

The Supreme Court's "Criminal" *Daubert* Cases

Paul C. Giannelli*

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* Weatherhead Professor of Law, Case Western Reserve University. J.D., 1970, LL.M., 1975, University of Virginia; M.S. in Forensic Science, 1973, George Washington University.

To put the point more bluntly: if the state does not test the scientific evidence with which it seeks to convict defendants, it should forfeit the right to use it.¹

I. INTRODUCTION

In the process of establishing a new standard for determining the admissibility of scientific evidence under Federal Rule 702, the Supreme Court in *Daubert v. Merrell Dow Pharmaceutical, Inc.*² handed down what is perhaps the most important evidence case ever decided.³ The Court followed with *General Electric Co. v. Joiner*⁴ and *Kumho Tire Co. v. Carmichael*⁵ to make up what is now known as the *Daubert* trilogy.

One unexpected development has been *Daubert's* disparate impact in civil and criminal cases. The notion that expert testimony in criminal and civil cases should be treated differently does not seem, at least to me, to be a remarkable proposition. The issues are very different. Instead of worrying about the “hired gun” phenomenon as in civil litigation,⁶ the criminal defense lawyer often lacks money for any “gun.”⁷ Moreover, the causation issues that loom so large in toxic tort cases are seldom an issue in criminal prosecutions,⁸ and the termination of the litigation before trial

¹ MIKE REDMAYNE, EXPERT EVIDENCE AND CRIMINAL JUSTICE 139 (2001).

² 509 U.S. 579 (1993).

³ See *United States v. Alatorre*, 222 F.3d 1098, 1100 (9th Cir. 2000) (“*Daubert* has become ubiquitous in federal trial courts.”); see also *United States v. Barnette*, 211 F.3d 803, 815 (4th Cir. 2000) (“In *Daubert*, the Supreme Court radically changed the standard for admissibility of scientific testimony.”).

⁴ 522 U.S. 136 (1997).

⁵ 526 U.S. 137 (1999).

⁶ See *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.”); see also *Chaulk v. Volkswagen of Am., Inc.*, 808 F.2d 639, 644 (7th Cir. 1986) (“There is hardly anything, not palpably absurd on its face, that cannot now be proved by some so-called ‘experts.’”). For an insightful discussion of the “hired gun” problem, see Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113.

⁷ See Peter J. Neufeld & Neville Colman, *When Science Takes the Witness Stand*, 262 SCI. AM. 46, 50 (1990) (“In DNA cases in Oklahoma and Alabama, . . . the defense did not retain any experts, because the presiding judge had refused to authorize funds.”). See generally 1 PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, SCIENTIFIC EVIDENCE §§ 4-1 to 4-5 (3d ed. 1999) (discussing the right to defense experts).

⁸ Causation is an issue with some crimes, such as homicide, and sometimes the medical cause of death is an issue—for example, in a “shaken baby” syndrome case. See *People v. Cauley*, 32 P.3d 602 (Colo. Ct. App. 2001).

through summary judgment is not a concern.⁹

What is remarkable about the civil-criminal dichotomy is that civil litigants have far greater discovery rights than criminal practitioners even though it is well accepted that pretrial disclosure is critical.¹⁰ Not only are discovery depositions and interrogatories unavailable, but a defendant in a death penalty case involving DNA can be precluded from seeing an expert's lab notes before trial.¹¹

What is also remarkable is that stricter admissibility standards would apply in civil cases than in criminal cases.¹² It is difficult to imagine a federal court in a toxic tort case that would allow a plaintiff's attorney to admit evidence that passed for "science" in a recent fingerprint case. In *United States v. Havvard*,¹³ the court accepted testimony by a FBI expert that: (1) there is a "zero error" rate in fingerprint examinations,¹⁴ (2) peer review under *Daubert* means a second examiner looks at the prints,¹⁵ and (3) adversarial

⁹ See LLOYD DIXON & BRIAN GILL, RAND INST. OF CIV. JUSTICE, CHANGES IN THE STANDARDS OF ADMITTING EXPERT EVIDENCE IN FEDERAL CIVIL CASES SINCE THE *DAUBERT* DECISION xvi (2002) ("Challenges also increasingly resulted in summary judgment.").

¹⁰ The ABA Standards note that the "need for full and fair disclosure is especially apparent with respect to scientific proof and the testimony of experts. This sort of evidence is practically impossible for the adversary to test or rebut at trial without an advance opportunity to examine it closely." Commentary, ABA STANDARDS RELATING TO DISCOVERY AND PROCEDURE BEFORE TRIAL 66 (Approved Draft 1970); see also Paul C. Giannelli, *Criminal Discovery, Scientific Evidence, and DNA*, 44 VAND. L. REV. 791 (1991).

¹¹ *Spencer v. Commonwealth*, 384 S.E.2d 785, 791 (Va. 1989); see also *Murderer Put to Death in Virginia: First U.S. Execution Based on DNA Tests*, N.Y. TIMES, Apr. 28, 1994, at A19 (reporting Spencer's execution).

¹² As one commentator has noted, "the heightened standards of dependability imposed on expertise proffered in civil cases has continued to expand, but . . . expertise proffered by the prosecution in criminal cases has been largely insulated from any change in pre-*Daubert* standards or approach." D. Michael Risinger, *Navigating Expert Reliability: Are Criminal Standards of Certainty Being Left on the Dock?*, 64 ALB. L. REV. 99 (2000). This issue is not new. The first Bush Administration, by executive order, imposed high standards for the admissibility of expert testimony in civil cases, while federal prosecutors were permitted to argue for lower standards in DNA cases. See Paul C. Giannelli, "Junk Science": *The Criminal Cases*, 84 J. CRIM. L. & CRIMINOLOGY 105 (1993).

¹³ 117 F. Supp. 2d 848, 855 (S.D. Ind. 2000) (stating that fingerprint identification satisfies standards announced in *Daubert* and *Kumho*; the court described this expertise as "the very archetype of reliable expert testimony under those standards"), *aff'd*, 260 F.3d 597 (7th Cir. 2001).

¹⁴ *Id.* at 854 ("The government claims the error rate for the method is zero."). There is an important distinction between not knowing the error rate because systematic testing has not been conducted and a zero error rate.

¹⁵ The court noted that a second qualified fingerprint examiner verified the conclusion and thus there was "review" by a "peer." *Id.* at 854 ("In fact, peer review is the standard operating procedure among latent print examiners."). In contrast, peer review under *Daubert* means the publication of data in "refereed scientific

testing is the equivalent of scientific testing.¹⁶ How can federal courts demand stringent epidemiological studies in toxic tort cases¹⁷ and then accept such vacuous reasoning in criminal cases?

Other examples are not hard to find. Many of the wrongful conviction cases involved hair comparison evidence. In *Williamson v. Reynolds*,¹⁸ a district court correctly noted that the hair expert's testimony lacked any scientific support.¹⁹ Nevertheless, the Tenth Circuit reversed on this issue.²⁰ Williamson was later exonerated by DNA profiling, and the hair evidence was shown to be "patently

journals." It is a screening mechanism and only the first step, followed by publication and then replication by other scientists. "Good science" is a commonly accepted term used to describe the scientific community's system of quality control which protects the community and those who rely upon it from unsubstantiated scientific analysis. It mandates that each proposition undergo a rigorous trilogy of publication, replication and verification before it is relied upon." Brief of Amicus Curiae New England Journal of Medicine *et al.* at 2, *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993) (No. 92-102) (supporting Merrell Dow).

¹⁶ *Havvard* found that latent print identification had been "tested" for nearly 100 years in adversarial proceedings with the highest possible stakes. In contrast, *Daubert-Kumho* requires scientific testing. The *Daubert* Court wrote:

[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.

Daubert, 509 U.S. at 590. *General Electric Co. v. Joiner* illustrates this point. That case involved a toxic tort issue—whether PCB's caused small cell lung cancer. The Supreme Court examined epidemiological and animal studies in upholding the trial court's decision to exclude expert testimony. See *Joiner*, 522 U.S. at 153-54.

¹⁷ See *Rider v. Sandoz Pharm. Corp.*, 295 F.3d 1194, 1202 (11th Cir. 2002) ("The district court, after finding that the plaintiffs' evidence was unreliable, noted that certain types of other evidence may have been considered reliable, including peer-reviewed epidemiological literature, a predictable chemical mechanism, general acceptance in learned treatises, or a very large number of case reports."); see also Jerome P. Kassierer & Joe S. Cecil, *Inconsistency in Evidentiary Standards for Medical Testimony: Disorder in the Courts*, 288 JAMA 1382, 1382 (2002) ("In some instances, judges have excluded medical testimony on cause-and-effect relationships unless it is based on published, peer-reviewed, epidemiologically sound studies, even though practitioners rely on other evidence of causality in making clinical decisions, when such studies are not available.").

¹⁸ 904 F. Supp. 1529, 1554 (E.D. Okla. 1995), *rev'd on this issue*, 110 F.3d 1508, 1523 (10th Cir. 1997).

¹⁹ The district court had "been unsuccessful in its attempts to locate any indication that expert hair comparison testimony meets any of the requirements of *Daubert*." *Williamson*, 904 F. Supp. at 1558. The court further 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." *Id.*

²⁰ 110 F.3d 1508, 1523 (10th Cir. 1997) (ruling that the due process, not *Daubert*, standard applies in habeas proceedings).

unreliable."²¹ In *Coleman v. Commonwealth*,²² another expert testified that the chances that a crime scene hair sample could come from someone other than the defendant was "possible, but unlikely."²³ Once again, this statement lacks any empirical basis. After Coleman's execution, serious questions concerning his guilt were raised.²⁴ The same hair expert testified in the same manner at Edward Honeker's trial, and Honeker was later exonerated by DNA.²⁵ Despite all this, later cases continued to admit this suspect evidence.²⁶ Indeed, one court judicially noticed the reliability of hair evidence,²⁷ implicitly finding this fact indisputable.²⁸ There is an embarrassing lack of empirical validation for this "well-accepted" technique.²⁹ In a recent

²¹ BARRY SCHECK ET AL., ACTUAL INNOCENCE: FIVE DAYS TO EXECUTION AND OTHER DISPATCHES FROM THE WRONGLY CONVICTED 146 (2000).

²² 307 S.E.2d 864 (Va. 1983).

²³ See JOHN TUCKER, MAY GOD HAVE MERCY: A TRUE STORY OF CRIME AND PUNISHMENT 51 (1997).

²⁴ See *id.* at 75. The trial judge was later interviewed about the case:

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.

Id.; see also *Coleman*, 307 S.E.2d at 867; Stuart Taylor, Jr., *Was An Innocent Man Executed?*, AM. LAW., Dec. 1997, at 40 ("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."). The Virginia Supreme Court has refused to grant media requests for new DNA tests on evidence from Coleman's trial. *Globe Newspaper Co. v. Commonwealth*, 570 S.E.2d 809, 813 (Va. 2002). The Boston Globe, Washington Post, Richmond Times-Dispatch, The Virginian-Pilot, and Centurion Ministries—a charitable organization that investigates wrongful conviction claims—filed a claim asking that biological evidence in the case be analyzed with modern DNA techniques.

²⁵ See EDWARD CONNORS ET AL., CONVICTED BY JURIES, EXONERATED BY SCIENCE: CASE STUDIES IN THE USE OF DNA EVIDENCE TO ESTABLISH INNOCENCE AFTER TRIAL 65 (1996).

²⁶ *E.g.*, *State v. Fukusaku*, 946 P.2d 32, 44 (Haw. 1997) ("Because 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."); *McGrew v. State*, 682 N.E.2d 1289, 1292 (Ind. 1997) (observing that hair comparison is 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) (admitting hair evidence).

²⁷ See *Johnson v. Commonwealth*, 12 S.W.3d 258, 262 (Ky. 1999).

²⁸ See FED. R. EVID. 201(b) (limiting judicial notice to facts that are not subject to reasonable dispute); see also *Daubert*, 509 U.S. at 593 n.11 ("[T]heories that are so firmly established as to have attained the status of scientific law, such as the laws of thermodynamics, properly are subject to judicial notice under Fed. Rule Evid. 201.").

²⁹ See Paul C. Giannelli & Emmie West, *Hair Comparison Evidence*, 37 CRIM. L. BULL. 514 (2001) (discussing the DNA exoneration cases in which hair evidence was

FBI study comparing the results of microscopic hair examinations and mitochondrial DNA analysis, the former were wrong 10% of the time—and this was when the conclusion was limited to an “association” (“consistent with” testimony).³⁰

Daubert is now a decade old, and its development and impact is the subject of this symposium. Part II of this article examines the transformation of *Daubert* from a case that most courts and commentators believed lowered the barriers to the admissibility of scientific evidence to one that a decade later the Court itself would describe as establishing an “exacting” standard.³¹ Part III reviews what I call the Supreme Court’s “criminal” *Daubert* cases. Although the *Daubert* trilogy all involve civil litigation, the Court decided several cases, both before and after *Daubert*, that involved expert testimony in criminal litigation. All these cases involved constitutional issues and hence are not directly comparable to *Daubert*, which involved the interpretation of a federal statute.³² Moreover, these cases all turn on different constitutional rights: cruel and unusual punishment,³³ the right of confrontation,³⁴ the right to preserve defense evidence,³⁵ and the right to present a defense.³⁶ Nevertheless, all involved the use of expert testimony, and all raised reliability issues in one form or another, and in this respect they share a common theme with *Daubert*. One additional point: the defendant lost in each case, and I will argue that in each the Court missed an important opportunity to impose the kind of “exacting” standards in criminal prosecutions that are now required in civil litigation.³⁷

used to convict the innocent); *see also* Clive A. Smith & Patrick A. Goodman, *Forensic Hair Comparison Analysis: Nineteenth Century Science or Twentieth Century Snake Oil?*, 27 COLUM. HUM. RTS. L. REV. 227, 231 (1996) (“If the purveyors of this dubious science cannot do a better job of validating hair analysis than they have done so far, forensic hair comparison analysis should be excluded altogether from criminal trials.”).

³⁰ Max M. Houch & Bruce Budowle, *Correlation of Microscopic and Mitochondrial DNA Hair Comparisons*, 47 J. FORENSIC SCI. 964, 966 (2002) (“Of the 80 hairs that were microscopically associated, nine comparisons were excluded by mtDNA analysis.”).

³¹ *Weisgram v. Marley Co.*, 528 U.S. 440, 455 (2000).

³² *Daubert*, 509 U.S. at 587 (“We interpret the legislatively enacted Federal Rules of Evidence as we would any statute.”).

³³ *Barefoot v. Estelle*, 463 U.S. 880 (1983); *see infra* text accompanying notes 113-26.

³⁴ *Delaware v. Fensterer*, 474 U.S. 15 (1985); *see infra* text accompanying notes 71-89.

