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Galileo's Revenge: Junk Science in the Courtroom

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GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM. By Peter W. Huber. New York: BasicBooks. 1991. Pp. viii, 274. \$23.

When Vice President Quayle launched the Bush Administration's assault on the legal profession in a speech before the American Bar Association last summer, Peter Huber's *Galileo's Revenge*¹ gained instant credibility. In his speech, Quayle declared, "it is time to reject the notion that 'junk science' is truly relevant evidence."² Since then, the catchy phrase *junk science* has moved firmly into the common argot,³ and the Bush Administration has followed through with proposals to reform the use of expert testimony.⁴

As *Galileo's Revenge* documents, the evils of allowing junk science to support tort verdicts are several. Most immediately, defendants may be forced to pay vast sums for harms they did not cause. For instance, in 1946 Charlie Chaplin lost a paternity suit despite seemingly irrefutable blood-type evidence that he could not have been the child's father.⁵ In 1986, a chemical producer suffered a forty-nine million dollar verdict after a jury heard anecdotal evidence and speculative expert testimony that pollution from a plant in Sedalia, Missouri damaged the immune systems of thirty-two plaintiffs.⁶

In addition to imposing direct costs — litigation expenses, jury awards, and settlements⁷ — accepting junk science creates significant

1. Peter W. Huber is a Senior Fellow of the Manhattan Institute.

2. Vice President Dan Quayle, Speech before the American Bar Association (Aug. 13, 1991), available in LEXIS, Nexis Library, Fednew File.

3. See, e.g., Bob Cohn, *The Lawsuit Cha-Cha*, NEWSWEEK, Aug. 26, 1991, at 58, 59; Norman Cole, *Breast Panel is Faulted*, WASH. TIMES, Feb. 9, 1992, at B5; *Dow Corning: Damage Control*, WASH. POST, Feb. 15, 1992, at A26; Ellen Goodman, *A Way to Begin Sorting Out the Silicone Conflict*, BOSTON GLOBE, Jan. 23, 1992, at 11; Leslie Spencer, *The Tort Tax*, FORBES, Feb. 17, 1992, at 40, 41; Thomas W. Henderson, *Threat of Lawsuit Enforces Product Safety*, N.Y. TIMES, Jan. 30, 1992, at A20 (letter to the editor).

4. In October 1991, President Bush issued Executive Order 12,778, which directs government attorneys to "make every reasonable effort to present only reliable expert testimony before a court." 56 Fed. Reg. 55,195, 55,196 (1991). To do so, experts testifying on behalf of the government may not "base their conclusions on explanatory theories that are not widely accepted." *Id.* at 55,797. This order represents a determined attempt to return to the standard of *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923). See *infra* note 24 and accompanying text. In February, the Bush Administration proposed legislation aimed at restricting all expert testimony. *And Justice For Some*, WASH. TIMES, Feb. 11, 1992, at F2.

5. The mother had blood type A. The child had blood type B, a situation that could have occurred only if her father had either type AB or B blood. Chaplin had blood type O. P. 168.

6. Pp. 96-98. The plaintiffs' strongest evidence was expert testimony that laboratory tests showed that their immune systems exhibited "pervasive abnormalities." P. 97. In fact, the tests were improperly interpreted and the plaintiffs' complaints were inconsistent with immune system diseases. Pp. 100-02.

7. Huber cites the \$180 million settlement in the main Agent Orange litigation as one premised on junk science. Pp. 98, 182. For a full discussion of the difficult issues of causation involved, see, PETER H. SCHUCK, *AGENT ORANGE ON TRIAL* (1986).

externalities. Safe, valuable products like the antinausea drug Bendectin (p. 127) or the Audi 5000 (p. 74) may be pulled from the market as "unsafe," while their makers suffer heavy financial losses. Other potentially useful products may never be introduced at all for fear of liability.⁸ Rising health insurance costs are fueled partially by large malpractice verdicts, some based on spurious scientific reasoning.⁹ Most insidious of all, doctors may base treatment decisions not on the best available medical information but on a standard of care defined by malpractice verdicts.¹⁰

Every new scientific procedure or theory faces a difficult road to general acceptance. A new forensic technique such as DNA fingerprinting must withstand repeated courtroom challenges as well as intense popular and academic debate.¹¹ Most such techniques, however, are grounded in good science, developed in reputable laboratories, subject to peer review and professional standards.¹² Junk science usually has none of these characteristics.

