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Junk Science in the United States and the Commonwealth

David E. Bernstein†

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I. INTRODUCTION

At one time the use of forensic science in American criminal trials was relatively rare. Since the mid-1970s, however, prosecutors have been using a growing number of forensic techniques with ever greater frequency. The use of scientific evidence in criminal cases has been controversial. Critics have argued, with some success, that many forensic techniques are unreliable and should be excluded from court.¹

As controversy over the reliability of evidence based on forensic science in criminal trials increased through the 1980s, an even more vociferous debate arose over the alleged misuse of scientific evidence in toxic tort litigation. Toxic tort cases involve allegations of injury from exposure to environmental pollutants or pharmaceuticals. Once quite rare, these cases became relatively commonplace by the early 1980s.² Soon thereafter, critics began to express skepticism regarding the evidence relied upon by plaintiffs in many of these cases. By the early 1990s, prominent critics such as Bert Black,³ Peter Huber,⁴ and even then–Vice President Dan Quayle⁵ were arguing that plaintiffs' attorneys often misused scientific evidence in toxic tort cases. Huber popularized the phrase “junk science” as a description of scientific evidence that is either inherently unreliable, or that is being stretched well beyond its limitations. Plaintiffs' attorneys and their defenders, meanwhile, argued that Huber and other critics were wildly overstating the junk science problem, if it existed at all.

Some legal scholars, editorialists, and others argued that juries must be

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protected from the scourge of junk science. Like-minded judges began to scrutinize scientific evidence closely before admitting it at trial and to exclude evidence that did not meet their strict standards. Other judges were content to rely on the adversarial system to reveal any flaws in tendered scientific evidence. These judges favored admitting any scientific evidence that seemed relevant, and therefore rarely excluded scientific evidence before trial.

The debate over the proper standards for the admissibility of scientific evidence reached the United States Supreme Court in 1993 in *Daubert v. Merrell Dow Pharmaceuticals.* The Court essentially adopted a rather strict reliability test, but the opinion was not sufficiently conclusive to end the controversy.

While the junk science debate has raged in the United States, a similar debate has simmered in several other common law jurisdictions. Legal scholars and judges in England, Canada, Australia, and New Zealand have been struggling with the issue of what standards they should use in deciding whether to admit expert scientific testimony. Because of the wealth of U.S. commentary and precedent on the admissibility of scientific evidence, the American debate has often spilled over to the Commonwealth. Commonwealth courts and commentators frequently cite U.S. sources to justify their positions regarding scientific evidence.

American commentators, however, have almost completely ignored legal and intellectual developments regarding scientific evidence in the Commonwealth. Of the hundreds of American law review articles that discuss scientific evidence, not a single one has a comparative focus. Indeed, these articles rarely cite any cases concerning scientific evidence from jurisdictions outside the United States.

One unfortunate consequence of the failure of Americans to take note of the growing controversy in the Commonwealth over scientific evidence is that Commonwealth courts and commentators are incorporating U.S. precedent and theory into their debate without any explanatory assistance or constructive criticism from Americans. This lack of American participation is problematic because even under the best of circumstances, the law in the United States is notoriously difficult for outsiders to master due to the many federal and state jurisdictions, each of which has its own case law. This problem is aggravated in the context of the admissibility of scientific evidence because there is an especially large number of cases on the subject, along with dozens of articles offering (frequently contradictory) commentary.

As a necessary prelude to discussing the law of scientific evidence in the Commonwealth, which has been influenced by American law, this Article

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7. I use "Commonwealth" in this Article to refer to England, Canada, Australia, and New Zealand. What this definition lacks in inclusiveness it makes up for in brevity. The vast majority of Commonwealth cases and commentary regarding scientific evidence is a product of these four countries.
8. I suspect that another difficulty facing Commonwealth courts and scholars trying to apprehend American law is that trends in judicial decisions tend to change far more rapidly in the United States than in other common law nations, where respect for precedent is far greater. Because this particular idiosyncracy of American law is not widely recognized abroad, Commonwealth courts have sometimes relied on outdated articles or cases, mistaking them to be current U.S. thinking on scientific evidence.
9. For an example of conflicting commentary on *Daubert,* see infra text accompanying notes 377-78.
begins with a discussion of the development of the rules regarding the admissibility of scientific evidence in the United States from 1923 to the present.

Next, this Article discusses the emerging controversy over scientific evidence in the Commonwealth. The novelty and importance of the discussion is threefold. First, it will serve as a unique reference for scholars exploring the debate over the rules for the admissibility of scientific evidence in various jurisdictions. There have been quite a few articles in Commonwealth publications discussing scientific evidence over the past few years, and many of them take a comparative law approach. To date, however, no book or article has comprehensively pulled together all of the relevant case law and commentary. This Article fills that void.

Second, this Article is the first to discuss the Commonwealth debate over scientific evidence from an American perspective. The Article examines how American law is being used and often misused in the Commonwealth.

The third unique feature of this Article is that it attempts to draw conclusions relevant to the American junk science debate by studying the development of the law of scientific evidence in the Commonwealth. The Article discusses the following lessons that Americans could learn from the Commonwealth debate: (1) the junk science problem is real; (2) juries are not competent to decide complex scientific issues; (3) tightening the rules for the admissibility of scientific evidence is a second best solution to the problem of junk science in tort; and (4) tightening the rules for the admissibility of scientific evidence will not solve the junk science problem in criminal cases — broader reforms are needed.

Thus, Part I of this Article discusses the development of the rules for the admissibility of scientific evidence in the United States. Part II discusses the admissibility rules in Canada, Australia, New Zealand, and England, with particular attention paid to the influence of American law in those countries. Part III reviews what Americans can learn from the Commonwealth debate over junk science. The Article concludes by applauding the general trend toward stricter scrutiny of scientific evidence.

II. THE AMERICAN LAW OF SCIENTIFIC EVIDENCE

The development of modern American law governing the admissibility of scientific evidence began in 1923 with the introduction of the Frye general acceptance test. Since then, American judges and scholars have debated whether the admissibility of scientific theories or techniques should be determined by a liberal “relevancy” test focusing mainly on the qualifications of the expert, the more conservative Frye general acceptance test, or a flexible reliability test focusing on whether the expert’s testimony is based on proper scientific methodology and reasoning. In 1993, the United States Supreme Court issued its first ruling on scientific evidence in Daubert v. Merrell Dow Pharmaceuticals. The Court rejected both the Frye test and the liberal

10. 293 F. 1013 (D.C. Cir. 1923).
relevancy test in favor of a flexible reliability test, the exact parameters of which have been a matter of debate. The Frye test, meanwhile, lives on in many state courts.

A. The Frye General Acceptance Test and Its Critics

Until recently, the majority rule in U.S. jurisdictions for the admissibility of scientific evidence was the Frye general acceptance test. In Frye v. United States, the District of Columbia Court of Appeals rejected the admissibility of evidence based on a forerunner of the modern lie detector test. In a pithy opinion, the court announced that "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." By 1954, Frye was sufficiently conspicuous to attract criticism from Professor Charles McCormick, author of a leading treatise on evidence. McCormick wrote that the Frye test "is a proper condition upon the court's taking judicial notice of scientific facts, but not a criterion for the admissibility of scientific evidence." To replace Frye, McCormick advocated what has become known as the relevancy approach: "Any relevant conclusions which are supported by a qualified expert witness should be received unless there are other reasons for exclusion. Particularly, its probative value may be overborne by the familiar dangers of prejudicing or misleading the jury, unfair surprise and undue consumption of time."

12. Id.
13. 293 F. 1013 (D.C. Cir. 1923).
14. Id. at 1014.
15. It is unclear how quickly the Frye test spread. Courts cited Frye only five times in published opinions before World War II, mostly in cases involving lie detectors. After World War II, courts cited Frye six times before 1950, 20 times during the 1950s, and 21 times during the 1960s. Bert Black et al., Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge, 72 TEX. L. REV. 715, 722 n.30 (1994). The paucity of citations to Frye does not necessarily mean that courts ignored it. First, many courts may have adopted the general acceptance test without citing Frye. See, e.g., Puhl v. Milwaukee Auto. Ins. Co., 99 N.W.2d 163, 168-69 (Wis. 1959) (paraphrasing Frye and adopting general acceptance test, but not citing case); People v. Miller, 98 N.W.2d 524, 525 (Mich. 1959) (adopting "general scientific recognition" test, but not citing Frye); Shanks v. State, 45 A.2d 85, 86 (Md. 1945) (discussing "general acceptance" standard for use of blood tests without citing Frye). Second, Frye applied only to novel scientific techniques, and there were few major advances in forensic evidence during this period that courts did not quickly accept. See Paul C. Giannelli, Daubert: Interpreting the Federal Rules of Evidence, 15 CARDOZO L. REV. 1999, 2003-04 (1994). Third, attorneys and judges rarely applied the Frye rule to novel scientific evidence in civil cases. See MICHAEL H. GRAHAM, HANDBOOK OF FEDERAL EVIDENCE § 703.2, at 651 (3d ed. 1991); 1 DAVID W. LOUISELL & CHRISTOPHER B. MUELLER, FEDERAL EVIDENCE 853 & n.24 (1977). Frye therefore was seldom an issue in medical malpractice and other civil cases, even when a party presented evidence at the frontier of science. Finally, another possible reason that Frye is not cited very frequently before the 1970s is that until then state courts decided almost all criminal cases. State courts are far less likely to take a systematic approach to an area of law than federal courts, and are far more likely to decide issues such as the admissibility of scientific evidence on an ad hoc basis. State courts also publish very few of their opinions, particularly at the trial court level.
18. MCCORMICK, supra note 16, at 363-64.
The statutory Federal Rules of Evidence,19 which went into effect in 1975, failed to clarify the standard for admitting novel scientific evidence, although several rules had a potential bearing on the issue. Rule 702 states that any qualified expert who possesses "scientific, technical, or other specialized knowledge [that] will assist the trier of fact to understand the evidence or to determine a fact in issue" may testify at trial.20 The only clear effect of this rule was to liberalize the type of person who could appear as an expert. Any other interpretation is in the eye of the beholder.21 Rule 403 permits the exclusion of relevant evidence if dangers of prejudice, confusion, misleading the jury, or wasting time substantially outweigh its probative value.22 Rule 703 provides that the facts or data on which experts base their opinions need not be admissible if they are "reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject . . . ."23 The Rules do not mention Frye.

Frye became a contentious issue around the same time the Federal Rules came into effect, as courts began to rule on the admissibility of forensic scientific evidence such as "voiceprint" identifications, bite mark comparisons, and hypnotically refreshed testimony.24 This period also marked the beginning of the federalization of criminal law, when the federal government began to prosecute crimes that had once been solely the responsibility of the states. The Frye rule, which originated in a federal opinion, naturally began to attract added attention.

Commentators began to attack Frye on a variety of grounds. Some argued that Frye was too conservative in restricting evidence that had not yet received "general acceptance."25 Others were unhappy with Frye's vagueness. The

19. The Federal Rules of Evidence are only binding on federal courts, but they have been voluntarily adopted by many states.
21. For example, one commentator submits that rule 702 was clearly meant to abolish the common law rule that expert testimony had to be beyond the common knowledge of the average layperson. Leslie A. Lunney, Protecting Juries from Themselves: Restricting the Admission of Expert Testimony in Toxic Tort Cases, 48 SMU L. Rev. 103, 119, 121-22 (1994). Several courts, however, have found that only testimony that meets the "beyond common knowledge" test is helpful to the jury and passes muster under rule 702. See, e.g., United States v. Tapia-Ortiz, 23 F.3d 738, 741 (2d Cir. 1994) (holding that testimony concerning "the weight, purity, dosages, and prices of cocaine clearly relates to knowledge beyond the ken of the average juror" and thus is acceptable expert testimony); United States v. Harris, 995 F.2d 532, 534 (4th Cir. 1993) (holding district court did not err in excluding testimony under Fed. R. Evid. 702 as court should consider whether testimony presented is simply reiterating facts already "within the common knowledge" of jurors); United States v. Brewer, 783 F.2d 841, 842 (9th Cir.), cert. denied, 479 U.S. 831 (1986) (excluding forensic anthropologist's testimony that defendant might not be robber in surveillance picture because jury could make determination on its own).
24. Giannelli, supra note 15, at 2004-09. Forensic science became more important to prosecutors both because of technological advances and because decisions by the United States Supreme Court in the 1960s favoring the rights of the accused made it more difficult for prosecutors to use other types of evidence. See, e.g., Miranda v. Arizona, 384 U.S. 436 (1966) (holding that prosecution may not use statements stemming from custodial interrogation without use of procedural safeguards); Mapp v. Ohio, 367 U.S. 643 (1961) (holding that Fourth Amendment protection against unreasonable searches and seizures applies to state criminal defendants).
25. E.g., Giannelli, supra note 17, at 1226 (noting that under Frye potentially helpful evidence may be excluded until general scientific consensus develops); see also Fredric I. Lederer, Resolving the Frye Dilemma—A Reliability Approach, 26 Jurimetrics J. 240, 241 (1986) ("Frye tends to be unduly
opinion does not specifically define "general acceptance" or the "particular field's" boundaries, nor does it suggest whether the judge should defer to the scientific community or use another standard to resolve these uncertainties. In fact, confusion among judges on these issues led to contradictory Frye rulings in different jurisdictions concerning the same types of evidence.

Immediately after the Federal Rules went into effect, some courts adopted the relevancy approach, while most continued to apply Frye. Both approaches remained viable, but in the ensuing years a third approach, which became known as the reliability approach, began to win adherents.

B. The Emergence of the Reliability Test

In United States v. Williams, a 1978 case upholding a district court’s admission of voiceprint evidence, the Second Circuit Court of Appeals rejected Frye and held that courts should determine the admissibility of scientific evidence, like any other evidence, by weighing probativeness, materiality, and reliability against any tendency to mislead or confuse the jury, or to prejudice the defendant unfairly. The court then looked to several specific factors in assessing reliability, including the acceptance of the technique “among scientists who had worked with spectrograms,” the relevant error rate, the standards for conducting tests pronounced by the International Association of Voice Identification, the care with which the expert applied the technique, the analogy between voiceprints and other accepted analytic methods, and “failsafe” characteristics that prevented the misuse of the technique.

On its face, Williams was hardly a revolutionary opinion, as it simply presented a minor variation on the relevancy test. But several commentators, opposed to Frye but unhappy with the extremely lax nature of the relevancy test, seized and expanded on the reliability criterion suggested by the Second Circuit in Williams. They argued that courts applying the relevancy test should incorporate a significant reliability aspect into that test. For example, a leading evidence treatise authored by Judge Jack Weinstein and Professor Margaret Berger advocated a reliability test, and listed the following as factors for determining reliability:

- the technique's general acceptance in the field;
- the expert's qualifications and stature;
- the use which has been made of the new technique;

conservative in its effect on the admissibility of novel evidence.").

26. 1 LOUISELL & MUELLER, supra note 15, § 105; Giannelli, supra note 17, at 1248. But see Philip H. Dixon, Recent Developments, 64 CORNELL L. REV. 875, 881 (1979) (arguing that Frye's vagueness is beneficial and gives court considerable leeway in deciding whether new scientific technique has achieved general acceptance in its appropriate field).

27. Black et al., supra note 15, at 739 (noting courts applying Frye have both admitted and rejected voiceprint evidence).

28. See Giannelli, supra note 17, at 1228-31.

29. 583 F.2d 1194 (2d Cir. 1978), cert. denied, 439 U.S. 1117 (1979).

30. Id. at 1198.

31. Id. at 1199.
the potential rate of error;
the existence of specialized literature;
the novelty of the new invention; and
the extent to which the technique relies on the subjective
interpretation of the expert.  

C. The Evidentiary Challenge of Toxic Tort Litigation

As debate grew over the relative merits of Frye, the relevancy approach, and the reliability approach, courts were soon faced with a new evidentiary challenge — toxic tort litigation. Plaintiffs' attorneys in toxic tort cases seldom had hard, nonspeculative scientific data on their side, and their theories of causation were often overwhelmingly rejected by the mainstream scientific community. Nevertheless, they found qualified expert witnesses to testify on their clients' behalf. These scientists were usually sincere in their beliefs that the mainstream scientific community had it wrong; less often, they were venal guns for hire.

Defense attorneys began to argue that the plaintiffs' scientific evidence must be excluded as unreliable under the Federal Rules of Evidence. The varied reactions of courts to defendants' motions to exclude evidence are best represented by the Agent Orange and Ferebee cases.

In Ferebee, a case involving a novel claim that exposure to a herbicide caused cancer, the D.C. Circuit Court of Appeals applied an extremely liberal test. Ferebee became a leading precedent favoring the relevancy
Meanwhile, the Agent Orange case became a leading precedent in favor of intensive judicial scrutiny of scientific evidence. In Agent Orange, the plaintiffs attempted to present testimony based primarily on animal studies that the defoliant Agent Orange caused a variety of ailments in Vietnam veterans. Judge Weinstein excluded the plaintiffs’ expert testimony under Federal Rules of Evidence 703 and 403 because the experts did not base their opinions on information reasonably relied upon by other experts in the scientific community and because their testimony did not meet “minimum standards of reliability.”

As legal scholar and attorney Bert Black notes, Judge Weinstein’s Agent Orange opinion was particularly significant because the judge did not apply a balancing test — such as the one proposed in the judge’s own treatise — to determine whether the experts’ techniques were reliable. Black argues that the problem with balancing tests is that they allow courts to substitute vague buzzwords for the sophisticated analysis that judges should undertake in determining the admissibility of scientific evidence. Judge Weinstein avoided this problem by focusing on the validity of the experts’ reasoning. He ultimately concluded that the plaintiffs’ experts could not appropriately extrapolate from animal studies to human causation without confirming epidemiological data.

While Judge Weinstein’s opinion received a great deal of attention, many courts continued to apply the more liberal relevancy test promoted in Ferebee. Federal and state decisions, often relying on Ferebee, upheld the awards of millions of dollars to plaintiffs with extremely dubious claims.

38. Critics called this “the let-it-all-in” approach. In re Air Crash Disaster at New Orleans, La., 795 F.2d 1230, 1234 (5th Cir. 1986) (complaining that decisions to receive expert testimony are often “simply tossed off to the jury under a ‘let it all in’ philosophy”); HUBER, supra note 4, at 17; Bert Black & David H. Hollander, Jr., Unravelling Causation: Back to the Basics, 3 U. BALTIMORE L. ENVTL. L. 1, 24 (1993).


