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SCIENTIFIC EVIDENCE IN CIVIL AND CRIMINAL CASES

Paul C. Giannelli*

I. INTRODUCTION

The Supreme Court of Arizona began its opinion in *Logerquist v. McVey*¹ by noting that the interpretation of Evidence Rule 702 had “become an issue of nationwide concern”² following the United States Supreme Court’s opinion in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*³ *Daubert* has indeed had a profound effect on the legal landscape—perhaps more than any other evidence law decision. It has triggered a heated debate in scientific circles⁴ as well as in the legal arena.⁵ It has produced an extensive reexamination by state courts of the standard for the admissibility of scientific evidence,⁶ the codification of state rules on the subject,⁷ as well as a new federal rule⁸ and a new uniform rule.⁹

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1. 1 P.3d 113 (Ariz. 2000).

2. *Id.* at 114.

3. 509 U.S. 579 (1993).

4. The summer 2000 edition of *Issues In Science and Technology*, the publication of the National Academies of Sciences and Engineering, is devoted to the subject of “Science and Law” and is replete with references to the *Daubert* decision.

5. *E.g.*, 1 PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, *SCIENTIFIC EVIDENCE* ch. 1 (3d ed. 1999); 1 DAVID L. FAIGMAN ET AL., *MODERN SCIENTIFIC EVIDENCE* 10-45 (1997).

6. As a result of the reexamination that began soon after *Daubert* was handed down, numerous states explicitly rejected *Frye* in favor of *Daubert*. See GIANNELLI & IMWINKELRIED, *supra* note 5, at 80-82 (listing the following as *Daubert* jurisdictions: Alaska, Connecticut, Indiana, Kentucky, Massachusetts, New Hampshire, New Mexico, Oklahoma, South Dakota, Tennessee, West Virginia). In addition, a number of states had rejected *Frye* before *Daubert* was decided. See *id.* at 82-84 (listing Arkansas, Delaware, Georgia, Hawaii, Iowa, Louisiana, Maine, Montana, North Carolina, Oregon, South Carolina, Texas, Utah, Vermont, and Wyoming).

7. See HAW. R. EVID. 702 (“In determining the issue of assistance to the trier of fact, the court may consider the trustworthiness and validity of the scientific technique or mode of analysis employed by the proffered expert.”); IND. R. EVID. 702(b) (“Expert scientific testimony is admissible only if the court is satisfied that the scientific principles upon which the expert testimony rests are reliable.”); OHIO R. EVID. 702(C):

The witness’ testimony is based on reliable scientific, technical, or other specialized information. To the extent that the testimony reports the result of a procedure, test, or experiment, the testimony is reliable only if all of the fol-

At one point in its opinion, the *Logerquist* majority stated that it did "not believe different tests should apply in civil cases; to the contrary, rules determining the competency of evidence should apply across the board, whether the case is on the civil or criminal calendar."¹⁰ But why? In this essay, I argue that courts have often failed to appreciate the significant differences in criminal and civil cases in this context.

II. DEATH, IMPRISONMENT AND ERRONEOUS CONVICTION

First, the stakes are different in criminal and civil litigation, as illustrated by *Barefoot v. Estelle*,¹¹ decided before *Daubert* and cited in *Logerquist*.¹² In the death penalty phase of the case, the prosecution offered psychiatric testimony concerning Barefoot's future dangerousness.¹³ One psychiatrist, Dr. James Grigson, without ever examining Barefoot, testified that "there was a 'one hundred percent and absolute' chance that Barefoot would commit future acts of criminal violence."¹⁴ On October 24, 1984, Thomas Barefoot was executed based on "junk science."¹⁵ The *Barefoot* Court

lowing apply: (1) The theory upon which the procedure, test, or experiment is based is objectively verifiable or is validly derived from widely accepted knowledge, facts, or principles; (2) The design of the procedure, test, or experiment reliably implements the theory; (3) The particular procedure, test, or experiment was conducted in a way that will yield an accurate result.

Michigan had adopted its provision before *Daubert*. See MICH. R. EVID. 702 (requiring expert testimony be based on "recognized" scientific, technical, or other knowledge").

8. FED. R. EVID. 702:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in the form of an opinion or otherwise, *if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.*

The italicized clause became effective on Dec. 1, 2000.

9. UNIF. R. EVID. 702 (effective June 1999).

10. 1 P.3d at 127.

11. 463 U.S. 880 (1983).

12. 1 P.3d at 126.

13. *Barefoot*, 463 U.S. at 884. Future dangerousness was a qualifying factor under the Texas death penalty statute. TEX. CRIM. PROC. CODE ANN. art. 37.071(b)(2) (Vernon 1981) (requiring a jury finding that "there is a probability that the defendant would commit criminal acts of violence that would constitute a continuing threat to society"). It continues to be factor. *Id.* at art. 37.071(2)(b)(1) (Supp. 2001).

14. *Barefoot*, 463 U.S. at 919 (Blackmun, J., dissenting) (quoting from record).

15. PETER W. HUBER, GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM 220 (1991). One could favor the death penalty and "yet still recoil at the thought that a junk science fringe of psychiatry . . . could decide who will be sent to the gallows. *Id.*

admitted evidence "at the brink of quackery."¹⁶ Justice Blackmun, the author of the *Daubert* opinion, dissented:

In the present state of psychiatric knowledge, this is too much for me. One may accept this in a routine lawsuit for money damages, but when a person's life is at stake . . . a requirement of greater reliability should prevail. In a capital case, the specious testimony of a psychiatrist, colored in the eyes of an impressionable jury by the inevitable untouchability of a medical specialist's words, equates with death itself.¹⁷

Furthermore, the DNA exonerations establish a connection between expert testimony and erroneous convictions. In *Actual Innocence* Barry Scheck, Peter Neufeld and Jim Dwyer examined 62 of the 67 DNA exonerations secured through Cardozo Law School's Innocence Project to ascertain what factors contributed to these miscarriages of justice; one of the more astounding conclusions was that a *third* of these cases involved "tainted or fraudulent science."¹⁸ Some of these cases involved the death penalty, and the Illinois misconduct cases played a role in the Governor's moratorium on executions in that state.¹⁹

III. MISCONDUCT

Second, the abuse of scientific evidence in criminal cases is well-documented.²⁰ Forged fingerprint evidence,²¹ fake autopsies,²² and perjured

16. See George E. Dix, *The Death Penalty, "Dangerousness," Psychiatric Testimony, and Professional Ethics*, 5 AM. J. CRIM. L. 151, 172 (1977).