In one form, junk science is good science gone wrong, what scientists themselves refer to as "pathological science."¹³ Perhaps the most familiar example of pathological science in recent years was the cold fusion farce performed on the stage of the popular press in 1989.¹⁴

8. Peter Huber, *Dan Quayle, the Lawyers and the AIDS Babies*, FORBES, Oct. 28, 1991, at 194.

9. For instance, Huber cites a string of malpractice verdicts against obstetricians that were based on their failure properly to use monitoring equipment of negligible diagnostic value. Pp. 75-91. For discussion of the link between malpractice verdicts and insurance costs, see PAUL C. WEILER, *MEDICAL MALPRACTICE ON TRIAL 2-7* (1991).

10. In 1988, the American College of Obstetricians and Gynecologists (ACOG) recommended discontinuing use of electronic fetal monitoring (EFM) for low risk births because of its inherent unreliability. Huber reports, however, that even most ACOG panel members continue to use EFM for fear of being sued for failing to use the technology. P. 87.

11. Despite use in more than 2000 trials, DNA typing as a means to identify criminal suspects remains the object of intense scientific debate, legal uncertainty, and public interest. See, e.g., Ranajit Chakraborty & Kenneth K. Kidd, *The Utility of DNA Typing in Forensic Work*, 254 SCIENCE 1735 (1991); R.C. Lewontin & Daniel L. Hartl, *Population Genetics in Forensic DNA Typing*, 254 SCIENCE 1745 (1991); Jane E. Hanner, Note, *DNA Fingerprinting: Evidence of the Future*, 79 KY. L.J. 415 (1990-91); Jeffrey A. Norman, Note, *DNA Fingerprinting: Is it Ready for Trial?*, 45 U. MIAMI L. REV. 243 (1990); Stephanie Griffith, *DNA Evidence Allowed in Va. Murder Trial*, WASH. POST, July 19, 1991, at D1.

12. Denis L. Rousseau, *Case Studies in Pathological Science*, 80 AM. SCI. 54 (1992). Huber describes an early example of pathological science: the 1903 "discovery" of N rays, a mysterious new type of ray that could brighten an electric spark. Pp. 24-25, 34-35.

13. Rousseau, *supra* note 12, at 54.

14. Two groups of scientists claimed to have produced nuclear fusion at room temperature using simple table top devices. Had it been true, their discoveries could have led to a valuable new source of commercial energy. See Lee Dye & Thomas H. Maugh II, *Excitement and Skepticism — Fusion Claim Sparks Rush to Duplicate Experiment*, L.A. TIMES, Mar. 25, 1989, § 1, at 1; see also Tim Beardsley, *Chilling Out — Shades of Langmuir: A Panel Suspects Cold Fusion Isn't So*, SCI. AM., Sept. 1989, at 20. Beardsley includes a discussion of how cold fusion fit the pathological science paradigm. In a tragicomic coda to the cold fusion fiasco one of its protagonists, Martin Fleischmann, recently turned up at Caltech to defend his work. Gary Taubes, *A Cold Fusion Déjà Vu at Caltech*, 254 SCIENCE 1582 (1991). Fleischmann's insistence that "[t]he

Fortunately, for those alert to the symptoms, pathological science evinces a characteristic etiology. It is most likely present when the effect being studied is at the limits of detectability or has a marginal statistical significance; when the investigator is quick to disregard established theory and to propose a revolutionary mechanism for the effect reported; and when experiments that could falsify the hypothesis advanced have not been done.¹⁵

The most charitable description of the science underlying the Bendectin litigation is that it fit the pathological profile.¹⁶ The original alarm was sounded by Dr. William G. McBride, an Australian gynecologist whose reputation was based on inflated credit for his role in exposing the dangers of thalidomide in 1961 (pp. 112, 125-26). The effect reported, a causal link between Bendectin and birth defects, was difficult to establish.¹⁷ A large body of reputable scientific data arguing against such a link was either ignored or rejected (p. 113). Experiments that could have strengthened the proponents' case were never done. Throughout the litigation, McBride continued to rely on a single preliminary study in which two of eight rabbits treated with a Bendectin-like chemical produced deformed fetuses.¹⁸

At its most destructive, junk science sheds all respectability. Instead of beginning as an investigation of neutral principles, it is undertaken to prove causation. Such efforts immediately turn the scientific method on its head. A good scientist never tries to *prove* anything. The only reputable experiment is one that attempts to *disprove* something. Only when alternative explanations have been eliminated will a careful scientist claim to have demonstrated an effect. Litigation-driven junk science is something very different.