³⁵ *Arizona v. Youngblood*, 488 U.S. 51 (1988); *see infra* text accompanying notes 90-112.

³⁶ *United States v. Scheffer*, 523 U.S. 303 (1998); *see infra* text accompanying notes 127-46.

³⁷ Compare DIXON & GILL, *supra* note 9, at xiii (“The rise that took place in both the proportion of evidence found unreliable and the proportion of challenged

Part IV assesses *Daubert's* effect in criminal cases. Although its impact is far less than in civil cases, it is still significant. Moreover, *Daubert* was only one of several developments that influenced the use of expert testimony in criminal prosecutions during the last decade. As described in Part V, DNA litigation and scientific evidence abuse cases have also played a part. Part VI sets forth recommendations for improving forensic science.

II. DAUBERT'S TRANSFORMATION

A. *Daubert v. Merrell Dow Pharmaceutical, Inc.*

In many ways, *Daubert* was a difficult opinion to interpret even at the time it was handed down. As one commentary observed, "[a]stonishingly, all parties expressed satisfaction with the *Daubert* decision—the lawyers for the plaintiff and defense, and scientists who wrote amicus briefs."³⁸ This alone should have raised red flags.

In particular, some initial reviews questioned whether the opinion provided much guidance. "The catch," as one commentator observed, "is that no one is exactly sure what the new standard is."³⁹ A central question was whether the Supreme Court intended its new reliability standard to be more permissive than the *Frye* "general acceptance" test⁴⁰ that it had rejected. There is much language in the *Daubert* opinion that pointed in this direction. For example, the Court commented:

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.⁴¹

evidence excluded suggests that the standards for admitting evidence have tightened."), with Jennifer L. Goscup et al., *The Effects of Daubert on the Admissibility of Expert Testimony in State and Federal Criminal Cases*, 9 PSYCHOL. PUB. POL'Y & L. 339, 364 (2002) ("[T]he *Daubert* decision did not impact on the admission rates of expert testimony at either the trial or the appellate levels.").

³⁸ Kenneth R. Foster et al., *Policy Forum: Science and the Toxic Tort*, 261 SCIENCE 1509, 1614 (1993); see also Bert Black & John A. Singer, *From Frye to Daubert: A New Test for Scientific Evidence*, 1 SHEPARD'S EXPERT & SCI. EVID. Q. 19, 39 (1993) ("Both plaintiff and defense lawyers have claimed victory in *Daubert*.").

³⁹ See David O. Stewart, *A New Test: Decision Creates Uncertain Future for Admissibility of Expert Testimony*, 79 A.B.A. J. 48 (1993).

⁴⁰ *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923).

⁴¹ *Daubert*, 509 U.S. at 589.

Other passages noted that “[t]he Rule’s basic standard of relevance . . . is a liberal one”⁴² and “a rigid ‘general acceptance’ requirement would be at odds with the ‘liberal thrust’ of the Federal Rules and their ‘general approach of relaxing the traditional barriers to ‘opinion’ testimony.”⁴³

Not surprisingly, a number of courts construed *Daubert* as lowering the admissibility bar. In *Borawick v. Shay*,⁴⁴ the Second Circuit wrote that “by loosening the strictures on scientific evidence set by *Frye*, *Daubert* reinforces the idea that there should be a presumption of admissibility of evidence.”⁴⁵ Similarly, in *United States v. Bonds*,⁴⁶ the Sixth Circuit explained “that the DNA testimony easily meets the more liberal test set out by the Supreme Court in *Daubert*.”⁴⁷ The polygraph cases also underscore this view. In *United States v. Posado*,⁴⁸ the Fifth Circuit stated that “the rationale underlying this circuit’s *per se* rule against admitting polygraph evidence did not survive *Daubert*.”⁴⁹ Other circuits followed,⁵⁰ and in this altered climate, some district courts admitted polygraph results.⁵¹

Furthermore, the methodology-conclusion distinction that was so prominent in *Daubert* further supported a lax standard of admissibility. The Court wrote: “The focus, of course, must be solely on principles and methodology, not on the conclusions that they

⁴² *Id.* at 587.

⁴³ *Id.* at 588 (quoting *Beech Aircraft Corp. v. Rainey*, 488 U.S. 153, 169 (1988)). There is, of course, language in *Daubert* that points toward a more exacting standard. See *supra* note 16 (quoting *Daubert*, 509 U.S. at 590). Moreover, there is the “gatekeeper” language, which also supports a more restrictive view. *Daubert*, 509 U.S. at 592-93.

⁴⁴ 68 F.3d 597 (2d Cir. 1995) (repressed memory).

⁴⁵ *Id.* at 610.

⁴⁶ 12 F.3d 540 (6th Cir. 1993).

⁴⁷ *Id.* at 568; see also *State v. Doriguzzi*, 760 A.2d 336, 341 (N.J. Super. Ct. App. Div. 2000) (“Although *Frye* has been replaced in the federal court system in favor of the more lenient standards of Federal Rule of Evidence 702 as set forth in *Daubert* . . . in New Jersey, with the exception of toxic tort litigation, *Frye* remains the standard.”); *Commonwealth v. Crews*, 640 A.2d 395, 400 n.2 (Pa. 1994) (“*Daubert* relaxes, somewhat, the impediments to admission of novel scientific evidence.”).

⁴⁸ 57 F.3d 428 (5th Cir. 1995).

⁴⁹ *Id.* at 429.

⁵⁰ See *United States v. Cordoba*, 104 F.3d 225, 227-28 (9th Cir. 1997) (noting that its former *per se* rule of exclusion is inconsistent with *Daubert*); see also *United States v. Call*, 129 F.3d 1402, 1404 (10th Cir. 1997).

⁵¹ See *United States v. Padilla*, 908 F. Supp. 923 (S.D. Fla. 1995) (admitting polygraph evidence offered by the defense); *State Farm Fire & Cas. Co.*, 897 F. Supp. 299 (W.D. La. 1995) (admitting polygraph evidence in a civil case); *United States v. Crumby*, 895 F. Supp. 1354 (D. Ariz. 1995); *United States v. Galbreth*, 908 F. Supp. 877 (D.N.M. 1995). See generally Paul C. Giannelli, *Polygraph Evidence Post-Daubert*, 49 HASTINGS L.J. 895 (1998).

generate.”⁵² Consequently, the trial judge reviews only the expert’s methods, *not* the expert’s conclusion.⁵³

B. General Electric Co. v. Joiner

The Supreme Court’s second case, *General Electric Co. v. Joiner*,⁵⁴ on first reading, would also seem to support the theme of liberal admissibility. The Court ruled that the appellate standard for reviewing a trial court’s admissibility decision under *Daubert* was an abuse-of-discretion,⁵⁵ a standard adopted without even considering the principal alternative standard: *de novo* review.⁵⁶ The Court’s standard suggests that admissibility decisions would not be second guessed on appeal—giving the trial court more leeway in admitting evidence. In contrast, a *de novo* review standard would have given appellate courts more authority to control junk science.

On further inspection, however, several aspects of *Joiner* caution against this reading. First, the evidence was excluded, not admitted. Second, the Court went beyond the question accepted for review and applied the standard without remand to the court of appeals.⁵⁷

⁵² *Daubert*, 509 U.S. at 595; *see also* State v. Merwin, 962 P.2d 1026, 1030 (Idaho 1998) (“Even under the holding in *Daubert*, the focus of the court’s inquiry is ‘on the principles and methodology, not on the conclusions that they generate.’”).

⁵³ *See* Kenneth J. Cheseboro, *Taking Daubert’s “Focus” Seriously: The Methodology/Conclusion Distinction*, 15 CARDOZO L. REV. 1745 (1994).

⁵⁴ 522 U.S. 136 (1997).

⁵⁵ *Id.* at 146-47. The Court wrote:

We hold, therefore, that abuse of discretion is the proper standard by which to review a district court’s decision to admit or exclude scientific evidence. We further hold that, because it was within the District Court’s discretion to conclude that the studies upon which the experts relied were not sufficient, whether individually or in combination, to support their conclusions that Joiner’s exposure to PCBs contributed to his cancer, the District Court did not abuse its discretion in excluding their testimony.

Id.

⁵⁶ Other courts have taken a different approach to the standard of review issue. For example, the Massachusetts Supreme Court has stated that “[i]n considering the issue of scientific validity, our review is *de novo* because a trial judge’s conclusion will have applicability beyond the facts of the case before him.” *Commonwealth v. Vao Sok*, 683 N.E.2d 671, 677 (Mass. 1997); *see also* David L. Faigman, *Appellate Review of Scientific Evidence Under Daubert and Joiner*, 48 HASTINGS L.J. 969 (1997) (arguing for *de novo* review).

⁵⁷ *See* Michael H. Gottesman, *From Barefoot to Daubert to Joiner: Triple Play or Double Error?*, 40 ARIZ. L. REV. 753, 766 (1998) (“Had the Court stopped there and remanded the case as defendants had requested, its decision would have been uncontroversial. However, although it had already answered the only question presented, the Court went on to hand the defendants a victory greater than they had sought.”).

Interestingly, the Chief Justice, who in his *Daubert* concurrence, voiced considerable discomfort with the capability of federal judges to understand scientific concepts such as “falsifiability” and who was concerned that they would be turned into amateur scientists,⁵⁸ had apparently overcome these fears and revealed no hesitation in reviewing epidemiological and animal studies in *Joiner*. Third, the “methodology-conclusion” dichotomy, so critical in *Daubert*, was drawn into question. The *Joiner* Court remarked that nothing in *Daubert* “requires a district court to admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered.”⁵⁹ In other words, the dichotomy is not as easy to apply as suggested in *Daubert*. Finally, the Court commented that “while the Federal Rules of Evidence allow district courts to admit a *somewhat* 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.”⁶⁰ The term “somewhat” is riveting. The language in *Daubert* (quoted above) suggested that a heck of a lot more evidence would be admissible under *Daubert* than under *Frye*.

In hindsight, at least, *Joiner* was a transitional case, moving from a liberal standard of admissibility as suggested in *Daubert*, to an exacting standard as noted a decade later.⁶¹

C. *Kumho Tires Co. v. Carmichael*

Kumho Tires Co. v. Carmichael,⁶² the third case in the *Daubert* trilogy, removed any doubts about the Court’s intended direction.⁶³

⁵⁸ *Daubert*, 509 U.S. at 600-01 (Rehnquist, C.J., concurring). The Chief Justice commented:

I defer to no one in my confidence in federal judges; but I am at a loss to know what is meant when it is said that the scientific status of a theory depends on its “falsifiability,” and I suspect some of them will be, too. I do not doubt that Rule 702 confides to the judge some gatekeeping responsibility in deciding questions of the admissibility of proffered expert testimony. But I do not think it imposes on them either the obligation or the authority to become amateur scientists in order to perform that role.

Id.

⁵⁹ 522 U.S. at 146.

⁶⁰ *Id.* at 142 (emphasis added).

⁶¹ See *Weisgram v. Marley Co.*, 528 U.S. 440, 455 (2000).

⁶² 526 U.S. 137 (1999).

⁶³ At the end of the day, the Court had upheld the exclusion of the proffered expert testimony in all three cases. In *Daubert*, the Court remanded. On remand, the court of appeals again excluded the evidence, and the Supreme Court denied

First, the Court extended *Daubert*'s reliability requirement to nonscientific testimony under Rule 702.⁶⁴ In the aftermath of *Daubert*, litigators quickly understood that they might avoid the *Daubert* reliability requirement by simply relabeling their evidence from “scientific” to “technical.” The Court had to shut this door or *Daubert*'s impact would have been restricted to a narrow category of cases.

Second, the Court acknowledged the relevance of the *Daubert* factors in determining reliability in this context.⁶⁵ In other words, these factors were not limited to “scientific” evidence; they might apply to all expert testimony. This may turn out to be the more critical aspect of the case. Other courts had concluded that the reliability requirement applied to nonscientific expert testimony but had adopted extremely lenient standards for such evidence. For example, the Hawaii Supreme Court had ruled that:

because the underlying scientific principles and procedures are of proven validity/reliability, it is unnecessary to subject technical

certiorari. 43 F.3d 1311 (9th Cir.), *cert. denied*, 516 U.S. 869 (1995).

⁶⁴ The Court concluded that “*Daubert*'s general holding—setting forth the trial judge's general ‘gatekeeping’ obligation—applies not only to testimony based on ‘scientific’ knowledge, but also to testimony based on ‘technical’ and ‘other specialized’ knowledge.” *Kumho*, 526 U.S. at 141. To support its conclusion, the Court noted that: (1) Rule 702 did not distinguish between “scientific” knowledge and “technical” or “other specialized knowledge”; (2) *Daubert*'s gatekeeping rationale was not limited to scientific knowledge; and (3) “it would prove difficult, if not impossible, for judges to administer evidentiary rules under which a gatekeeping obligation depended upon a distinction between ‘scientific’ knowledge and ‘technical’ or ‘other specialized’ knowledge.” *Id.* at 148.

⁶⁵ In determining the admissibility of technical or other specialized knowledge, the Court held that the trial court “*may* consider one or more of the specific factors that *Daubert* mentioned when doing so will help determine that testimony's reliability.” *Id.* at 141. The Court characterized the *Daubert* inquiry as “flexible” and noted:

[W]e can neither rule out, nor rule in, for all cases and for all time the applicability of the factors mentioned in *Daubert*, nor can we now do so for subsets of cases categorized by category of expert or by kind of evidence. . . . *Daubert* itself is not to the contrary. It made clear that its list of factors was meant to be helpful, not definitive. Indeed, those factors do not all necessarily apply even in every instance in which the reliability of scientific testimony is challenged. It might not be surprising in a particular case, for example, that a claim made by a scientific witness has never been the subject of peer review, for the particular application at issue may never previously have interested any scientist. Nor, on the other hand, does the presence of *Daubert*'s general acceptance factor help show that an expert's testimony is reliable where the discipline itself lacks reliability, as, for example, do theories grounded in any so-called generally accepted principles of astrology or necromancy.

Id. at 150-51.

knowledge to the same type of full-scale reliability determination required for scientific knowledge. Thus, although technical knowledge, like all expert testimony, must be both relevant and reliable, its reliability may be presumed.⁶⁶

Although the court ruled that technical expert testimony must be reliable, it undercut the significance of that ruling by treating technical evidence as presumptively admissible. The court effectively shifted the burden of proof on the reliability requirement to the opposing party. *Kumho* rejected this approach. Consequently, the reliability requirement is not only wide but it is deep.

