional lawyer representation of the parties as the norm." Cleary, *supra* note 304, at 910; *see also* Rock v. Arkansas, 483 U.S. 44, 61 (1987).

abstract. Often, the litigation process itself will adequately address the potential for unfair prejudice that the admission of questionable scientific evidence would create.

If the adversary process is unlikely to mitigate significantly the danger of unfair prejudice, then the trial court must determine whether the probative value of the proffered testimony is substantially outweighed by the danger of admitting it. Only if the probative value of the evidence is substantially outweighed by its dangers will the trial court have the discretion under Rule 403 to exclude the evidence.

D. Rule 403's Balancing Approach: A World of Difference

Application of the proposed Rule 403 analysis to questionable scientific evidence would introduce three critical differences in the admissibility inquiry as compared to the approaches the restrictive courts have used under Rules 702 and 703. First, the Rule 403 analysis calls for a balancing rather than a threshold approach. As a result, the fact that the proffered evidence is the best, and perhaps only, evidence available weighs strongly in favor of its admission under the Rule 403 approach,[371] but it plays no role at all under the Rule 702 and 703 threshold analyses. Further, under the proposed Rule 403 analysis, a court must consider both the value and the potential harm of the questionable scientific evidence, whereas under the restrictive Rule 702 and 703 approaches, the evidence is evaluated against a threshold "valid science" standard.

Second, the Rule 403 analysis re-focuses the trial court's attention on the evidence within the concrete context of the litigation and the adversarial process rather than the abstract world of science. Instead of asking the trial judge to determine whether scientific evidence is valid, Rule 403 asks the trial judge to evaluate the evidence's role within an adversary context and consider the evidence's likely effect on the jury's resolution of the issues. Such an inquiry requires the judge to determine, for example: (i) whether the evidence is a type that well-trained lawyers in the area can adequately discredit through effective cross-examination, (ii) whether the presence of opposing experts will adequately convey to the jury the disputed nature of the issue on which the opposing experts have testified, and (iii) whether a limiting instruction, or the trial judge's ability to comment on the evidence, will adequately remind the jury to make its own evaluation of the evidence, guided perhaps, but not controlled by the experts' opinions. Even assuming a generous degree of scientific savvy on the part of trial judges,[372] the trial-oriented inquiries on which Rule

371. *See* 22 Wright & Graham, *supra* note 261, § 5214 (observing that "the judge cannot focus exclusively on the challenged evidence, but must look at the other evidence already introduced or available to the proponent").

372. *See* Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2796 (1993) ("We are confident that federal judges possess the capacity to undertake [a review of the proffered testimony to ensure that the testimony is scientifically valid and has a valid scientific connection].").

403 focuses are far more likely to be within a trial judge's expertise than would an analysis based entirely on scientific validity.

Moreover, the threshold good science approach essentially asks the trial judge to determine whether he or she finds the proffered testimony convincing and therefore encourages trial courts to usurp the jury's traditional role of deciding what weight to assign various pieces of evidence.[373] By keeping relevant causation evidence from the jury if the trial judge is not convinced of its validity, the threshold approach inevitably leads the judge to substitute improperly his or her judgment on the issue of causation for that of the jury. On the other hand, Rule 403's balancing of probative value against unfair prejudice reminds the trial judge to focus on the evidence's role within the context of the litigation and the adversarial process rather than on the evidence's substantive correctness.

Third, while application of Rule 403's structured balancing test may sometimes lead a trial judge to the same conclusion that he or she would otherwise have reached under the restrictive Rule 702 and 703 threshold approaches,[374] Rule 403 will lead to the admission of questionable scientific evidence in far more cases. Given Congress's undisputed intent to rely principally on the adversarial process rather than gatekeeper judges to resolve disputed issues of fact, applying Rule 403 to the admissibility

373. *See* Daubert v. Merrell Dow Pharmaceuticals, Inc., 113 S. Ct. 2786, 2797 (1993); Osburn v. Anchor Labs., Inc., 825 F.2d 908, 915-16 (5th Cir. 1987); *see also* Garnac Grain Co. v. Blackley, 932 F.2d 1563, 1567 (8th Cir. 1991); Wilson v. Merrell Dow Pharmaceuticals, Inc., 893 F.2d 1149, 1154 (10th Cir. 1990); Payton v. Abbott Labs, 780 F.2d 147, 156 (1st Cir. 1985).