17. *Barefoot*, 463 U.S. at 916.

18. BARRY SCHECK, ET AL., *ACTUAL INNOCENCE* 246 (2000).

19. See Dirk Johnson, *Illinois, Citing Verdict Errors, Bars Executions*, N.Y. TIMES, Feb. 1, 2000. The infamous Cruz and Hernandez prosecutions occurred in Illinois. See EDWARD CONNORS ET AL., *CONVICTED BY JURIES, EXONERATED BY SCIENCE: CASE STUDIES IN THE USE OF DNA EVIDENCE TO ESTABLISH INNOCENCE AFTER TRIAL* 44-46 (1996).

20. See, e.g., Paul C. Giannelli, *The Abuse of Scientific Evidence in Criminal Cases: The Need for Independent Crime Laboratories*, 4 VA. J. SOC. POL'Y & L. 439 (1997) (discussing the need for independent assessment of scientific evidence to avoid abuse of scientific proof).

21. See generally Boris Geller et al., *A Chronological Review of Fingerprint Forgery*, 44 J. FORENSIC SCI. 963 (1999) (discussing history of fingerprint forgeries); Mark Hansen, *Troopers' Wrongdoing Taints Cases*, 80 A.B.A. J., Mar. 1994, at 22 (discussing New York police officers fabrication of fingerprint evidence in numerous cases).

22. See generally Richard L. Fricker, *Pathologist's Plea Adds to Turmoil: Discovery of Possibly Hundreds of Faked Autopsies Helps Defense Challenges*, 79 A.B.A. J., Mar. 1993, at 24 ("If the prosecution theory was that death was caused by a Martian death ray, then that was what [the pathologist] reported."); Chip Brown, *Pathologist Accused of Falsifying Autopsies, Botching Trial Evidence Forensics*, L.A. TIMES, Apr. 12, 1992, at A24 ("[F]ormer Dallas County assistant medical examiner Linda Norton was quoted as saying [Dr.] Erdmann routinely performs 'made-to-

testimony²³ have all been reported. The Department of Justice's 1997 report on the FBI laboratory, issued by the Inspector General, graphically portrayed negligence, misconduct, and other shortcomings of the premier crime laboratory in the country.²⁴ The investigation found scientifically flawed testimony, inaccurate testimony, testimony beyond the competence of examiners, improperly prepared laboratory reports, insufficient documentation of test results, inadequate record management and retention, and failures of management to resolve serious and credible allegations of incompetence.²⁵ The report's recommendations are revealing because they are so basic. They include (1) seeking accreditation of the FBI laboratory by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board; (2) requiring examiners in the Explosives Unit to have scientific backgrounds in chemistry, metallurgy, or engineering; (3) mandating that each examiner who performs work prepare and sign a separate report instead of having one report "without attribution to individual

order autopsies that support a police version of a story.""); Roy Bragg, *New Clues May be Dug from Grave; Furor Touches on Autopsies, Brains*, HOUSTON CHRON., Mar. 28, 1992, at 1 ("[C]all him McErdmann, . . . He's like McDonald's—billions served.") (quoting Dallam County District Attorney Barry Blackwell).

23. See, e.g., *In re Investigation of the W. Va. State Police Crime Lab., Serology Div.*, 438 S.E.2d 501 (W. Va. 1993) (ordering state officials to notify prisoners of their right to file *habeas* actions because a chief serologist falsified test results in as many as 134 cases from 1979 to 1989).

The accompanying report states:

The acts of misconduct on the part of [serologist] Zain included (1) overstating the strength of results; (2) overstating the frequency of genetic matches on individual pieces of evidence; (3) misreporting the frequency of genetic matches on multiple pieces of evidence; (4) reporting that multiple items of evidence had been tested, when only a single item had been tested; (5) reporting inconclusive results as conclusive; (6) repeatedly altering laboratory records; (7) grouping results to create the erroneous impression that genetic markers had been obtained from all samples tested; (8) failing to report conflicting results; (9) failing to conduct or to report conducting additional testing to resolve conflicting results; (10) implying a match with a suspect when testing supported only a match with the victim; and (11) reporting scientifically impossible or improbable results.

Id. at 516.

24. OFFICE OF INSPECTOR GENERAL, U.S. DEP'T OF JUSTICE, THE FBI LABORATORY: INVESTIGATION INTO LABORATORY PRACTICES AND ALLEGED MISCONDUCT IN EXPLOSIVES-RELATED AND OTHER CASES (April 1997) [hereinafter cited as I.G. REPORT]. See also JOHN F. KELLY & PHILLIP K. WEARNE, *TAINTING EVIDENCE* 2 (1998):

The findings were alarming. FBI examiners had given scientifically flawed, inaccurate, and overstated testimony under oath in court; had altered the lab reports of examiners to give them a pro-prosecutorial slant, and had failed to document tests and examinations from which they drew incriminating conclusions, thus ensuring that their work could never be properly checked.