41. See Giannelli supra note 15, at 204.

42. Black, supra note 3, at 685-86.

43. Black proposes a theoretical framework for determining relevance based on consideration of two factors: (1) the validity of the reasoning leading to a conclusion, and (2) the reliability of the conclusion. Id.; see also Barry M. Epstein & Marc S. Klein, The Use and Abuse of Expert Testimony in Product Liability Actions, 17 SETON HALL L. REV. 656, 673-74 (1987) (distinguishing reliability of experts’ data from experts’ reasoning).

44. Agent Orange, 611 F. Supp. at 1250-55.


46. E.g., Wells v. Ortho Pharmaceutical Corp., 615 F. Supp. 262 (N.D. Ga. 1985), aff’d in part, modified in part, 788 F.2d 741 (11th Cir.) (upholding award of approximately $5 million for birth defects allegedly caused by spermicide), cert. denied, 479 U.S. 950 (1986); Elam v. Alcolac, Inc., 765 S.W.2d 42 (Mo. Ct. App. 1988) (upholding award of over $40 million based on discredited theory of “clinical ecology”). There was scant scientific evidence supporting the judgment in Wells, and it was roundly
Eventually, criticism of such awards led many courts to follow Judge Weinstein's lead and tighten their scrutiny of scientific evidence.47

D. The Revival of Frye

In *United States v. Downing*,48 the Third Circuit Court of Appeals, like the court in *Agent Orange*, explicitly adopted a test that focused on an expert's reasoning. The court held that the Federal Rules of Evidence require a trial court to conduct a preliminary inquiry focusing not only on the soundness and reliability of the technique used in generating the evidence, and the possibility that admitting the evidence would confuse or mislead the jury, but also on the proffered connection between the technical data and the disputed factual issues in the case.49 The Third Circuit thus did not define relevance in laymen's term, as Professor McCormick favored,50 but in scientific terms. Courts in the Third Circuit became obligated to review not only the general soundness of an expert's technique, but also the expert's extrapolation from that technique to his conclusion.

Lower courts in the Third Circuit applied the *Downing* reliability test and excluded evidence in several toxic tort cases. When these cases were appealed, however, the Third Circuit vacated the district courts' rulings.51 Although the Third Circuit had established what appeared to be a strict test for the admissibility of scientific evidence, in practice it applied a liberal, forgiving test.

Critics of the misuse of science in civil cases began to lose patience with the reliability approach. The Third Circuit's failure to follow through on the *Downing* criteria caused them to search for alternatives to the Federal Rules.52 Many pinned their hopes on a rejuvenated general acceptance test.

Courts had started to reformulate the *Frye* test to address the underlying reliability of expert scientific opinion as early as 1975, when a federal criticized in both the scientific and mainstream media. For a review of the science involved, see James L. Mills, *Spermicides and Birth Defects*, in PHANTOM RISK, supra note 33, at 87. For harsh criticism of the Wells decision, see James L. Mills & Duane Alexander, *Occasional Notes: Teratogens and "Litogens"*, 325 NEW ENG. J. MED. 1234, 1235 (1986); *Federal Judges vs. Science*, N.Y. TIMES, Dec. 27, 1986, § 1, at 22. For harsh criticism of Elam, see Richard S. Cornfield & Stuart F. Schlossman, *Immunologic Laboratory Tests: A Critique of the Alcolac Decision*, in PHANTOM RISK, supra note 33, at 401. Many more examples of tort judgments in favor of plaintiffs that lacked a sound scientific basis are described in PHANTOM RISK, supra note 33.


48. 753 F.2d 1224 (3d Cir. 1985).

49. Id. at 1237.

50. See supra note 16 and accompanying text.

51. See, e.g., In re Paoli R.R. Yard PCB Litig., 916 F.2d 829 (3d Cir. 1990); DeLuca v. Merrell Dow Pharmaceuticals, 911 F.2d 941 (3d Cir. 1990).

appellate court held that it "deem[ed] general acceptance as being nearly synonymous with reliability." In 1978, the California Supreme Court, perhaps the most influential state court in the country due to California's large population, held that under its version of the Frye test, the proponent of the scientific evidence must establish "(1) the reliability of the method ..., usually by expert testimony, and (2) [that] the witness furnishing such testimony [is] properly qualified as an expert to give an opinion on the subject. Additionally, the proponent ... must demonstrate that correct scientific procedures were used in the particular case." This test became known as the Kelly-Frye test.

In 1987, in State v. Castro, the New York Court of Appeals found that the then-current state of the law required Frye courts, at a minimum, to ask two questions: (1) Is there a theory that is generally accepted in the scientific community that supports the conclusion that the scientific test can produce reliable results? and (2) Are there currently techniques and experiments capable of producing reliable results that are generally accepted in the scientific community? The court, like the California Supreme Court, then added a third query: whether the expert performed the technique in an accepted manner in the particular case. Several other courts adopted this third criterion as well, mainly in the context of DNA testing.

Some courts began to use a test analogous to Castro in toxic tort cases. Instead of analyzing whether experts performed a particular technique properly, as would make sense in a forensic context, courts determined whether experts extrapolated from their data in a generally accepted manner. In Christophersen v. Allied-Signal Corp., the plaintiff claimed that exposure to chemical fumes at the battery manufacturing plant where her husband had worked caused his fatal colon cancer. The Fifth Circuit adopted a four part test for the admissibility of scientific evidence, which relied on rules 403, 702, and 703, and the Frye rule. The test focused on:

- the expert's qualifications (rule 702);
- the factual basis for the testimony (rule 703);
- the level of acceptance of the methodology employed (Frye); and
- the balance between probativeness and the potential for undue prejudice (rule 403).

56. Id.
59. Id. at 1110-12.
The court, citing Bert Black's influential article, ultimately concluded that the methodology or reasoning that the plaintiff's expert had used to arrive at his conclusion was not generally accepted within the relevant scientific community.

Shortly after the Fifth Circuit decided Christophersen, Peter Huber's *Galileo's Revenge: Junk Science in the Courtroom* was published. Huber's book, which reached a mass audience, detailed the misuse of scientific evidence in a range of civil cases. The book attracted a great deal of attention and made the issue of "junk science" into a matter of public debate. A consistent theme of Huber's book was that in order to avoid the risk of being bamboozled by fringe scientists, courts should defer to mainstream scientific opinion when reviewing scientific evidence. Huber, who was also influenced by Black, strongly advocated "a sophisticated, modern application of Frye [that] looks to the methods behind a scientific report."

E. *The Supreme Court Enters the Fray*

The resurgence of Frye set the stage for the Supreme Court's 1993 decision in *Daubert v. Merrell Dow Pharmaceuticals*. *Daubert* involved two boys born with tragic birth defects that reduced the size of their limbs. Their parents sued, alleging that the mothers' use of the morning sickness drug Bendectin during pregnancy had caused the children's deformities. The problem facing the plaintiffs was that the defendant presented the trial court with overwhelming scientific evidence from epidemiological studies showing that fetuses exposed to Bendectin do not have a higher rate of limb reductions than those not exposed.

The plaintiffs countered by presenting experts who testified that based on their reanalyses of the data used in those epidemiological studies, they believed that Bendectin does cause birth defects. The district court found this evidence incompetent and granted summary judgment for the defendant.

The plaintiffs appealed to the Ninth Circuit Court of Appeals, which affirmed. The court began by emphasizing its adherence to the Frye rule. It then noted that the plaintiffs' experts had not submitted their reanalyses to peer review or published them in a scientific journal. Citing Huber, the court applied a unique version of Frye. It held that because the experts' reanalyses were not subjected to verification and scrutiny by others in the field, the results of their studies would not be accepted in the scientific community.

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61. Christopherson, 939 F.2d at 1111 n.9.
63. *Huber, supra* note 4, at 200.
65. *Id.*
66. 951 F.2d 1128 (9th Cir. 1991).
67. *Id.* at 1129-30.
68. *Id.* at 1130.
This opinion quickly gained notoriety for its strong exclusionary bent. Not only did the Ninth Circuit rely exclusively on the \textit{Frye} rule in a civil case, it also adopted the position that it is not the expert's technique, theory, or even reasoning process that must be generally accepted. Rather, when testifying on an issue of general interest to the scientific community, an expert must submit her research to peer review, because only such review, outside of the litigation context, can qualify her research as generally accepted in the scientific community.

The Supreme Court, which had rejected earlier opportunities to establish standards for the admissibility of scientific evidence under the Federal Rules, granted certiorari to decide whether \textit{Frye} was still viable under the Federal Rules, particularly rule 702.

The Supreme Court's decision in \textit{Daubert} established new guidelines for the admissibility of scientific evidence. The Court first announced that the promulgation of the Federal Rules of Evidence had superseded \textit{Frye} and that a simplistic "general acceptance" approach to the admissibility of scientific evidence violates those rules.\footnote{70} But the Court also rejected the let-it-all-in relevancy approach and affirmed that district court judges have an important role to play as "gatekeepers" in excluding unreliable scientific evidence.\footnote{71} The Court noted that rule 702 "clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify."\footnote{72} The text of rule 702, the Court continued, requires that proffered scientific evidence constitute "scientific . . . knowledge." "The adjective 'scientific,'" stated the Court, "implies a grounding in the methods and procedures of science," while the word knowledge "connotes more than subjective belief or unsupported speculation."\footnote{73}

After rejecting the let-it-all-in standard, the Court proceeded to establish a two part reliability and helpfulness test to use in determining the admissibility of scientific evidence under rule 702. The Court stated that, although most courts only applied the \textit{Frye} test to novel evidence, courts must apply the \textit{Daubert} test to all scientific evidence.\footnote{74}

First, the Court held that the rule's requirement of "scientific knowledge" establishes a standard of "evidentiary reliability," defined as "trustworthiness" and "scientific validity."\footnote{75} The Court then turned its attention to the other half of rule 702, which requires that proposed expert scientific testimony "assist the trier of fact to understand the evidence or to determine a fact in issue."\footnote{76} The Court read this language to mandate that proposed testimony

\textbf{References}

\footnote{69} Id. at 1131.
\footnote{70} Daubert v. Merrell Dow Pharmaceuticals, 113 S. Ct. 2786, 2793-94 (1993).
\footnote{71} Id. at 2798.
\footnote{72} Id. at 2795.
\footnote{73} Id.
\footnote{74} Id. at 2796 n.11 ("Although the \textit{Frye} decision itself focused exclusively on 'novel' scientific techniques, we do not read the requirements of rule 702 to apply specially or exclusively to unconventional evidence.").
\footnote{75} Id. at 2795 n.9. One article the Court relied upon in addressing the issue of scientific validity was Black, \textit{supra} note 3. Id. at 2793 n.4.
\footnote{76} \textit{Daubert}, 113 S. Ct. at 2795.
be scientifically relevant to the issue at hand. The relevant consideration is one of "fit" — evidence that meets the standards of scientific validity for one purpose is not necessarily scientifically valid for other purposes. As the Court put it, rule 702's "assist the trier of fact" language "requires a valid scientific connection to the pertinent inquiry as a precondition to admissibility." Under the test established by Daubert, courts confronted with challenged expert scientific testimony must conduct two distinct inquiries. First, are the studies or data upon which the expert is relying trustworthy? Second, if so, are these studies or data actually probative of the issues before the court?

The Court proceeded to enumerate factors that may "bear on the inquiry" into whether scientific evidence is admissible. The Court cautioned that these factors do not constitute a definitive checklist or test and that courts may consider other factors as well. First, courts faced with challenged scientific evidence should determine whether the theory or technique at issue can be (or has been) tested. Peer review and publication, the Court added, are important, though not generally dispositive, factors. The Court also directed judges' attention to determining the known or potential rate of error of a technique in question, as well as the existence and maintenance of standards controlling the technique's operation. Moreover, despite the official demise of Frye, general acceptance of the method or theory at issue is still a consideration; the Court noted that "[w]idespread acceptance can be an important factor in ruling particular evidence admissible" because it is circumstantial proof that other scientists find the evidence to be reliable.

Since Daubert was published, there has been an ongoing debate over its meaning. Most controversial has been Daubert's holding that rule 702 requires "a valid scientific connection to the pertinent inquiry as a precondition to admissibility." The Court cautioned that lower courts should examine only an expert's methodology, not her conclusions.

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77. 113 S. Ct. at 2796.
78. Id. at 2796.
79. Id. at 2796-97; see also Black et al., supra note 15, at 721. Black builds upon and adds to the Daubert screening factors applicable to scientific evidence, elaborating nine "guideposts" for understanding and evaluating scientific claims. These include: (1) explanatory power; (2) falsifiability; (3) logical consistency; (4) scope of testing; (5) consistency with accepted theories; (6) subsequent application and use by the scientific community; (7) precision; (8) post-hypothesis testing; and (9) peer review and publication. Black et al., supra note 15, at 783-85.
80. Daubert, 113 S. Ct. at 2796-97; see PHANTOM RISK, supra note 33, at 433.
81. Daubert, 113 S. Ct. at 2797; see PHANTOM RISK, supra note 33, at 434.
82. Daubert, 113 S. Ct. at 2797.
83. Id.; see PHANTOM RISK, supra note 33, at 433, 435.
84. Daubert, 113 S. Ct. at 2796.
85. Id. at 2797. Some commentators have argued that the Daubert inquiry should end when the court has determined that the expert is using a methodology appropriate for the general subject at issue, and that the court should not explore whether the study upon which the expert relied can validly support her conclusions. Giannelli, supra note 15, at 2011-12; Michael H. Gottesman, Admissibility of Expert Testimony after Daubert: The "Prestige" Factor, 43 EMORY L.J. 867, 869-72 (1994). This position has managed to attract some support in the case law. Hopkins v. Dow Corning Corp., 33 F.3d 1116, 1124 (9th Cir. 1994), cert. denied, 115 S. Ct. 734 (1995); United States v. Bonds, 12 F.3d 540, 555-59 (6th Cir. 1993). The Sixth Circuit Court of Appeals, for example, has held that DNA evidence is admissible and that any questions about the mathematical techniques used by the prosecution's expert should be raised during cross-examination. Bonds, 12 F.3d at 554-68.
Overall, it seems that *Daubert* may encourage strict scrutiny of scientific evidence in some jurisdictions. Courts that were previously inclined to give strict scrutiny to scientific evidence in such cases are continuing to do so. Courts that were inclined toward a more liberal position have interpreted *Daubert* to allow more frequent admission of questionable testimony. Courts that had no strong views on scientific evidence before *Daubert*, however, seem inclined to join the strict scrutiny camp. Pretrial exclusion of scientific evidence, particularly in toxic tort cases, is becoming ever more common.

*Daubert* has had an even greater impact on the admissibility of technical or quasi-scientific testimony. One type of quasi-scientific testimony, testimony based on psychological theories, has frequently been excluded in both criminal and civil litigation since *Daubert*. Courts have excluded testimony by psychiatrists and psychologists on issues involving child abuse, post-traumatic stress disorder, and child abuse accommodation syndrome. In this respect, *Daubert* is stricter than *Frye*; many *Frye* jurisdictions refused to apply the general acceptance test to such "soft" scientific evidence.

Moreover, although the *Daubert* Court expressly restricted its holding to

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The Ninth Circuit Court of Appeals, however, deciding *Daubert* on remand, noted that *Daubert* demands that in reviewing an expert's principles and methodologies, a court should determine whether there is a valid scientific connection to the pertinent inquiry. The pertinent inquiry, the court stated, is not simply whether Bendectin can cause birth defects, but whether it more probably than not caused the plaintiffs' birth defects. *Daubert* v. Merrell Dow Pharmaceuticals, 43 F.3d 1311, 1320 (9th Cir. 1995). The court therefore determined whether the plaintiffs' experts' animal and other studies allowed a scientist reasonably to rely on them to prove that Bendectin caused birth defects in the plaintiffs. *Id.* at 1320-22.

For a similar analysis, see *Cavallo* v. *Star Enter.* No. 94-1499-A, 1995 U.S. Dist. LEXIS 9836, at 56-61 (E.D. Va. July 10, 1995) (rejecting evidence that exposure to fumes caused plaintiff's injuries). The author believes that the *Daubert* remand opinion's take on the methodology issue is more consistent with both the letter and the spirit of the *Daubert* Supreme Court opinion than that of *Hopkins* or *Bonds*.

86. The Third Circuit, for example, continuing its pro-plaintiff policy in toxic tort cases, has held that it will give a "hard look" to cases in which a lower court has made a *Daubert* ruling, but only when the court has ruled testimony inadmissible. *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 763-65 (3d Cir. 1994).


scientific testimony, lower courts have regularly subjected technical evidence — also covered by rule 702 — to full Daubert gatekeeper analysis. Thus, Daubert has been applied to a broad range of specialized expert testimony, including economics, statistics, and accounting. Only rarely has a court held that Daubert is not relevant to the admissibility of technical expert testimony. In contrast to emerging doctrine under Daubert, Frye’s “general acceptance” test was almost never applied to technical evidence. Remarkably, the readiness of post-Daubert courts to screen such testimony for reliability indicates that Daubert has caused closer scrutiny of expert testimony in civil cases than mere affirmation of the Frye rule would have permitted.

On the other hand, Frye is undergoing something of a renaissance in state courts. Few state courts have as yet adopted Daubert, and three of the five most populous states, California, New York, and Florida, have all rejected Daubert and retained the Frye rule.

III. THE ADMISSIBILITY OF SCIENTIFIC EVIDENCE IN CANADA, AUSTRALIA, NEW ZEALAND, AND ENGLAND

Until recently, few scholars in the Commonwealth focused their attention on the admissibility of expert testimony in general, and on scientific evidence in particular. Before the 1987 publication of Ian Freckelton’s The Trial of the Expert, there was no modern treatment of the subject of expert witnesses outside the United States. Over the last decade, however, the appropriate standard for admitting expert evidence has become a major controversy among judges, attorneys, and legal scholars in England, Canada, Australia, and New Zealand.

Several themes emerge from this Article’s discussion of scientific evidence in the Commonwealth. First, until very recently, the law in most common law nations uniformly subjected expert testimony to a liberal


relevancy test. This contrasts with the United States, where the Frye general acceptance test has influenced the law of scientific evidence for more than seventy years. Scholarly and judicial attitudes, however, are now slowly changing in these other countries to favor stricter pretrial scrutiny.

Second, Frye is strongly influencing the debate over the admissibility of scientific evidence in the Commonwealth. While the Frye controversy is muted in England, the debate over the admissibility of scientific evidence in Canada, Australia, and New Zealand often focuses on Frye's general acceptance test.