374. For example, in Viterbo v. Dow Chem. Co., 826 F.2d 420 (5th Cir. 1987), the plaintiff claimed that his symptoms of depression, high blood pressure, allergies, nervousness, and "itching on his arms and legs" were caused by his occupational exposure to a pesticide, Tordon 10K. *Id.* at 421. The plaintiff's expert, Dr. Alfred Johnson, eventually hospitalized the plaintiff, and performed multiple tests on the plaintiff, including allergy testing. *Id.* None of the tests implicated Tordon 10K as the basis for the plaintiff's depression and hypertension. *Id.* at 423. On the basis of the plaintiff's oral history alone, Dr. Johnson concluded that the plaintiff suffered from a toxic reaction to Tordon 10K. Significantly, however, Dr. Johnson failed to ascertain whether the plaintiff had a family history of depression and hypertension (which the plaintiff did), notwithstanding Dr. Johnson's own testimony that these conditions had a hereditary component. *Id.* Dr. Johnson also admitted that the plaintiff's condition could have been caused by a number of other causes. *Id.* Thus, on the basis of negative test results and an incomplete oral history, Dr. Johnson made a finding of causation. The Fifth Circuit affirmed the trial court's exclusion of Dr. Johnson's testimony under Rule 703 because the opinion lacked the requisite foundation and reliability. *Id.* at 424.

For the reasons previously discussed, *see supra* notes 89-105 and accompanying text, the court should not have relied on Rule 703 as a basis for excluding Dr. Johnson's fundamentally unsupported testimony. Once the court established that physicians typically rely on oral histories and laboratory results in making diagnoses, Rule 703 has been satisfied. In this case, even though Dr. Johnson's testimony was fundamentally unsupported, Rule 401's general relevancy requirement may also have been satisfied. If it was, the weakness of the underlying bases suggests that Dr. Johnson's testimony has little probative value because the flaws in his bases substantially reduce the tendency of his opinion to establish the cause of the plaintiff's symptoms. Given the minimal probative value of Dr. Johnson's testimony, the risk that the jury may give undue credence to Dr. Johnson's opinion because of his "expert" label might suggest a danger of unfair prejudice sufficient to justify excluding the testimony under Rule 403.

issue would return to the Rules the "liberal thrust" that Congress intended when it enacted them.[375]

VI. CONCLUSION

In enacting the evidentiary rules concerning expert testimony Congress intended to liberalize the admissibility of such evidence by overruling certain common law limitations on the use of expert testimony, and to establish a uniform code of evidence to simplify practice in the federal courts. Certain federal courts have expressed concern, however, that the liberal admissibility of expert testimony often leads to inconsistent and inaccurate results in toxic tort cases. These courts have chosen to restrict the admissibility of expert testimony in a manner that is inconsistent with the plain-meaning and legislative history of the Rules in question.

In a determined attempt to restrict the flow of relevant, but questionable, scientific evidence to toxic tort juries, the restrictive courts have generally ignored Rule 403 as a basis for evaluating scientific evidence, in favor of reliability tests that have been improperly injected into Rules 702 and 703. By doing so, the courts have crafted an admissibility standard much more restrictive than the structured balancing of Rule 403 that Congress intended to govern the issue, and have thereby substituted a trial judge's admissibility decision for the rigors of the adversary process as the appropriate testing mechanism for determining the accuracy and substantive correctness of questionable scientific evidence.

375. *Daubert*, 113 S. Ct. at 2794.

Lectures