In the furor surrounding the Audi 5000, a passel of lawyers and their experts set out to "prove" that design defects caused the car to accelerate suddenly and uncontrollably, resulting in serious accidents. Various "causes" were proposed: "an 'electronic glitch' in the computer that determines the air fuel mix," "defects in the accelerator and shift linkage," "a voltage surge or drop in the car's computer" (p. 60), "a transient malfunction in the computer" (p. 61), "total brake failure" (p. 64), and electronic or radio interference with the car's electronic components (p. 67). For none of these theories did the plaintiffs ever attempt to demonstrate a mechanism. The only purported exper-

thing is correct . . . [i]n the end people will have to give way," *id.*, bears all the hallmarks of pathological science. See Rousseau, *supra* note 12, at 54.

15. Rousseau, *supra* note 12, at 54.

16. A less charitable description would be *fraud*. See p. 126.

17. In fact no clear link was ever demonstrated by verifiable scientific evidence. Rather, proponents eventually developed a "mosaic theory" based on a hodgepodge of unrelated data. The theory was never published in a professional journal. P. 113.

18. As it turned out this experiment was probably faked anyway — another characteristic of pathological science. P. 126.

iment intended to uncover the cause of the sudden acceleration was more theater than science. A plaintiff's expert, appearing on the television program *60 Minutes*, drilled a hole in an Audi transmission, pumped in compressed air, and forced the accelerator pedal to "go down by itself."¹⁹ Such a demonstration makes good television but proves nothing. When the National Highway Transportation Safety Board and similar agencies in Canada and Japan investigated the accidents — carefully considering and rejecting possible causes — they all reached the same conclusion: the accidents occurred when people mistakenly stepped on the gas instead of the brake (pp. 68-69).

In recounting the Bendectin litigation, the Audi 5000 case, and several other examples,²⁰ Huber effectively and mercilessly describes the pernicious effect of junk science on the courtroom. Junk science-spouting expert witnesses are derided as "hookers" (p. 19), "far-siders" (p. 41), "new-age Galileos" (p. 93), "scientific nonentities" (p. 178), "outliers," "aberrations," and "living examples of dysfunction and pathology" (p. 109). Huber is less convincing, however, in explaining why courts allow such nonsense and in advising how to prevent it. His principal villains are, first, weak-willed judges — lacking the courage or experience to exclude spurious testimony²¹ — and second, "Calabresians"²² — who transformed tort liability from a system based on duties and rights into a search for the "cheapest cost avoider" (p. 11).

Huber dismisses Calabresian theory as a phony "liability science" (p. 12) in which accidents have potentially innumerable causes and the real goal is not compensating harm but social engineering. Huber has no patience with the view that the tort system should function primarily to deter accidents. His critique is twofold. First, he attacks a system in which all contributing factors are elevated to the level of causes, a process that results in an amorphous "causation pack" (pp. 159-68). Lumping together a variety of contributing factors and then attempting to extract a single one to blame, argues Huber, robs the concept of causation of real meaning. For example, smoking greatly multiplies

19. As Huber recounts, a major part of the Audi plaintiffs' strategy was the *60 Minutes* report that described the car's supposed tendency to accelerate on its own. The quoted description is from Ed Bradley's commentary in the report. P. 61.

20. Huber has a stock set of examples he has used in the book and elsewhere: traumatic cancer caused by bumps or falls, spermicides alleged to cause birth defects, whooping cough vaccine alleged to cause brain damage and death, swine flu vaccine alleged to cause "serum sickness," incompetence by obstetricians alleged to cause cerebral palsy, and trace environmental pollutants alleged to cause "chemically induced AIDS." P. 1.