25. I.G. REPORT, *supra* note 24, Executive Summary, pt. I, section A.

examiners"; (4) providing for the review of analytical reports by the unit chief;²⁶ (5) preparing adequate case files to support reports;²⁷ (6) monitoring court testimony in order to preclude examiners from testifying to matters beyond their expertise or in ways that are "unprofessional"; and (7) developing written protocols for scientific procedures.

IV. INEFFECTIVE ASSISTANCE OF COUNSEL

Third, the adversary context differs in criminal and civil cases.²⁸ The overwhelming number of criminal defendants, upwards of 80 percent in some jurisdictions, are indigent.²⁹ Consequently, most defendants must rely on government attorneys, public defenders, or government-paid private attorneys to defend them.³⁰ In short, the government is responsible for the defense as well as for the prosecution.

The right to counsel includes the right to effective assistance of counsel.³¹ There is good reason to believe that effective counsel is often not provided. The compensation schedule in some states almost ensures inadequate representation.

In too many states, serving as counsel to the indigent is a fast way to join their ranks. For instance, in Mississippi, the maximum fee

26. "Our central point is that peer review by qualified personnel is an essential aspect of a high-performing forensic science laboratory. The Rudolph matter, certain conclusions in the Oklahoma City report, and other cases demonstrate the importance of vigorous, substantive peer review." *Id.* at pt. I.

27. "The Rudolph files and some of Martz's work underscore the importance of case files containing all the documentation necessary for another appropriately qualified examiner to be able to understand and replicate the examiners's data and analysis. We encountered the problem of incomplete or missing documentation in many case files." *Id.* at pt. I.

28. The Court in *Daubert* stated that "[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 596 (1993). Consequently, assessing how well the adversary system functions is an important issue in the criminal versus civil context.

29. See YALE KAMISAR ET AL., *MODERN CRIMINAL PROCEDURE* 25 (9th ed. 1999) ("The most complete national survey estimated the overall felony indigency rate at 48%, but a later sampling of felony defendants in the 75 largest counties indicated that approximately 80% receive court appointed attorneys.").

30. See *Gideon v. Wainwright*, 372 U.S. 335, 344, 352 (1963) (holding that the right to counsel applies to the states). "[I]n our adversary system of criminal justice, any person haled into court, who is too poor to hire a lawyer, cannot be assured a fair trial unless counsel is provided for him." *Id.* at 344.

31. *McMann v. Richardson*, 397 U.S. 759, 771 n.14 (1970) ("It has long been recognized that the right to counsel is the right to the effective assistance of counsel."); see also *Strickland v. Washington*, 466 U.S. 668 (1984) (reaffirming the right to counsel includes the right to effective assistance of counsel).

for non-death penalty cases is \$1,000, plus a token amount for office overhead. In certain rural sections of Texas the limit is \$800. In Virginia, \$305 is the most a court-appointed counsel can receive for defending a client in a felony punishable by less than twenty years. A kid selling sodas on a summer weekend at Virginia beach would make more money.³²

A recent New York Times article captured the essential truth here: *Poor Legal Work Common For Innocents on Death Row*.³³

Ineffective assistance cases involving scientific evidence are not hard to find. For example, in *Baylor v. Estelle*³⁴ the Ninth Circuit wrote:

We have difficulty understanding how reasonably competent counsel would not recognize "the obvious exculpatory potential of semen evidence in a sexual assault case," particularly when the criminalist's report plainly indicates that the donor was an ABO nonsecretor whereas Baylor was an ABO type "O" secretor and that this 'would thus eliminate' Baylor as the perpetrator unless a test . . . on a liquid semen sample showed that he mimicked a nonsecretor Whether or not Stockwell's report was itself conclusive, it was one test away from tilting the scale powerfully in Baylor's direction.³⁵

Similarly, another court found ineffectiveness where defense counsel knew that gunshot residue testimony was "critical" but nevertheless failed to "depose the State's expert witness nor . . . bothered to consult with any other expert in the field."³⁶ Other cases, both federal³⁷ and state,³⁸ are of the same ilk.

32. SCHECK ET AL., *supra* note 18, at 188.

33. Dirk Johnson, *Poor Legal Work Common For Innocents on Death Row*, N.Y. TIMES, Feb. 5, 2000, at A1.

34. 94 F.3d 1321 (9th Cir. 1996).

35. *Id.* at 1324. See also Proffitt v. United States, 582 F.2d 854, 857 (4th Cir. 1978) ("The failure of defense counsel to seek [expert services] when the need is apparent deprives an accused of adequate representation in violation of his sixth amendment right to counsel."); United States *ex rel.* Foster v. Gilmore, 35 F. Supp. 2d 626, 630 (N.D. Ill. 1999) ("This court finds inexplicable 'and wholly ineffective' defense counsel's failure to consult a psychiatric expert prior to or even during the trial.").

36. Troedel v. Wainwright, 667 F. Supp. 1456, 1461 (S.D. Fla. 1986).

Even the third-year law student knew the defense needed a psychiatric expert witness. That witness was to be Dr. Kling. As a result of trial counsel's woefully deficient performance, however, Dr. Kling was not provided with sufficient information and, as a result, his testimony not only failed to help the defense, it significantly hindered it. Kling's report (which he now acknowledges was inaccurate) permitted the prosecution to turn Kling's trial testimony against Bloom, and it gave the prosecution the ammunition it needed

The Justice Department's study on DNA exonerations also underscored this point. A professor of forensic science wrote:

One problem that DNA testing will not remedy is inadequate legal counsel. In case after case reported here, defense counsel failed to consult competent scientific experts. Even a neophyte forensic serologist would have detected the problems with the prosecution's serological evidence in the Dotson case. It is also clear that in case after case, defense counsel failed to review the case notes of the prosecution's forensic serologists. Even a layperson would have seen that Fred Zains's written reports and sworn testimony were contradicted by his case notes. Again, one has to reflect on the

to secure guilty verdicts of first degree murder with special circumstances [death penalty] on all three counts.