The Court confirmed this view in *Weisgram v. Marley Co.*⁶⁷ while reviewing a summary judgment in a wrongful death action against a manufacturer of an allegedly defective baseboard heater. Although expert testimony was involved, the Court was not required to elaborate further on the *Daubert-Kumho* standard. Nevertheless, the Court did remark: “Since *Daubert*, moreover, parties relying on expert evidence have had notice of the exacting standards of reliability such evidence must meet.”⁶⁸ Here, the “liberal” standard of the Federal Rules has been explicitly replaced by an “exacting” standard.⁶⁹ As one district court observed, the Supreme Court in *Daubert* and *Kumho* “is plainly inviting a reexamination even of ‘generally accepted’ venerable, technical fields.”⁷⁰

⁶⁶ State v. Fukusaku, 946 P.2d 32, 43 (Haw. 1997).

⁶⁷ 528 U.S. 440 (2000).

⁶⁸ *Id.* at 455; see also *Brooke Group, Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 242 (1993) (“When an expert opinion is not supported by sufficient facts to validate it in the eyes of the law, or when indisputable record facts contradict or otherwise render the opinion unreasonable, it cannot support a jury’s verdict.”).

⁶⁹ See *United States v. Horn*, 185 F. Supp. 2d 530, 553 (D. Md. 2002). The court determined that:

Under *Daubert*, therefore, it was expected that it would be easier to admit evidence that was the product of new science or technology. In practice, however, it often seems as though the opposite has occurred—application of *Daubert/Kumho* *Tire* analysis results in the exclusion of evidence that might otherwise have been admitted under *Frye*.

Id.; see also *Kassierer & Cecil*, *supra* note 17, at 1383 (“In the *Daubert* case . . . the Supreme Court rejected the deferential standard of the *Frye* Rule in favor of a more assertive standard that required courts to determine that expert testimony was well grounded in the methods and procedures of science.”).

⁷⁰ *United States v. Hines*, 55 F. Supp. 2d 62, 67 (D. Mass. 1999); see also *infra* notes 149-60.

III. SUPREME COURT'S CRIMINAL "DAUBERT" CASES

As noted earlier, the Supreme Court decided a number of criminal procedure cases dealing with expert evidence between 1983 and 2000. Although these cases all involved constitutional issues, I argue that reliability concerns are embedded in each and thus a rough comparison with *Daubert-Kumho* is possible.

A. Delaware v. Fensterer

In *Delaware v. Fensterer*,⁷¹ a 1985 decision, the Supreme Court considered a confrontation challenge involving the basis of expert testimony. Fensterer was charged with the murder of his live-in fiancée whose body was discovered at a shopping center parking lot. The prosecution contended that Fensterer had strangled the victim in their apartment with a cat leash. The government's case rested on circumstantial evidence. Two hairs on the leash were similar to the victim's hair, and an FBI analyst testified that one of the two hairs had been "forcibly removed." The prosecution argued that the hair had been dislodged during the strangulation. According to the Delaware Supreme Court, the expert's testimony "established the leash as the murder weapon" and "[t]he leash belonged to Fensterer and [the victim]."⁷²

The FBI expert testified that there are three methods to determine whether hair has been forcibly removed but could not remember which method he had used in reaching his conclusion.⁷³ He testified: "As to the exact manner in which this particular hair was forcibly removed, I don't know. I have no indication in my notes other than the fact it was forcibly removed."⁷⁴

On appeal, the Delaware Supreme Court ruled that the FBI expert's lack of memory precluded the defense from effectively testing the basis for his opinion by cross-examination. This, the court reasoned, violated the accused's confrontation rights because a

⁷¹ 474 U.S. 15 (1985).

⁷² State v. Fensterer, 493 A.2d 959, 964 (Del. 1985).

⁷³ The three methods are as follows: (1) The presence of a follicular tag on the hair, (2) the presence of an elongated and misshaped root, and (3) the presence of a sheath of skin surrounding the root area.

⁷⁴ 493 A.2d at 963 (quoting record of trial). A defense expert vigorously challenged the proposition that the presence of a follicular tag indicated forcible removal. He maintained that "scientific authority contradicted" this theory. *Id.* at 964. The defense expert further testified that he had telephoned the FBI expert who had stated that his opinion rested on the "follicular tag" theory. The defense expert testified "that he had spoken by telephone with [the prosecution expert], who advised him that his conclusion of forcible removal was based on the presence of the follicular tag." *Fensterer*, 474 U.S. at 17.

Special Agent from the FBI “can appear to be a highly credible person to the average lay jury”⁷⁵ and effective cross-examination depends on the expert’s committing himself to a basis for his opinion. “Without an acknowledgment of the basis of his opinion, defense counsel’s cross-examination of the Agent was nothing more than an exercise in futility.”⁷⁶

The United States Supreme Court disagreed and reversed per curiam—without briefs or argument.⁷⁷ According to the Court, “the Confrontation Clause guarantees an *opportunity* for effective cross-examination, not cross-examination that is effective in whatever way, and to whatever extent, the defense might wish.”⁷⁸ On remand, however, the Delaware Supreme Court again held the opinion inadmissible but on evidentiary, rather than constitutional, grounds. According to that court: “While a witness’s mere lack of memory as to a particular fact may go only to the weight of that evidence, an expert witness’s inability to establish a sufficient basis for his opinion clearly renders the opinion inadmissible under D.R.E. 705.”⁷⁹

In a later case, *United States v. Owens*,⁸⁰ the United States Supreme Court, citing *Fensterer*, applied the same rationale to a lay witness’s memory lapse.⁸¹ However, the two cases could have easily been

⁷⁵ *Fensterer*, 493 A.2d at 964.

⁷⁶ *Id.*

⁷⁷ Justice Marshall dissented “from this summary disposition, which has been ordered without affording the parties prior notice or an opportunity to file briefs on the merits.” 474 U.S. at 23 (Marshall, J., dissenting). Justice Blackmun also voted for “plenary consideration,” as did Justice Stevens, who referred to the case as “novel.” *Id.*

⁷⁸ *Id.* at 20. Later in the opinion the Court returned to this point, writing that “the Confrontation Clause is generally satisfied when the defense is given a full and fair opportunity to probe and expose . . . infirmities through cross-examination, thereby calling to the attention of the factfinder the reasons for giving scant weight to the witness’ testimony.” *Id.* at 22. The Court held that a sufficient opportunity was provided at trial because the defense counsel’s cross-examination “demonstrated to the jury that [the expert] could not even recall the theory on which his opinion was based. Moreover, through its own expert witness, the defense was able to suggest to the jury that [the FBI expert] had relied on a theory which the defense expert considered baseless.” *Id.* at 20.

⁷⁹ *Fensterer v. State*, 509 A.2d 1106, 1109-10 (Del. 1986).

⁸⁰ 484 U.S. 554 (1988).

⁸¹ *Id.* at 559-60. A hospitalized witness, suffering from a fractured skull, identified Owens as his attacker and picked his picture from a photo array. At trial, the witness testified about the attack, including his hospital identification of Owens. On cross-examination, however, he admitted that he could not remember seeing his assailant. The Supreme Court held that the witness’s impaired memory did not deprive Owens of the right of cross-examination. According to the Court, the Confrontation Clause guarantees only an opportunity for effective cross-examination. This right is satisfied when the defendant has the opportunity to

distinguished. It is one thing to acknowledge that we often can do little to prevent memory lapses of lay witnesses (which resulted from a severe beating in *Owens*); it is quite another thing to say the same about an expert. There is no valid reason, legal or scientific, that justifies the failure to document forensic analyses. The American Society of Crime Laboratory Directors recommends it,⁸² as did the first DNA report published by the National Academy of Sciences.⁸³

Contrast *Fensterer* with *Daubert*'s language concerning the scientific method: “Proposed testimony must be supported by appropriate validation—*i.e.*, ‘good grounds,’ based on what is known.”⁸⁴ Compare *Fensterer* with *Kumho Tire* where the Court wrote: “*Daubert* pointed out that Federal Rules 702 and 703 grant expert witnesses testimonial latitude unavailable to other witnesses on the ‘assumption that the expert’s opinion will have a reliable basis in the knowledge and experience of his discipline.’”⁸⁵ Is there anything less scientific than failing to record test results?⁸⁶

bring out such matters as a witness’s faulty memory.

⁸² The American Society of Crime Laboratory Directors (ASCLD) issued guidelines on casework documentation and reporting. Proper documentation requires a system of note keeping that records the basis for any findings, conclusions, and interpretations, and the retention of all notes, charts, photographs, or diagrams. “The documentation should be such that a knowledgeable analyst or supervisor, in the absence of the primary analyst, would be able to evaluate and interpret the data.” ASCLD, *Guidelines for Forensic Laboratory Management Practices*, 14 CRIME LABORATORY DIG. 39, 43 (Apr. 1987). Competent laboratory reports must include (1) an “accurate summary of significant material contained in the case notes,” (2) “interpretive information as well as examination results wherever possible,” and (3) identification of “the analyst(s) and, if appropriate, the testing methodology.” *Id.*

⁸³ NAT’L RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE 104-05 (1992) [hereinafter DNA TECHNOLOGY]. The report concluded that:

The ideal program would contain mechanisms to ensure that: . . . Case records—such as notes, worksheets, autoradiographs, and population databanks—and other data or records that support examiners’ conclusions are prepared, retained by the laboratory, and made available for inspection on court order after review of the reasonableness of a request.

Id.

⁸⁴ *Daubert*, 509 U.S. at 590.

⁸⁵ *Kumho*, 526 U.S. at 148 (quoting *Daubert*, 509 U.S. at 592). *Fensterer* can also be compared to amended Rule 702, which requires that expert testimony be “based upon sufficient facts or data.” FED. R. EVID. 702(1).

⁸⁶ Georgia Supreme Court Justice George T. Smith criticized the practice as follows:

It is an insult to intelligent people to say that a scientific test was conducted from which absolutely no notes or records survive. . . . A basic principle of scientific testing is that careful records of test procedure and results are to be scrupulously maintained. A scientific test without an accompanying report of the testing environment, number of trials, raw results and analyzed data is in reality no test at all.

Moreover, had *Fensterer* been decided the other way the chief beneficiary in the long run may have been the prosecution because its experts would have been required to have supporting documentation, and perhaps the Inspector General's 1997 Report on the FBI laboratory would not have needed to recommend that adequate case files be required.⁸⁷

Proper documentation can also preclude a number of abuses. The Journal of Forensic Sciences, the official publication of the American Academy of Forensic Sciences, published a symposium on the ethical responsibilities of forensic scientists in 1989.⁸⁸ One article discussed a number of laboratory reporting practices, including (1) "preparation of reports containing minimal information in order not to give the 'other side' ammunition for cross-examination," (2) "reporting of findings without an interpretation on the assumption that if an interpretation is required it can be provided from the witness box," and (3) "[o]mitting some significant point from a report to trap an unsuspecting cross-examiner."⁸⁹ These practices could be curbed, if not eliminated, by the implementation of proper documentation requirements.

B. Arizona v. Youngblood

In the 1970s, courts began to extend the *Brady* doctrine⁹⁰ to the preservation of evidence.⁹¹ In addition to due process, the right of

Law v. State, 307 S.E.2d 904, 908 (Ga. 1983) (Smith, J., dissenting).

⁸⁷ U.S. DEP'T OF JUSTICE, OFFICE OF INSPECTOR GENERAL, THE FBI LABORATORY: AN INVESTIGATION INTO LABORATORY PRACTICES AND ALLEGED MISCONDUCT IN EXPLOSIVES-RELATED AND OTHER CASES (1997) [hereinafter FBI LABORATORY]. "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 examiner's data and analysis. We encountered the problem of incomplete or missing documentation in many case files." *Id.*, pt. 1, at 25.

⁸⁸ Symposium, *Ethical Conflicts in the Forensic Sciences*, 34 J. FORENSIC SCI. 717-93 (1989).

⁸⁹ Douglas M. Lucas, *The Ethical Responsibilities of the Forensic Scientist: Exploring the Limits*, 34 J. FORENSIC SCI. 719, 724 (1989). Lucas was the Director of the Centre of Forensic Sciences for the Ministry of the Solicitor General, Toronto, Ontario.

⁹⁰ In *Brady v. Maryland*, 373 U.S. 83 (1963), the Supreme Court recognized the prosecution's constitutional duty to disclose exculpatory evidence. The Court wrote: "[T]he suppression by the prosecution of evidence favorable to an accused upon request violates due process where the evidence is material either to guilt or to punishment, irrespective of the good faith or bad faith of the prosecution." *Id.* at 87.

⁹¹ See generally 3 WAYNE LAFAVE ET AL., CRIMINAL PROCEDURE § 19.5(h) (3d ed. 1999); Che H. Lee, Comment, *The Prosecution's Duty to Preserve Evidence Before Trial*, 72 CAL. L. REV. 1019 (1984); Comment, *Judicial Response to Government Loss or Destruction of Evidence*, 39 U. CHI. L. REV. 542 (1972).

preservation may be supported by the compulsory process⁹² and right of confrontation guarantees.⁹³ The right of preservation was extensively litigated in scientific evidence cases. Defendants successfully argued that this right had been violated by the prosecution's failure to preserve drugs,⁹⁴ bullets,⁹⁵ a fingertip,⁹⁶ blood,⁹⁷ urine,⁹⁸ and trace metal detection results,⁹⁹ as well as physical evidence of arson,¹⁰⁰ rape,¹⁰¹ and homicide.¹⁰² Nevertheless, the scope of the right remained uncertain.

In *Arizona v. Youngblood*,¹⁰³ the Supreme Court addressed the

⁹² See *Gov't of V.I. v. Testamark*, 570 F.2d 1162, 1166 (3d Cir. 1978) ("Loss or destruction of relevant evidence . . . may also deny a defendant the right to compulsory process."); Peter Westen, *The Compulsory Process Clause*, 73 MICH. L. REV. 71, 174-75 n.485 (1974) ("The government's failure to preserve material evidence in the defendant's favor . . . violates his right of compulsory process because it precludes him from effectively producing the evidence in court.").

⁹³ See *Johnson v. State*, 249 So. 2d 470, 472 (Fla. Dist. Ct. App. 1971) (confrontation right to reexamine incriminatory bullet); *People v. Taylor*, 369 N.E.2d 573, 576 (Ill. App. Ct. 1977) (confrontation and due process rights to preservation of heroin for independent examination).

⁹⁴ *E.g.*, *People v. Clements*, 661 P.2d 267, 273 (Colo. 1983) (failure to preserve nondangerous materials used to manufacture drugs violates due process); *People v. Gomez*, 596 P.2d 1192, 1197 (Colo. 1979) (consumption of heroin in unnecessary tests violates due process); *Stipp v. State*, 371 So. 2d 712 (Fla. Dist. Ct. App. 1979) (consumption of cocaine); *People v. Dodsworth*, 376 N.E.2d 449, 451 (Ill. App. Ct. 1978) (consumption of MDMA); *People v. Taylor*, 369 N.E.2d 573, 576 (Ill. App. Ct. 1977) (consumption of heroin); *Green v. Commonwealth*, 684 S.W.2d 13, 16 (Ky. 1984) (consumption of drugs); *People v. Wagstaff*, 484 N.Y.S.2d 264, 266 (App. Div. 1985) (destruction of marijuana).