21. Huber is extremely critical of judges who adopt a "let-it-all-in" approach to evidence. P. 16. "Let-it-all-in rules of scientific evidence have made it trivially easy to begin pseudoscientific speculation in court and almost impossible to end it." P. 209.

22. Huber politely describes Guido Calabresi's seminal work *The Cost of Accidents* as a lucid, "elegant" book (p. 11) but quickly demonizes both the man and his theory. In a recurring metaphor Calabresians are compared to medieval witch hunters desperate to find the cause of crop failure and other calamities. P. 22; see also p. 215.

the background risk of health problems resulting from exposure to asbestosis, the pill, video display terminals, coal dust, petrochemicals, pesticides, cotton textiles, and chemical dyes (p. 163). Huber despairs, however, that litigation is directed at the secondary factors and not the one plaintiffs could have controlled: smoking. He sneers at a trial judge who couldn't even "distinguish between smoke started with a Zippo and smoke supplied by the community arsonist" (p. 163). Following expert testimony that on-the-job smoke hardened a firefighter's arteries, the judge awarded the plaintiff a disability pension (pp. 163-64). Huber is incredulous that the judge ignored evidence showing the plaintiff was a heavy smoker with a congenital arterial abnormality (p. 163), conditions that in Huber's view should have created an "open-and-shut" defense (p. 165). Good science (and presumably law based on it) Huber says, is "unburdened by concerns about what is fair, just, reasonable or socially acceptable" (p. 165).

More fundamentally, Huber attacks the Calabresians for not living up to their promise that holding the cheapest cost avoider liable will reduce the frequency of accidents: "[t]here is no systematic empirical evidence — not a shred — that liability science applied to anything but the utterly obvious case has in fact improved the efficient control of accidents" (p. 186). In concluding that "how much we sue has no observable effect whatsoever on how safe we are" (p. 187), Huber meets the argument head on that plaintiffs' lawyers are important social engineers ferreting out irresponsible manufacturers and dangerous products. He cites a number of cases where lawyers have taken credit for exposing risks: asbestos, the Ford Pinto, the Dalkon Shield, Rely tampons, DES, thalidomide, and the swine flu vaccine (pp. 172-73). In each instance, however, as Huber documents, serious litigation only followed regulatory or scientific questioning of the product (pp. 172-75); only in junk science cases like Audi and Bendectin did lawyers lead the charge (p. 175). As a diagnostic rule of thumb, Huber may have something. Suits brought without identifying the mechanism underlying the alleged causation and liability are suspicious. But we should not go too far. It remains possible that energetic plaintiffs' lawyers may stumble across something that regulators and independent experts have missed.

Huber's other villains, judges, are attacked repeatedly but somewhat unfairly. He argues strongly that judges should scrutinize the substance of expert testimony before admitting it.²³ Huber makes a persuasive case that, with a little conviction and effort, judges can determine when an expert is testifying responsibly. Essentially, Huber

23. Interestingly, Huber declines to call for closer scrutiny of expert qualifications. He complains that "[a]ny old résumé qualifies someone to be a witness" (p. 177) but argues that the focus should remain on what the witness has to say. "This was, indeed, the key insight in the old *Frye* rule. *Frye* directed the focus away from the individual, whatever his credentials might be, and toward the scientific consensus." P. 199.

calls for a return to the standard of *Frye v. United States*,²⁴ under which experts could only testify about theories reflecting a consensus of the relevant scientific community.²⁵ He points out that identifying scientific consensus is not as difficult as advocates for one side would have us believe (pp. 199-200). He urges judges to go out and read the literature. A report from the National Institutes of Health or an article in a professional journal, Huber argues, should be given more weight than the theory of an iconoclastic witness (pp. 200-01). Most importantly, judges should learn to recognize good science by its methodology. Responsible work is peer-reviewed, uses the scientific method, employs proper controls, replicates tests and error estimates, and states its conclusions cautiously (p. 203). Huber is right. Judges, even their law clerks, are capable — or we should demand that they be capable — of distinguishing between reasoned conclusions and baseless speculation. The critical problem, which Huber ignores, is that judges may not be free to make such inquiries under current evidence law.