Bloom v. Calderon, 132 F.3d 1267, 1278 (9th Cir. 1997).

37. *E.g.*, Glenn v. Tate, 71 F.3d 1204, 1208-11 (6th Cir. 1995) (finding ineffective assistance in penalty phase of capital murder case for failing to present evidence of defendant's mental retardation/neurological impairment, by acquiescing to prosecutor's suggestion that experts requested by defense be treated as court-appointed rather than defense experts, and by failing to challenge expert reports); Driscoll v. Delo, 71 F.3d 701, 709 (8th Cir. 1995):

In a capital murder case whether or not the alleged murder weapon . . . had blood matching the victim's constituted an issue of the utmost importance. Under these circumstances, a reasonable defense lawyer would take some measures to understand the laboratory tests performed and the inferences that one could logically draw from the results. At the very least, any reasonable attorney under the circumstances would study the state's laboratory report with sufficient care so that if the prosecution advanced a theory at trial that was at odds with the serology evidence, the defense would be in a position to expose it on cross-examination.

See also Foster v. Lockhart, 9 F.3d 722, 726 (8th Cir. 1993) (finding defense counsel's failure to pursue an impotency defense in a rape case constituted ineffective assistance); United States v. Tarricone, 996 F.2d 1414, 1418 (2d Cir. 1993) (concluding that attorney's failure to consult handwriting expert made out a viable claim of ineffective assistance); Sims v. Livesay, 970 F.2d 1575, 1580-81 (6th Cir. 1992) (finding that defense counsel's failure to have quilt examined for gunshot residue constituted ineffective assistance); *Gilmore*, 35 F. Supp. 2d at 630 ("This court finds inexplicable—and wholly ineffective—defense counsel's failure to consult a psychiatric expert prior to or even during the trial.").

38. *E.g.*, People v. Frierson, 599 P.2d 587, 598-600 (Cal. 1979) (finding that defense counsel's failure to seek expert advice as to whether the defendant was under the influence of drugs at the time of the offense constituted ineffective assistance of counsel); Moore v. State, 827 S.W.2d 213, 214-15 (Mo. 1992) (finding counsel ineffective for failing to request serological test). In the case of *State v. Hicks*, the court found that defense counsel's failure to obtain DNA analysis was not a strategic or tactical decision:

Before the trial, [defense counsel] knew that the root tissue of hair specimens could be subject to DNA testing at certain out-of-state laboratories and he knew of the technology used for that testing. He did not discuss this with his client or with the district attorney, or petition the court to have this test performed or do anything to pursue such testing.

536 N.W.2d 487, 491 (Wis. Ct. App. 1995).

likelihood that numerous innocent persons are presently incarcerated because of the inadequacy of their attorneys.³⁹

V. ACCESS TO DEFENSE EXPERTS

Access to expert testimony is another major difference between criminal and civil cases.⁴⁰ Obtaining expert assistance is generally not difficult for the prosecution. The prosecution has access to the services of state, county, or metropolitan crime laboratories. In addition, federal forensic laboratories often provide their services to state law enforcement agencies. For example, the services of the FBI Laboratory "are rendered free of cost to contributing agencies" and available to "all duly constituted state, county, and municipal law enforcement agencies in the United States."⁴¹ These services, which are provided without charge, include both the examination of evidence and the court appearance of the expert. In contrast, forensic laboratory services are not generally available to criminal defendants. A survey of approximately 300 crime laboratories revealed that "[f]ifty-seven percent . . . of the responding laboratories would only examine evidence submitted by law enforcement officials."⁴²

In *Ake v. Oklahoma*⁴³ the United States Supreme Court for the first time recognized a due process right to expert assistance for indigents when the matter about which the expert is to testify is likely to be a significant factor

39. Walter F. Rowe, *Forward*, in CONVICTED BY JURIES, EXONERATED BY SCIENCE, *supra* note 19, at xvii-xviii. See also *id.* at 68 ("ineffective counsel at [Piszek's] trial (trial counsel never requested DNA testing)"); KELLY & WEARNE, *supra* note 24, at 26-27 ("You can ignore high profile cases like OJ Simpson. That is not typical.").

40. The *Logerquist* majority wrote: "Of course, no one can quantify how many times juries have been fooled by junk science, although it undoubtedly has occurred, or how many times this has favored the prosecution or the defense, the plaintiff or the defendant." *Logerquist v. McVey*, 1 P.3d 113, 130 (Ariz. 2000). We do, however, know that the prosecution relies on expert testimony more than the defense. "About one quarter of the citizens who had served on juries which were presented with scientific evidence believed that had such evidence been absent, they would have changed their verdicts—from guilty to not guilty." Joseph L. Peterson et al., *The Uses and Effects of Forensic Science in the Adjudication of Felony Cases*, 32 J. FORENSIC SCI. 1730, 1748 (1987).

41. FEDERAL BUREAU OF INVESTIGATION, HANDBOOK OF FORENSIC SCIENCE ix (rev. ed. 1994); 28 C.F.R. § 0.85(g) (2000) (authorizing the FBI lab "to provide, without cost, technical and scientific assistance, . . . for all duly constituted law enforcement agencies, . . . which may desire to avail themselves of the service").

42. Joseph Peterson et al., *The Capabilities, Uses, and Effects of the Nation's Criminalistics Laboratories*, 30 J. FORENSIC SCI. 10, 13 (1985).