⁹⁵ See *Johnson v. State*, 249 So. 2d 470, 472 (Fla. Dist. Ct. App. 1971).

⁹⁶ See *People v. Morgan*, 606 P.2d 1296, 1298 (Colo. 1980).

⁹⁷ See *People v. Collins*, 730 P.2d 293, 297-99 (Colo. 1986); see also *People v. Garries*, 645 P.2d 1306, 1308 (Colo. 1982); *State v. Swanson*, 722 P.2d 1155, 1158 (Mont. 1986); *State v. Kersting*, 623 P.2d 1095, 1103-04 (Or. App. 1981); *State v. Lovato*, 617 P.2d 169, 171 (N.M. Ct. App. 1980).

⁹⁸ See *People v. Moore*, 666 P.2d 419, 423 (Cal. 1983).

⁹⁹ See *People ex rel. Gallagher v. District Court*, 656 P.2d 1287, 1292 (Colo. 1983).

¹⁰⁰ See *State v. Hannah*, 583 P.2d 888, 889 (Ariz. 1978) (inadvertent destruction of arson evidence violates due process).

¹⁰¹ See *Hilliard v. Spalding*, 719 F.2d 1443, 1447 (9th Cir. 1983) (failure to preserve sperm sample); *Deberry v. State*, 457 A.2d 744, 747 (Del. 1983) (failure to preserve clothing for blood analysis violates *Brady*); *State v. Havas*, 601 P.2d 1197, 1198 (Nev. 1979) (failure to preserve victim's clothing required dismissal).

¹⁰² See *People v. Sheppard*, 701 P.2d 49 (Colo. 1985) (vehicle destroyed); see also *State v. Wright*, 557 P.2d 1, 67 (Wash. 1976) (victim's clothing destroyed); *People v. Harmes*, 560 P.2d 470, 473 (Colo. 1976) (failure to preserve videotape of alleged assault violated due process).

¹⁰³ 488 U.S. 51 (1988). In an earlier case, *California v. Trombetta*, 467 U.S. 479 (1984), the Supreme Court ruled that due process did not require the preservation of additional breath samples as part of intoxication testing. According to the Court:

Whatever duty the Constitution imposes on the States to preserve

issue in a case involving the failure to preserve semen in a sexual assault case. The evidence was critical.¹⁰⁴ While bad faith is not a requirement in the *Brady* suppression cases, the Supreme Court nevertheless ruled it determinative in a failure to preserve situation. The Court added: “The failure of the police to refrigerate the clothing and to perform tests on the semen samples can at worst be described as negligent.”¹⁰⁵

Some courts have found “bad faith destruction,”¹⁰⁶ while

evidence, that duty must be limited to evidence that might be expected to play a significant role in the suspect’s defense. To meet this standard of constitutional materiality, . . . [the] evidence must both possess an exculpatory value that was apparent before the evidence was destroyed, and also be of such a nature that the defendant would be unable to obtain comparable evidence by other reasonably available means.

Id. at 488-89. The Court held that neither of these conditions was satisfied. Given the reliability of the intoxilyzer, “breath samples were much more likely to provide inculpatory [rather] than exculpatory evidence.” *Id.* at 489. Moreover, alternative methods of attacking intoxilyzer results were available; the defendant had the right under state law to inspect the intoxilyzer, the right to introduce evidence to show possible interference with the machine’s measurements, and the right to cross-examine the police concerning operator error. *Id.* at 490. *Youngblood* differed from *Trombetta*, however. A serious crime was involved in the former, not a DUI prosecution. Moreover, *Youngblood* concerned the preservation of evidence already in the police’s possession, not the preservation of evidence that the police would not ordinarily retain.

¹⁰⁴ Dissenting, Justice Blackmun wrote:

But we do know several important things about the evidence. First, the semen samples on the clothing undoubtedly came from the assailant. Second, the samples could have been tested, using technology available and in use at the local police department, to show either the blood type of the assailant, or that the assailant was a nonsecreter, *i.e.*, someone who does not secrete a blood-type “marker” into other body fluids, such as semen. Third, the evidence was clearly important. A semen sample in a rape case where identity is questioned is always significant. Fourth, a reasonable police officer should have recognized that the clothing required refrigeration. Fifth, we know that an inconclusive test was done on the swab. The test suggested that the assailant was a nonsecreter, although it was equally likely that the sample on the swab was too small for accurate results to be obtained. And, sixth, we know that respondent is a secreter. If the samples on the clothing had been tested, and the results had shown either the blood type of the assailant or that the assailant was a nonsecreter, its constitutional materiality would be clear.

Id. at 68 (citations omitted) (Blackmun, J., dissenting).

¹⁰⁵ *Id.* at 58.

¹⁰⁶ *E.g.*, *United States v. Bohl*, 25 F.3d 904, 906 (10th Cir. 1994) (Government denied defendants “a meaningful opportunity to present a defense by intentionally disposing of potentially exculpatory and highly probative evidence in the face of [defendants’] repeated requests for pretrial access to that evidence”); *United States v. Cooper*, 983 F.2d 928, 932 (9th Cir. 1993) (bad faith destruction of

numerous courts have not.¹⁰⁷ This is not surprising since the standard is a difficult one to satisfy.¹⁰⁸ Indeed, the *Youngblood* approach was so out-of-line with notions of basic fairness that an overwhelming number of state courts have rejected it as a matter of state constitutional law.¹⁰⁹ The Alabama Supreme Court, for instance, has

methamphetamine lab equipment violates due process); *People v. Walker*, 628 N.E.2d 971, 973 (Ill. App. Ct. 1993) (determining that destruction of clothing satisfies the demanding *Youngblood* test and finding items that were destroyed within six weeks of the crime were based on improper authorization); *State v. Jordan*, 597 N.E.2d 1165, 1169 (Ohio Ct. App. 1992) ("[B]y destroying and then substituting other evidence and securing indictments based upon it, the police actions in themselves constituted a [due process] violation . . .").

¹⁰⁷ *E.g.*, *Villafuerte v. Stewart*, 111 F.3d 616, 625 (9th Cir. 1997) ("Nor did the failure to conduct tests on the semen sample violate Villafuerte's due process rights. The record contains no evidence that the semen sample could have had exculpatory value which was apparent at the time the officers failed to perform the tests."); *Jones v. McCaughtry*, 965 F.2d 473, 477-78 (7th Cir. 1992) (failure to preserve non-motile sperm); *Paradis v. Arave*, 954 F.2d 1483, 1488-89 (9th Cir. 1992) (panties negligently lost); *United States v. McKie*, 951 F.2d 399, 403 (D.C. Cir. 1991) (crack cocaine lost after lab tests); *United States v. Sandoval*, 913 F. Supp. 494, 497 (S.D. Tex. 1995) ("[T]here is no indication . . . that the agents destroyed the marijuana to circumvent disclosure requirements or for any other improper motive."); *State v. Baldwin*, 618 A.2d 513, 522 (Conn. 1993) (mistaken destruction of narcotic vials); *State v. Dulaney*, 493 N.W.2d 787, 791 (Iowa 1992) (routine destruction of blood sample); *State v. Mabe*, 412 S.E.2d 386, 388 (S.C. 1991) (destruction of cocaine).

¹⁰⁸ See generally Note, *The Role of Police Culprability in Leon and Youngblood*, 76 VA. L. REV. 1213, 1223 n.59 (1990) ("Of course, there is the additional difficulty of proving that the police knew the evidence to be exculpatory. Few officers will be willing to admit they destroyed evidence they knew to be exculpatory.")

¹⁰⁹ In *State v. Morales*, 657 A.2d 585 (Conn. 1995), the Connecticut Supreme Court recognized that:

Apparently only Arizona and California . . . have concluded that their state charters offer the same limited degree of protection as the federal constitution. Like our sister states, we conclude that the good or bad faith of the police in failing to preserve potentially useful evidence [semen stains that could have been tested for DNA] cannot be dispositive of whether a criminal defendant has been deprived of due process of law. Accordingly, we, too, reject the litmus test of bad faith on the part of the police, which the United States Supreme Court adopted under the federal constitution in *Youngblood*.

Id. at 594 n.20; see, e.g., *Thorne v. Department of Public Safety*, 774 P.2d 1326, 1331 n.9 (Alaska 1989) ("We have construed the Alaska Constitution's Due Process Clause to not require a showing of bad faith."); *State v. Matafeo*, 787 P.2d 671, 673 (Haw. 1990) (bad faith test too restrictive because it precludes courts "in cases where no bad faith is shown, from inquiring into the favorableness of the evidence or the prejudice suffered by the defendant as a result of its loss"); *Commonwealth v. Henderson*, 582 N.E.2d 496, 497 (Mass. 1991) ("The rule under the due process provisions of the Massachusetts Constitution is stricter than that stated in the *Youngblood* opinion."); *State v. Osakalumi*, 461 S.E.2d 504, 512 (W. Va. 1995) ("As a matter of state constitutional law, we find that fundamental fairness requires this Court to evaluate the State's failure to preserve potentially exculpatory evidence in the context of the entire record."); *State v. Delisle*, 648 A.2d 632, 643 (Vt. 1994)

recognized an exception to the bad faith test where the evidence is so critical to the defense as to make a criminal trial without it “fundamentally unfair.”¹¹⁰ The court applied this exception in a toxic waste dumping prosecution where the sole evidence, the samples tested, was not preserved. Similarly, the Delaware Supreme Court rejected *Youngblood* and set forth a three-pronged analysis: (1) the degree of negligence or bad faith involved; (2) the importance of the missing evidence, considering the probative value and reliability of secondary or substitute evidence that remains available; and (3) the sufficiency of the other evidence used at trial to sustain the conviction.¹¹¹

The *Youngblood* test provides no incentive for police departments to adopt standard operating procedures that ensure the proper collection and preservation of evidence. Larry Youngblood was later exonerated through DNA testing—after having spent nine years in prison. Dr. Edward Blake, a DNA scientist, told a reporter:

We now have before us a flawed legal precedent that stands on the shoulders of an innocent man. . . . For those organizations that are poorly run or mismanaged or don’t give a damn, . . . the Youngblood case was a license to let down their guard and be lazy. The effect that had was generally to lower the standards of evidence collection.¹¹²

C. Barefoot v. Estelle

Barefoot v. Estelle,¹¹³ a capital murder case decided by the Court in 1983, is the case most closely related to *Daubert*. In the penalty phase,

(*Youngblood* decision “too narrow because it limits due process violations to only those cases in which a defendant can demonstrate bad faith, even though the negligent loss of evidence may critically prejudice a defendant”).

¹¹⁰ *Ex parte Gingo*, 605 So. 2d 1237, 1241 (Ala. 1992); see also *Gurley v. State*, 639 So. 2d 557 (Ala. Crim. App. 1993) (failure to preserve murder victim’s wallet for defense testing violates state constitution).

¹¹¹ *Hammond v. State*, 569 A.2d 81, 87 (Del. 1989). The *Hammond* court did not foreclose the possibility of conviction despite the state’s failure to properly preserve evidence:

We remain convinced that fundamental fairness, as an element of due process, requires the State’s failure to preserve evidence that could be favorable to the defendant “[to] be evaluated in the context of the entire record. . . .” When evidence has not been preserved, the conduct of the State’s agents is a relevant consideration, but it is not determinative.

Id. (internal citation omitted).

¹¹² Barbara Whiteaker, *DNA Frees Inmate Years After Justices Rejected Plea*, N.Y. TIMES, Aug. 11, 2000, at A12.

¹¹³ 463 U.S. 880 (1983). For a further discussion of *Barefoot*, see Giannelli, *supra* note 12.

the prosecution offered psychiatric testimony concerning Barefoot's future dangerousness.¹¹⁴ 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."¹¹⁵ Barefoot challenged the admission of this evidence on constitutional grounds due to its unreliability.

In an *amicus* brief, the American Psychiatric Association (APA) stated that the "large body of research in this area indicates that, even under the best of conditions, psychiatric predictions of long-term dangerousness are wrong in at least two out of every three cases."¹¹⁶ In a later passage, the brief noted that the "unreliability of [these] predictions is by now an established fact within the profession."¹¹⁷ A substantial body of research supported the APA position.¹¹⁸

Nevertheless, the Court rejected Barefoot's argument. According to the Court, "[n]either petitioner nor the [APA] suggests that psychiatrists are always wrong with respect to future dangerousness, *only most of the time*."¹¹⁹ In another passage, the Court noted that it was "not persuaded that such testimony is *almost entirely unreliable* and that the factfinder and the adversary system will not be competent to uncover, recognize, and take due account of its shortcomings."¹²⁰

If this is a standard at all, it is an incredibly low one. It permitted the admission of evidence, as one commentator noted, "at the brink of quackery"¹²¹—and, in a death penalty case.¹²² Justice Blackmun, the author of the *Daubert* opinion, dissented:

¹¹⁴ Future dangerousness was a qualifying factor under the Texas death penalty statute. TEX. CODE CRIM. PROC. ANN. art. 37.071(2)(b)(1) (West 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").

¹¹⁵ *Barefoot*, 463 U.S. at 919 (Blackmun, J., dissenting) (quoting from record).

¹¹⁶ Brief Amicus Curiae for the American Psychiatric Association at 9, *Barefoot v. Estelle*, 463 U.S. 880 (1983) (No. 82-6080).

¹¹⁷ *Id.* at 12.

¹¹⁸ See generally Charles Patrick Ewing, *Preventive Detention and Execution: The Constitutionality of Punishing Future Crimes*, 15 LAW & HUM. BEHAV. 139 (1991); Michael L. Radelet & James W. Marquart, *Assessing Nondangerousness During Penalty Phases of Capital Trials*, 54 ALB. L. REV. 845 (1990); Christopher Slobogin, *Dangerousness and Expertise*, 133 U. PA. L. REV. 97 (1984).

¹¹⁹ *Barefoot*, 463 U.S. at 901 (emphasis added).

¹²⁰ *Id.* at 898-99.

¹²¹ George E. Dix, *The Death Penalty, "Dangerousness," Psychiatric Testimony, and Professional Ethics*, 5 AM. J. CRIM. L. 151, 172 (1977).

¹²² On October 24, 1984, Thomas Barefoot was executed based on "junk science." PETER W. HUBER, *GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM* 220 (1991) (noting that 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").