This influence of Frye on the common law outside of the United States is a new phenomenon. As recently as 1988, Professor Edward J. Imwinkelried of the University of California at Davis Law School wrote that “[f]rom a comparative law perspective, it is difficult to defend the Frye rule.” After briefly examining the law in other common law and civil law countries, Imwinkelried concluded that “[i]n enforcing the Frye rule, American courts appear to stand alone.” One could no longer make that statement today, as Frye gains prominence in other common law countries. (Daubert may, however, start eroding Frye's influence abroad). It is now far less difficult to defend Frye from a comparative law perspective.

As we will see, the spread of the Frye test is but one example of the influence of the American junk science debate on Commonwealth law. Unfortunately, Commonwealth courts, legal scholars, and reformers sometimes misinterpret American precedent, and too frequently rely on outdated sources. This (sometimes misinformed) reliance on American law is a third theme of this section.

Finally, this Article shows that, with the possible exception of England and its relevancy test, the rules regarding the admissibility of scientific evidence are in flux in many of the Commonwealth countries. Commonwealth courts cite local precedents and scholarship, along with cases, books, and articles from their sister common law jurisdictions, including the United States. None of these jurisdictions has, however, created a uniform test for admissibility to replace the relevancy test.

A. The Law of Scientific Evidence in Canada

In recent years Canadian courts have carefully scrutinized scientific evidence before allowing its admission. They have not, however, settled on a uniform test to use in screening the admissibility of scientific evidence.99

97. Id. at 28.
99. JOHN SOPINKA ET AL., THE LAW OF EVIDENCE IN CANADA 567 (1992). See also R. v. Lafferty, 80 C.C.C.3d 150, 151 (N.W. T. Sup. Ct. 1993) ("There is no specific test for admissibility of novel scientific evidence such as the test of general acceptance by the scientific community which is used in some United States jurisdictions."); S. Rosaline Baker, A Critical Approach to the Admissibility and Weight of DNA Evidence in Canada, 20 C.R.4th 212, 213 (1993) ("Currently, the test for the admissibility of novel scientific evidence in Canada is unclear."); Ronda Bessner, The Road Not Taken: The Refusal of the...
Most courts have adopted some version of a reliability test, while a minority apply the general acceptance test. The Canadian Supreme Court has discussed scientific evidence three times, but has never announced a broadly applicable test. Until it does, the rules regarding the admissibility of scientific evidence will continue to vary widely.

1. **The Frye Debate in Canada**

As noted above, a minority of Canadian judges and scholars has advocated adoption of the Frye general acceptance test. In *R. v. Medvedew,* a 1978 case involving the admissibility of spectrographic or “voice print” analysis, a dissenting judge stated that he did not know “whether the [Frye] test had been adopted in Canadian courts or not,” but that “it makes sound sense and expresses a view in accord with the principles of common law.” In 1985, the Law Reform Commission of Canada recommended that forensic “techniques that do not meet the test propounded in the Frye case should be regarded with a considerable degree of scepticism.”

Most judges, however, have resisted adopting Frye. In 1986, an Ontario District Court judge, basing his argument on articles by Justice McCormick and by Professor Paul Giannelli of Case Western, said that “it would be folly to adopt the threshold requirement imposed by the Frye standard on the proponent of new scientific evidence.” Instead, the court advocated adoption of the “more flexible” relevancy and helpfulness approach. According to the court, this method is reflected in rule 702 of the Federal Rules of Evidence.

The court was apparently unaware of the emerging debate in the United States over the scope of rule 702. It described rule 702 as establishing a liberal relevancy test, similar to that set forth in the English case of *R. v. Turner.*

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101. *Id.* at 200 (O'Sullivan, J., dissenting).


106. *Id.*

is admissible if it will "furnish the court with scientific information which is likely to be outside the experience and knowledge of a judge or jury." But by 1986, several American courts had interpreted rule 702 far more narrowly.  

2. The Canadian Supreme Court Adopts a Liberal Approach

In the 1987 case of R. v. Beland, the Canadian Supreme Court faced the issue of whether polygraph tests submitted by a defendant were admissible. The prosecution argued for the exclusion of the polygraph evidence since it is "not reliable to an acceptable standard." Justice McIntyre, speaking for the majority, rejected the reliability approach, and stated that "even the finding of a significant percentage of error" in the results of a polygraph "would not, by itself, be sufficient ground to exclude it as an instrument for use in the courts." But the court still held that polygraphs are inadmissible because the credibility of the issue it measures falls within the experience of judges and juries. Since the polygraph requires an operator, the polygraph only masks human fallibility "with the mystique of science." The court did not adopt a more general test to evaluate the admissibility of scientific evidence.

Justice Wilson wrote an influential dissent in Beland advocating a liberal standard for the admissibility of scientific evidence. Her opinion reflects a somewhat dated understanding of American evidence law. Apparently unaware of the emergence of the reliability test in the United States, she viewed the Crown's argument as an attempt to introduce the Frye test into Canadian law. Wilson quoted with approval Iowa Supreme Court Justice Mark McCormick's assertion that American courts were moving away from Frye because it was "too rigid, somewhat unclear, and an unnecessary and undesirable barrier to the admissibility of scientific evidence in some situations." Neglecting an emerging trend toward strict scrutiny in the United States, Justice Wilson relied on data from Justice McCormick's dated article to argue in favor of following a "discernable trend" in the United States.

109. Id. at 83. This was also the law in the United States before Frye. Frye v. United States, 293 F. 1013, 1014 (D.C. Cir. 1923) ("The rule is that the opinions of experts or skilled witnesses are admissible in evidence in those cases in which the matter of inquiry is such that inexperienced persons are unlikely to prove capable of forming a correct judgment upon it." (quoting defendant's brief)).


112. Id. at 432 (Wilson, J., dissenting) (stating reliability should not be standard for admissibility).

113. Id. at 417.

114. Id. at 418.


116. 2 S.C.R. at 432.

117. Id. at 433 (quoting McCormick, supra note 32, at 904).
States toward an expansive admissibility standard. Yet, by 1987 the trend in the United States was arguably toward more restrictive rules for the admissibility of scientific evidence.

Three years later, in R. v. Lavallee, Justice Wilson wrote an opinion allowing the admission of evidence of battered woman syndrome if the accused had a reasonable fear of death or injury. Justice Wilson concluded that battered spouse syndrome was beyond the understanding of the average juror. Testimony regarding the syndrome could help dispel myths that jurors were likely to believe, such as the idea that a severely beaten woman would necessarily leave her husband, or that women enjoy being beaten. This opinion did little to clarify the rule for the admissibility of scientific evidence in Canada, however, since the court limited its holding to evidence regarding battered woman syndrome. But Justice Wilson’s opinion implicitly adopted the liberal relevancy standard because she did not inquire “into the integrity of the theory that the expert employed.”

Justice Sopinka wrote a concurrence in Lavallee that incorporated a version of the Frye rule. He stated that an expert should arrive at an opinion “on the basis of forms of enquiry and practice that are accepted means of decision within that expertise.”

3. Lower Court Reaction

Because a majority of the Canadian Supreme Court did not settle on a test for the admissibility of scientific evidence in Beland or Lavallee, but instead decided each case on its facts, lower Canadian courts were largely on their own. Some courts found Justice Wilson’s rejection of Frye in Beland persuasive. But instead of adopting a relevancy test, these courts substituted flexible, multipart reliability tests that borrowed heavily from American law.

In R. v. Johnston, for example, an Ontario General Division court, relying on Justice Wilson’s dissent in Beland, held “that the Frye test should not be adopted in Canada.” Instead, a “more expansive admissibility standard, relevancy and helpfulness,” should be adopted. The court, citing American sources including Justice McCormick’s Iowa Law Review article and two Second Circuit opinions, United States v. Williams and United States v. Williams.
and United States v. Jakobetz, in essence adopted the early reliability tests advocated in the United States. The judge noted that he could be criticized for excessive "cross-border shopping." But he "found the selection of 'merchandise' much wider and better displayed"; he therefore "made the decision to pay duty, G.S.T. and import."

In R. v. Melaragni, another Ontario General Division judge applied a multifactor test to determine the admissibility of scientific evidence. First, the court held that novel evidence must be relevant, pass a minimum threshold test of reliability, be outside the experience and knowledge of the trier of fact, and be tendered through a properly qualified expert. Once those preconditions were met, the court considered nine additional factors. The court added

129. 955 F.2d 786 (2d Cir. 1992), cert. denied, 113 S. Ct. 104 (1993).
130. The court enunciated fourteen factors that should be considered in assessing whether novel scientific evidence is helpful and therefore admissible:

1. The potential rate of error;
2. The existence and maintenance of standards;
3. The care with which the scientific technique has been employed and whether it is susceptible to abuse;
4. Whether there are analogous relationships with other types of scientific techniques that are routinely admitted into evidence;
5. The presence of failsafe characteristics;
6. The expert's qualifications and stature;
7. The existence of specialized literature;
8. The novelty of the technique in its relationship to more established areas of scientific analysis;
9. Whether the technique in question has been generally accepted by experts in the field . . . ;
10. The nature and breadth of the inference adduced;
11. The clarity with which the technique may be explained;
12. The extent to which basic data may be verified by the court and jury;
13. The availability of other experts to evaluate the technique; and
14. The probative significance of the evidence.

69 C.C.C.3d at 415. The court added that if the proffered evidence satisfies that test, the court should then perform an analysis similar to that required by American Federal Rule of Evidence 403. The court recognized that there is no rule 403 counterpart in any Canadian statute or regulation, but it found that a trial court possesses a residual discretion to reject evidence that is more prejudicial than probative. Id. at 417.

131. Id. at 418. For an even longer list of factors courts should consider, see Paciocco, Evaluating, supra note 99, at 313-18.
133. These factors are:

1. Is the evidence likely to assist the jury in its fact-finding mission, or is it likely to confuse and confound the jury?
2. Is the jury likely to be overwhelmed by the 'mystic infallibility' of the evidence, or will the jury be able to keep an open mind and objectively assess the worth of the evidence?
3. Will the evidence, if accepted, conclusively prove an essential element of the crime which the defense is contesting, or is it simply a piece of evidence to be incorporated into a larger puzzle?
4. What degree of reliability has the proposed scientific technique or body of knowledge achieved?
5. Are there a sufficient number of experts available so that the defense can retain its own expert if desired?
6. Is the scientific technique or body of knowledge such that it can be independently tested by the defense?
7. Has the scientific technique destroyed the evidence upon which the conclusions have been based, or has the evidence been preserved for defense analysis if requested?
8. Are there clear policy or legal grounds which would render the evidence inadmissible despite its probative value?
that its list was not necessarily exhaustive and that the weight of each factor would depend on the circumstances of each case.144

In R. v. S.S.,135 a defendant in an incest case offered evidence regarding "false memory syndrome." The New Brunswick provincial court stated that it could use either of two possible tests to determine the admissibility of such novel evidence: Frye or the "reasonable reliability" test. The court, quoting liberally from Justice Wilson's dissent in Beland, found that the latter test was preferred in Canada.136 Applying the reasonable reliability test to the facts at issue, the court excluded the defendant's evidence.137

These lower court opinions did little to resolve the uncertainty in the Canadian law of scientific evidence. The multipart standards suggested in Johnston and Melaragni were so manipulable that they were meaningless. Moreover, while all the courts cited Justice Wilson favorably, they could not agree on the proper rule for the admissibility of scientific evidence. The Johnston court summarized the preferred test as a liberal "relevancy and helpfulness test," while the S.S. court promoted a seemingly more conservative "reasonable reliability" interpretation.

Furthering the confusion, a few other courts agreed with Justice Sopinka's position in Lavallee and applied the Frye test. In an unpublished ruling in 1990, an Ontario trial court held that expert testimony is admissable only if the "expertise that the witness purports to have [is] an expertise that is recognized, generally received in the scientific community."138 In 1993, the Northwest Territories Supreme Court held that it would admit novel scientific evidence only if it is reliable, relevant, and helpful to the trier of fact.139 Although the court did not cite Frye, it held that the reliability of the scientific evidence in question was demonstrated by the general acceptance of the scientific techniques involved.140

9. Will the evidence cause undue delay or result in the needless presentation of cumulative evidence?

Id. at 353.

134. Id.


136. Id. at 327-28.

137. Id. at 328-29.


140. Id. at 165; cf. Beverly McLachlin, Paper Presented before Canadian Bar Association Civil Litigation Section, Vancouver, Edmonton (June 21-22, 1993), quoted in Paciocco, Evaluating, supra note 99, at 318 (opining that "the best gauges of reliability are the fact that the theories on which [expert opinion evidence] is founded are widely accepted throughout society and are based on rigorous and wide empirical testing or observation") (alteration in original).
4. The Canadian Supreme Court’s Latest Pronouncement on Scientific Evidence: R. v. Mohan

With Canadian law regarding scientific evidence in chaos, the Canadian Supreme Court had another opportunity to clarify the law in 1994. In R. v. Mohan, the Canadian Supreme Court considered the case of a pediatrician charged with sexually assaulting his female patients. The accused sought to call a psychiatrist to testify that a perpetrator of the offenses alleged would be part of a limited group of “sexual psychopaths” who had certain definable psychological profiles. The psychiatrist was to state that the defendant’s psychiatric profile did not fit within this group.

In determining the admissibility of this evidence, the court, speaking through Justice Sopinka, first discussed the general framework for the admissibility of expert evidence. Justice Sopinka held that the following criteria must be considered: (1) relevance, (2) necessity in assisting the trier of fact, (3) the absence of any exclusionary rule, and (4) the qualifications of the expert.

With regard to the first criterion, Sopinka stressed that relevance is not mere logical relevance, but legal relevance. Courts may exclude evidence that is logically relevant if its probative value is outweighed by its prejudicial effect, if its presentation involves an inordinate amount of time, or if its potential to mislead the trier of fact is out of proportion to its reliability. Sopinka defined the second criterion, assistance to the trier of fact, as evidence that is likely to be outside the experience and knowledge of the trier of fact. The final two criteria allow a court to exclude expert evidence if the testimony would run afoul of another rule, or if the expert is unqualified.

Thus, the Mohan court established legal relevance and assistance to the trier of fact as the primary criteria for the admissibility of most expert evidence and established, as the measure of relevance, a vague balancing test similar to American Federal Rule of Evidence 403.

Yet despite the seemingly liberal thrust of the criteria he announced in Mohan, Sopinka applied a reliability test with a significant general acceptance.
Sopinka wrote that "[t]he trial judge should consider the opinion of the expert and whether the expert is merely expressing a personal opinion or whether the behavioural profile which the expert is putting forward is in common use as a reliable indicator of membership in a distinctive group." In other words, Sopinka explained, the court "must consider whether the scientific community has developed a standard profile for the offender who commits this type of crime." "An affirmative finding on this basis will satisfy the criteria of relevancy and necessity and make the evidence admissible" if the expert is testifying within her expertise.

Applying this test, Sopinka found that the defendant's expert provided no evidence indicating any "general acceptance" of the expert's theory that people who commit sexual assault on young women necessarily possess distinguishing behavioral characteristics. Sopinka added that he discovered no material in the record to support a finding that the profile of a pedophile or psychopath has been standardized. Therefore, continued Sopinka, the expert's group profiles were not sufficiently reliable to be considered helpful to the jury. Sopinka concluded that absent sufficient indicia of reliability, the evidence could not be deemed helpful to the jury nor its value be said to outweigh its potential for misleading or diverting the jury.

Sopinka's opinion did not cite any American case law on the issue of the admissibility of scientific evidence. Nevertheless, one scholar has argued that "[t]he court in Mohan appears to have arrived at the same position as the court in Daubert, though with decidedly less fanfare" because of the opinion's focus on the underlying validity of expert evidence. The opinion's heavy reliance on general acceptance, however, seems to be inspired by Frye more than Daubert.

In any event, any suggestion that Mohan has established Daubert, Frye, or any other grand test for the admissibility of expert testimony that would clarify the law of scientific evidence in Canada is probably based on wishful thinking. Sopinka was not attempting to establish a universally applicable rule, as was done in those two cases. Rather, he stated explicitly that the question before the court was how to apply broad, general criteria of relevance and helpfulness to a particular type of evidence. The enunciated general acceptance standard therefore apparently applies only to evidence of

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147. Sopinka's opinion dovetails nicely with an article written by David Paciocco of the University of Ottawa. Paciocco criticized the relevance and helpfulness test apparently supported by Justice Wilson's dissent in Beland as "remarkably un instructive" by itself. Paciocco, Evaluating, supra note 99, at 310. The test, however, is useful "when it is appreciated that the inquiry is to be focussed intently on the integrity of the expert process that is being presented as evidence." Id. at 311. Properly applied, added Paciocco, the relevance and helpfulness test "involves a broad assessment of reliability, utility and prejudice as well." Id. at 312.
148. Mohan, 89 C.C.C.3d at 423.
149. Id.
150. Id.
151. Id. at 424.
psychiatric profiles. In other areas, Canadian courts apparently have extremely broad discretion.

The early indications are that Mohan has not done much to clarify the standards for the admissibility of scientific evidence in Canada. In R. v. T., an Ontario trial court applied Mohan to the issue of the admissibility of expert testimony regarding repressed memory syndrome. The court acknowledged that Mohan requires a court to determine “whether there exists an acceptable body of evidence or acceptance of the theory to objectively validate the opinion.” But the court added that it did not read Mohan as adopting Frye, a test which, according to the court, “has spawned an immeasurable amount of litigation and criticism.” Frye, continued the court, “has never achieved a precedential foothold in Canadian law” and “is neither consistent with the approach in Mohan” nor with other recent Canadian cases. The court added incorrectly that “in the United States, [Frye] has largely been overtaken by case law” and statutory rules of evidence.

Instead of Frye, the court found that the test for the admissibility of scientific evidence “should be a flexible one exploring the existence of indicia of reliability and trustworthiness.” The court noted that “there is a continuum of reliability in matters of science from near certainty in physical sciences to the far end of the spectrum inhabited by junk science and opinion akin to sorcery or magic.” In order to balance properly the danger of admitting unreliable evidence against the potential for excluding helpful, reliable evidence, the court adopted the standards suggested by the United States Supreme Court in Daubert:

> Whether the technique can be demonstrably tested, the existence of peer review for the theory or technique, the existence of publication, the testing or validation employing control and error measurement, and some recognition or acceptance in the relevant scientific field all contribute to an assessment of the reliability of the opinion.

The court then ignored all these Daubert factors and applied a liberal relevancy test instead. It admitted the challenged evidence because “[the]
doctor’s opinions are founded in clinical experience and relevant academic study."