43. 470 U.S. 68 (1985). Ake's attorney requested a psychiatric evaluation at state expense to prepare an insanity defense. The trial court refused, and although insanity was the only contested issue at trial, no psychiatrist testified on this issue. *Id.* at 72.

at trial.⁴⁴ The importance of *Ake* is self-evident. The first National Academy of Sciences Report on DNA evidence commented: "Because of the potential power of DNA evidence, authorities must make funds available to pay for expert witnesses" ⁴⁵

Nevertheless, a number of sources indicate that the lack of defense experts continues to be a problem.⁴⁶ In 1990, the *National Law Journal* published the results of a six-month investigation of capital murder defenses in the South. One of the "key findings" concerned defense experts: "Judges routinely deny lawyers' requests for expert/investigative fees."⁴⁷ Another article reported that in "DNA cases in Oklahoma and Alabama, . . . the defense did not retain any experts, because the presiding judge had refused to authorize funds."⁴⁸ In addition, a 1992 study of indigent defense systems noted that the "greatest disparities occur in the areas of investigators and expert witnesses, with the prosecutors possessing more resources."⁴⁹

44. We hold that when a defendant has made a preliminary showing that his sanity at the time of the offense is likely to be a significant factor at trial, the Constitution requires that a State provide access to a psychiatrist's assistance on this issue, if the defendant cannot otherwise afford one.
Id. at 74.

45. NATIONAL RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE 149 (1992). The report also includes the following passage: "Defense counsel must have access to adequate expert assistance, even when the admissibility of the results of analytical techniques is not in question, because there is still a need to review the quality of the laboratory work and the interpretation of the results." *Id.* at 147.

46. See KELLY & WEARNE, *supra* note 24, at 27 ("Experts cost money; the vast majority of defendants don't have it, and the courts are often reluctant to spend it by authorizing the funds to pay for a defense expert. The result has been what some experts have termed an economic presumption of guilt."); STEPHEN A. SALTZBURG & DANIEL J. CAPRA, AMERICAN CRIMINAL PROCEDURE 802 (6th ed. 2000) ("Generally speaking the courts have read *Ake* narrowly, and have refused to require appointment of an expert unless it is absolutely essential to the defense.").

47. Marcia Coyle et al., *Fatal Defense: Trial and Error in the Nation's Death Belt*, NAT'L L.J., June 11, 1990, at 30. As part of the investigation, sixty death row trial lawyers were interviewed. "54.2% felt courts provided inadequate investigation and expert funds." *Id.* at 40. One attorney, who was appointed to represent a death row inmate in Georgia, had his request for the appointment of an expert denied. He commented, "There's an economic presumption of guilt The district attorney has all the resources of the state crime lab, and we have to go hat in hand to the judge and the DA on every request." *Id.* at 38. See also *A Study of Representation in Capital Cases in Texas*, 56 TEX. B.J. 333, 408 (Apr. 1993) (Report of The Spangenberg Group prepared for the Texas State Bar) ("There is a serious underfunding of essential expert services and other expenses in capital trials and appeals.").

48. Peter J. Neufeld & Neville Colman, *When Science Takes the Witness Stand*, 262 SCI. AM. 46, 53 (May 1990). See also *Dubose v. State*, 662 So. 2d 1189, 1192-93 (Ala. 1995) (discussing *Ake* violations for failure to provide indigent defendant with funds for DNA expert); *Prater v. State*, 820 S.W.2d 429, 439 (Ark. 1991) (finding reversible error where the trial judge denied motion for appointment of defense expert because no available funds).

49. R. HANSON, INDIGENT DEFENDERS: GET THE JOB DONE AND DONE WELL 100 (1992) (study by the National Center for State Courts).

VI. INADEQUATE DISCOVERY

The criminal justice system cannot adequately deal with scientific evidence without pretrial discovery, and good science is the antithesis of "trial by ambush." Nevertheless, pretrial discovery of expert testimony is far more extensive in civil than in criminal cases.⁵⁰ Discovery depositions and interrogatories are not available in criminal trials in the overwhelming majority of jurisdictions. Timothy Spencer was the first person executed based on DNA evidence.⁵¹ Yet, when the defense sought discovery of the prosecution expert's "work notes," which formed the basis of his report, the motion was denied, and the Virginia Supreme Court upheld this ruling.⁵² There are other DNA discovery cases in which the denial of discovery was upheld.⁵³

VII. UNVALIDATED EXPERT TESTIMONY

In *Kumho Tire Co. v. Carmichael*⁵⁴ the United States Supreme Court declared that the

objective of [*Daubert's* gatekeeping] requirement is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.⁵⁵

Unfortunately, the "practices" in some fields of forensic science are seriously deficient. In many areas little systematic research has been conducted to validate the field's basic premises and techniques, and often there is no justifiable reason why such research would not be feasible.

50. See Paul C. Giannelli, *Criminal Discovery, Scientific Evidence, and DNA*, 44 VAND. L. REV. 791, 821-25 (1991).

51. *Murderer Put to Death in Virginia: First U.S. Execution Based on DNA Tests*, N.Y. TIMES, Apr. 28, 1994.

52. *Spencer v. Commonwealth*, 384 S.E.2d 785, 791 (Va. 1989) (reaffirming "[t]here is no general constitutional right to discovery in a criminal case'") (citations omitted).

53. E.g., *State v. Dykes*, 847 P.2d 1214 (Kan. 1993) (holding that denial of request for the data base used to determine DNA match did not deny a fair trial; defense argued that accused's "substantial" Cherokee ancestry made this data important); *Sadler v. State*, 846 P.2d 377 (Okla. Crim. App. 1993) (finding prosecution's failure to turn over "inconclusive" DNA report did not violate due process).

54. 526 U.S. 137 (1999).

55. *Id.* at 152.