Huber identifies the root of the problem but fails to return to it.²⁶ Adoption of the Federal Rules of Evidence in 1975 changed the way expert testimony is admitted.²⁷ The *Frye* rule was discarded in favor of a looser set of guidelines that allow almost any expert testimony that may assist the trier of fact.²⁸ With one prominent exception, the sanity or competence of a criminal defendant, an expert may even offer an opinion on the ultimate issue of fact.²⁹ Faced with such broad rules, a judge may not feel free to exercise the discretion Huber advocates, and a jurist determined to follow his advice would face a real risk of reversal.

24. 293 F. 1013 (D.C. Cir. 1923).

25. "[W]hile 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." 293 F. at 1014.

26. The Federal Rules of Evidence are mentioned only once in the book. P. 15.

27. A further criticism of *Galileo's Revenge* is that it suggests *Frye* has been abandoned. Many jurisdictions continue to apply *Frye*, at least to some aspects of expert testimony, although just how many is uncertain. See Steven M. Egesdal, Note, *The Frye Doctrine and Relevancy Approach Controversy: An Empirical Evaluation*, 74 GEO. L.J. 1769, 1769-70 n.2 (1986) ("The majority of courts continue to follow the *Frye* doctrine."). But see Faust F. Rossi, *Modern Evidence and the Expert Witness*, LITIG. Fall, 1985, at 18, 20 (noting that "courts in more than 15 jurisdictions have rejected *Frye*," and that, "[t]he movement away from *Frye* is not surprising."). See generally 5 JACK B. WEINSTEIN & MARGARET A. BERGER, WEINSTEIN'S EVIDENCE ¶ 702[3] (1991) ("the Advisory Committee Note's failure to even mention the *Frye* case must be considered significant. The silence of the rule and its drafters may arguably be regarded as tantamount to an abandonment of the general acceptance standard."); Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1196, 1228-29 (1980) (noting that as of 1980 the effect of the Federal Rules of Evidence on *Frye* was uncertain).

28. FED. R. EVID. 702.

29. FED. R. EVID. 704.

A recent case illustrates the difficulties courts face under the current Federal Rules and similar systems. In *Christophersen v. Allied Signal Corp.*,³⁰ the plaintiff's decedent died of colon and liver cancer after working for fourteen years in a plant that produced nickel/cadmium batteries.³¹ The plaintiff appealed the district court's refusal to admit expert testimony attempting to prove that exposure to chemicals on the job caused Christophersen's cancer and ultimate death.³² The plaintiff's expert offered testimony that was pure junk. The Fifth Circuit, sitting en banc, stated:

Dr. Miller is not an expert in either oncology or pathology. Miller's opinion as to the cause of Christophersen's death was formed without consultation with oncologists or other cancer specialists. Dr. Miller's experience with cancer occurred during his residency when he assisted in a study of the immune system as affected by smoking and asbestos. Dr. Miller does not routinely treat cancer patients, nor has he ever treated a patient with a colon cancer of the type that affected Christophersen.³³

Miller's opinion was based only on an affidavit of another worker describing generally the fumes in the plant and asserting that Christophersen had been exposed to them. Astonishingly, Miller felt qualified to testify without even knowing the chemical composition of the fumes alleged to have caused Christophersen's cancer.³⁴ Huber would no doubt agree that this expert is the kind of charlatan, and his "evidence" the kind of quackery, that should be bounced out of court at the first available opportunity. Unfortunately, it isn't that simple.

Under Rule 702 "a witness qualified as an expert by knowledge, skill, experience, training or education may testify" if doing so will assist the trier of fact.³⁵ The Advisory Committee's notes to Rule 702 state only that "[t]he rule is broadly phrased"³⁶ and offer no substantive guidance to a court about how to identify a qualified expert. Consequently, while both the district court and the Fifth Circuit en banc were willing to question the expert's qualifications in *Christophersen*, neither felt able to exclude his testimony under Rule 702.³⁷ Further,