In another case decided near the end of 1994 that involved the admissibility of DNA evidence, the New Brunswick Court of Appeals ignored Mohan. Instead, the court — after rejecting the *Frye* rule — stated that "the law in Canada can be ascertained by looking at the test that the courts have applied in cases involving novel scientific evidence. Fingerprint evidence, evidence dealing with footprints, hair and fibre samples and other scientific evidence such as chromatographs are admitted on the basis of relevance." The court concluded that "the science of DNA testing is sufficiently credible to admit evidence from such tests when the particular tests themselves are relevant." After reviewing the evidence proffered by the prosecution, the court found that it was both "relevant and helpful" and therefore admissible.

The continued uncertainty in Canadian law regarding scientific evidence suggests that Canadian jurisprudence would benefit significantly from a *Daubert*-like decision that would suggest generally applicable criteria for courts to use when confronted with a challenge to expert scientific testimony. The Canadian Supreme Court should in fact improve on *Daubert* by giving lower courts more guidance regarding how to apply such criteria in actual cases. Unfortunately, the Canadian Supreme Court appears to favor deciding the admissibility of scientific evidence on a case-by-case basis depending on what it sees as the equities of the situation.

B. The Law of Scientific Evidence in Australia

Australia has had perhaps the most vociferous debate over scientific evidence outside the United States. The traditional relevancy test in Australia came under attack after prosecutors misused scientific evidence in winning several convictions. Australian common law has moved gradually toward an American model of requiring that scientific evidence be generally accepted as reliable before it can be admitted in court. Indeed, American case law and commentary on scientific evidence have directly influenced Australian law. Australians have not always understood American law, however, and have had trouble interpreting the *Frye* general acceptance test in particular.

Meanwhile, the limited Australian momentum toward stricter scrutiny of scientific evidence is threatened by a new federal evidence code. The

163. *Id.* at *54.
165. Remarkably, the court relied heavily on Mark McCormick's outdated article in rejecting *Frye* to the exclusion of much more recent and currently influential American scholarship. *Id.* at 150-51.
166. *Id.* at 151.
167. *Id.* at 152.
168. *Id.* at 158.
scientific evidence provision of this code is heavily influenced by American attitudes toward the admissibility of scientific evidence circa 1985, just before the strict scrutiny trend in the United States began. Due to the scholarly work of Ian Freckelton and others, however, Australians have become much more knowledgeable about American law. It seems only a matter of time before this knowledge, combined with simmering outrage at cases involving a miscarriage of justice, manifests itself in a clear trend toward strict scrutiny of scientific evidence.

1. The Misintroduction of the Frye General Acceptance Test Into Australia

An Australian case that preceded Frye adopted the general acceptance standard for the admissibility of scientific evidence. In R. v. Parker,170 the court held that fingerprint evidence could be admissible if the theory at issue was “generally recognized by scientific men.” This case did not receive much attention in the ensuing years, however.171

By the late 1950s, Australian law began to move toward an “organized field of expertise test” for the admissibility of expert testimony. In 1956, the High Court of Australia held that before expert evidence may be admitted, the party proffering the evidence must show that it is based on special study by, or knowledge of, a qualified expert.172 In 1960, Justice Dixon of the High Court of Australia wrote that any evidence from a qualified expert that could be probative is admissible if two conditions are met. First, the substance of the testimony must be beyond the common knowledge of the trier of fact, and, second, the expert’s testimony must be gleaned from an organized field of knowledge.173 According to one influential treatise, an expert witness’s opinion should be admitted even if he put forward an unproven theory not accepted by the weight of scientific opinion.174 In the criminal context, however, the trial judge had discretion to exclude evidence whose probative value was substantially outweighed by its prejudicial impact.175

170. 1912 V.L.R. 152, 154.
171. Ian R. Freckelton, Science and the Legal Culture, 2 EXPERT EVIDENCE. 107, 109 (1993). Freckelton, whose work has been very influential in Australia, is a prominent Australian barrister and author of a treatise on expert evidence.
174. Cross on Evidence § 29060, at 783 (4th Austl. ed. 1991). Cross cites Commissioner for Gov’t Transp. v. Adamcik, 106 C.L.R. 292 (1961), a case involving marginal medical testimony that a plaintiff’s leukemia was caused by physical trauma. Adamcik provides dubious support for this rule. First, the case involved the standard for the sufficiency of scientific evidence, not its admissibility. The admissibility of the evidence in question was apparently never raised. Second, three of the four judges on the court expressed their willingness to vacate the opinion below. However, because the appellant had asked for a reversal, not a new trial, these three judges felt constrained to affirm. Id. at 301 (Taylor, J.), 303 (Menzies, J.), 307-08 (Windley, J.). Nevertheless, Adamcik has been cited for the proposition that at least in civil cases, “it is well established that any witness qualified as an expert by the possession of the relevant degrees may be permitted to propound medical theories even of bizarre curiosity.” Gordon Samuels, Is This the Best We Can Do?, 25 AUSTL. J. FORENSIC SCI. 3, 6 (1993). Gordon Samuels is a judge sitting on the Court of Appeal, Supreme Court of New South Wales.
175. Freckelton, supra note 171, at 109.
The law began to change in the late 1970s, when Australian prosecutors began to rely on novel forensic techniques to secure convictions. As in the United States, the exponential growth of forensic science began to shake up the previously somnolent law of expert evidence.

The Australian common law began rather inadvertently to return to the general acceptance test in 1977. In *R. v. Gilmore*, the New South Wales Court of Criminal Appeal considered the admissibility of spectrographic voice analysis. The court, relying on Australian precedent, held that it had the authority to consider "both the question of whether or not a particular witness qualifies as an expert, and the question of whether the field in respect of which his evidence is sought to be tendered is such as to be properly the subject of expert testimony." Looking to the development of the field in the United States, the court found that voice spectrography "is a recognized field in which a properly qualified expert can give admissible evidence."

The *Gilmore* opinion relied heavily on the Fourth Circuit opinion in *United States v. Bailer* to support its judgment. The opinion, as cited in *Gilmore*, gave several examples of how the district court "adequately guarded against dangers inherent in the use of newly developed scientific tests," including ensuring the expertise of the witness, holding a *voir dire* on a test's probative value, checking the availability of other experts, and giving limiting instructions to the jury. None of the examples mentioned general acceptance.

The *Gilmore* court stated that "the approach laid down in *Bailer* is that which should also be regarded as correctly stating the approach to be adopted in this State." Thus, *Gilmore* was perfectly consistent with prior Australian common law. It essentially applied a "recognized field" of expertise test and then cited *Bailer* for the proposition that courts should take steps to ensure that scientific evidence is not presented to the jury in a way that would render it more prejudicial than probative. *Gilmore* did not in any way adopt *Frye*.

Confusion on this point arose, however, because later in its opinion the *Gilmore* court referred to *Commonwealth v. Lykus*, a case from the Supreme Judicial Court of Massachusetts finding that voiceprint evidence had met the test of general acceptability as required by *Frye*. In context, it is

176. 2 N.S.W.L.R. 935 (1977).
177. *Id.* at 938-39.
178. *Id.* at 939.
179. 519 F.2d 463 (4th Cir. 1975).
181. *Bailer*, 519 F.2d at 466.
182. *Id.* at 466-67.
184. In fact, at least one prominent American commentator has associated a test similar to that adopted in *Gilmore* with the liberal relevancy test advocated by Professor Charles McCormick. Edward Cleary, one of the reporters of the Federal Rules of Evidence, stated that common law experience suggests that the relevancy provisions of Federal Rules 401 to 403 could be applied to "purportedly scientific evidence in an insufficiently established field." Edward W. Cleary, Preliminary Notes on Reading the Rules of Evidence, 57 Neb. L. Rev. 908, 916 (1978).
clear that the *Gilmore* court did not intend this citation to be construed as supportive of *Frye*. In fact, on the next page of its opinion, the court repeated its belief that the cautionary observations in *Bailer* quoted above “are an adequate safeguard” against the misuse of expert testimony.

Nevertheless, some commentators read *Gilmore* as adopting the *Frye* test. Because *Gilmore* clearly applied a “recognized field of expertise” test as the primary screening mechanism for expert testimony, commentators confused the field of expertise test with the *Frye* rule, though they are at best distant cousins. In other words, commentators read an opinion that mentioned *Frye* in passing as adopting *Frye*, and then assumed that *Frye* is synonymous with the field of expertise test applied by the court. This confusion occurred partly because of the lack of Australian familiarity with *Frye* and partly because the commentators simply did not read the *Gilmore* opinion (or the opinions it cited) carefully. One also gets the impression that some wily commentators saw *Gilmore* as an opportunity to tighten the Australian law of scientific evidence by importing the stricter American *Frye* rule, even if diluted by the field of expertise criterion.

In any event, the *Frye* cat was out of the bag. As *Frye* began to receive more attention in the United States, it also began to attract attention and create controversy in Australia. In 1981, a New South Wales district court combined the *Frye* and reliability tests when it looked to the “proved or accepted basis” of polygraphy in order to determine the admissibility of expert testimony. Other courts, however, continued to apply versions of the field of expertise test.

2. The Effect of the Miscarriage of Justice Cases

Meanwhile, public concern over the potential misuse of scientific evidence was growing, particularly after the miscarriage of justice that

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187. The court also explicitly disavowed the reliability test, stating that “[to] recognize . . . a degree of risk of inaccuracy and to recognize a need for caution in the use of the evidence, is far from treating the evidence as inadmissible.” *Id.* at 941.

188. *Id.*

189. *See infra* notes 217-18 and accompanying text.


191. One article states that the *Gilmore* court “was aware of the *Frye* doctrine and used words reminiscent of the *Frye* test.” Paul Giugni, *Runjanjic v. R.*, 14 SYDNEY L. REV. 511, 514 (1992). The latter part of that statement is at best debatable. The same article states that the *Bailer* court “applied the *Frye* test in determining the admissibility of expert evidence,” which is simply not true. *Id.* at 514 n.24.

192. R. v. Murray, 7 A. Crim. R. 48, 49 (N.S.W. Dist. Ct. 1981). Because this case was decided by a district court, it has minimal precedential value. Letter from Ian R. Freckelton, Australian evidence scholar, to author (July 4, 1995) (on file with author).

193. In *R. v. McHardie*, 2 N.S.W.L.R. 733, 753 (1983), for example, the New South Wales Court of Criminal Appeal held that expert testimony is admissible if it has its basis in a “field of knowledge.” *Id.* at 753. In *R. v. Bonython*, 38 S.A.S.R. 45 (1984) the court held that “the court may require . . . [that] techniques or technology have a sufficient scientific basis to render results arrived at by that means to render part of a field of knowledge which is a proper subject of expert evidence.” *Id.* at 47 (quoted in *R. v. Jarrett*, 1994 Austl. S.A.S.C. LEXIS 64, at *32-*34).
occurred in the Splatt case.\textsuperscript{194} The Splatt case arose out of the brutal murder of an elderly woman in December, 1977. A jury convicted Edward Charles Splatt of the murder. Splatt spent several years in jail, while consistently maintaining his innocence. After a public campaign for a review of his conviction, a Royal Commission was appointed to review the evidence. The Report of the Royal Commission found reasonable doubt regarding the validity of the scientific evidence used to convict Splatt, and he was released.\textsuperscript{195}

The Splatt controversy was followed by one of the most controversial cases in Australian history, \textit{R. v. Chamberlain},\textsuperscript{196} better known as the Dingo Baby Case.\textsuperscript{197} While on a camping trip, Alice Lynne Chamberlain claimed to have seen a dingo (a wild dog) carrying something off near her tent. She soon realized the dingo was holding her baby, and witnesses confirmed that she cried out, "My God, My God. A dingo has got my baby." Neither the dingo nor the baby was found, but the baby's clothes were recovered.

The government eventually charged Mrs. Chamberlain with murder. The prosecution claimed that she cut her baby's throat in the family car and that later that evening Mrs. Chamberlain or her husband took the body from the car and buried it in sand nearby. Subsequently, according to the prosecution, one or both Chamberlains disinterred the body, cut the fabric of the baby's garments to simulate damage by a dingo, and removed the clothing and placed it in a pile.

At trial, both parties presented complex and contradictory scientific evidence on contested issues such as the origins of the cuts on the baby's garments, the ability of a dingo to carry a baby, and what appeared to be blood stains found on the baby's clothing and in the defendants' car. At the end of the trial, the court essentially told the jurors that if they did not comprehend the scientific evidence, they could decide the case based on their common sense and how convincing they found the experts:

\begin{quote}
Merely because you can't fully understand the techniques and methods employed in modern scientific research, doesn't mean you can't act on the evidence. . . . Of course, you can. In the long run, it will depend on your assessment of the witness as to how he or she appeals to you in the course of your inquiry, and you are therefore entitled . . . to look at the demeanour, the manner in which the evidence was given, and utilize your common [sic] sense judgment as to the extent, if any, you rely on this evidence.\textsuperscript{198}
\end{quote}

The jury convicted Mrs. Chamberlain.\textsuperscript{199}


\textsuperscript{195} Id.


\textsuperscript{199} Dean C.R. Williams of Monash University Law School notes that "it is likely that in many cases juries faced with [conflicts in expert evidence] resort to reliance upon irrelevant considerations such as which experts appear the more confident and self-assured." The court's instructions in \textit{Chamberlain} encouraged this tendency. C.R. Williams, \textit{Evidence and the Expert Witness}, 26 AUSTL. J. FORENSIC SCI. 3, 6 (1994); see also Roberts, \textit{infra} note 237, at 788 ("[A]dversarial criminal practice invites the court to evaluate scientific evidence by reference to scientifically irrelevant criteria, such as the expert's physical
On appeal, a two-judge majority rejected a challenge to the jury instructions quoted above, and compounded the trial court’s errors by focusing on the personalities of the experts, rather than concentrating on apparent problems with the scientific evidence. After accusing the two principal defense expert witnesses of exhibiting “an unbecoming arrogance,” the majority affirmed the conviction. On appeal to the High Court, a majority once again affirmed — this time over a vigorous dissent by Justice Murphy, who severely criticized the prosecution’s scientific evidence.

Possible flaws in the government’s scientific evidence, and the unscientific nature of the inquiry, shocked the Australian scientific community. In 1984, thirty-four Australian scientists signed a joint statement expressing serious doubts about the prosecution’s blood evidence. In 1985, the Chamberlain Innocence Committee presented fresh evidence to the Northern Territory Attorney General that the baby’s jumpsuit was cut by a dingo’s teeth. The Committee’s presentation also cast doubt on the blood evidence. The embarrassed government ordered a Royal Commission to investigate the possible misuse of forensic science by the prosecution.

The Splatt and Chamberlain cases “demonstrated to both the [Australian] legal fraternity and the community at large that the growth of the forensic science industry has brought many uncertainties with it.” Because of the dearth of tort cases relying on scientific evidence in Australia, litigation had not generated the specialist experts (such as those practicing in the United States) who brazenly publicize their controversial skills. Perhaps that is why Splatt and Chamberlain were so shocking. The two cases led to widespread condemnation in Australia of the use of unreliable forensic evidence.

appearance, accent, or communication skills.”).

200. Chamberlain v. R., 72 F.L.R. 1, 30 (Fed. Ct. N. Terr. 1983); see Gerber, supra note 197, at 246. Similarly, in Wells v. Ortho Pharmaceutical Corp., 615 F. Supp. 262, 267 (N.D. Ga. 1985), aff’d in part, modified in part, 788 F.2d 741 (11th Cir.), cert. denied, 479 U.S. 950 (1986), the judge, sitting as trier of fact, noted that he did not like the demeanor and tone of the defendants’ experts and awarded over $5 million to a plaintiff who alleged that a spermicide caused her child’s birth defect. However, in Wiechmann v. Lovering & Workover Corp., 59 S.A. St. R. 203, 204 (1992), a South Australian court held that demeanor should be of little importance in resolving conflicts between well qualified experts. Rather, courts must assess the probability that each side is correct. For an explanation of why courts should not give weight to a scientific expert’s demeanor, see David E. Bernstein, The Admissibility of Expert Evidence After Daubert v. Merrell Dow Pharmaceuticals, 15 CARDOZO L. REV. 2139, 2145-47 (1994).


204. See BROWN & WILSON, supra note 203, at 8-9; see also McGauran, supra note 203, at 85 (“We are quite some considerable distance from countries like the USA, in which expert witnesses are entrepreneurial and in which professional judgements are driven by the marketplace.”).
3. The Australian Law Reform Commission Report Favors a Relevancy Test

In 1985, in the midst of the controversy over *Chamberlain*, the Australian Law Reform Commission (ALRC), charged with recommending a new evidence code, released an interim report. The report rejected *Frye*, as well as any suggestion that expert opinion must be supported by a “reputable body of opinion.”[205] The ALRC also rejected the reliability test, stating that “[d]emonstrated lack of reliability . . . goes not to admissibility . . . but to the weight. . . . Reliance is, therefore, placed upon the protections inherent in the adversary conduct of trials and the nature of cross-examination.”[206]

The ALRC recommended that judicial discretion be limited to excluding scientific evidence on the basis of the prejudicial effects that it may have, its questionable reliability, and its tendency to mislead, confuse, or require undue time and cost. The ALRC noted that under this test, if evidence is “liable irrationally or incorrectly to affect court assessment of the evidence, the court could also rule it to be inadmissible.”[207] The ALRC added that evidence could be excluded in exceptional cases.[208]

After a period for comments, the ALRC issued its final report. The report observed that the ALRC received many objections from those who felt that courts should restrict expert testimony, particularly by adopting the *Frye* rule.[209] But the Commission continued to reject *Frye*. It maintained that “expert testimony cannot be excluded simply because it relates to new areas, conflicts with other expert testimony or because it is difficult to comprehend. If it could be, the courts would lag behind community knowledge.”[210]

Another important Australian critic of both *Frye* and the reliability test was attorney Ian Freckelton, author of the seminal work on the Anglo-Australian law of scientific evidence, *The Trial of the Expert*.[211] Freckelton argued that

[The courtroom is not the proper forum to determine the reliability or validity of a scientific technique, nor is it the right venue to assess whether controversy within the scientific community has subsided sufficiently for the technique or theory to be accounted as receiving general or even substantial acceptance within that community.][212]

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206. 1 Id.
207. 1 Id.
208. 1 Id.
209. 38 AUSTL. LAW REFORM COMM’N, FINAL REPORT, EVIDENCE 83 (1987)
211. FRECKELTON, supra note 197.
212. FRECKELTON, supra note 197, at 172. The point Freckelton misses is that courts inevitably weigh the reliability and validity of scientific techniques. The question is whether there should be an initial pretrial hearing on the evidence where the court can make a reasoned determination as to its validity, or whether the trier of fact will have the sole burden of evaluating scientific evidence in the midst of a trial.
4. **Strict Scrutiny Gains Momentum**

Just before Freckelton's book was published, the Royal Commission established to look into the use of scientific evidence in *Chamberlain* published its report. The report presented detailed criticisms of the scientific evidence used to convict Mrs. Chamberlain. Acting on the advice of the Commission, in 1988 the Northern Territory Court of Appeal ordered that Mrs. Chamberlain be freed.