A. Questioned Document Examinations

In 1995 a federal district court in *United States v. Starzecpyzel*⁵⁶ concluded that “the testimony at the *Daubert* hearing firmly established that forensic document examination, despite the existence of a certification program, professional journals and other trappings of science, cannot, after *Daubert*, be regarded as ‘scientific . . . knowledge.’”⁵⁷ The court further stated that “while scientific principles may *relate* to aspects of handwriting analysis, they have little or nothing to do with the day-to-day tasks performed by [Forensic Document Examiners] [T]his attenuated relationship does not transform the FDE into a scientist.”⁵⁸

Nevertheless, the court did not exclude handwriting comparison testimony.⁵⁹ Instead, it admitted the testimony as based on “technical” knowledge.⁶⁰ This controversy has been exhaustively covered in other articles,⁶¹ but the critical point for present purposes is not in dispute—empirical validation is possible but is only beginning to be done.

B. Hair Comparisons

In the past courts have upheld the admissibility of hair evidence under *Frye*.⁶² After *Daubert* was decided, however, the district court in *Williamson v. Reynolds*,⁶³ a federal habeas case, took a closer look at hair comparison evidence. There, an expert testified that hair samples were “microscopically consistent.”⁶⁴ The expert then went on to explain what this meant: “In other words, hairs are not an absolute identification, but they either came from this individual or there “could be another individual somewhere in the world that would have the same characteristics to their hair.”⁶⁵ The district court noted that the “expert did not explain which of the ‘approximately’ 25 characteristics were consistent, any standards for determining whether the

56. 880 F. Supp. 1027 (S.D.N.Y. 1995).

57. *Id.* at 1038.

58. *Id.* at 1041.

59. *Id.* at 1049.

60. The court also approved a jury instruction, which stated that “FDEs offer practical, rather than scientific expertise.” *Id.*

61. See, e.g., Paul Giannelli & Edward Imwinkelried, *Forensic Science: Handwriting Comparison*, 35 CRIM. L. BULL. 517 (1999); D. Michael Risinger et al., *Brave New “Post-Daubert World”—A Reply to Professor Moenssens*, 29 SETON HALL L. REV. 405 (1998).

62. E.g., *People v. Watkins*, 259 N.W.2d 381, 385 (Mich. App. 1977).

63. *Williamson v. Reynolds*, 904 F. Supp. 1529, 1558 (E.D. Okla. 1995), *aff’d on other grounds*, 110 F.3d 1508, 1523 (10th Cir. 1997).

64. *Id.* at 1554 (quoting from the trial court record).

65. *Id.*

samples were consistent, how many persons could be expected to share this same combination of characteristics, or how he arrived at his conclusions.”⁶⁶ Moreover, the district court professed that it had “been unsuccessful in its attempts to locate *any* indication that expert hair comparison testimony meets *any* of the requirements”⁶⁷ of *Daubert*. The court observed: “Although the hair expert may have followed procedures accepted in the community of hair experts, the human hair comparison results in this case were, nonetheless, scientifically unreliable.”⁶⁸ Finally, as is often the case, the prosecutor exacerbated the problem by stating in closing argument, “[T]here’s a match.”⁶⁹ Even the state court of criminal appeals misinterpreted the evidence, writing that the “[h]air evidence placed [petitioner] at the decedent’s apartment.”⁷⁰ The district court decision was subsequently reversed because due process, not *Daubert*, provided the controlling standard for habeas review.⁷¹ The defendant, however, was later exonerated by exculpatory DNA evidence, and as Scheck and his colleagues observe, “[t]he hair evidence was patently unreliable.”⁷²

Unfortunately, later cases—even in *Daubert* jurisdictions—have not continued the type of scrutiny displayed by the district court in *Williamson*. For example, in *Johnson v. Commonwealth*⁷³ the Kentucky Supreme Court upheld the admissibility of hair evidence.⁷⁴ Indeed, because hair comparison evidence had been accepted by Kentucky courts and other states’ courts, it held that courts could take judicial notice that hair comparison evidence was scientifically reliable.⁷⁵ Judicial notice typically extends only to *indisputable*

66. *Id.*

67. *Id.* at 1558.

68. *Id.*

69. *Id.* at 1557 (quoting from the trial record).

70. *Id.* (quoting state court)

71. *Williamson v. Ward*, 110 F.3d 1508, 1522-23 (10th Cir. 1997).

72. SCHECK, ET AL., *supra* note 18, at 146.

Not until December 1985, three years after the murder, did the state finish its first report on the hair examination. A trained hair man named Melvin Hett concluded that thirteen hairs found around the victim’s body appeared to have come from the head and pubis of Dennis Fritz. Another four hairs from the murder scene were linked to Ron Williamson. By itself, though, the hair report was not strong enough to prove capital murder.

Id. at 134.

73. 12 S.W.3d 258 (Ky. 1999). The court also wrote: “Under *Daubert*, adopted by this Court . . . the *Frye* test of general acceptance is but one factor to be considered in determining the admissibility of scientific evidence under FRE (or KRE) 702.” *Id.* at 261.

74. *Id.* at 263-64.

75. *Id.* at 262-63. The dissent believed that hair comparison evidence should have been scrutinized in accordance with *Daubert*, that the level of acceptance of scientific techniques can change over time, and that judicial notice “should be reserved for the rare occasion when the

facts.⁷⁶ Similarly, the Hawaii Supreme Court, another court that has adopted *Daubert*, ruled that “[b]ecause the scientific principles and procedures underlying hair and fiber evidence are well-established and of proven reliability, the evidence in the present case can be treated as ‘technical knowledge.’ Thus, an independent reliability determination was unnecessary.”⁷⁷

What we know about hair comparisons is this: they are often misused.⁷⁸ In one case, the expert testified that the crime scene hair sample “was unlikely to match anyone” other than the defendant, Edward Honaker.⁷⁹ This conclusion was a gross overstatement. At best, the expert could have testified that the crime-scene hairs were “consistent with” the defendant’s exemplars, which means that they could have come from Honaker or thousands of other people. Honaker spent ten years in prison before being exonerated by DNA analysis. Indeed, another hair examiner would later opine that “the hairs were *not* comparable.”⁸⁰ “Roger Coleman was executed in 1992 for a slaying in rural Virginia.”⁸¹ The same expert who had testified against Honaker also testified against Coleman—and in the same

evidence sought to be admitted is seemingly beyond dispute, such as, for example, evidence that the sun rises every day in the east, or acknowledgment of the law of gravity.” *Id.* at 267 (Stumbo, J., dissenting).