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.¹²³

In short, *Daubert* required a far higher standard of admissibility for money-damages than *Barefoot* required for the death penalty. Nor can *Barefoot* be distinguished from *Daubert* as a constitutional, rather than an evidentiary, decision.¹²⁴ The Court's Eighth Amendment jurisprudence has long proclaimed that "death is different"¹²⁵ and imposed higher reliability standards.¹²⁶

D. United States v. Scheffer

*United States v. Scheffer*¹²⁷ is in one sense the most difficult case to criticize. In *Scheffer*, the Supreme Court upheld the military's *per se* exclusionary rule of polygraph results in the face of a constitutional challenge.¹²⁸ Given the state of polygraph research,¹²⁹ the Court might have rested its decision on reliability grounds alone.¹³⁰ Nevertheless, even the unreliability argument is not without problems. The most notable is the comparison with *Barefoot*. The research on polygraph evidence is far more supportive than that on

¹²³ *Barefoot*, 463 U.S. at 916.

¹²⁴ One commentary points out that "*Barefoot* explicitly did *not* involve the Rules, but rather the constitutionality of imposing the death penalty based on questionable evidence." Bert Black & John A. Singer, *From Frye to Daubert: A New Test for Scientific Evidence*, 1 SHEPARD'S EXPERT & SCI. EVIDENCE Q. 19, 37 (July 1993).

¹²⁵ See *Ring v. Arizona*, 536 U.S. 584, 605-06 (2002) ("As Arizona's counsel maintained at oral argument, there is no doubt that '[d]eath is different.'").

¹²⁶ E.g., *Murray v. Giarratano*, 492 U.S. 1, 8-9 (1989) ("The finality of the death penalty requires 'a greater degree of reliability' when it is imposed.") (quoting *Lockett v. Ohio*, 438 U.S. 586, 604 (1978)); *Beck v. Alabama*, 447 U.S. 625, 637-38 (1980) (Because the death penalty is different, the Court has "invalidated procedural rules that tended to diminish the reliability of the sentencing determination."). See also *Ake v. Oklahoma*, 470 U.S. 68, 87 (1985) (Burger, C.J., concurring) ("In capital cases the finality of the sentence imposed warrants protections that may or may not be required in other cases.").

¹²⁷ 523 U.S. 303 (1998).

¹²⁸ *Id.* at 313.

¹²⁹ See NAT'L RESEARCH COUNCIL, THE POLYGRAPH AND LIE DETECTION 29-30 (2002) [hereinafter POLYGRAPH AND LIE DETECTION]. Even here I have serious reservations about the Court's treatment of the right to present a defense, as well as its attempts to distinguish *Washington v. Texas*, 388 U.S. 14 (1967), and *Chambers v. Mississippi*, 410 U.S. 284 (1973).

¹³⁰ As discussed later, however, the Court based its holding on several distinct grounds.

"future dangerousness." Polygraph evidence easily satisfies the *Barefoot* test: not "always wrong . . . only most of the time." Keep in mind that the Court's options were not limited to *per se* admission or exclusion. The Court could have rejected the *per se* ban, as it did with hypnotically-refreshed testimony in *Rock v. Arkansas*,¹³¹ and left the issue to the states to develop alternative reliability standards, which had been the military court's position.¹³² Such an approach would have probably resulted in what now exists in federal cases—trial court discretion that is typically exercised in favor of exclusion in the absence of a prosecution stipulation.¹³³

Moreover, the Court never confronted an issue raised by Justice Stevens in dissent¹³⁴ and mentioned by Justice Kennedy in his concurring opinion.¹³⁵ The very government that argued against

¹³¹ 483 U.S. 44 (1987) (holding that prohibiting all hypnotically refreshed testimony violated the defendant's right to testify on her own behalf but leaving open the possibility that exclusion on a case-by-case approach would be constitutional).

¹³² In *Scheffer*, the U.S. Court of Appeals for the Armed Forces had held that Military Rule 707's *per se* exclusionary rule was unconstitutional as applied in that case. In that court's view:

A *per se* exclusion of polygraph evidence offered by an accused to rebut an attack on his credibility, without giving him an opportunity to lay a foundation under Mil. R. Evid. 702 and *Daubert*, violates his Sixth Amendment right to present a defense. We limit our holding to exculpatory evidence arising from a polygraph examination of an accused, offered to rebut an attack on his credibility.

Scheffer, 44 M.J. 442, 445 (C.A.A.F. 1996).

¹³³ *E.g.*, *Conti v. Commissioner*, 39 F.3d 658, 663 (6th Cir. 1994) (noting that "unilaterally obtained polygraph evidence is almost never admissible under Evidence Rule 403"); *United States v. Sherlin*, 67 F.3d 1208, 1216-17 (6th Cir. 1995) ("[A] privately commissioned polygraph test, which was unknown to the government until after its completion, is of extremely dubious probative value."). *See also* 1 GIANNELLI & IMWINKELRIED, *supra* note 7, § 8.4(D).

¹³⁴ Justice Stevens wrote:

[T]o the extent that the use of the lie detector plays a special role in the military establishment, military practices are more favorable to a rule of admissibility than is the less structured use of lie detectors in the civilian sector of our society. That is so because the military carefully regulates the administration of polygraph tests to ensure reliable results. The military maintains "very stringent standards for polygraph examiners" and has established its own Polygraph Institute, which is "generally considered to be the best training facility for polygraph examiners in the United States." The military has administered hundreds of thousands of such tests and routinely uses their results for a wide variety of official decisions.

Scheffer, 523 U.S. at 323-24 (Stevens, J., dissenting) (footnotes omitted).

¹³⁵ In his concurrence, Justice Kennedy stated:

I doubt, though, that the rule of *per se* exclusion is wise, and some later case might present a more compelling case for introduction of the testimony than this one does. Though the considerable discretion given to the trial court in admitting or excluding scientific evidence is

polygraph evidence nevertheless spends millions of dollars each year running the Defense Polygraph Institute, sponsors research on the technique, and employs the technique both in and outside of the criminal system.¹³⁶

Perhaps to avoid these issues, the Court attempted to support its position with other rationales, none of which are very compelling. One rationale was that polygraph evidence would violate the ultimate issue prohibition.¹³⁷ However, commentators have harshly criticized the ultimate issue rule,¹³⁸ and both the Federal and Military Rules of Evidence have rejected the rule outright.¹³⁹ Should DNA evidence be excluded because it treads upon the “ultimate” issue in the case—the identity of the perpetrator? Fingerprint comparisons? Future dangerousness was an ultimate issue in *Barefoot*.

Second, the majority cited the jury’s role in determining credibility.¹⁴⁰ This argument needs further examination. Assume the accused claims alibi and DNA evidence is admitted against him; the DNA evidence will undoubtedly reflect on the accused’s credibility, and yet no one would suggest DNA evidence is inadmissible on this ground. The Court, of course, may have only been concerned with a “direct” comment on credibility. But as one commentator noted:

[T]he very fact that jurors possess common knowledge about credibility puts them in a good position to come to their own conclusions; they may therefore be more skeptical about an expert’s testimony on credibility than about testimony on a more esoteric issue, such as DNA profiling. Some support for this contention comes from the studies of jury reactions to polygraph evidence, which have generally found that juries are not overwhelmed: they draw their own conclusions about credibility,

not a constitutional mandate, see *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, . . . there is some tension between that rule and our holding today. And, as Justice Stevens points out, there is much inconsistency between the Government’s extensive use of polygraphs to make vital security determinations and the argument it makes here, stressing the inaccuracy of these tests.

Id. at 318 (Kennedy, J., concurring).

¹³⁶ See Giannelli, *supra* note 51.

¹³⁷ *Scheffer*, 523 U.S. at 313-14 (“Jurisdictions, in promulgating rules of evidence, may legitimately be concerned about the risk that juries will give excessive weight to the opinions of a polygrapher, clothed as they are in scientific expertise and at time offering, as in respondents’ case, a conclusion of the ultimate issue in the trial.”).

¹³⁸ 7 JOHN H. WIGMORE, EVIDENCE § 1920, at 18 (Chadbourn rev. 1978) (calling the rule “a mere bit of empty rhetoric”).

¹³⁹ See FED. R. EVID. 704(a); MIL. R. EVID. 704.

¹⁴⁰ *Scheffer*, 523 U.S. at 313 (“By its very nature, polygraph evidence may diminish the jury’s role in making credibility determinations.”).

not always agreeing with the polygrapher’s verdict.¹⁴¹

Finally, an additional red herring was offered to support the *Scheffer* holding: the avoidance of litigation on collateral issues that “prolong[] criminal trials and threaten[] to distract the jury from its central function of determining guilt or innocence.”¹⁴² Justice Holmes once explained this factor: “[S]o far as the introduction of collateral issues goes, that objection is a purely practical one—a concession to the shortness of life.”¹⁴³ Weighed against this “consideration” is the *constitutional* right to present a defense, which the Court has described as a fundamental right: “The right to offer the testimony of witnesses, and to compel their attendance, if necessary, is in plain terms the right to present a defense, the right to present the defendant’s version of the facts. . . . The [defendant] has the right to present his own witnesses to establish a defense. This right is a fundamental element of due process of law.”¹⁴⁴ Thus, it seems rather breathtaking that such a “fundamental” right could be so easily trumped by a lack-of-time rationale.¹⁴⁵ The admissibility of DNA evidence often consumes a lot of court time but “collateralness” was never cited as a major concern.¹⁴⁶

E. *Ake v. Oklahoma*

Painting this picture of the Supreme Court decisions would be unfair without mentioning *Ake v. Oklahoma*,¹⁴⁷ in which the Court in 1985 recognized for the first time an accused’s right to expert assistance. Although *Ake* has often been interpreted narrowly,¹⁴⁸ it

¹⁴¹ REDMAYNE, *supra* note 1, at 174.

¹⁴² *Scheffer*, 523 U.S. at 314.

¹⁴³ *Reeve v. Dennett*, 11 N.E. 938, 943-44 (Mass. 1887).

¹⁴⁴ *Washington v. Texas*, 388 U.S. 14, 19 (1967); *see also* *Crane v. Kentucky*, 476 U.S. 683, 690 (1986) (“Whether rooted directly in the Due Process Clause of the Fourteenth Amendment or in the Compulsory Process or Confrontation Clauses of the Sixth Amendment, the Constitution guarantees criminal defendants ‘meaningful opportunity to present a complete defense.’”) (citations omitted).

¹⁴⁵ *See generally* Janet C. Hoeffel, *The Sixth Amendment’s Lost Clause: Unearthing Compulsory Process*, 2002 WIS. L. REV. 1275; Edward J. Imwinkelried, *A Defense of the Right to Present Defense Expert Testimony: The Flaws in the Plurality Opinion in United States v. Scheffer*, 69 TENN. L. REV. 539 (2002).

¹⁴⁶ *See* *United States v. Yee*, 134 F.R.D. 161, 168 (N.D. Ohio 1991) (“[H]earings were held for approximately six weeks.”); *see also* *People v. Castro*, 545 N.Y.S.2d 985, 986 (Sup. Ct. 1989) (“This hearing took place over a twelve week period producing a transcript of approximately five thousand pages.”).

¹⁴⁷ 470 U.S. 68 (1985).

¹⁴⁸ *See* 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

remains a landmark case, and the Court deserves credit for recognizing this right. Nevertheless, the Court has passed up many opportunities to strengthen *Ake*. That case also stands in stark relief to permitting bogus evidence in death penalty cases (*Barefoot*), refusing to require the police to implement reasonable measures to ensure the safe handling of evidence (*Youngblood*), and turning a blind eye toward expert testimony lacking such a rudimentary basis as documentation (*Fensterer*).

IV. DAUBERT'S EFFECT IN CRIMINAL CASES

As stated earlier, *Daubert* has had a far more significant impact in civil litigation than in criminal litigation. That is not say, however, that its affect in criminal cases has been insubstantial. Several significant developments in criminal prosecutions can be traced to *Daubert*, five of which are discussed in this section.

A. Reexamination of "Venerable" Techniques

First, some federal courts have read the *Daubert* trilogy as inviting a "reexamination even of 'generally accepted' venerable, technical fields."¹⁴⁹ Attacks, some successful and some not, have been launched against handwriting evidence,¹⁵⁰ hair comparisons,¹⁵¹ fingerprint

defense.")

¹⁴⁹ *United States v. Hines*, 55 F. Supp. 2d 62, 67 (D. Mass. 1999); *see also* *United States v. Hidalgo*, 229 F. Supp. 2d 961, 966 (D. Ariz. 2002) ("Courts are now confronting challenges to testimony, as here, whose admissibility had long been settled.").

¹⁵⁰ *See Hidalgo*, 229 F. Supp. 2d at 967. *Hidalgo* thusly limited the introduction of expert handwriting evidence:

Because the principle of uniqueness is without empirical support, we conclude that a document examiner will not be permitted to testify that the maker of a known document is the maker of the questioned document. Nor will a document examiner be able to testify as to identity in terms of probabilities.

Id.; *see also* *United States v. Lewis*, 220 F. Supp. 2d 548, 554 (S.D. W. Va. 2002) ("[Expert's] bald assertion that the 'basic principle of handwriting identification has been proven time and time again through research in [his] field,' without more specific substance, is inadequate to demonstrate testability and error rate."); *United States v. Saelee*, 162 F. Supp. 2d 1097, 1103 (D. Alaska 2001). The *Saelee* court highlighted the relative lack of credible testing of handwriting identification methods:

There is little known about the error rates of forensic document examiners. The little testing that has been done raises serious questions about the reliability of methods currently in use. As to some tasks, there is a high rate of error and forensic document examiners may not be any better at analyzing handwriting than laypersons. This is illustrated not only in the Kam studies relied on by Mr. Cawley, but also in a series of proficiency tests carried out by Collaborative Testing

examinations,¹⁵² firearms identification,¹⁵³ bitemarks,¹⁵⁴ and

Service under the supervision of the Forensic Sciences Foundation.

Id.; see also *United States v. Fujii*, 152 F. Supp. 2d 939, 940 (N.D. Ill. 2000) (determining that expert testimony concerning Japanese handprinting was inadmissible and stating that: "Handwriting analysis does not stand up well under the *Daubert* standards. Despite its long history of use and acceptance, validation studies supporting its reliability are few, and the few that exist have been criticized for methodological flaws."); *United States v. Starzecpyzel*, 880 F. Supp. 1027, 1038 (S.D.N.Y. 1995) ("[T]he 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.'"). But see *United States v. Jolivet*, 224 F.3d 902, 906 (8th Cir. 2000) (affirming admission of expert testimony that it was likely that defendant wrote the questioned documents and finding such opinion reliable because the expert was well-qualified in handwriting analysis and that his testimony "may be properly characterized as offering the jury knowledge beyond their own and enhancing their understanding of the evidence before them"); *United States v. Prine*, 220 F. Supp. 2d 1203 (W.D. Wash. 2002). See generally Andre Moenssens, *Handwriting Identification Evidence In the Post-Daubert World*, 66 UMKC L. REV. 251 (1997); D. Michael Risinger et al., *Brave New "Post-Daubert World"—A Reply to Professor Moenssens*, 29 SETON HALL L. REV. 405 (1998).