The Royal Commission's work gave new momentum to those favoring stricter rules for the admissibility of scientific evidence. One author wrote in the *Medical Journal of Australia* that because only experts are entitled to give opinion evidence, just as the legal system has a “best evidence” rule for documents, it should create a “best expert” requirement for expert testimony. Without such a requirement, he fumed, “anyone whose name is on the medical register becomes an instant expert, and is entitled to proffer opinion evidence on any medical subject.”

One stumbling block on the road to a stricter test for the admissibility of scientific evidence was that Australians were confused about what such a rule might look like. Some Australian commentators continued to argue that the “organized branch of knowledge” or “field of expertise” test is a version of the *Frye* rule. Other commentators are unsure whether the test is a version of the *Frye* rule.

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213. The report, as summarized by Freckelton, found the following flaws in the scientific evidence in *Chamberlain*: (1) use of tests without confirmatory analysis to verify the results; (2) failure to use adequate controls; (3) testing on articles of evidence from which a clear result could not be expected, and failure to use a control in such circumstances; (4) failure to test the antifetal hemoglobin antiserum before using it; (5) use of an antiserum produced as a research product when it had been made clear by its manufacturer that its diagnostic significance was limited and should be established by interested scientists working in clinical laboratories; (6) failure to take adequate account of the effects of denaturing from the heat in the car and the effluxion of time when interpreting test results; (7) excessively hasty testing; (8) employment of tests by scientists relatively inexperienced in performing them without adequate guidance from a more experienced scientist; (9) destruction of testing material without even recording the results photographically; (10) absence of a system for cross-checking results and procedures; (11) readiness to "speculate" rather than be confined by the available data; (12) descent into partiality by some of the scientists; (13) preparedness of some witnesses to go beyond their areas of expertise; (14) unpreparedness of forensic scientists to consult each other. Ian R. Freckelton, *Of Blood, Babies and Bathwater*, 17 ALTERNATIVE L.J. 10, 11 (1992).


216. Gerber, supra note 197, at 243

217. See, e.g., ANDREW L.C. LIGERTWOOD, AUSTRALIAN EVIDENCE § 7.40, at 378 (2d ed. 1993). One writer, for example, contended that the test incorporated the first part of the original *Frye* dicta, where the court noted that at some point a "discovery crosses the line between the experimental and demonstrable stages." Oliver P. Holdenson, The Admission of Expert Evidence of Opinion as to the Potential Unreliability of Evidence of Visual Identification, 16 MELB. U. L. REV. 521, 541 (1988) (quoting *Frye* v. United States, 293 F. 1013, 1014 (D.C. Cir. 1923)).


The confusion over *Frye* is reflected, for example, in the commentary of one writer, who acknowledged that "[t]his concept of a field of expertise is a great deal wider than [the] prerequisite of general acceptance by a community of experts." Giugni, supra note 191, at 513. Yet, he added that it is "unclear" whether the judgments applying a field of expertise test implement *Frye*. Id.
As discussed above, the field of expertise test originally developed independently of the Frye rule. But if the "field of expertise" test can be considered a relative of the Frye rule, it is a rather distant one that does not match the predominant American interpretation of Frye.

In any event, the Australian cases adopting the field of expertise test are sufficiently vague that they "advanced Australian jurisprudence only a very short way because they leave unanswered the question of how the courts should react to iconoclastic or state-of-the-art scientific views not shared by most of the scientific community." Since many Australians who favor tighter standards for admitting scientific evidence look to Frye as a strict American test that could be imported into Australian law, the fact that in Australia Frye is sometimes associated with the liberal field of expertise test is doubtlessly perplexing to them.

While some courts struggled with the field of expertise rule, the Frye general acceptance test gained momentum. In R. v. Runjanjic, the South Australian Court of Criminal Appeal reversed a trial court opinion refusing to admit evidence of battered woman's syndrome on behalf of the defendants, who argued that they acted under duress from their lovers. Chief Justice King stated for the majority that an essential prerequisite to the admission of expert evidence on the battered woman's syndrome was that "it be accepted by experts competent in the field of psychology or psychiatry as a scientifically established facet of psychology." King later favorably cited a case from New York — a Frye jurisdiction — for the proposition that

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219. See supra text accompanying notes 172-91.

220. See supra text accompanying notes 11-28 and 53-63 (discussing development of Frye in United States). Some U.S. courts subsume a field of expertise analysis within a general acceptance analysis. See, e.g., Hosford v. State, 560 So. 2d 163, 168 (Miss. 1990) ("Is the field of expertise one in which it has been scientifically established that due investigation and study in conformity with techniques and practices generally accepted within the field will produce a valid opinion?") (quoting House v. State, 445 So. 2d 815, 822 (Miss. 1984)).

221. Freckelton, supra note 171, at 109.

222. One reformer, concerned about abuses of scientific evidence such as those in the Chamberlain case, argued that the field of expertise test should be separated from the Australian version of Frye, and that proffered scientific evidence should meet both standards. He urged that the field of expertise test should be a threshold inquiry. Gerber, supra note 197, at 244. If proposed testimony passes the field of expertise test, the party bringing the testimony should also satisfy Frye by showing "that the tests which have been applied have found general acceptance within the scientific community which specializes in that area." Id. at 245.

223. In the wake of the Chamberlain scandal, courts that applied the field of expertise test tended to apply other, more stringent tests as well. For example, in R. v. Runjanjic, 53 A. Crim. R. 362 (1991), Justice Bollen, concurring, stated that "[e]xpert testimony is inadmissible if 'the state of the pertinent art or scientific knowledge does not permit a reasonable opinion to be asserted even by an expert.'" Id. at 372 (quoting MCCORMICK ON EVIDENCE § 13 (4th ed. 1987)). This was his interpretation of the "field of expertise" test. But Justice Bollen also reviewed the evidence in question to ensure that its probative value outweighed its prejudicial effect. Id. at 373. Meanwhile, in Casley-Smith v. FS Evans & Sons Party Ltd., 49 S.A. St. R. 314, 320 (1988), the South Australia Supreme Court added a reliability and acceptance test to the field of expertise rule. The court held that scientific evidence is admissible only if it is "sufficiently organised or recognised to be accepted as a reliable body of knowledge or experience." Id. at 320. However, by citing Frye with approval later in its opinion, the Casley-Smith court confused matters. See id. at 323.

224. Freckelton, Novel, supra note 218, at 246-47; Freckelton, supra note 171, at 110.


226. Id. at 366.
recent findings of researchers in the field have confirmed . . . [the] presence [of battered woman’s syndrome] and thereby indicated that the scientific community accepts its underlying premises.”

Although the opinion does not cite Frye, Australian commentators have reasonably interpreted the language in the opinion focusing on acceptance as adopting the Frye general acceptance test.

The Northern Territory Supreme Court, meanwhile, also adopted a Frye-like test in R. v. Lewis. In Lewis, two experts for the prosecution argued that they could identify bite marks allegedly made by the accused. The trial court, in this case, admitted the evidence, and the jury convicted the defendant. On appeal, Justice Muirhead, writing for the majority, held that when the government intends to present novel scientific evidence, it has a duty to “demonstrate its scientific reliability.” According to Justice Muirhead, the admissibility of bite evidence would be determined in light of the “established universal view” regarding the reliability of the technique in identifying bite marks. This test is actually stricter than Frye since it requires universal, rather than general, acceptance.

Justice Maurice, concurring, explicitly relied on Frye. He argued that “[w]here the evidence is of a comparatively novel kind, the . . . Crown . . . should demonstrate its scientific reliability.” Maurice admitted that “[i]t could not be asserted that the Frye test has become law in Australia.” But he added that Frye “provides a useful guideline in determining whether novel forensic evidence should go before a jury.”

By 1990, Freckelton acknowledged the “increasingly strong indications” that Frye was becoming the law of Australia. He predicted that an Australian court, in formulating criteria for the admission of DNA evidence, would “borrow Frye language and focus upon the degree of dissension about any new technique within the scientific community.” However, another writer, James Kearney, argued that while the Frye approach “is known in Australia . . . it could not be said to be the law in Australia.”


228. See Ian R. Freckelton, Novel Psychological Evidence, in EXPERT EVIDENCE § 13.90 (Ian R. Freckelton & Hugh Selby eds., 1993); Freckelton, Novel, supra note 218; Freckelton, supra note 171; Giugni, supra note 191, at 513. In R. v. C., 60 S.A. St. R. 467 (1993), King reiterated that general acceptance is a precondition of admissibility, though he avoided ruling on the issue in that case. Instead, he held the evidence inadmissible on the ground that it was not “necessary” to help the trier of fact. Justice Duggan continued to reject general acceptance in favor of the field of expertise test.


230. Id. at 271.

231. Id. (Maurice, J., concurring).

232. Id. at 269.

233. Id.


235. Id. at 31.

of DNA admissibility arose, "it would probably be decided by the discretion to exclude otherwise admissible evidence if it would operate unfairly against the accused."

As the debate over the admissibility of scientific evidence in Australia proceeded, shock over Splatt and Chamberlain continued to reverberate. Freckelton, for example, began to espouse a more conservative position on the admissibility of scientific evidence. He noted that "[t]he system is not structured in such a way that expert witnesses, particularly in the criminal field, will regularly be subjected to rigorous cross-examination likely to test the quality of the scientific work that they have undertaken or the propriety of the protocols followed by them or their laboratory." Other commentators, appalled by the results of the Chamberlain inquiry, and concerned about other controversial cases in which the prosecution misused forensic evidence, began to call for stricter scrutiny of scientific evidence.

Despite the overall trend in both judicial decisions and legal scholarship favoring strict scrutiny of scientific evidence in Australia, some courts continued to apply a liberal field of expertise test. In 1993, the South Australia Court of Criminal Appeal held that it was sufficient for the purposes of approving admissibility that podiatry "is something in the nature of a science which requires a course of study in order to obtain knowledge of it." The defendant asked the court to apply Frye, but the court

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237. Id. at 49. In R. v. Lucas, 2 V.R. 109, 115, 118 (1992) the court excluded DNA evidence because there had been no foundational testimony given regarding the frequency of a match between DNA found at the crime scene and the members of the general population. The court applied the traditional discretionary test and found that the testimony lacked sufficient probative value compared with its possible prejudicial effect. The court also held that scientific evidence "must have a basis in a body of recognised scientific theory." It is not clear whether this test is best analogized to Frye or to the field of expertise test.


238. Freckelton, supra note 213, at 10.

239. Justice Michael Kirby, the President of the Court of Appeal of New South Wales, Australia, summarized the problems with expert testimony that the cases revealed:

Partisan expert evidence can do terrible wrongs in the forensic setting. The judge, as much as the jury, will often be ignorant of the realm of discourse engaged in by the forensic expert. The accused may not have equal access to the expertise in the possession of the Crown, simply because of the repeated experience from which the expertise derives. Such experts may be too close to the prosecution. They may lose their objectivity. Yet their very expertise may cloak them with the appearance of professional neutrality. They may be over-confident in their skills and of the 'science' they apply. Dependent on those who call them, they may unconsciously take on their cause.

Michael Kirby, Miscarriages of Justice—Our Lamentable Failure?, COMMONWEALTH L. BULL., July 1991, at 1037, 1045-46. Similarly, after reviewing the miscarriage of justice cases, attorney Judy Bourke wrote:

scientific test evidence is frequently misused in criminal trials because of its unreliability. The heart of the problem lies in the fact that those charged with presenting and trying the facts of a trial, whether judge, jury, counsel or solicitor, are unable to assess the accuracy of the test results

Bourke, supra note 194, at 124.


241. Freckelton, Expert, supra note 218, at 89.
ignored this request and failed even to cite the case.

In June 1994, by contrast, the South Australia Supreme Court explicitly adopted Frye in R. v. Jarrett.\textsuperscript{242} The court held that the procedures adopted by witnesses for the prosecution in the implementation of PCR DNA tests were admissible because they were "recognized by the scientific community as reliable and have been developed to the stage whereby the results obtained by them may be accepted with confidence."\textsuperscript{243} The court rejected the defendant's contention\textsuperscript{244} that it should adopt the stricter, modern version of the Frye rule formulated by the New York Court of Appeals in Castro.\textsuperscript{245} Under this version of Frye, the trial judge would have been obligated to conduct a pretrial hearing to determine if the testing laboratory substantially performed the scientifically accepted tests and techniques, yielding sufficiently reliable tests to be admissible to the jury.\textsuperscript{246} The Jarrett court held that such issues are matters for the jury to decide.\textsuperscript{247}

The court's handling of the Castro issue was hardly a model of judicial craftsmanship. First, the court cited a series of cases that provided scant support for its position. It relied on a thirty-three year old Australian case of questionable relevance,\textsuperscript{248} and also cited the High Court of Australia opinion upholding the Chamberlain conviction\textsuperscript{249} despite Mrs. Chamberlain's ultimate acquittal. The court also relied heavily on the Baller case,\textsuperscript{250} which had rejected Frye in favor of a liberal relevancy test. Baller, a 1975 Fourth Circuit case interpreting the Federal Rules of Evidence, was superseded by Daubert. Yet the Jarrett court failed to discuss, or even cite, Daubert.

Second, none of the cases cited by the court adopted the Frye rule, and

\textsuperscript{243.} Id. at *48. The defendant had initially asked the trial court to reject the evidence. He alleged that the PCR method was new and untried, had not been accepted as reliable, and was highly susceptible to contamination. However, the hearing on the evidence established, in the words of the supreme court, that PCR DNA has crossed the line between "the experimental and demonstrable stages," Frye v. United States, 293 F. 1013 (D.C. Cir. 1923), and is "part of a body of knowledge... which is sufficiently organised or recognised to be accepted as a reliable body of knowledge" by relevant scientists, namely molecular biologists.
\textsuperscript{244.} Id. at *14.
\textsuperscript{245.} Id. at *25-26.
\textsuperscript{246.} Australian commentators have praised Castro. Freckelton, supra note 213, at 11-13; Kearney, supra note 236, at 49-52. Dr. Eric Magnusson of the Department of Chemistry, Australian Defense Force Academy, argues that the criteria established in Castro "were nothing more than the minimum standards which most scientists regarded as obligatory for a properly conducted investigation." Eric Magnusson, Reasonable Doubt, Legal Doubt and Scientific Doubt, 26 Austral. J. Forens. Sci. 8, 9 (1994).
\textsuperscript{249.} Id. at *31, citing Adamcik, 106 C.L.R. 292 (1961). In Adamcik, the court considered the sufficiency of admitted evidence, not the admissibility of evidence. I may be overstating this point, since sufficiency and admissibility determinations have often been conflated in Australia. But since Adamcik has been such an influential opinion with regard to admissibility, we are faced with a classic chicken and egg problem: Has erroneous conflation of admissibility and sufficiency determinations by jurists led to the citation of Adamcik, which concerns sufficiency, in admissibility case? Or did repeated misciting of Adamcik in evidence treatises, as an admissibility (as well as a sufficiency) case, cause the conflation?
\textsuperscript{250.} Id. at *32 (citing United States v. Baller, 519 F.2d 463 (4th Cir. 1975)).
Bailer, as noted previously, implicitly rejected it. If the Jarrett court found those cases persuasive, it should have rejected Frye and adopted a liberal relevancy test. But once the court decided to adopt Frye, the cases it cited provided no guidance as to whether the traditional or modern interpretation of the rule is preferable. The court could have written a far more persuasive opinion had it discussed the American cases accepting and rejecting Castro’s version of Frye.

The Frye test seems to be on its way to becoming the dominant test in Australia. Judy Bourke, a Frye supporter, argues that “many Australian lawyers think the Frye test is either part of Australian common law or, if not, it should be.” Andrew Ligertwood, author of the treatise Australian Evidence, confirms that “recent [Australian] state authority favours application of the Frye test.” Yet, because Australians have frequently misconstrued the Frye test, it is not clear whether all Australian jurisdictions that have purportedly adopted Frye would do so if they understood Frye’s true nature. Moreover, modern American Frye jurisdictions often apply the general acceptance test to an expert’s reasoning, an expansion of Frye that was rejected in Australia in Jarrett. Meanwhile, what effect, if any, Daubert will have on Australian case law remains to be seen. Freckelton notes that the standards set forth in Daubert may be influential in Australian courts, but that “the Frye test seems inexorably destined to enter into the law of Australia” to some degree.

251. See supra text accompanying notes 179-88.
252. See supra note 57 (listing cases accepting and rejecting Castro’s version of Frye).
253. Bourke, supra note 194, at 145. Some Australian scientists support Frye as well. Magnusson, supra note 245, at 9 (“[T]ruly professional forensic science recognises profession-wide standards of professional practice and that it is against these standards that scientific evidence must be assessed.”).
254. LIGERTWOOD, supra note 217, § 7.41, at 378. In contrast, the first edition of Ligertwood’s treatise, published in 1988, did not even mention Frye. ANDREW L.C. LIGERTWOOD, AUSTRALIAN EVIDENCE § 7.41, at 300 (1st ed. 1988). Ligertwood, however, advocates a validity and reliability test for scientific evidence. Confusing the field of expertise test with Frye, he argues against Frye. He argues that a proposed witness’s expertise in a generally accepted, recognized field should not necessarily qualify him to testify. Rather, the witness must be able to help the jury. Therefore, for example, a dentist may practice in a recognized field, but his testimony regarding bite mark identification, which is still an unrecognized field, should not be admitted. Ligertwood also argues that DNA testing may be generally accepted, but that the testing may be performed so badly in a particular case as to make the evidence too unreliable to admit. LIGERTWOOD, supra note 217, § 7.42, at 379. Anticipating Daubert, he maintains that general acceptance is but one indicium of reliability. Id. § 7.41, at 378. Bourke’s commentary also anticipates recent American developments. She criticizes Australian cases for focusing on only novel scientific evidence, because scientific evidence can be unreliable even if it is not novel. Bourke, supra note 194, at 142-46. In Daubert, the Supreme Court explicitly held that all scientific testimony, not just novel testimony, must be screened for reliability. Daubert v. Merrell Dow Pharmaceuticals, 113 S. Ct. 2786, 2796 n.11 (1993).
255. Ian R. Freckelton, The Area of Expertise Rule, in EXPERT EVIDENCE, supra note 228 § 9.330; see also Stephen J. Odgers & James T. Richardson, Keeping “Junk” Science Out of the Courtroom 17 (unpublished, undated manuscript on file with author) (“Daubert will reinforce the trend of authorities in Australia. . . . [T]he focus on reliability is likely to strike a chord in the development of the common law in [Australia] . . . .”).
256. Freckelton, supra note 255. As in the United States, scholars in Australia are debating whether Daubert is more or less strict than Frye. Freckelton maintains that Daubert is “more demanding” because it requires courts to focus on the validity of scientific evidence. Freckelton, Expert, supra note 218, at 50; Freckelton, supra note 255 § 9.290. Dean C.R. Williams of Monash University, however, contends that in Daubert “the United States Supreme Court took a major step in terms of rendering more expert evidence admissible.” Williams, supra note 199, at 5.
5. The Australian Evidence Code

In early 1995 the Australian parliament passed a new federal evidence code that create new rules for the admissibility of scientific evidence. It is unclear how influential the new code of evidence will be. The federal courts hear relatively few cases, and the Australian states are not obligated to adopt the federal code. However, New South Wales has already adopted the code in the form of the 1995 New South Wales Evidence Act, and litigants are likely to cite it even where it has not been adopted.