30. 939 F.2d 1106 (5th Cir. 1991) (en banc) (per curiam), *cert denied*, 112 S. Ct. 1280 (1992). While Huber cannot be faulted for failing specifically to discuss *Christophersen*, a case decided after *Galileo's Revenge* was published, he can be faulted for failing to analyze any of the decisions that struggle with how and when to admit expert testimony. *E.g.*, *United States v. Downing*, 753 F.2d 1224, 1235 (3d Cir. 1985) ("Federal Rules of evidence neither incorporate nor repudiate [*Frye*]"); *United States v. Williams*, 583 F.2d 1194 (2d Cir. 1978), *cert. denied*, 439 U.S. 1117 (1979) (holding that *Frye* did not survive enactment of the Federal Rules of Evidence); *State v. Hall*, 297 N.W.2d 80, 84-85 (Iowa 1980) (en banc) (rejecting *Frye* as "inconsistent with modern concepts of evidence").

31. 939 F.2d at 1108, 1113.

32. 939 F.2d at 1109.

33. 939 F.2d at 1112.

34. 939 F.2d at 1113.

35. FED. R. EVID. 702.

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

37. 939 F.2d at 1113.

as the dissent demonstrates, many judges shy away from even such preliminary questioning of an expert's qualifications.³⁸

To exclude the expert's testimony, the Fifth Circuit had to twist Rule 703 and resuscitate principles derived from *Frye*.³⁹ The court applied the *Frye* test to the expert's methodology and held that the methods or reasoning a witness uses to connect the facts to a conclusion must be generally accepted by the relevant scientific community.⁴⁰ The court's reasoning provoked vigorous complaint from the concurring and dissenting justices,⁴¹ has already been the subject of academic criticism,⁴² and seems likely to draw disagreement from other circuits.⁴³

Under Rule 703 an expert may testify based on the kinds of facts and data "reasonably relied upon by experts in a particular field."⁴⁴ As generally interpreted, Rule 703 raises only a question of admissibility of an expert opinion based on material that would otherwise be inadmissible.⁴⁵ As the *Christophersen* concurring opinion points out, the question is only whether the facts themselves, in this case the affidavit, may be used to form an opinion.⁴⁶ The majority, however, went a step further, stating that "the inquiry into the 'types' of 'facts and data' underlying an expert's testimony is not limited to the admissibility of that data."⁴⁷ The court concluded that the expert's opinion was based on "untrustworthy" facts and thus would not be helpful to the jury.⁴⁸

The *Christophersen* majority seemingly has performed exactly the kind of analysis called for in *Galileo's Revenge*. It is a serious deficiency of the book, however, that its excoriation of the status quo and

38. 939 F.2d at 1124 (Reavley, J., dissenting). Apparently the dissenting judges thought it sufficient that while Miller was not an oncology specialist, "oncology constitutes a subspecialty of internal medicine, in which he does specialize." *Id.* The dissent continued, "Dr. Miller notes that an oncologist is more qualified in the treatment of cancer, but not necessarily more qualified concerning carcinogenesis." *Id.* The dissent's reasoning boils down to: since their expert isn't qualified we should be able to present one who isn't qualified either.

39. 939 F.2d at 1113-16.

40. 939 F.2d at 1115.

41. 939 F.2d at 1117-20 (Clark, C.J., concurring in the result); 939 F.2d at 1129-34 (Reavley, J., dissenting).

42. Recent Case, 105 HARV. L. REV. 791, 794 (1992) (*Christophersen* court "plainly erred").

43. The Third Circuit has specifically rejected a *Frye*-type "generally accepted" standard. *United States v. Downing*, 753 F.2d 1224, 1236-37 (3d Cir. 1985). Alternately, the Sixth Circuit has cited *Christophersen* with approval. *Cribbs v. Hobart Corp.*, No. 90-2335, 1991 U.S. App. LEXIS 30219 at *7 (6th Cir. Dec. 19, 1991) ("we are not in disagreement with [*Christophersen*]").

44. FED. R. EVID. 703.

45. See generally WEINSTEIN & BERGER, *supra* note 27 at ¶ 703[01].

46. *Christophersen v. Allied-Signal Corp.*, 939 F.2d 1106, 1117-20 (5th Cir. 1991) (en banc) (per curiam) (Clark, C.J., concurring in the result), *cert. denied*, 112 S. Ct. 1280 (1992).