¹⁵¹ See *Williamson v. Reynolds*, 904 F. Supp. 1529, 1558 (E.D. Okl. 1995) ("This court has been unsuccessful in its attempts to locate any indication that expert hair comparison testimony meets any of the requirements of *Daubert*."), *rev'd on this issue*, *Williamson v. Ward*, 110 F.3d 1508, 1522-23 (10th Cir. 1997) (ruling that the due process, not *Daubert*, standard applies in habeas proceedings); see also Paul C. Giannelli & Emmie West, *Hair Comparison Evidence*, 37 CRIM. L. BULL. 514 (2001) (discussing the DNA exoneration cases in which hair evidence was used to convict the innocent).

¹⁵² See *United States v. Llera Plaza*, 188 F. Supp. 2d 549, 558 (E.D. Pa. 2002) (excluding and then admitting fingerprint evidence); see also *United States v. Martinez-Cintron*, 136 F. Supp. 2d 17, 20 (D. P.R. 2001) (admitting evidence); *United States v. Havard*, 117 F. Supp. 2d 848 (S.D. Ind. 2000) (same), *aff'd*, 260 F.3d 597 (7th Cir. 2001); Robert Epstein, *Fingerprints Meet Daubert: The Myth of Fingerprint "Science" Is Revealed*, 75 SO. CAL. L. REV. 605, 628 n.122 (2002) ("Internal documents of the NIJ presently on file with the author . . . reveal that the Institute was ready to publish the Solicitation in September of 1999, but that at the FBI's request, publication was delayed until after Mitchell's trial."). See generally Jennifer Mnookin, *Fingerprint Evidence in an Age of DNA Profiling*, 67 BROOK. L. REV. 13 (2001); Jessica M. Sombat, Note, *Latent Justice: Daubert's Impact on the Evaluation of Fingerprint Identification Testimony*, 70 FORDHAM L. REV. 2819 (2002); David A. Stoney, *Fingerprint Identification: The Scientific Basis of Expert Testimony on Fingerprinting Identification*, §§ 27-2.0 - 2.4, in 3 MODERN SCI. EVIDENCE (David L. Faigman et al. eds., 2002).

¹⁵³ See *United States v. Santiago*, 199 F. Supp. 2d 101 (S.D.N.Y. 2002) (determining that ballistics evidence satisfies the *Daubert* standard); see also Joan Griffin & David J. LaMagna, *Daubert Challenges to Forensic Evidence: Ballistics Next on the Firing Line*, CHAMPION 20 (Sept.-Oct. 2002); Lisa J. Steele, "All we want you to do is confirm what we already know." A *Daubert* Challenge to Firearms Identifications, 38 CRIM. L. BULL. 465 (2002).

¹⁵⁴ See *Howard v. State*, 697 So. 2d 415, 429 (Miss. 1997). The Supreme Court of Mississippi wrote:

While few courts have refused to allow some form of bite-mark comparison evidence, numerous scholarly authorities have criticized

intoxication testing.¹⁵⁵ Such challenges would not have occurred under *Frye*. The handwriting challenges triggered research on that subject¹⁵⁶ as well as the establishment of standards¹⁵⁷ and the curtailment of overstated conclusions in some cases.¹⁵⁸ Moreover, there have been more legal articles on these subjects in the last few

the reliability of this method of identifying a suspect. . . . There is little consensus in the scientific community on the number of points which must match before any positive identification can be announced. . . . Suffice it to say that testimony concerning bite marks in soft, living flesh has not been scientifically accredited at this time.

Id.; see also I.A. Pretty & D. Sweet, *The Scientific Basis for Human Bitemark Analyses—A Critical Review*, 41 SCI. & JUST. 85, 86 (2001) (“Despite the continued acceptance of bitemark evidence in European, Oceanic and North American Courts, the fundamental scientific basis for bitemark analysis has never been established.”).

¹⁵⁵ See *United States v. Horn*, 185 F. Supp. 2d 530, 549 (D. Md. 2002). As the court described it:

The doctrine of judicial notice is predicated upon the assumption that the source materials from which the court takes judicial notice are reliable. Where, as here, that reliability has been challenged, the court cannot disregard the challenge, simply because a legion of earlier court decisions reached conclusions based on reference to the same then-unchallenged authority. . . . I cannot agree that the HGN, WAT and OLS tests, singly or in combination, have been shown to be as reliable as asserted by Dr. Burns, the NHTSA publications, and the publications of the communities of law enforcement officers and state prosecutors.

Id. (footnote omitted).

¹⁵⁶ *E.g.*, Sargur Srihari et al., *Individuality of Handwriting*, 47 J. FORENSIC SCI. 856 (2002) (1,500 individual handwriting samples scanned into a computer programmed to compare the samples based on a variety of features such as slant, height, number of interior contours, and number of vertical slope components; computer matched exemplars with a 98% accuracy rate); see also Moshe Kam et al., *Writer Identification by Professional Document Examiners*, 42 J. FORENSIC SCI. 778 (1997) (false positive rate for professionals was 6.5% compared to 38.3% for non-professionals); Moshe Kam et al., *Writer Identification by Professional Document Examiners*, 42 J. FORENSIC SCI. 778 (1997) (forensic document examiners demonstrated a false positive error rate of only .5%); Moshe Kam et al., *Effects of Monetary Incentives on Performance of Non-Professionals in Document-Examination Proficiency Tests*, 43 J. FORENSIC SCI. 1000 (1998).

¹⁵⁷ See *United States v. Grizzo*, 2002 U.S. Dist. Lexis 7564, *19 (E.D. Pa. 2002).

¹⁵⁸ See *United States v. Rutherford*, 104 F. Supp. 2d 1190, 1194 (D. Neb. 2000). The court refused to allow the introduction of a handwriting experts testimony, stating:

[T]he Court concludes that FDE Rauscher’s testimony meets the requirements of Rule 702 to the extent that he limits his testimony to identifying and explaining the similarities and dissimilarities between the known exemplars and the questioned documents. FDE Rauscher is precluded from rendering any ultimate conclusions on authorship of the questioned documents and is similarly precluded from testifying to the degree of confidence or certainty on which his opinions are based.

Id.; accord *United States v. Hidalgo*, 229 F. Supp. 2d 961 (D. Ariz. 2002); *United States v. Hines*, 55 F. Supp. 2d 62, 67 (D. Mass. 1999).

years than in the prior quarter century,¹⁵⁹ which should mean closer scrutiny of this type of expert testimony for the foreseeable future. Whether lawyers have the ability and resources to challenge this testimony through cross-examination and the presentation of defense experts, however, remains to be seen. Even so, the forensic science community views these attacks as serious and is reforming.¹⁶⁰

B. Closing the Frye Loophole

Second, *Daubert* closed a major loophole in the *Frye* rule. Many *Frye* courts recognize an exception for non-novel evidence, which exempts certain techniques from the general acceptance requirement.¹⁶¹ For example, California courts apply this exception to bitemark comparisons¹⁶² and evidence based on narcotic detection dogs.¹⁶³ Similarly, Arizona courts use this exception to exempt footprint evidence¹⁶⁴ and predictions of recidivism using actuarial models from close scrutiny.¹⁶⁵ *Daubert* explicitly rejected this “free pass” to admissibility,¹⁶⁶ and *Kumho* reinforced this view by subjecting

¹⁵⁹ See *supra* notes 150-54.

¹⁶⁰ See Graham R. Jones, *President’s Editorial—The Changing Practice of Forensic Science*, 47 J. FORENSIC SCI. 437, 437 (2002). Jones pointed out the practical effects *Daubert* had:

The *Daubert* Standard goes a step further than *Frye* and requires the forensic scientists to prove that the evidence is fundamentally scientifically reliable, not just generally accepted by his/her peers in the discipline. Defense lawyers have also become more critical and aggressive in challenging forensic evidence and are more willing to hire qualified forensic experts to assist them.

Id.

¹⁶¹ See 1 GIANNELLI & IMWINKELRIED, *supra* note 7, § 1-5(D).

¹⁶² According to *People v. Marx*, 126 Cal. Rptr. 350 (Ct. App. 1975), the *Frye* test “finds its rational basis in the degree to which the trier of fact must accept, on faith, scientific hypotheses not capable of proof or disproof in court and not even generally accepted outside the courtroom.” *Id.* at 355-56. The court went on to hold that bite mark evidence did not involve blind acceptance by the jury. The basis on which the expert reached his conclusions—models, photographs, and X-rays—were shown to the trier of fact, and the expert’s conclusions were verifiable by the court. Thus, the “court did not have to sacrifice its independence and common sense in evaluating” the evidence. *Id.* at 357.

¹⁶³ See *People v. Sommer*, 16 Cal. Rptr. 2d 165, 173 (Ct. App. 1993) (determining that a narcotic detection dog was not subject to *Frye*).

¹⁶⁴ See *State v. Murray*, 906 P.2d 542, 562 (Ariz. 1995) (en banc) (“*Frye* analysis is not applicable to footprint [comparisons].”).

¹⁶⁵ See *State ex rel. Romley v. Fields*, 35 P.3d 82, 89 (Ariz. Ct. App. 2001) (“Based upon our understanding of *Frye* as interpreted by *Logerquist*, we conclude that the use of actuarial models by mental health experts to help predict a person’s likelihood of recidivism is not the kind of novel scientific evidence or process to which *Frye* applies.”).

¹⁶⁶ *Daubert*, 509 U.S. at 592 n.11 (“Although the *Frye* decision itself focused

all expert testimony to the reliability requirement.

C. Effect on Frye Standard

Daubert's affect on the *Frye* test has also been noteworthy. *Daubert* has forced state courts to reexamine their admissibility standard for scientific evidence. Although numerous courts have rejected *Frye* in favor of *Daubert*,¹⁶⁷ some jurisdictions have retained *Frye*,¹⁶⁸ and many of these are populous states, in which many, if not most, criminal cases are tried. Some of these courts believe *Frye* offers greater protection for defendants than *Daubert*.¹⁶⁹

exclusively on 'novel' scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence."); see also *People v. Shreck*, 22 P.3d 68, 79 n.12 (Colo. 2001). The *Schreck* court wrote:

We decline to limit the applicability of CRE 702 to only the novel scientific evidence governed previously by *Frye*. Nothing in the text of the rule requires such a limitation, and our holding is consistent with that of the United States Supreme Court in *Daubert*, which expressly applied its holding to all scientific evidence.

¹⁶⁷ E.g., *Shreck*, 22 P.3d at 70. As the *Schreck* court clarified:

We now hold that CRE 702, rather than *Frye*, governs a trial court's determination as to whether scientific or other expert testimony should be admitted. Such an inquiry should focus on the reliability and relevance of the proffered evidence and requires a determination as to (1) the reliability of the scientific principles, (2) the qualifications of the witness, and (3) the usefulness of the testimony to the jury.

Id.; see, e.g., *Schafersman v. Agland Coop.*, 631 P.3d 862, 867 (Neb. 2001) (describing a veterinarian's expert opinion on multiple mineral toxicity which alleged that cows were injured by contaminated feed). "[W]e conclude that the framework for evaluating expert opinion testimony in Nebraska should no longer be guided by *Frye*, but should instead reflect the criteria set forth in *Daubert* and its progeny." *Id.* (citations omitted). Other states that have explicitly adopted *Daubert* include Alaska, Connecticut, Idaho, Indiana, Kentucky, Massachusetts, New Hampshire, New Mexico, Oklahoma, South Dakota, Tennessee, and West Virginia. See I GIANNELLI & IMWINKELRIED, *supra* note 7, § 1-13.

¹⁶⁸ E.g., *People v. Leahy*, 882 P.2d 321, 323 (Cal. 1994) (The "*Kelly* formulation [of *Frye* under the Cal. Evid. Code] survived *Daubert* . . ."); *People v. Miller*, 670 N.E.2d 721, 731 (Ill. 1996) ("Illinois follows the *Frye* standard for the admission of novel scientific evidence."); *Burrall v. State*, 724 A.2d 65, 80 (Md. 1999) (Despite *Daubert*, "we have not abandoned *Frye* or *Reed*."); *Goeb v. Tharaldson*, 615 N.W.2d 800, 814 (Minn. 2000) ("Having reviewed the cases and the commentary surrounding this issue, we reaffirm our adherence to the *Frye-Mack* standard and reject *Daubert*."). Other *Frye* jurisdictions include Alabama, Arizona, Florida, Kansas, Michigan, Mississippi, Missouri, Nevada, New Jersey, New York, Pennsylvania, and Washington. See I GIANNELLI & IMWINKELRIED, *supra* note 7, § 1-15.

¹⁶⁹ See *Ramirez v. State*, 810 So. 2d 836, 843 (Fla. 2001). The Florida Supreme Court asserted that:

In keeping with the State's burden in a criminal trial (i.e., the State must prove each element of the charged offense beyond a reasonable doubt), this Court has continued to use the *Frye* test when evaluating novel scientific evidence proposed by the State even though the United States Supreme Court, in a civil case, has adopted a different rule.

In addition, terms such as gatekeeper,¹⁷⁰ testability, and peer review have crept into the *Frye* lexicon. *Ramirez v. State*¹⁷¹ illustrates this development. In *Ramirez*, the Florida Supreme Court rejected the testimony of five experts who claimed general acceptance for matching a knife with a cartilage wound in a murder victim—a type of “toolmark” comparison. The court wrote:

Although several of the State’s experts testified that the underlying principle employed by Hart [the examiner] is generally accepted in the field, we conclude that this testimony standing alone is insufficient to establish admissibility under *Frye* in light of the fact that Hart’s testing procedure possesses none of the *hallmarks of acceptability* that apply in the relevant scientific community to this type of evidence.¹⁷²

The court went on to note that the procedure had never been tested, “meaningful peer review” was lacking,¹⁷³ the error rate had not been quantified, and objective standards had not been developed. *Ramirez* represents a reinvigorated *Frye* test,¹⁷⁴ and it is not alone.¹⁷⁵

Id.; see also *State v. Copeland*, 922 P.2d 1304, 1314 (Wash. 1996) (en banc). The en banc court determined that:

Where novel scientific evidence is at issue, the additional *Frye* inquiry allows the judiciary to defer to the scientists precisely where to do so recognizes both the need for admissibility of novel scientific evidence where it is sufficiently accepted, and the need to protect against novel scientific evidence which has not even gained general acceptance in the relevant field. The trial court’s gatekeeper role under *Frye* involves by design a conservative approach, requiring careful assessment of the general acceptance of the theory and methodology of novel science, thus helping to ensure, among other things, that “pseudoscience” is kept out of the courtroom.

Id.

¹⁷⁰ See *Copeland*, 922 P.2d at 1314 (describing the “trial court’s gatekeeper role under *Frye*”).

¹⁷¹ 810 So. 2d 836 (Fla. 2001).