Section 79 of the code provides that expert evidence is admissible if a person "has specialized knowledge based on the person's training, study or experience," and if the testimony "is wholly or substantially based on that knowledge."

The Australian federal government commissioned two attorneys, Geoff Bellamy and Peter Meibusch, to comment on the text of the Evidence Act in the government's publication of the rules. Bellamy and Meibusch apparently believe that section 79 establishes an extremely liberal rule for the admissibility of expert testimony. In essence, they argue that if the evidence is relevant and meets the requirements of the equivalent of Federal Rule of Evidence 403, it is admissible. This test reflects conventional wisdom in Australian legal circles in the mid-1980s, when the Law Reform Commission reported its proposals for dealing with the admissibility of scientific evidence in an evidence code.

Given the recent trend in Australia toward stricter scrutiny of scientific evidence, courts in jurisdictions adopting the code may try to interpret section 79 creatively in order to avoid its liberal implications, much as American courts did with rules 702 and 703 after passage of the Federal Rules of Evidence. Like the Federal Rules of Evidence, the Australian Evidence Code is sufficiently vague to allow such interpretations to thrive.

In fact, after urging that challenges to expert evidence be restricted to situations in which the evidence is more prejudicial than probative, Bellamy and Meibusch add in note 79.2 that "[t]he Law Reform Commission considered that the discretion 'could be used to exclude evidence that has not

258. Id.
259. Note 79.1 refers the reader to the Law Reform Commission report for help in understanding section 79. COMMONWEALTH EVIDENCE LAW, supra note 257, at 75. As discussed previously, see supra notes 205-210 and accompanying text, that report rejected both the Frye note and the reliability test. Note 79.2, meanwhile, states that "[t]here is no requirement that the knowledge upon which expert opinion evidence is based must relate to a 'recognised field of expertise.'" COMMONWEALTH EVIDENCE LAW, supra note 257, at 75. The note adds that the "relevance discretion in § 135 will enable courts to exclude expert opinion evidence where its probative value is substantially outweighed by the danger that it might be misleading or confusing." Id. at 75-76.
260. Section 135 promulgates a test analogous to American Federal Rule of Evidence 403. Section 135 states that "[t]he court may refuse to admit evidence if its probative value is substantially outweighed by the danger that the evidence might: (a) be unfairly prejudicial to a party; or (b) be misleading or confusing; or (c) cause or result in undue waste of time." EVIDENCE ACT 1995, supra note 257, § 135.
261. See supra notes 205-10 and accompanying text.
262. See Freckelton, Expert, supra note 218, at 87.
sufficiently emerged from the experimental to the demonstrable.' 262 This language mirrors the Frye case263 and is arguably an implicit endorsement of Frye, although Frye's language regarding general acceptance is not cited.264

Moreover, section 79 is obviously based on American Federal Rule of Evidence 702. Rule 702, once considered very forgiving, has been interpreted strictly by the Supreme Court in Daubert. The seemingly innocuous word "knowledge," for example, which appears in both rule 702 and section 79, was interpreted in Daubert as "connot[ing] more than subjective belief or unsupported speculation. The term 'applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds.' . . . Proposed testimony must be supported by appropriate validation — i.e., 'good grounds,' based on what is known."265 Already, commentators have argued that Australian courts should use the "knowledge" language in section 79 to import Daubert into Australian law.266

Finally, Australian courts could simply interpret section 135, which is modeled on Federal Rule of Evidence 403, strictly in the context of expert testimony, as advocated by Judge Weinstein with regard to rule 403. In Daubert, the Supreme Court approved of the following comment by Weinstein: "Expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk, the judge in weighing possible prejudice against probative force under rule 403 of the present rules exercises more control over experts than over lay witnesses."267 Indeed, Freckelton argues that the Evidence Act "is geared to give much greater prominence to the exclusionary mechanisms" in section 135.268 He adds that "[g]eneral acceptance and reliability certainly leap out as contenders to breathe life into what can otherwise degenerate into relatively meaningless incantations."269

Thus, Australian rules for the admissibility of scientific evidence may get even more confused. Whether Australian courts will back away from the apparently liberal intent of section 79 remains to be seen.

C. The Law of Scientific Evidence in New Zealand

Because New Zealand has a population of under four million, the body of case law is relatively small and there is an attendant dearth of New Zealand cases and commentary discussing scientific evidence. Nevertheless, the debate over the proper standards for the admissibility of scientific evidence in New

262. COMMONWEALTH EVIDENCE LAW, supra note 257, at 76.
263. Frye v. United States, 293 F. 1013, 1014 (D.C. Cir. 1923).
266. Odgers & Richardson, supra note 255, at 21.
269. Id.
Zealand has been interesting. As discussed below, New Zealand courts and commentators have considered cases from all of the jurisdictions discussed in this Article. The relevancy, reliability, field of expertise, and general acceptance tests all have their supporters in New Zealand.

1. Frye in New Zealand

Like Australia, New Zealand has struggled with the Frye rule, and with the differences between Frye and the field of expertise test. In R. v. B., a case alleging that the defendant committed incest and indecent acts, a child psychologist who had interviewed the complainant sought to testify as to the complainant's credibility. The court applied the "field of expertise" test: "As a precondition of admissibility the subject matter to which the expert opinion relates must be a sufficiently recognised branch of science at the time the evidence is given." A field of expertise will be recognized when "research establishes the accuracy of knowledge in that field." The court refused to let the child psychologist testify because it found that experts in that field could not prove as matters of expert observation that "persons subjected to sexual abuse demonstrate certain characteristics or act in peculiar ways which are so clear and unmistakable that they can be said to be concomitants of sexual abuse."

The court thus applied a strict version of the field of expertise test by narrowly construing the relevant field. Instead of defining the relevant field as child psychology, the court instead defined the field as expertise in determining the behavior or characteristics of victims of sexual abuse.

Two years later, in R. v. Accused, the court, following R. v. B., excluded psychological evidence. This evidence came from a school guidance counselor concerning specific behavioral characteristics she considered consistent with sexual abuse, i.e., "child sexual abuse accommodation syndrome."

In 1991, the New Zealand Law Commission, which is charged with making recommendations for possible amendments to New Zealand's evidence code, released its paper on expert and opinion evidence. The Commission noted that R. v. B. was the leading case on expert evidence in New Zealand, and that the case established a possible counterpart to Frye when it held that admissible scientific evidence must come from a "recognised
branch of science." The Commission’s proposition that this test is similar to Frye and creates the same problems is debatable.

The Law Commission then engaged in a thorough analysis of whether New Zealand should adopt the Frye rule. The Commission, citing American sources including Giannelli and McCormick, found that the Frye test has been subject to considerable criticism in the United States. The Commission noted that because Frye focuses on acceptance in the scientific community, much depends on whether the relevant community is defined narrowly or broadly. Also, new possibly reliable evidence may not be admissible, particularly when it is based on the theories of a single pioneering expert in the field. The effect of the rule is that new developments in science are slow to appear in the courts. We therefore do not consider that the Frye test is satisfactory. The Commission instead argued that a test should be developed that is responsive to reliability concerns, but flexible enough to cover a wide range of situations.

The Commission concluded that code provisions should be enacted for the admissibility of expert evidence that “focus directly on the value and reliability of the testimony.” The Commission added that the Australian Law Reform Commission and the American Federal Rules of Evidence promoted two sound approaches. The ALRC advocated that expert testimony be restricted only by a showing that the expert is qualified, and that judges be given a general power to exclude unfairly prejudicial, confusing, or misleading evidence. The Federal Rules, meanwhile, establish a liberal “helpfulness to the fact-finder” rule.

After seemingly endorsing extremely liberal tests for the admissibility of scientific evidence, the New Zealand Law Commission switched gears. It stated that a commitment to reliability underlies the approaches of both the Federal Rules of Evidence and the ALRC. Unreliable expert opinion clearly will be unhelpful under the Federal Rules approach, and can be unduly prejudicial, misleading, or a waste of time under the ALRC's

279. Id. at 18 (quoting R. v. B., 1 N.Z.L.R. 362, 367 (1987)).
280. As noted previously, at note 220 and accompanying text, the Australian field of expertise test and the Frye test are distant cousins. In R. v. B., the court defined the relevant field of expertise as credibility of a particular psychological theory. Frye, of course, applies to a “theory or technique.” Thus, if New Zealand courts continue to define field of expertise as narrowly as in R. v. B., the test would be analogous to Frye. It seems likely, however, that none of this crossed the court’s mind, and that the court defined the relevant field so narrowly in order to exclude unreliable evidence. See generally Confronting the New Challenges of Scientific Evidence, 108 HARV. L. REV. 1481, 1496 (1995) (arguing that when test for admissibility depends on relevant scientific community, courts can manipulate definition of “community” to reach desired outcomes).
281. Giannelli, supra note 17.
282. MCCORMICK, supra note 16.
283. N.Z. LAW COMM’N, supra note 277, at 18.
284. N.Z. LAW COMM’N, supra note 277, at 18.
286. N.Z. LAW COMM’N, supra note 277, at 22.
287. N.Z. LAW COMM’N, supra note 277, at 22 (quoting 1 AUSTL. L. REFORM COMM’N, EVIDENCE: INTERIM REPORT 416 (1985)).
288. N.Z. LAW COMM’N, supra note 277, at 23.
289. N.Z. LAW COMM’N, supra note 277, at 23.
recommendations.\textsuperscript{290} The New Zealand Commission then advocated a test promoted at the time by American authors, such as Bert Black, who favored restrictive policies toward expert evidence.\textsuperscript{291} According to the New Zealand Commission, scientific evidence “must be assessed for scientific reliability, including the validity of the underlying scientific theory and the reliability of the procedures and techniques used in the particular case.”\textsuperscript{292} However, “the theory need not be accepted by all or most scientists working in the relevant area.”\textsuperscript{293} In addition, “[o]bjectivity may also be an important facet for reliability,” particularly with regard to social science evidence.\textsuperscript{294} The Commission concluded its confused discussion by stating that while it believed that the Australian Law Reform Commission’s test would be adequate, it would be preferable to add the helpfulness test as a prophylactic.\textsuperscript{295}

New Zealand has not amended its evidence code to take into account its Law Commission’s conclusions. This is probably just as well, since those conclusions are, as described above, rather incoherent.

2. Recent Developments in New Zealand

Meanwhile, the common law in New Zealand has continued to develop. In 1993, one New Zealand court interpreted \textit{R. v. B.} as establishing the equivalent of a \textit{Frye} test. In \textit{R. v. C.S.},\textsuperscript{296} the court excluded evidence from a psychologist concerning an alleged child sexual abuse victim’s behavior patterns as an adult. The court, relying on \textit{R. v. B.}, held that a psychologist may not testify regarding human behavior unless the opinion is “firmly founded upon \textit{accepted} scientific research.”\textsuperscript{297}

The following year, however, another High Court judge refused to apply \textit{R. v. B.} to the issue of whether complainants may testify regarding their allegedly recovered memories of sexual abuse.\textsuperscript{298} Instead, the court applied a liberal relevancy test that did not scrutinize the validity or general acceptance of the theory that memories can be repressed and recovered years later.\textsuperscript{299}

Most recently, in \textit{R. v. Calder}\textsuperscript{300} the High Court of New Zealand, Christchurch Registry, considered the admissibility of evidence that blood and hair analyses of a decedent led “to the irresistible conclusion that he was poisoned by acrylamide . . . .”\textsuperscript{301} Faced with contradictory New Zealand precedents favoring the liberal relevancy, general acceptance, and field of

\textsuperscript{290} N.Z. LAW COMM’N, \textit{supra} note 277, at 23
\textsuperscript{291} N.Z. LAW COMM’N, \textit{supra} note 277, at 24; see Black, \textit{supra} note 3 (advocating a strict test for the admissibility of scientific evidence focusing on reliability and validity).
\textsuperscript{292} N.Z. LAW COMM’N, \textit{supra} note 277, at 24.
\textsuperscript{293} N.Z. LAW COMM’N, \textit{supra} note 277, at 24.
\textsuperscript{294} N.Z. LAW COMM’N, \textit{supra} note 277, at 24.
\textsuperscript{295} N.Z. LAW COMM’N, \textit{supra} note 277, at 25.
\textsuperscript{296} 11 C.R.N.Z. 45 (H.C. 1993).
\textsuperscript{297} \textit{Id.} at 47 (emphasis added).
\textsuperscript{299} \textit{Id.}
\textsuperscript{300} No. 154/94 (N.Z.H.C. April 12, 1995).
\textsuperscript{301} \textit{Id.} at 2.
expertise tests, the court turned to foreign law in an attempt to promulgate an appropriate rule. The court considered the rules for admissibility of scientific evidence in England, the United States, Australia, and Canada, as well as the local New Zealand Law Commission Report. After examining precedents such as Robb, Frye, Daubert, Lucas, Johnson, and Melaragni, the court concluded that

[b]efore expert evidence, such as that in issue in this case, can be put before the jury by a suitable qualified person it must be shown to be both relevant and helpful. To be relevant the evidence must logically tend to show that a fact in issue is more or less likely. To be helpful the evidence must pass a threshold which can conveniently be called the minimum threshold of reliability. This means the proponent of the evidence must show that it has a sufficient claim to reliability to be admitted.

While noting that this test might be criticized as too general to be of much help, the court argued that in order to engage properly in its “gatekeeper” role it must be sufficiently flexible to apply the appropriate standards in dissimilar cases. Thus, faced with a choice among the whole panoply of tests discussed in this paper, the court, like the American and Canadian Supreme Courts before it, opted for a flexible reliability test.

D. The Law of Scientific Evidence in England

The use of scientific evidence in court has become a major public issue in England, mainly because of the misuse of forensic science in the so-called miscarriage of justice cases. Unlike courts in the other countries surveyed in this Article, English courts have not generally responded to the controversy over the perceived misuse of forensic science by abandoning the traditional liberal relevancy test in favor of stricter standards for the admissibility of scientific evidence. While some English critics have called for courts to tighten standards for the admissibility of scientific evidence, English reform of the use of forensic science has focused on improving the forensic science system itself.

1. English Law on the Admissibility of Scientific Evidence

The traditional position of English common law is that any witness accredited as an expert may testify on the subject of her expertise. English commentators sporadically called on courts to adopt more stringent standards for the admissibility of scientific evidence, but met with little

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302. *Id.* at 4-6. The court refused to consider New Zealand precedents such as *R. v. B.* on the ground that psychological evidence in child sex abuse cases is significantly different from physical forensic evidence.

303. See *infra* text accompanying notes 322-27 for a discussion of Robb.


305. *Id.*

306. The court ultimately found that the proffered evidence was admissible. *Id.* at 2.

307. See *infra* notes 327-32 and accompanying text.

success.\textsuperscript{309} In England and Wales, a court must decide whether a field of learning has developed to such a point that a person of proper qualifications can give testimony. The standards used for this determination are at the discretion of each judge.\textsuperscript{310} Courts generally have not given a hard look at whether a theory or technique that forms the basis for an expert's testimony is reliable, or whether it is accepted in the relevant scientific community.\textsuperscript{311} However, the common law rule that a potential witness may testify as an expert only if his testimony is not within the common knowledge of the jurors — enunciated most clearly in \textit{R. v. Turner}\textsuperscript{312} — is largely intact, particularly with regard to psychiatric and psychological testimony.\textsuperscript{313}

In the late 1970s, \textit{Preece v. H.M. Advocate}\textsuperscript{314} shattered faith in the propriety of liberal rules for the admissibility of forensic evidence. The government accused Preece of murdering a female hitchhiker.\textsuperscript{315} At trial, the prosecution presented testimony by a scientist who had examined seminal stains on the woman's pants and identified them as belonging to blood group A. He also stated that Preece was of blood group A. The expert failed to mention that the victim also had the same blood type and that the stains probably included some of her secretions. The expert testified that he could tell the difference between male and female secretions. However, his method of doing so had never been reported in the scientific literature. This expert had also provided other key scientific evidence linking Preece to the victim. The jury convicted Preece. On appeal, the court overturned the conviction after finding that the expert had not acted objectively and that all the evidence he presented was suspect.\textsuperscript{316}

\begin{itemize}
\item \textsuperscript{309} E.g., R. Coleman & H. Walls, \textit{The Evaluation of Scientific Evidence}, 1974 CRIM. L. REV. 276.
\item \textsuperscript{311} Freckelton, \textit{supra} note 171, at 110; see also Mike Redmayne, \textit{The Royal Commission's Proposals on Expert Evidence: A Critique}, 2 Expert Evidence 157, 161 (1994) ("The courts in England and Wales have proved reluctant to develop any exclusionary rules of evidence to prevent 'junk' science or cowboy experts from being heard in the courtroom.").
\item \textsuperscript{312} 1975 Q.B. 834, 841 (C.A.) ("If on the proven facts a judge or jury can form their own conclusions without help, then the opinion of an expert is unnecessary. In such a case if it is given dressed up in scientific jargon it may make judgment more difficult.").
\item \textsuperscript{313} This test has some influence in Canada and Australia as well. \textit{R. v. Mohan}, [1994] 2 S.C.R. 9, 23-24 (citing \textit{Turner} for proposition that expert psychiatric evidence must be helpful to jury); \textit{R. v. Smith}, 1992 V.R. 907 (holding that expert testimony regarding unreliability of identifications is inadmissible because it probably would not assist jury more than thorough cautionary instruction from judge).
\item One leading English academic expert on scientific evidence, Mike Redmayne, is not optimistic about the future of the common knowledge test. He states that "\textit{Turner} comes in for regular academic criticism, and is slowly being undermined." E-mail from Mike Redmayne, Manchester University, to author (Sept. 21, 1993) (printed copy on file with author).
\item \textsuperscript{314} \textit{H.C.J.} June 19, 1981 (unreported opinion), recorded in 1981 CRIM. L. REV. 783.
\item \textsuperscript{316} \textit{Preece}, 1981 CRIM. L. REV. 783. Further investigation revealed that the expert in question, Dr. Alan Clift, had engaged in a wholly inappropriate pattern of advocacy in favor of the prosecution in a series of cases. Clift was forced into early retirement. John Phillips, \textit{A Winter's Tale—The Slings and Arrows of Expert Evidence"}, 57 LAW INST. J. 710, 710-11 (1983). A similar scandal in the United States
\end{itemize}
Partly as a result of Preece, statutory law gives judges wide discretion to exclude evidence, including expert testimony, in criminal cases. Under section 78 of the Police and Criminal Evidence Act of 1984, a judge can refuse to admit evidence if it appears from all the circumstances that its admission would adversely affect the fairness of the proceedings. Judges rarely invoke this provision to exclude forensic evidence.