47. 939 F.2d at 1114.

48. 939 F.2d at 1114, 1116.

its calls for reform fail to discuss the Federal Rules of Evidence at all. Whether Huber thinks judges should attempt reform independently under the existing rules is unclear. He calls repeatedly for trial judges to return to the rule of *Frye* but makes no mention of how they can do so in a way that will easily survive appellate review.⁴⁹

Huber's two other potentially valuable suggestions for reform get such cursory treatment (a single paragraph each) that one wonders whether even he has any faith in their utility. He applauds legislative reform that limits the conditions under which experts may testify (pp. 205-06). Such reforms, however, will do little to affect the substance of expert testimony. The statutes Huber cites⁵⁰ only stiffen the qualification requirements for experts. They cannot prevent the more fundamental problem of an expert with an impressive resume mouthing junk. His second recommendation, that judges appoint their own experts (p. 206), might be useful but would require a radical overhaul of the adversary system as currently structured. Huber is silent about how such a change might occur.

The adversary system itself, and particularly the lawyer's role as zealous advocate within it, bear much responsibility for the problems Huber describes. He plainly disparages a system where Melvin Belli can boast, "[i]f I got myself an impartial witness, I'd think I was wasting my money" (p. 18). Time and again Huber makes the point that greed goes hand in hand with junk science testimony. In seventeenth-century Spain, after Inquisitors were prohibited from confiscating the property of condemned witches, the number of witchcraft trials plummeted (p. 189). In nineteenth-century Germany, following passage of the world's first workers' compensation law, the percentage of cancers diagnosed as having been caused on the job more than doubled (p. 42). A small contemporary law firm specializing in bogus cerebral palsy claims, Huber estimates, could easily gross fifty million dollars after an initial investment of "maybe \$5 million at most" (p. 81). According to Huber, "the general method is standard. First, a victim is located, then the lawyer and a well-paid expert root about for a cause plausible enough to pitch to a jury" (p. 81).

49. In *Christophersen* the trial judge's original ruling was reversed on appeal only to be surprisingly reinstated by the Fifth Circuit's en banc ruling. *Christophersen v. Allied-Signal Corp.*, 902 F.2d 362 (5th Cir. 1990), *revd.*, 939 F.2d 1106 (5th Cir. 1991) (en banc) (per curiam), *cert. denied*, 112 S. Ct. 1280 (1992).

50. As Huber reports:

In 1987, for example, Alabama passed a law requiring expert witnesses to have practiced recently in the same specialty as the doctor they charge with medical malpractice. Colorado passed a law in 1988 restricting malpractice expert testimony to licensed physicians who can demonstrate "substantial familiarity" with the applicable standard of care and the procedure being litigated. A recent Maryland law bars testimony from any malpractice expert who spends more than 20 percent of his time in court. Kansas, Maryland, Michigan, Rhode Island, and West Virginia have developed similar requirements. Most of these states also bar from the witness stand academics who do not practice at all.

Pp. 205-06 (citations omitted).

The system Huber describes contains more villains than just his major targets, judges and legal theorists. To be sure, judges can, as the *Christophersen* court did, get tougher on expert testimony. The rules of evidence could be revised. *Frye* could be resurrected. But, just as an accident may have many "causes," junk science ends up in court through the actions of many parties. All will have to participate if reform is to succeed.

One encouraging sign is that some medical and scientific societies have begun to take the problem of junk science testimony seriously. The American Medical Association has taken the positions that a medical witness must not become an advocate and that contingent witness fees are unethical.⁵¹ Such self-policing efforts among the community of potential experts should be supported and should serve as a model to the legal community.

Huber quotes the advertisement of a witness-for-hire company that promises, "[i]f the first doctor we refer doesn't agree with your legal theory, we will provide you with the name of a second" (p. 207; citation omitted). Such an offer is reprehensible, but it is only good business. Extending one of Huber's metaphors provides a ready analogy. Mouthpiece expert witnesses, he suggests, are little better than whores (p. 19). But, as any economist or vice cop could tell you, whores would not exist without customers. Any effort to reduce the supply of junk-science testimony must also reduce the demand.

— *John F. Baughman*

51. Other professional societies have taken similar positions. P. 207.