¹⁷² *Id.* at 849 (emphasis added).

¹⁷³ The court described the deficiencies:

The North American articles were written by law enforcement technicians and while several of those articles address principles related to Hart’s theory none undertakes the kind of searching, critical review that is the sine qua non of scientific acceptance. The European articles, on the other hand, were written by medical doctors and professors and are far more discerning; they delineate general studies and contain extensive analyses. The articles in that group, however, address only traditional knife mark theory relative to striation signatures. None address Hart’s testing methodology and the absolute certainty of identification deduced from such a test.

Id. at 850 (footnotes omitted).

¹⁷⁴ *Ramirez*, 810 So. 2d at 844 (Fla. 2001). The Florida Supreme Court stated: When applying the *Frye* test, a court is not required to accept a “nose count” of experts in the field. Rather, the court may peruse disparate

D. Effect on Relevancy Approach

Daubert's affect on the third approach to scientific evidence, the relevancy approach, may have been the most profound—and yet the least noticed. Under this approach, qualifying the expert generally qualifies the technique employed by that expert.¹⁷⁶ *Barefoot* illustrates this approach.¹⁷⁷ This, of course, is a very lax standard,¹⁷⁸ one which *Daubert* implicitly rejected by requiring reliability in addition to relevancy.¹⁷⁹

sources—*e.g.*, expert testimony, scientific and legal publications, and judicial opinions—and decide for itself whether the theory in issue has been “sufficiently tested and accepted by the relevant scientific community.” In gauging acceptance, the court must look to properties that traditionally inhere in scientific acceptance for the type of methodology or procedure under review—*i.e.*, “indicia” or “hallmarks” of acceptability. A bald assertion by the expert that his deduction is premised upon well-recognized scientific principles is inadequate to establish its admissibility if the witness’s application of these principles is untested and lacks indicia of acceptability.

Id. (footnotes omitted).

¹⁷⁵ See *Wilson v. State*, 803 A.2d 1044 (Md. 2002) (excluding under *Frye* probability testimony concerning two children suffering sudden infant death syndrome (SIDS)).

¹⁷⁶ See Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1197, 1250 (1980).

¹⁷⁷ *Barefoot*, 463 U.S. at 930. “[T]he rules of evidence generally extant at the federal and state levels anticipate that relevant, unprivileged evidence should be admitted and its weight left to the factfinder, who would have the benefit of cross-examination and contrary evidence by the opposing party.” *Id.* at 889. “We are not persuaded that such testimony is almost entirely unreliable and that the factfinder and the adversary system will not be competent to uncover, recognize, and take due account of its shortcomings.” *Id.* at 882.

¹⁷⁸ Wisconsin still follows the relevancy approach. See *State v. Peters*, 534 N.W.2d 867, 873 (Wis. Ct. App. 1995) (holding DNA evidence admissible). Wisconsin follows neither *Frye* nor *Daubert*: “Once the relevancy of the evidence is established and the witness is qualified as an expert, the reliability of the evidence is a weight and credibility issue for the fact finder and any reliability challenges must be made through cross-examination or by other means of impeachment.” *Id.*; see also *State v. Donner*, 531 N.W.2d 369, 374 (Wis. Ct. App. 1995) (holding intoxication test admissible). The *Donner* court wrote:

[B]efore *Daubert*, the *Frye* test was not the law in Wisconsin. To that extent, Wisconsin law and *Daubert* coincide. Beyond that, Wisconsin law holds that “any relevant conclusions which are supported by a qualified witness should be received unless there are other reasons for exclusion.” Stated otherwise, expert testimony is admissible in Wisconsin if relevant and will be excluded only if the testimony is superfluous or a waste of time. . . . Assuming that *Daubert* in its application represents something beyond *Walstad*, we observe that we . . . are bound to follow our supreme court case law.

Id. (internal citations omitted).

¹⁷⁹ *Daubert*, 509 U.S. at 589 (“[U]nder the Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable.”); see also *Kumho Tires Co. v. Carmichael*, 526 U.S. 137 (1999) (although

A number of courts had rejected *Frye* before *Daubert* was decided.¹⁸⁰ Many of these courts now claim that *Daubert* is consistent with their former approach.¹⁸¹ This is true in some instances but not in others.¹⁸² Many of these jurisdictions had, in effect, adopted the relevancy approach, and their movement toward *Daubert* raises their standard of admissibility.

E. The “Third-prong” Controversy: Daubert “Plus”

Finally, the 2000 amendment to Rule 702 can be traced to *Daubert*.¹⁸³ It goes beyond *Daubert* and *Kumho*, however.¹⁸⁴ The amendment, for instance, requires the proper application of the

expert qualified, testimony rejected).

¹⁸⁰ Arkansas, Delaware, Georgia, Iowa, Montana, North Carolina, Ohio, Oregon, Rhode Island, South Carolina, Texas, Utah, Vermont, and Wyoming. See I GIANNELLI & IMWINKELRIED, *supra* note 7, § 1-14.

¹⁸¹ *E.g.*, Moore v. State, 915 S.W.2d 284, 294 (Ark. 1996) (“*Daubert* . . . adopted a reliability approach to Rule 702, comparable to the relevancy approach of *Prater* in which reliability is the critical element.”); Nelson v. State, 628 A.2d 69, 73 (Del. 1993) (“Our decisions [in prior cases] are consistent with the Supreme Court’s decision in *Daubert*.”); State v. Foret, 628 So. 2d 1116, 1123 (La. 1993) (“Past decisions of this court have espoused similar sentiments [as *Daubert*]”); State v. Moore, 885 P.2d 457, 471 (Mont. 1994) (“[T]he guidelines set forth in *Daubert* are consistent with our previous holding in *Barmeyer* concerning the admission of expert testimony of novel scientific evidence, and we, therefore, adopt the *Daubert* standard”); DiPetrillo v. Dow Chem. Co., 729 A.2d 677, 686 (R.I. 1999) (“Though we declined expressly to adopt the *Daubert* I standard, our previous cases have endorsed its principles.”).

¹⁸² See State v. Williams, 446 N.E.2d 444, 448 (Ohio 1983). The Ohio position merely left the issue to trial judge “discretion”:

[T]he Rules of Evidence establish adequate preconditions for admissibility of expert testimony, and we leave to the discretion of this state’s judiciary, on a case by case basis, to decide whether the questioned testimony is relevant and will assist the trier of fact to understand the evidence or to determine a fact in issue.

Id.

¹⁸³ The following was added to Rule 702 in December, 2000: “(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.” FED. R. EVID. 702.

¹⁸⁴ See Rudd v. General Motors Corp., 127 F. Supp. 2d 1330, 1336-37 (M.D. Ala. 2001). The district court noted that:

[T]he new Rule 702 appears to require a trial judge to make an evaluation that delves more into the facts than was recommended in *Daubert*, including as the rule does an inquiry into the sufficiency of the testimony’s basis (“the testimony is based upon sufficient facts or data”) and an inquiry into the application of a methodology to the facts (“the witness has applied the principles and methods reliably to the facts of the case”). Neither of these two latter questions that are now *mandatory* under the new rule . . . were expressly part of the former admissibility analysis under *Daubert*.

Id.

technique in the particular case, thus settling the *Frye-Daubert* “plus” issue, at least in federal courts.

This issue arose in the DNA cases where some courts had held that, because of the “complexity” of DNA analysis and its “powerful impact” on a jury, “passing muster under *Frye* alone is insufficient.”¹⁸⁵ Accordingly, a three-pronged analysis was adopted: (1) the underlying theory must have been generally accepted, (2) the procedures implementing the theory must have been generally accepted, and (3) the testing laboratory must have followed these procedures. This third prong was labeled *Frye* “plus.”¹⁸⁶ Some federal courts, in DNA¹⁸⁷ and polygraph cases,¹⁸⁸ applied this requirement after *Daubert* was decided—*i.e.*, *Daubert* “plus.” The issue was surprisingly controversial, but this requirement had been applied pre-DNA and pre-*Daubert*¹⁸⁹ and is found in virtually every intoxication test (DUI) statute in this country. Nevertheless, the courts had split on the issue, with some holding that the application of proper procedures went to weight and not admissibility.¹⁹⁰ Amended Rule

¹⁸⁵ *People v. Castro*, 545 N.Y.S.2d 985, 987 (Sup. Ct. 1989).

¹⁸⁶ See Stephanie B. Goldberg, *A New Day for DNA?*, 78 A.B.A. J. 84, 84 (1992) (“*Frye* Plus”).

¹⁸⁷ *E.g.*, *United States v. Martinez*, 3 F.3d 1191, 1197-98 (8th Cir. 1993). The Eighth Circuit wrote:

We believe that the reliability inquiry set forth in *Daubert* mandates that there be a preliminary showing that the expert properly performed a reliable methodology in arriving at his opinion. . . . In order to determine whether scientific *testimony* is reliable, the court must conclude that the testimony was derived from the application of a reliable methodology or principle in the particular case.

Id.

¹⁸⁸ In *United States v. Galbreth*, 908 F. Supp. 877, 881-82 (D.N.M. 1995), the court wrote: “It is not entirely clear whether *Daubert* requires as a prerequisite to admissibility that the proponent establish the validity of the specific application of a scientific technique.” *Id.* at 880-81. The court continued:

[A]fter reviewing the case law addressing this issue in the context of other forensic laboratory techniques and after careful consideration of the testimony presented at the hearing regarding the polygraph technique, the Court holds that in the context of polygraph evidence, such scrutiny is imperative to a faithful application of *Daubert*.

Id. at 882. The court went on to rule “that in addition to establishing the scientific validity of the polygraph technique in the abstract, the proponent of the proposed testimony must also prove that the specific examination was conducted properly by a competent examiner.” *Id.*

¹⁸⁹ See *United States v. Bruno*, 333 F. Supp. 570 (E.D. Pa. 1971) (chromatographic analysis of ink). “It is widely recognized that the party offering the results of laboratory tests must . . . vouch for its correct administration in the particular case.” *Id.* at 574.

¹⁹⁰ See 1 GIANNELLI & IMWINKELRIED, *supra* note 7, at 36 (listing cases involving polygraph, voiceprints, as well as other types of scientific evidence that adopt this

702 resolves this debate in favor of the more stringent approach.

Furthermore, the Advisory Committee’s Note to Rule 702 specified a number of reliability factors¹⁹¹ that supplement the ones enumerated in *Daubert*.¹⁹² One is whether the field of expertise claimed by the expert is known to reach reliable results. This provides some “official” support for challenges to entire fields of forensic science (*e.g.*, fingerprints and hair comparisons).¹⁹³

position); *see also* *State v. Lehr*, 38 P.3d 1172, 1179 (Ariz. 2002) (“Finally, there needs to be a foundational showing that correct procedures were followed in a given case. This foundation is distinct from the *Frye* finding itself and, in the judge’s discretion, may initially be provided at trial in front of the jury rather than at a separate hearing.”).

¹⁹¹ *See* FED. R. EVID. 702 advisory committee’s note (2000). The following factors may be relevant under Rule 702: whether the underlying research was conducted independently of litigation; whether the expert unjustifiably extrapolated from an accepted premise to an unfounded conclusion; whether the expert has adequately accounted for obvious alternative explanations; whether the expert was as careful as she would be in her professional work outside of paid litigation; and whether the field of expertise claimed by the expert is known to reach reliable results. *Id.*

¹⁹² In describing the trial judge’s screening or “gatekeeping function,” the *Daubert* Court identified a number of factors. First, in evaluating reliability, a judge should determine whether the scientific theory or technique can be and has been tested. *Daubert*, 509 U.S. at 593. Second, whether a theory or technique has been subjected to peer review and publication is “a relevant, though not dispositive, consideration in assessing . . . scientific validity.” *Id.* at 594. Third, a technique’s “known or potential rate of error” is a pertinent factor. *Id.* Fourth, the “existence and maintenance of standards controlling the technique’s operation” are other indicia of trustworthiness. *Id.* Finally, “general acceptance” remains an important consideration. *Id.*

¹⁹³ The federal amendment does not stand alone. The amended Uniform Rule 702 and several jurisdictions have codified reliability standards post-*Daubert*, although it is unclear whether this will result in more stringent standards. *See, e.g.*, 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.”). The Ohio evidence rule provides:

To the extent that the testimony reports the result of a procedure, test, or experiment, the testimony is reliable only if all the following 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; and (3) the particular procedure, test, or experiment was conducted in a way that will yield an accurate result.

OHIO R. EVID. 702(C). The Supreme Court of Tennessee, in *State v. Coley*, 32 S.W.3d 831 (Tenn. 2000), announced:

Tennessee Rule of Evidence 702 is more stringent than its federal counterpart. As a matter of contrast, while Fed. R. Evid. 702 requires only that the evidence “assist the trier of fact,” Tenn. R. Evid. 702 requires that expert testimony “substantially assist the trier of fact. . . .” This distinction indicates that the probative force of the testimony must be stronger before it is admitted in Tennessee.

V. OTHER INFLUENTIAL FACTORS

Daubert is only a part of the picture, however. There are at least two other formative influences that should be considered.

A. DNA Evidence

The advent of DNA evidence has also shaped the course of forensic science in significant ways. The DNA admissibility “wars”¹⁹⁴ highlighted the need for valid protocols¹⁹⁵ and proficiency testing,¹⁹⁶ and commentators soon began asking why such procedures were *not* applied in other forensic fields.¹⁹⁷

More importantly, the research scientists who testified as experts in the DNA cases (for both the prosecution and defense) came from a “scientific” culture, unlike the many forensic examiners who work in crime laboratories and are sometimes described as “cops in lab coats.” The DNA scientists were comfortable with quality control procedures, demanded written protocols, viewed proficiency testing as a positive development, and believed in open science and “not trial by ambush.”¹⁹⁸ All this was new to forensic science, which had grown

Id. at 834 (citations omitted). The Michigan rule predated *Daubert*. See MICH. R. EVID. 702 (allowing expert testimony only if based on “recognized” scientific, technical, or other knowledge).

¹⁹⁴ See William C. Thompson, *Evaluating the Admissibility of New Genetic Identification Tests: Lessons From the “DNA War”*, 84 J. CRIM. L. & CRIMINOLOGY 22 (1993).

¹⁹⁵ Eric S. Lander & Bruce Budowle, *DNA Fingerprinting Dispute Laid to Rest*, 371 NATURE 735, 735 (Oct. 27, 1994). Lander and Budowle pointed out:

The initial outcry over DNA typing standards concerned laboratory problems: poorly defined rules for declaring a match; experiments without controls; contaminated probes and samples; and sloppy interpretation of autoradiograms. Although there is no evidence that these technical failings resulted in any wrongful convictions, the lack of standards seemed to be a recipe for trouble.

Id.