Some commentators began to call for the adoption of a Frye-like general acceptance test. Authors of an English book on medicine and the law, for example, argued that both Preece and the Australian Chamberlain cases raise the Frye issue, which the authors call the issue of "the general acceptability of scientific tests." The authors noted that prosecution experts in Preece and Chamberlain relied on methodology that had not withstood peer review. They suggested that a technique should be reported in the scientific literature before it is acceptable to the courts, and that some form of "established expertise" test may be desirable.

Preece does not, however, seem to have appreciably changed judicial attitudes toward scientific evidence. One particularly significant (and disturbing) case illustrating the laissez-faire approach of many English judges is R. v. Robb. In Robb, the defendant argued on appeal that the trial court erred in admitting expert testimony identifying his voice from tapes of conversations. The defendant argued that the technique used "was worthless and generally accepted by orthodox professional opinion as being so." The expert himself agreed that the weight of informed opinion agreed that his technique was unreliable. The defendant also objected that because the expert had not set out the criteria he relied upon, there was no way to test the accuracy of his conclusions.

The court nevertheless affirmed the trial court's admission of the evidence, holding that neither general acceptance nor reliability is a precondition to the admissibility of expert scientific testimony. The court stated that it would not allow a "quack, a charlatan, or an enthusiastic amateur" to testify. The court did add that the testimony is admissible if the expert is qualified by academic training and practical experience, and able to give testimony with a "value significantly greater than that of the ordinary

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319. For a discussion of Chamberlain, see supra text accompanying notes 196-202.
320. GEE & MASON, supra note 317, at 154; see also M. MANSFIELD & T. WADDLE, PRESUMED GUILTY 235-36 (1993) (expert evidence should be based only on professionally acceptable test).
321. Id.
323. 93 Crim. App. at 165.
324. Id.
325. Id. at 166.
untutored layman." 326

Robb may represent the last gasp of the extreme relevancy test. Recently, courts have overturned a series of convictions in which the prosecution had misused scientific evidence. The revelations that have accompanied these decisions have led to widespread agitation in British legal circles for a stricter test regarding the admission of scientific evidence. 327

The case that gathered the most attention involved the so-called Birmingham Six. In 1975, a jury convicted six men in an IRA bombing of two pubs. The government’s forensic scientist had relied on the “Griess” test in testifying that there was a ninety-nine percent probability that residues found on the accuseds’ hands were from nitroglycerine. It was later determined that the “Griess” test is unreliable and that the residue could have been innocent contamination from playing cards, adhesive tape, and certain soaps. After a long campaign, the convictions were eventually overturned. 328

Among other cases that attracted attention was the 1976 case, R. v. Maguire, in which a jury convicted the “Maguire Seven” of illegally possessing nitroglycerine. This conviction was also quashed many years later, amid much criticism of the prosecution’s failure to turn over scientific evidence that tended to favor the defendants. 329 Another miscarriage-of-justice case involved Judith Ward, who was convicted in 1974 for murder and for causing explosions likely to endanger life and property. The conviction was quashed in June, 1991. 330

In the aftermath of the Birmingham Six and Maguire Seven scandals, an English legal reform group called “Justice,” along with the Council for Science and Society, established a task force to recommend improvements in the way courts use forensic evidence in criminal trials. The final report made two recommendations for screening scientific evidence. First, the report suggested that courts should exercise caution “in accepting the results of a method which has not been published and has not been subjected to the scrutiny of other experts.” 331 The report then advised that courts check to see whether an expert excluded alternative hypotheses. 332 The report explained that an observation may be compatible with an expert’s conclusion, but may also be compatible with an alternative explanation.

Another critic of English law on scientific evidence, Peter Alldridge of Cardiff Law School, has stated flatly that “English law needs a test for the admissibility of novel scientific evidence which considers the evidence itself

326. Id. This proposition can be traced back to R. v. Silverlock, 2 Q.B. 766, 771 (1894) (holding expert need not have acquired skill “in the way of his business or in any definitive way”).

327. These cases have also led to calls for improvement in criminal procedure. The possible options, along with some specific recommendations, are discussed in ROYAL COMM’N ON CRIM. JUST., THE ROLE OF FORENSIC SCIENCE IN CRIMINAL PROCEEDINGS 144-61 (1993).


332. Id.
as well as the witness.\footnote{333} Another commentator who favors stricter scrutiny of scientific evidence in England has argued that courts should focus on the scientific reliability and relevance of expert testimony.\footnote{334}

Some commentators have predicted that in the aftermath of the successful appeals of the Birmingham Six and others, English lawyers will persuade courts to tighten their restrictions on expert testimony.\footnote{335} There are signs that English courts are indeed cracking down on suspect expert testimony in the context of DNA evidence.\footnote{336} More generally, however, there seems to be little movement toward stricter scrutiny of scientific evidence along the lines of what has happened in the United States, and, to a lesser extent, Australia and Canada.

2. Reforms of the Forensic Science System

Despite the lack of change in common law rules regarding scientific evidence in England, there have been broader efforts to reform the forensic science system.\footnote{337} First, there have been attempts and proposals to improve the quality of forensic science laboratories through certification and otherwise. The United Kingdom Royal Commission on Criminal Justice report notes that the Forensic Science Service has instituted procedures to upgrade quality and performance by its employees. For example, all significant results must be checked by a colleague with appropriate experience.\footnote{338} The commission also recommends that there occasionally be some sort of external audits,\footnote{339} and that the government establish a new authority, the Forensic Science Advisory Council (FSAC). The FSAC would investigate and report to the Home Secretary on the “performance, achievements and efficiency” of forensic science laboratories.\footnote{340}

The report recommends greater use of accreditation of scientific laboratories under the National Measurement Accreditation Service.\footnote{341} This

\footnote{333. Alldridge, supra note 310, at 698; see also Mike Redmayne, supra note 311, at 162 (arguing that English courts could adopt rule for expert testimony similar to rule 403 of U.S. Federal Rules of Evidence, which allows courts to exclude evidence whose prejudicial effect substantially outweighs its probative value).}

\footnote{334. Editorial Introduction: Some Legal Issues Affecting Novel Forms of Expert Evidence, 1 EXPERT EVIDENCE 79, 83 (1992) (arguing that courts should ensure reliability of expert testimony and its relevance to particular questions court is considering).}

\footnote{335. See, e.g., D.J. Gee, The English Medical Witness — Why So Late?, 33 MED. SCI. L. 11, 11 (1993).}


\footnote{337. A recent article regarding forensic science by the Lord Chief Justice, who is the head of the criminal courts in England, discusses possible procedural reforms, but does not mention admissibility standards at all. See Lord Taylor, The Lund Lecture, 35 MED. SCI. L. 3 (1995).}

\footnote{338. ROYAL COMM’N ON CRIM. JUST., supra note 327, at 149.}

\footnote{339. Id.}

\footnote{340. Id. at 150-51.}

\footnote{341. Id. at 150; see also id. at 139 (noting lack of accreditation of experts).}
is part of the National Physical Laboratory of the Department of Trade and aims to establish national and international recognition of the competence of accredited testing laboratories. The report adds that it might even be possible for interpretations and opinions, not just scientific fact, to be accredited. The entire process would be overseen by the FSAC.\textsuperscript{342}

The report also addresses the issue of the competence of forensic scientists. It states that the main qualification should continue to be an academic degree in the relevant scientific discipline. But the report adds that the Royal Commission would welcome the development of specific qualifications for forensic scientists since that could assist the courts in assessing their competence as expert witnesses. In particular, the Commission praised the National Council for Vocational Qualifications (of the Department of Education) for its preliminary efforts toward establishing standards for awarding qualifications to forensic scientists.\textsuperscript{343}

Many reformers in the United Kingdom believe that a large percentage of the problems that have arisen in the forensic science context are attributable to the fact that English forensic science is almost solely the province of the state. Government forensic scientists sometimes became partisan, and even if they did not, their talents would continue to be available only to the prosecution. Few Home Office and police scientists ever quit for private practice, which leaves very few properly trained, experienced, and competent forensic scientists from whom defendants can seek advice.\textsuperscript{344} Because of these problems, the authors of the Justice Report, among other reform advocates, argue that the government Forensic Science Service should be changed into an "agency whose expertise is available equally to Prosecution and Defence, and whose independence and efficiency are generally recognized and respected by all."\textsuperscript{345}

In 1991, the two forensic science departments that had been attached to the police, the Forensic Science Service and the Metropolitan Police Forensic Science Laboratory, were given executive agency status, which meant that they could accept work from anyone, not just the police or the prosecution.\textsuperscript{346} There has been little change of substance however, with the only noticeable difference that the "police now pay for services on a case by case basis rather than by annual subscription."\textsuperscript{347} Many defense solicitors refuse to ask FSS scientists to be defense experts, either because they do not trust FSS scientists to conceal defense investigations from prosecutors, or

\begin{itemize}
  \item 342. \textit{Id.} at 150.
  \item 343. \textit{Id.}
  \item 345. \textit{ODDIE, supra note} 331, at 49; \textit{see also} Stockdale, \textit{supra} note 344, at 773 (arguing for independent Forensic Science Service).
  \item 346. ROYAL COMM’N ON CRIM. JUST., \textit{supra} note 327, at 71; Alldridge, \textit{supra} note 308, at 139. Several Australian states have already taken steps to ensure the neutrality of their forensic laboratories. In South Australia, the State Forensic Science Centre is independent of the police force and undertakes scientific examinations for both the police and the defense. In Victoria, the State Forensic Science Laboratory is within the police department, but has a philosophy of nonpartisanship. The New South Wales Institute of Forensic Medicine is stressing a greater degree of independence from the police than in the past, but has to overcome entrenched attitudes developed by the adversarial system. BROWN & WILSON, \textit{supra} note 203, at 16-17.
  \item 347. Alldridge, \textit{supra} note 308, at 139.
\end{itemize}
because their clients object to “police evidence.” Moreover, the FSS scientists too frequently refuse to acknowledge that their work is controversial, and continue to act in an adversarial manner. According to the Royal Commission, forensic scientists are not always aware that their methods and conclusions may be controversial in broader scientific circles. Some forensic scientists believe that it is not their job to draw out the limitations of prosecution evidence, but rather the responsibility of the defense.

Observers of the British justice system generally agree that the changes in the status of the Forensic Science Service and the Metropolitan Police Forensic Science Laboratory have had at best a marginal impact on resolving problems associated with state domination of forensic science in England. Alldridge cites the following concerns: (1) “it has been difficult to secure defense access to scientific evidence”; and (2) defendants often are not properly funded by legal aid and are therefore unable to hire forensic scientists to carry out whatever checks are necessary. A House of Lords report, meanwhile, identifies the following problems: (1) rationing of police analysis because of budget constraints; (2) “cowboy” private practitioners; (3) fragmentation of analysis; (4) cuts in investment activities by the Forensic Science Services; and (5) the increasing inability of defendants to afford forensic science services.

Similarly, the Royal Commission noted that defense forensic experts are in short supply, and it is difficult to judge the competence of such experts. Another problem defense counsel face is that the government, which has access to the forensic evidence first, is able to frame the forensic debate. By the time defense lawyers are in a position to conduct their investigations, crime scenes have often been disturbed; exhibits lost, damaged, or destroyed in testing; and the opportunity to examine victims or assailants may no longer be available. Evidence relevant to the defense case may not even be collected or noticed by prosecution authorities whose principal concern is to secure incriminating evidence.

Some of these problems — like the fact that it is the prosecution that frames the debate and has initial access to the forensic evidence — are probably insoluble. But one scholar argues that many of the other problems can be solved through “the establishment of a wholly independent forensic science service, appropriately publicly funded, available to all, the scientists available to be called as court witnesses, their material and results to be

348. ROYAL COMM’N ON CRIM. JUST., supra note 327, at 139.
349. ROYAL COMM’N ON CRIM. JUST., supra note 327, at 137.
350. ROYAL COMM’N ON CRIM. JUST., supra note 327, at 138; see also JONES, supra note 330, at 3 (“Impartial forensic science has come to mean state science.”).
351. Alldridge, supra note 308, at 140.
353. ROYAL COMM’N ON CRIM. JUST., supra note 327, at 149, 155. The Commission notes: “There appears to be no comprehensive information available on the number of firms offering [forensic] services . . . . Our impression is that the number of fully qualified scientists engaged in this work in the private sector is limited by the scope for remuneration under current arrangements for legal aid. Moreover, laboratory facilities in the private sector are limited . . . . It is, however, possible for defense scientists to use the facilities of public sector laboratories . . . .” Id. at 146.
354. ROYAL COMM’N ON CRIM. JUST., supra note 327, at 139.
355. ROYAL COMM’N ON CRIM. JUST., supra note 327, at 140.
available to both prosecution and defence.\textsuperscript{356} The Royal Commission, meanwhile, recommended

where scientific evidence is in the hands of the prosecution and where a suspect has been charged and is legally represented, that the defence should have an enforceable right to observe any further scientific tests conducted on it or, unless the material exists only in minute quantities, the right to remove some of the material . . . so that tests can be carried out by defence scientific experts.\textsuperscript{357}

IV. LESSONS

Much of the debate over scientific evidence in the United States has been undertaken by those with an ideological or pecuniary interest in the subject. Conservatives upset with the perceived litigation explosion and its effect on corporate liability, evidence scholars who disfavor juries, corporate defense counsel, and criminal defense attorneys generally argue for stricter standards for the admissibility of scientific evidence. Liberals who favor expansive liability for corporations, scholars who embrace the jury system, plaintiffs' attorneys, and prosecutors generally argue for more liberal standards. By studying the controversies surrounding scientific evidence in other common law countries, Americans can relinquish their ideological and other baggage and gain insight into some of the unanswered questions that plague our own debate. For example, is the use of unreliable scientific evidence, or the misuse of potentially reliable scientific evidence, truly an important factor in American litigation? If so, are juries able and willing to distinguish junk science from sound scientific evidence? If juries are not willing and able to do so, what legal rules, if any, can be established that would exclude bad scientific evidence from trial, while still allowing parties to admit valid scientific evidence?

A. The Junk Science Problem is Real

Perhaps no issue has stirred as much rancor among evidence and torts scholars as the controversy over the scope of the junk science problem in American courtrooms. Ever since the publication of Peter Huber's \textit{Galileo's Revenge} in 1991, debate has raged over Huber's thesis that plaintiffs' attorneys routinely use eccentric, incompetent, or corrupt experts to bamboozle juries into awarding huge damages to plaintiffs whose claims are not supported by valid scientific evidence.

Some of Huber's most vociferous critics deny that the junk science problem exists. Despite the widespread condemnation by American legal scholars of the prevalence of junk science in the criminal context,\textsuperscript{358} some critics imply that wealthy corporate defendants devised the junk science debate by buying influence at the Manhattan Institute (Huber's employer) and other

\begin{itemize}
\item \textsuperscript{356} Samuels, \textit{supra} note 352, at 153.
\item \textsuperscript{357} ROYAL COMM'N ON CRIM. JUST., \textit{supra} note 327, at 155.
\item \textsuperscript{358} See \textit{supra} note 1 and accompanying text.
\end{itemize}
"right-wing" think tanks. The alleged goal is to prevent injured plaintiffs relying on scientific evidence from emerging victorious in toxic tort litigation.359

If Huber's critics are correct, and the junk science problem is largely a mirage conjured up by selfish special interests seeking to avoid tort liability, one would expect that among common law nations criticism of junk science in the courts would be limited to the United States. Other common law legal systems, including those of England, Canada, and Australia, do not have anywhere near the enormous volume of tort litigation present in the United States.360 As a result, those countries do not have corporate-funded tort reform groups of the sort that Huber's critics blame for the movement toward stricter scrutiny of scientific evidence in the United States. Moreover, toxic tort cases, the focus of Huber's book, are almost unknown outside the United States.361

Yet, as we have seen, contrary to the implications of the work of some of Huber's critics, there has been a growing chorus of criticism of the quality and veracity of scientific expert testimony in other common law countries. Unlike in the United States, where the primary opposition to junk science has come from tort reformers concerned about the perceived explosion in tort liability, the junk science controversy abroad is primarily limited to debate over the perceived misuse of scientific evidence by prosecutors in criminal cases such as Preece and Chamberlain.362

B. Juries Are Not Competent to Decide Complex Scientific Issues

Most evidence and tort scholars acknowledge that there are at least occasional problems with the use of scientific evidence in American courts. Many of them believe that the problem is a minimal one that can be resolved


362. The use of questionable medical testimony in civil litigation, however, has received some attention, particularly in Australia. See, e.g., K.H. Marks, The Interventionist Court and Procedure, 18 MONASH U. L. REV. 1, 7 (1992) ("Under our system, the court may be deprived of opinion which gives real assistance to it in deciding the question. In the personal injuries field we have witnessed many medical experts who are full time on hire as expert witnesses and who do not otherwise practice medicine."); Margaret Lyons, Jury Stay Out on Expert Witnesses, BUS. REV. Wkly., Nov. 29, 1991, at 59 (discussing misuse of experts in Australia); Peter Walsh, Australia: The Slippery Slope to Litigation Lunacy, AUSTL. FIN. REV., Aug. 20, 1991, at 13 (expressing concern that Australia may be following United States down slippery slope). The consensus, however, seems to be that the absence of contingency fees and other incentives for speculative litigation has shielded Australia from much of the junk science that has been introduced into American courtrooms in civil cases. Lyons, supra.
through minor tinkering with the rules of evidence and procedure. Others believe that junk science is a major problem caused largely by the inability of lay juries to separate good science from bad science. Huber is the most prominent member of the latter group.