76. FED. R. EVID. 201(b) (judicially noticed fact is one not subject to reasonable dispute). See 2 EDWARD J. IMWINKELRIED ET AL., *COURTROOM CRIMINAL EVIDENCE* ch. 30 (3d ed. 1998).

77. *State v. Fukusaku*, 946 P.2d 32, 44 (Haw. 1997); see also *McGrew v. State*, 682 N.E.2d 1289, 1292 (Ind. 1997) (holding hair comparison admissible, finding that it was “more a ‘matter of observation by persons with specialized knowledge’ than a matter of scientific principles”); *McCarty v. State*, 904 P.2d 110, 125 (Okla. Crim. App. 1995) (upholding the admissibility of hair comparison evidence).

78. See, e.g., Clive A. Stafford Smith & Patrick D. Goodman, *Forensic Hair Comparison Analysis: Nineteenth Century Science or Twentieth Century Snake Oil?*, 27 COLUM. HUM. RTS. L. REV. 227 (1996) (exploring the validity of hair comparison analysis).

79. CONNORS, ET AL., *supra* note 19, at 58; see also HARLAN LEVY, *AND THE BLOOD CRIED OUT: A PROSECUTOR’S SPELLBINDING ACCOUNT OF THE POWER OF DNA* 153 (1996) (acknowledging that “[t]here was no question that the state hair expert [at Honaker’s trial] had overstated the distinctiveness of the hair recovered from the victim’s shorts in his trial testimony”).

80. JOHN TUCKER, *MAY GOD HAVE MERCY: A TRUE STORY OF CRIME AND PUNISHMENT* 345 (1997).

With the cooperation of a conscientious prosecutor, Kate Germond had the hairs reexamined by one of the world’s leading experts on hair analysis and DNA tests performed on sperm found on a vaginal swab taken from the victim at the time of the rape. The hair expert said that in his opinion the hairs were *not* comparable, and the DNA analysis proved beyond doubt that Honaker was not the rapist.

Id.

81. *Id.*

manner.⁸² The United States Supreme Court ruled that a lawyer's mistake in filing Coleman's state collateral appeal (one day late) precluded federal habeas review.⁸³ Serious questions about Coleman's innocence have been raised, and the prosecution's use of the hair evidence was, to say the least, suspect.⁸⁴ While conducting research for his book on the *Coleman* case, John Tucker interviewed the trial judge:

Years later, in response to the author's question about what evidence in the case he thought had the most powerful impact on the jury, Judge Persin said it was Elmer Gist's testimony about the comparison of the pubic hairs. It was, Judge Persin observed, the first and only testimony that seemed to tie Roger Coleman to the murder specifically.⁸⁵

As Tucker correctly notes: "A finding of consistency is highly subjective, and experts may and often do disagree about such a finding."⁸⁶ Nevertheless, at trial the prosecutor "described, with great emphasis, the scientific evidence, and especially the comparison of the pubic hairs, asserting that 'it would be extremely unlikely that anyone else would have hair that would be consistent with this hair.'"⁸⁷ Unfortunately for Coleman, the defense counsel failed to challenge this statement.⁸⁸ Tucker describes the testimony as follows:

82. *Id.* ("In October 1994, after nearly ten years in prison, Edward Honaker was released. The state forensic expert who had testified in 1985 that the hairs were comparable and unlikely to have come from anyone other than Honaker was Elmer Gist.")

83. *Coleman v. Thompson*, 501 U.S. 722, 727, 757 (1991).

84. See TUCKER, *supra* note 80, at 34-35; see also Stuart Taylor, Jr., *Was An Innocent Man Executed?*, AM. LAW. (Dec. 1997) ("I'd put the odds that Coleman was innocent somewhere above fifty-fifty. . . . The state's hair evidence was shown (after the trial) to be far from probative and far from reliable."); Ronald J. Tabak, *Death Penalty Be Not Proud*, 84 A.B.A. J. 80 (Jan. 1998) (reviewing Tucker's book and noting that "defense counsel did not seriously challenge a highly dubious hair comparison that greatly influenced the jury. The lawyer who dealt with the evidence had never examined a hair expert before.")

85. See TUCKER, *supra* note 80, at 75. "According to Gist, he had microscopically compared the pubic hair found on Wanda McCoy with those removed from Roger Coleman on March 13, and they were 'consistent.'" *Id.* at 51.

Unlike fingerprints, hairs are not positive identifiers, and unlike blood types, there is no scientifically accepted figure for the number or percentage of people whose hair is "consistent" with one another. . . . But as Jack Davidson and Mickey McGlothlin knew, or would soon find out, Elmer Gist had often testified, and would surely testify again, that it is "possible, but unlikely" that consistent hairs could come from different people.

Id.

86. *Id.*

87. *Id.* at 63 (quoting the prosecuting attorney).

88. *Id.* at 64 ("The scientific evidence was ignored altogether, leaving unchallenged McGlothlin's exaggerated claim about the importance of the pubic hairs.")