¹⁹⁶ DNA TECHNOLOGY, *supra* note 83, at 55 (“No laboratory should let its results with a new DNA typing method be used in court, unless it has undergone such proficiency testing via blind trials.”).

¹⁹⁷ See Michael J. Saks & Jonathan J. Koehler, *What DNA “Fingerprinting” Can Teach the Law About the Rest of Forensic Science*, 13 CARDOZO L. REV. 361, 372 (1991). After reviewing DNA evidence, Saks and Koehler concluded that:

[F]orensic scientists, like scientist in all other fields, should subject their claims to methodologically rigorous empirical tests. The results of these tests should be published and debated. Until such steps are taken, the strong claims of forensic scientist must be regarded with far more caution than they traditionally have been.

Id.

¹⁹⁸ See *United States v. Kelly*, 420 F.2d 26, 29 (2d Cir. 1969) (“[The] course of the government smacks too much of a trial by ambush, in violation of the spirit of the [discovery] rules. A new trial is required, with a fair opportunity for the defense to

to maturity in an adversarial environment.¹⁹⁹ The spillover effect of DNA profiling on forensic science has been substantial.

B. Scientific Abuse Cases

DNA technology had another unexpected fallout. It exonerated the wrongfully convicted, and in the process, the causes of these convictions were brought into the sunlight. In their book, *Actual Innocence*, Barry Scheck, Peter Neufeld, and Jim Dwyer examined sixty-two DNA exonerations secured through Cardozo Law School's Innocence Project to ascertain what factors contributed to these miscarriages of justice; one of the more startling conclusions was that a *third* of these cases involved "tainted or fraudulent science."²⁰⁰ This reinforced prior disclosures of expert abuse.²⁰¹ Fred Zain was the most notorious,²⁰² but he was not alone; cases in Oklahoma City²⁰³ and Montana²⁰⁴ are currently under investigation.

run its own neutron activation tests of the material . . .").

¹⁹⁹ See Randolph N. Jonakait, *Forensic Science: The Need for Regulation*, 4 HARV. J. L. & TECH. 109 (1991). "Forensic scientists present opinions and conclusions without research. They fail to test the accuracy and reliability of their work until questions are raised by others . . ." *Id.* at 148. "All available information indicates that forensic science laboratories perform poorly. . . . Current regulation of clinical labs indicates that a regulatory system can improve crime laboratories." *Id.* at 191.

²⁰⁰ SCHECK ET AL., *supra* note 21, at 246.

²⁰¹ See Paul C. Giannelli, *The Abuse of Scientific Evidence in Criminal Cases: The Need for Independent Crime Laboratories*, 4 VA. J. SOC. POLICY & L. 439 (1997); see also David Bernstein, *Junk Science in the United States and the Commonwealth*, 21 YALE J. INT'L L. 123 (1996) (discussing cases in Canada, Australia, New Zealand, and England).

²⁰² Zain was Chief Serologist for ten years in West Virginia. In reviewing a judicial report on Zain's misconduct, the West Virginia Supreme Court spoke of "shocking and egregious violations," "corruption of our legal system," and "mock[ing] the ideal of justice under law." The report by the judge states:

The acts of misconduct on the part of 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.

In re Investigation of the W. Va. State Police Crime Lab., Serology Div., 438 S.E.2d 501, 503 (W. Va. 1993) (quoting report).

²⁰³ Jim Yardley, *Oklahoma Inquiry Focuses on Scientist Used by Prosecutors*, N.Y. TIMES, May 2, 2001, at A1.

²⁰⁴ See Adam Liptak, *2 States to Review Lab Work of Expert Who Erred on ID*, N.Y.

The Inspector General's 1997 report on the FBI laboratory demonstrated the extent of the problem.²⁰⁵ This investigation found inaccurate testimony, testimony beyond the competence of examiners, insufficient documentation of test results, scientifically flawed reports, inadequate record management and retention, and failures of management to resolve serious and credible allegation of incompetence. 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 the preparation and signing of separate reports instead of having one composite report "without attribution to individual examiners"; (4) establishing report review procedures by unit chiefs; (5) preparing adequate case files to support reports; (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.

These disclosures have had an impact. By 2001, the Florida Supreme Court felt compelled to note:

In order to preserve the integrity of the criminal justice system in Florida, particularly in the face of rising nationwide criticism of forensic evidence in general, our state courts—both trial and appellate—must apply the *Frye* test in a prudent manner to cull scientific fiction and junk science from fact. Any doubt as to admissibility under *Frye* should be resolved in a manner that minimizes the chance of a wrongful conviction, especially in a capital case.²⁰⁶

VI. RECOMMENDATIONS

Daubert has irrevocably altered the paradigm for the admissibility of expert testimony. While there have been several reforms, much remains to be done. First, basic scientific research is needed. Many forensic techniques gained judicial acceptance before demanding standards were required. Only the federal government—the FBI and National Institute of Justice—have the resources to fund this research. The actual research, however, needs to be done outside

TIMES, Dec. 19, 2002, at A24 (discussing hair evidence in the trial of Jimmy Ray Bromgard, who spent 15 years in prison before being exonerated by DNA).

²⁰⁵ FBI LABORATORY, *supra* note 87.

²⁰⁶ Ramirez v. State, 810 So. 2d 836, 853 (Fla. 2001) (citations omitted).

forensic science.²⁰⁷ It should be done by independent organizations such as the National Academy of Sciences,²⁰⁸ which has conducted studies on voiceprints,²⁰⁹ DNA,²¹⁰ polygraph,²¹¹ and comparative bullet lead analysis.²¹²

The need for independent review is illustrated by the DNA experience. In November 1991, Professor Seymour Geisser, a statistician at the University of Minnesota, submitted a critical paper

²⁰⁷ See REDMAYNE, *supra* note 1, at 25. Redmayne noted the limitations of publishing in forensic journals:

Details of [a] new technique might be published, but this will be in a limited range of journals—*Science and Justice*, *Journal of the Forensic Sciences*, *Forensic Science International*—that probably does not get read much outside the forensic science community. Publication here obviously counts for something, but it is usually only when a technique becomes controversial that the wider scientific community—including, sometimes, those best placed to judge its validity—will take an interest in it.

Id.; see also *United States v. Starzecpyzel*, 880 F. Supp. 1027, 1037 (S.D.N.Y. 1995). *Starzecpyzel* made a similar observation:

The next *Daubert* factor is peer review and publication. FDEs publish in several journals, including the *Journal of Forensic Sciences*, the *International Journal of Forensic Sciences*, and the *International Journal of Forensic Document Examiners*. Only a handful of articles in these journals were brought to the Court’s attention that speak to issues of the reliability of forensic document examination. In scrutinizing these articles, the Court found them to be significantly different from scholarly articles in such fields as medicine or physics, in their lack of critical scholarship.

Id.; see also *United States v. Saelee*, 162 F. Supp. 2d 1097, 1103 (D. Alaska 2001). In *Saelee*, the court explained that an:

[Expert] offered a four-page list of published and unpublished articles dealing with handwriting analysis. According to Mr. Cawley, these articles are written by forensic document examiners, and the published articles are presented at professional meetings for peer review. However, Mr. Cawley also testified that he did not know whether any of the articles discussed error rates, empirical testing, or coincidental matches, although he claimed to have read the articles. The list, without analysis of the substance of the articles, is of little use to the court. The court infers that most of the listed articles were written by proponents of the guild style (apprentice training) process of training handwriting examiners.

Id.

²⁰⁸ See 36 U.S.C.A. § 150303 (2001) (“On request of the United States Government, [the Academy] shall . . . investigate, examine, experiment, and report upon any subject of science or art . . .”).

²⁰⁹ NAT’L RESEARCH COUNCIL, ON THE THEORY AND PRACTICE OF VOICE IDENTIFICATION (1979).

²¹⁰ NAT’L RESEARCH COUNCIL, THE EVALUATION OF FORENSIC DNA EVIDENCE (1996); DNA TECHNOLOGY, *supra* note 83.

²¹¹ See POLYGRAPH AND LIE DETECTION, *supra* note 129.

²¹² This report is scheduled for release in the fall of 2003.

on the forensic use of DNA statistics to the *American Journal of Human Genetics*. The *Journal* asked Professor Geisser to obtain permission from the FBI to use their original data rather than the data submitted by the FBI to defense attorneys. Geisser then requested permission from Dr. Budowle, the FBI's top DNA scientist. James Kearney, head of the Forensic Science Research at the FBI, informed Geisser that (1) the FBI had made commitments earlier to other scientists (Chakraborty, Devlin, Risch, and Weir) and his study must not conflict with their studies, (2) the FBI data may be used only in a joint collaboration with Dr. Budowle, (3) the use of the data was restricted to this one paper, and (4) all authors must agree to the entire contents of a final manuscript prior to submission to a journal. Geisser believed that:

an independent study under such provisions would be totally compromised, if not impossible. . . . By the way, Chakraborty, Devlin, Risch and Weir have all published articles based on the FBI databases without Budowle as a co-author. Recently, I analyzed Cellmark databases for a court in Ann Arbor, Michigan. At the insistence of Cellmark, the prosecutor requested that the judge rule that I not be allowed to submit my analysis of their data for publication. So much for open science!²¹³

Second, the improvement of expert testimony in criminal cases depends on better crime laboratories.²¹⁴ They should be regulated²¹⁵ as in New York²¹⁶ and Oklahoma.²¹⁷ Labs need to be subjected to a rigorous accreditation process; the American Society of Crime Laboratory Directors' program is a good start.²¹⁸ Individual examiners need to undergo certification, a process that should

²¹³ Am. Ass'n for the Advancement of Sci., Committee on Scientific Freedom & Responsibility, 5 PROFESSIONAL ETHICS REPORT 2 (1992).

²¹⁴ See Nick Madigan, *Houston's Troubled DNA Crime Lab Faces Growing Scrutiny*, N.Y. TIMES, Feb. 9, 2003, at A20 (reporting that operations were suspended in December 2002 after an audit found numerous problems).

²¹⁵ See Eric Lander, *DNA Fingerprinting On Trial*, 339 NATURE 501, 505 (1989) ("At present, forensic science is virtually unregulated – with the paradoxical result that clinical laboratories must meet higher standards to be allowed to diagnose strep throat than forensic labs must meet to put a defendant on death row.").

²¹⁶ N.Y. EXEC. § 995-b (McKinney 2003).

²¹⁷ OKLA. STAT. ANN. tit. 74, § 150.37.

²¹⁸ See *Smith v. State*, 702 N.E.2d 668, 673 (Ind. 1998) (DNA). The *Smith* court acknowledged the importance of accreditation:

[T]he lab was accredited by the American Society of Crime Lab Directors in 1990. Furthermore, the lab runs its tests under controlled conditions, follows specific protocols, and conducts quality testing on the kits and the analysts. Any concerns in this respect go to the weight of the evidence, not its admissibility.

Id.; see also *Commonwealth v. Rosier*, 685 N.E.2d 739, 743 n.9 (Mass. 1997) (DNA).

include credible proficiency testing,²¹⁹ continuing education, and recertification. Finally, standardization of laboratory procedures, including written protocols are needed.²²⁰ All this requires money in an area where the underfunding of crime labs is chronic.²²¹

VII. CONCLUSION

Daubert has evolved into a stringent standard in civil cases. Paradoxically, and perhaps shamefully, this standard has not been consistently imposed in criminal cases. Moreover, the Supreme Court has repeatedly missed opportunities to require more exacting standards in the use of scientific evidence in criminal prosecutions. If the government is not willing to do the necessary validation research,

²¹⁹ In fingerprint cases, a British fingerprint examiner with twenty-five years experience at New Scotland Yard testified that the FBI proficiency tests were nearly fraudulent: "It's not testing their ability. It doesn't test their expertise. I mean I've set these tests to trainees and advanced technicians. And if I gave my experts these tests, they'd fall about laughing." *United States v. Llera Plaza*, 188 F. Supp. 2d 549, 558 (E.D. Pa. 2002).

²²⁰ See *State v. Jones*, 541 S.E.2d 813 (S.C. 2001). In *Jones*, the South Carolina Supreme Court observed that:

Kennedy has compared the insole impressions made in some 200 Canadian army boots with the feet of the wearers. He began research in the area in 1989 after earlier work done by Dr. Louise Robbins was discredited. Kennedy testified that different researchers use different methods in making these type comparisons, but that he felt his method (the one used by Agent Derrick) was the best. . . . Here, there was no written protocol in existence when Agent Derrick conducted his testing, much less one which had been subjected to SLED's quality control policies

Id. at 818, 819; see also *United States v. Bahena*, 223 F.3d 797, 809, 810 (8th Cir. 2000) (voicegram analysis rejected). The Eighth Circuit noted that:

[The expert] conceded that the method he used was not in accordance with the standards of the International Association for Identification. It is true, as defendant points out, that there are other organizations in the field, with other standards, but Mr. De Vir did not testify that the methods he used conformed to any recognized standards.

Id.

²²¹ In 1967, President Johnson's Crime Commission noted that "the great majority of police department laboratories have only minimal equipment and lack highly skilled personnel able to use the modern equipment now being developed." PRESIDENT'S COMMISSION ON LAW ENFORCEMENT AND ADMINISTRATION OF JUSTICE, *THE CHALLENGE OF CRIME IN A FREE SOCIETY* 235 (1967). In 1974, President Nixon's Crime Commission commented: "Too many police crime laboratories have been set upon budgets that preclude the recruitment of qualified, professional personnel." NAT'L ADVISORY COMMISSION ON CRIMINAL JUSTICE STANDARDS AND GOALS, *POLICE* 304 (1974). A report on Washington State crime labs revealed that a "staggering backlog of cases hinders investigations of murder, rape, arson, and other major crimes." Tomas Fuillen & Eric Nalder, *Overwhelming Evidence: Crime Labs in Crisis*, SEATTLE TIMES, Jun. 19, 1994, at A1, A14.

exclusion of evidence may be the only option.²²² Citing the “best evidence” principle,²²³ a British commentator has asserted:

[W]hen expert evidence is excluded owing to reliability concerns, the proponent may be able to improve the quality of the evidence in the future. This is most obvious when the proponent is the state, which is in a good position to carry out further research on a technique or theory.²²⁴

²²² See *United States v. Crisp*, 324 F.3d 261, 272 (4th Cir. 2003) (Michael, J., dissenting) (“The government has had ten years to comply with *Daubert*. It should not be given a pass in this case.”).

²²³ Professor Nance has argued against the conventional wisdom that posited jury control as the underlying rationale for evidentiary rules, a position put forth by Thayer and endorsed by McCormick. Dale A. Nance, *The Best Evidence Principle*, 73 IOWA L. REV. 227 (1988). Nance claimed that litigant control was a better explanatory theory—that is, the exclusion of some types of evidence is intended to require litigants to produce “better evidence.”

²²⁴ REDMAYNE, *supra* note 1, at 126.