Huber's attack on juries' competence to comprehend scientific evidence is a consistent theme throughout *Galileo's Revenge,* and is particularly apparent in the concluding chapters. Huber expresses dismay about the fallibility of "a thousand juries scattered across the country grappling with the complexities of immune system impairment." Later, he complains that courts allow "random panels of jurors . . . to decide scientific truth by majority vote." He also unfavorably compares a system that "invite[s] random groups of twelve stout citizens to vote as they please" to the rigors of the scientific process.

In perhaps the most influential passages of his book, Huber argues that judges should prevent jury verdicts based on junk science by screening proffered scientific evidence before trial to ensure that only reliable, generally accepted scientific evidence is presented to juries. Other scholars and attorneys echo Huber's concerns about jury competence and, like him, call for stricter pretrial screening of scientific evidence to prevent juries from relying on bad science in making their decisions.

Prominent critics of Huber, including Ronald Allen, Kenneth Chesebro, Jean Macchiarioli Eggen, Michael Green, Edward Imwinkelried, Michael Jacobs, Neil Vidmar, and Judge Jack

363. Indeed, when *Galileo's Revenge* was still a work-in-progress, Huber published an article with the suggestive title of "Junk Science and the Jury." Peter W. Huber, *Junk Science and the Jury,* 1990 U. Chi. LEGAL F. 273.
364. HUBER, supra note 4, at 201.
365. HUBER, supra note 4, at 218.
366. HUBER, supra note 4, at 228.
367. HUBER, supra note 4, at 200-02. For example, the Ninth Circuit relied on this part of *Galileo's Revenge* in *Daubert v. Merrell Dow Pharmaceuticals,* 951 F.2d 1128, 1130 (9th Cir. 1991), vacated and remanded, 113 S. Ct. 2786 (1993).
369. Ronald J. Allen, *Expertise and the Daubert Decision,* 84 J. CRIM. L. & CRIMINOLOGY 1157, 1159 (1994); Ronald J. Allen & Joseph S. Miller, *The Common Law Theory of Experts: Deference or Education?* 87 NW. U. L. REV. 1131, 1143-44 (1993) ("[Huber's] argument also assumes that judges are better equipped than jurors to make determinations of scientific consensus, or presumably to decide when scientific consensus need not be given deference. This is a popular myth these days, but we know of no good reason to adopt it uncritically.").
370. Chesebro, supra note 359, at 1652-54, 1722.
371. Eggen, supra note 359, at 946 n.322.
Weinstein\textsuperscript{376} argue that juries are generally able to comprehend complex scientific evidence and to make reasonable decisions based on the evidence presented. The consensus among these scholars is that minor tinkering with the traditional liberal rules governing the admissibility of scientific evidence will correct the few problems that arise.

The debate between Huber and his allies and their critics regarding jury competence is especially important after Daubert. Daubert is sufficiently ambiguous that both sides of the debate claim the opinion as a victory. Michael Green, for example, argues that the Daubert court "delivered a rebuke to much of the jury bashing that has become voguish of late."\textsuperscript{377} Huber, in contrast, writes that "what Daubert stands for is that judges have a major role to play in distinguishing accurate, reliable, science from untested speculation, transparent error, or outright fraud."\textsuperscript{378} Perceptions regarding jury competence, and therefore the scope of the junk science problem, are likely to play a large role in determining how strictly courts interpret Daubert.

The only way to definitively settle the debate regarding the scope of the junk science problem in tort and criminal law would be to gather data on its prevalence. But it is not at all clear how to gather and interpret such information. Perhaps this explains why Huber's critics have not contradicted his thesis with empirical evidence.\textsuperscript{379}

Nor have Huber's critics presented data showing that lay juries succeed in resolving scientific disputes. Professor Joseph Sanders has noted that "[g]iven the intensity of opinion on jury competence, the amount of systematic information is surprisingly limited."\textsuperscript{380} The most comprehensive study to date of jury decisionmaking in complex cases casts doubt on whether jurors are able to understand complex evidence and implies that jurors simply ignore much of the expert testimony presented to them.\textsuperscript{381} This study, however, is not definitive.

Another way to assess jury competence in cases involving complex scientific evidence is to turn to comparative law. If scholars in other common

\begin{footnotes}

\textsuperscript{375} Neil Vidmar, \textit{Are Juries Competent to Decide Liability in Tort Cases Involving Scientific/Medical Issues? Some Data from Medical Malpractice}, 43 \textit{EMORY L.J.} 885, 886-87 (1994).


\textsuperscript{377} Green, supra note 372, at 48.


\textsuperscript{379} See Lewin, supra note 62 (attacking Huber for not providing empirical data regarding scope of junk science problem). \textit{See generally} Imwinkelried, \textit{The Daubert Decision}, supra note 373, at 22 (criticizing Huber for failing to present data regarding jury incompetence); Jacobs, supra note 374, at 1090 (same). None of these critics have provided data of their own.


\textsuperscript{381} \textit{SPECIAL COMM. ON JURY COMPREHENSION OF THE ABA SEC. OF LITIG., JURY COMPREHENSION IN COMPLEX CASES} (1989).
\end{footnotes}
law nations perceive the same problems with the effect of scientific evidence on juries in their countries as Huber and his allies do in the United States, this would be strong evidence that Huber’s broad thesis is correct. Specifically, if the prevalence of dubious scientific evidence is related to the inability of juries to properly interpret scientific evidence, one would expect that scholars in other common law countries would perceive a similar problem. One would also expect that the perceived junk science problem would be far less significant in contexts where juries are not used.

As this Article has demonstrated, the growing misuse of scientific evidence in the courtroom, particularly in jury trials, is indeed well recognized throughout the common law world. Commonwealth commentators join American critics of junk science in asserting that lay juries are not competent to weed out dubious scientific testimony. 382

As discussed above, 383 in Australia and England the misuse of scientific evidence came to public attention as a result of several well publicized trials in which defendants were unjustly convicted after the prosecution presented unreliable scientific evidence to the jury. The British government established a Royal Commission on Criminal Justice to investigate British cases involving the misuse of scientific evidence to obtain criminal convictions. According to one participant in the Commission’s work, the Commission based its final recommendations on two propositions: first, that a trial is not the best place for scientific disputation; and second, that a lay jury is not equipped to settle scientific disagreements among experts. 384 Both of these propositions mimic the concerns of Huber and other American critics of junk science. 385

In Australia, in addition to Splatt and Chamberlain, a remarkable number of convictions have attracted controversy because of suspicions that the scientific evidence supporting the convictions was not sound. 386 Australian commentators have argued that these cases reveal that juries have trouble interpreting scientific evidence. By 1992, Peter McGauran, a member of Parliament and the Shadow Minister for Science and Technology, found a “growing debate as to the preparedness of the jury system to absorb and critically assess forensic evidence.” 387 The Chief Justice of the Australian Capital Territory Supreme Court, for example, asked rhetorically:

How can lay decision-makers in a matter of days or weeks, and based on the limited information put before them, without transcripts of evidence and often enough without copies of experts’ reports, resolve disagreements between people who have spent a lifetime reading, studying and acquiring expertise within their respective fields of knowledge? 388
In Canada, the misuse of scientific evidence in the courtroom has not become a public issue. Canadian attorneys and jurists, however, are aware of the problems that arise when lay jurors are required to decide cases based on complex scientific evidence. The Canadian Supreme Court recently expressed its concern over the potential misuse of scientific evidence in criminal trials:

There is a danger that expert evidence will be misused and will distort the fact-finding process. Dressed up in scientific language which the jury does not easily understand and submitted through a witness of impressive antecedents, this evidence is apt to be accepted by the jury as being virtually infallible and as having more weight than it deserves.389

As evidenced by the attention given the subject in England, Canada, and Australia, the problem of junk science in court is endemic to common law legal systems, at least when juries are used as triers of fact. Thus, Huber’s views that jury incompetence plays a major role in the junk science problem, and that a potential junk science problem is present whenever juries are asked to resolve a scientific dispute, are supported by evidence from common law jurisdictions outside the United States.

C. Tightening the Rules for the Admissibility of Scientific Evidence Is a Second-Best Solution to the Problem of Junk Science in Tort

As we have seen, concern over the problem of the misuse of scientific evidence in adversarial litigation is by no means limited to conservative critics of the American tort system such as Peter Huber. Rather, judges and legal scholars in England, Canada, Australia, and New Zealand all recognize that scientific evidence can be, and has been, abused in the adversarial process, and that juries often do not recognize these abuses. In all of these countries, debate rages among courts and commentators over the extent to which the rules of evidence should be modified to assure that the scientific evidence presented to juries is trustworthy.

Huber identifies two causes of the junk science problem in the American tort system: “Junk science is impelled through our courts by a mix of opportunity and incentive. ‘Let-it-all-in’ legal theory creates the opportunity. The incentive is money: the prospect that the Midas-like touch of a credulous jury will now and again transform scientific dust into gold.”390 Junk science, then, is a problem because courts permit plaintiffs to submit dubious theories of causation to a jury, and because juries too often believe these theories.

There are, therefore, two possible explanations for the relative dearth of junk science-based tort cases in the Commonwealth. The first is that there is less opportunity to introduce dubious evidence in Commonwealth courts regarding scientific evidence is “how much can we realistically ask randomly selected, lay representatives of the community to do in their capacity as jurors?” Freckelton, supra note 213, at 14. More recently, Freckelton has concluded that “juries are singularly inequipped to decide what ideally would be decided in laboratories and the halls of academia.” Letter from Ian Freckelton, Australian evidence scholar, to author (July 4, 1995) (on file with author); cf. Samuels, supra note 174, at 3 (arguing that use of juries in cases involving scientific evidence does not create “an unacceptable level of injustice”).

390. HUBER, supra note 4, at 3.
because they apply stricter rules for the admissibility of scientific evidence than do American courts. The second possibility is that Commonwealth attorneys have less economic incentive to engage in speculative litigation.

Huber and other American critics of junk science have focused their efforts on restricting the opportunity for junk science litigation by encouraging courts to engage in stricter pretrial scrutiny of scientific evidence.\(^{391}\) Stricter rules for the admissibility of scientific evidence can reduce the use of junk science, but experience since Daubert has shown that junk science can coexist with such rules. Relying on judges to screen scientific evidence before trial means relying on courts to be conscientious and competent. While there are good reasons for believing that judges are generally more competent than juries at resolving scientific issues,\(^{392}\) judges are by no means perfect. Moreover, judges, particularly elected judges at the state level, are not immune from the same pro-plaintiff and antidefendant prejudices that often affect juries.\(^{393}\)

Comparing American and Commonwealth experience with junk science in tort suggests that restricting opportunity through strict rules for the admissibility of scientific evidence is a less effective means of eliminating junk science than restricting incentive. Unlike in the United States, junk science is not considered a serious problem in tort cases in the Commonwealth (although there is some concern about expert medical testimony in civil cases, particularly in Australia).\(^{394}\) Remarkably, a recent four volume Australian treatise on comparative scientific evidence barely touches on tort cases.\(^{395}\)

This dearth of junk science in tort cases in the Commonwealth is not a result of strict standards for the admissibility of scientific evidence. Commonwealth attorneys actually have greater opportunities than their American counterparts to present junk science evidence to a trier of fact. As demonstrated in Part III of this Article, at all relevant times the rules for the admissibility of scientific evidence in England, Canada, and Australia have been at least as liberal, and sometimes far more liberal, than the rules for the admissibility of scientific evidence in the United States. In fact, because tort cases in the Commonwealth are heard by judges, not juries, civil defendants rarely challenge the admissibility of scientific evidence. If the evidence is meritless, courts simply assign no weight to it.

While not lacking the opportunity, Commonwealth attorneys do lack the incentive to bring speculative lawsuits based on dubious science. It is far easier and potentially vastly more profitable for both the attorney and her client to bring a tort action in the United States than in other common law jurisdictions. Potential toxic tort plaintiffs outside the United States have a host of disadvantages relative to American plaintiffs. First, and perhaps most

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392. See Sanders, supra note 380, at 82 (discussing reasons judges are more competent than juries).


394. See supra note 362.

395. EXPERT EVIDENCE, supra note 228.
important, is the paucity of civil jury trials outside the United States.\(^{396}\)

As noted previously, the biggest problem with lay juries deciding toxic tort cases is that they frequently do not comprehend the evidence put before them.\(^{397}\) That aside, the use of juries inherently encourages speculative tort litigation.

First, jury trials lead to wildly inconsistent verdicts, particularly when complex scientific issues are involved.\(^{398}\) Moreover, because jury verdicts have no precedential value, even a tort defendant who has won a string of victories may not be able to achieve final victory on an issue.\(^{399}\) Plaintiffs' attorneys in the United States find that it is profitable to bring the same dubious multimillion dollar claim before many juries in the expectation that a few random victories will more than compensate for a larger number of losses. In contrast, in England, Canada, or Australia, once a court issues a thoughtful decision rejecting a dubious scientific claim, other courts will respect that judgment, thus bringing the litigation to a quick end.\(^{400}\) Juries, moreover, tend to award much higher damages than do judges, adding to American plaintiffs' incentives to litigate questionable claims.

Given the constitutional basis of civil jury trials\(^{401}\) and populist sentiment favoring juries, it seems highly unlikely that the United States will follow its sister common law jurisdictions and abolish civil juries.\(^{402}\) Putting the jury issue aside, plaintiffs in Commonwealth legal systems have the following additional disadvantages relative to American plaintiffs:

- contingency fees are generally prohibited;
- the "English" fee-shifting rule prevails;
- joint and several liability is usually unavailable;
- awards for lost earning capacity, pain and suffering, and loss of enjoyment of life are meager;

\(^{396}\) FLEMING, supra note 360, at 101.

\(^{397}\) See, e.g., Sanders, supra note 380, at 5-12, 45 (documenting lack of jury comprehension in Bendectin cases).

\(^{398}\) E.g., PHANTOM RISK, supra note 33, at 138-41.

\(^{399}\) For example, Merrell Dow Pharmaceuticals, manufacturer of the morning sickness drug Bendectin, has been defending its product from lawsuits alleging that it causes birth defects for almost twenty years. Despite the fact that Merrell Dow has emerged victorious in dozens of cases, and has not paid plaintiffs' attorneys a cent, the litigation continues.

\(^{400}\) For example, in Rothwell v. Raes, 76 D.L.R.4th 280 (Ont. Ct. App. 1990), the court upheld the trial court's decision favoring the defendant in a case alleging brain damage from a pertussis (whooping cough) vaccine. The court held that the mere possibility that the vaccine caused an injury does not amount to the probability necessary to sustain a plaintiff's verdict. Similarly, an English court rejected a claim linking a pertussis vaccine to brain damage in 1988. Loveday v. Renton, THE TIMES, 31 Mar. 1988 (available on LEXIS, Enggen file); see D. Hull, Pediatrics, in A PRACTICAL GUIDE TO MEDICINE AND THE LAW 199, 207 (J.P. Jackson ed., 1991). John Fleming points out that in the United States "[c]onsistency and uniformity, as ideals of equal justice, are not valued to the same degree as they are in England and many other countries. The very latitude inevitable in jury assessment of damages prompted English courts to abjure even occasional 'spot' jury trial, in the belief that the consistency attained by professional judges encourages settlements and avoids the American inflation of awards." FLEMING, supra note 360, at 125.

\(^{401}\) U.S. CONST. amend. VII.

\(^{402}\) It is, however, entirely possible that legislatures will continue to limit jury discretion on subsidiary issues by, for example, continuing to impose caps on certain types of damages and restricting punitive damage awards.
• punitive damage awards are rarer and smaller than in the United States.403

The most effective way that the United States could significantly reduce litigation based on junk science would be to restrict the financial incentives to bring such cases by adopting all or some of these rules.404 Tort reform must stand or fall on its overall merits. But a reduction of lawsuits based on junk science is a potentially large benefit to be weighed against the potential costs.

D. Tightening the Rules for the Admissibility of Scientific Evidence Will Not Solve the Junk Science Problem in Criminal Cases; Broader Reforms are Needed

As we have seen, courts in Canada and Australia have been trying to crack down on junk science in criminal cases by slowly tightening the rules for the admissibility of scientific evidence. In England, however, there has been very little movement toward stricter standards for admitting scientific evidence. Instead, English reformers have largely focused on broader reforms to improve the quality of the scientific evidence used in court.

The enacted and proposed English reforms are a better solution to the junk science problem in criminal cases than stricter rules for the admissibility of scientific evidence. Challenging the admissibility of scientific evidence requires a competent attorney who recognizes that the evidence proffered by the prosecution is potentially excludable. Successfully challenging dubious testimony requires ample resources, both to comprehend the underlying scientific debate and effectively to explain why the proffered evidence does not meet appropriate standards. In many cases, a defendant needs to hire his own expert to launch a successful challenge. In practice, however, many criminal defendants are impoverished and must rely on legal aid provided by the state. Unfortunately, some legal aid attorneys are not competent; even those who are competent may not be given sufficient resources by the state to launch a successful challenge to junk science proffered by the prosecution.

While stricter standards for admitting scientific evidence benefit only those who can afford to mount an effective legal challenge to questionable scientific evidence, broader reforms benefit even the most impecunious defendants. Of course, there is no reason a jurisdiction could not have what may amount to the best of both worlds — English-style broad reform of the forensic science system and stricter rules for the admissibility of scientific evidence.


404. The combination of these rules and the absence of jury trials has been extremely effective in curbing toxic tort litigation in the Commonwealth. See supra note 361 and accompanying text.
V. Conclusion

While this Article may encourage Americans to wrestle with the implications of the Commonwealth experience with scientific evidence, Commonwealth courts seem slowly to be “Americanizing” their admissibility rules regarding scientific evidence. A tentative consensus is emerging among Commonwealth judges that it is their duty to exclude dubious expert testimony before trial. Most Commonwealth legal scholars applaud this trend, and the analysis presented in this Article suggests that there are sound reasons behind it.

No one would deny that the general acceptance test, the reliability test, and every other test that has been devised to screen scientific evidence create problems of their own, not the least of which is the problem of judicial competence in enforcing them. The adoption of admissibility rules such as general acceptance or reliability does not guarantee that courts will stop admitting scientifically dubious evidence.

The fact that a foolproof rule for admitting scientific evidence cannot be devised does not mean that courts should decline to apply rules that will improve the system. Adoption of the general acceptance or reliability test is not a panacea. Enforcement of such rules, however, can help ensure that the lives, liberty, and property of future Preeces, Chamberlains, and Merrell Dows are not put in jeopardy by the presentation of unreliable scientific evidence to befuddled lay jurors.