Nor did [the expert] compare the pubic hairs found on Wanda [the victim] with anyone other than Coleman and Wanda herself—not even her husband Brad. Nevertheless, when he asserted that he had made a comparison of those hairs with Roger’s pubic hair, and that the hairs were “consistent” with each other, meaning, he said, that it was “possible, but unlikely” that the hairs found on Wanda could have come from anyone other than Roger Coleman, the jurors exchanged glances and settled back in their seats.⁸⁹

Two points are noteworthy. First, there is an obvious (and embarrassing) lack of empirical validation in this context. Second, the courts talk of “judicial notice” of hair evidence, the “reliability” of hair evidence, and the “general acceptance” of hair evidence without specifying any limitations. “General acceptance” in the scientific community that an examiner may validly testify that hair evidence is “consistent with” the accused’s hair is a world away from “general acceptance” that a positive identification is possible—and yet such an important qualification is rarely specified in the cases.

VIII. CIVIL CASES

The above issues typically do not arise in civil litigation. The problems associated with expert and scientific evidence in civil trials are quite different. A commonly-cited issue in civil cases concerns “hired guns.”⁹⁰ This can, no doubt, be a problem in some criminal cases, but the extensive use of government-employed crime laboratory personnel and medical examiners significantly reduces prosecution reliance on outside experts, and inadequate funding for the defense precludes the problem of selling testimony to the “highest bidder.”⁹¹

Another prominent issue in civil cases involves causation in toxic tort litigation, as in *Daubert*. Causation is rarely an issue in criminal law—typically, it is limited to the cause of death in homicide prosecutions. Moreover, the toxic tort cases raise policy issues above and beyond the reliability of expert testimony. If litigation indeed drove an effective drug, such as Bendectin, from the market, even in the absence of valid scientific evidence that it caused birth defects,⁹² serious public health issues are raised.

89. *Id.* at 76.

90. See Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113.

91. *In re Air Crash Disaster at New Orleans*, 795 F.2d 1230, 1234 (5th Cir. 1986) (“[E]xperts whose opinions are available to the highest bidder have no place testifying in a court of law.”).

92. See HUBER, *supra* note 15, ch. 7 (discussing Bendectin).

Similarly, even if no scientific evidence establishes a causal link between silicone breast implants and connective tissue disease, the fact that a drug company failed to conduct any tests on its product until litigation commenced raises countervailing policy issues.⁹³ These types of concerns are simply not part of criminal trials.

IX. CONCLUSION

The *Daubert* decision contained a number of ambiguities. One concerned whether *Daubert* liberalized the standard for admissibility. There is some language in the opinion that pointed in this direction,⁹⁴ and a number of courts have adopted this position.⁹⁵ The polygraph cases are a good example. In *United States v. Posado*,⁹⁶ the Fifth Circuit stated that “the rationale underlying this circuit’s per se rule against admitting polygraph evidence did not survive *Daubert*.”⁹⁷

There is, however, language in *Daubert* that pointed the other way,⁹⁸ particularly the Court’s emphasis on the “gatekeeper” function of the trial court.⁹⁹ The federal cases that reexamined handwriting (*United States v.*

93. Rebecca Dresser et al., *Breast Implants Revisited: Beyond Science on Trial*, 1997 Wis. L. REV. 705.

94. See *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 590 (1993):

Given the Rules’ permissive backdrop and their inclusion of a specific rule on expert testimony that does not mention “general acceptance,” the assertion that the Rules somehow assimilated *Frye* is unconvincing. *Frye* made “general acceptance” the exclusive test for admitting expert scientific testimony. That austere standard, absent from, and incompatible with the Federal Rules of Evidence, should not be applied in federal trials.

95. E.g., *United States v. Kwong*, 69 F.3d 663, 668 (2d Cir. 1995) (polygraph) (“The Federal Rules of Evidence, although concededly more liberal than the *Frye* test, still require a determination that the proffered scientific evidence is both relevant and reliable.”); *Borawick v. Shay*, 68 F.3d 597, 610 (2d Cir. 1995) (“[B]y loosening the strictures on scientific evidence set by *Frye*, *Daubert* reinforces the idea that there should be a presumption of admissibility of evidence.”); *United States v. Bonds*, 12 F.3d 540, 568 (6th Cir. 1993) (“We find that the DNA testimony easily meets the more liberal test set out by the Supreme Court in *Daubert*.”).

96. 57 F.3d 428 (5th Cir. 1995).

97. *Id.* at 429.

98. See *Daubert*, 509 U.S. at 590:

[I]n order to qualify as “scientific knowledge,” an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation—i.e., “good grounds,” based on what is known. In short, the requirement that an expert’s testimony pertain to “scientific knowledge” establishes a standard of evidentiary reliability.

99. *Id.* at 592-93. In *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 142 (1997), the Court commented: “Thus, while the Federal Rules of Evidence allow district courts to admit a somewhat

Starzecpyzel)¹⁰⁰ and hair analysis (*Williamson v. Reynolds*)¹⁰¹ undercut the notion that *Daubert* is a more permissive standard. By the time *Kumho* was decided, a federal district court would conclude that *Kumho* “plainly invit[es] a reexamination even of ‘generally accepted’ venerable, technical fields.”¹⁰² For the reasons outlined in this essay, I welcome this much needed and long overdue scrutiny of scientific evidence in criminal prosecution.

broader range of scientific testimony than would have been admissible under *Frye*, they leave in place the ‘gatekeeper’ role of the trial judge in screening such evidence.” (emphasis added).

100. 880 F. Supp. 1027 (S.D.N.Y. 1995).

101. 904 F. Supp. 1529, 1554-58 (E.D. Okla. 1995).

102. *United States v. Hines*, 55 F.Supp. 2d 62, 67 (D. Mass. 1999). As a result, expert testimony concerning the general similarities and differences between a defendant’s handwriting exemplar and a stick up note was admissible but not the specific conclusion that the defendant was the author, because such an opinion lacked empirical validation. *Id.* at 67-71.