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Banishing *Ipse Dixit*: The Impact of *Kumho Tire* on Forensic Identification Science

Michael J. Saks*

I. Introduction

From the viewpoint of conventional science, the forensic identification sciences are contenders for being the shoddiest science offered to the courts.¹ After being in business for nearly a century, they still have developed little that would be recognized as a scientific foundation and, consequently, have little basic science to apply to their operational activities. For much of the twentieth century, the courts readily admitted these fields, apparently because they were flying the banner of science and not because they presented sound data supporting their claims. The decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*² concluded that the duty of judicial gatekeeping of expert testimony could be met only if judges were persuaded of the soundness of an expert's underlying claims.³ No one was more surprised than the judges when they realized that subjecting the forensic identification sciences to *Daubert* scrutiny led to the conclusion that they should be excluded.⁴ Consequently, after *Daubert* courts began to look for ways to avoid its application

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1. This is, of course, more true of some of them and less true of others. See generally DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY (1997) [hereinafter FAIGMAN ET AL.]; John Thornton, *The General Assumptions and Rationale of Forensic Identification*, in 2 MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY § 20 (David L. Faigman et al. eds., 1997); J. Orenstein, *Effect of the Daubert Decision on Document Examinations from the Prosecutor's Perspective*, at <http://www.fbi.gov/programs/lab/fsc/backissu/oct1999/abstrcte.htm> (June 14-18, 1999) ("*Daubert* challenges prosecutors and the QDE [Questioned Document Examiner] community to work with scholars to develop ways to demonstrate to courts . . . that the basic principles of QDE analysis are scientifically valid . . ."). The QDE community has failed "to develop a rigorous empirical defense of its theories and methods." The reason for this shortcoming is that "forensic document examiners traditionally had not had any particular reason to conduct validity studies because their testimony was being admitted without them." *Id.*

2. 509 U.S. 579 (1993).

3. See *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 597 (1993) (concluding that evidence must be based on scientific principles).

4. See *United States v. Starzecpyzel*, 880 F. Supp. 1027, 1036 (S.D.N.Y. 1995) (stating that "were the court to apply *Daubert* to FDE [forensic document examination], it would have to be excluded").

to the forensic identification sciences. Moreover, some forensic identification scientists looked for ways to evade *Daubert* scrutiny. The solution to this problem for those judges and for pseudo-scientists was to re-classify those fields as non-science.⁵ But *Kumho Tire Co. v. Carmichael*⁶ patched that hole, so to say, at least by its apparent terms.⁷ That is to say, hauling down the science flag and hoisting the non-science flag does not exempt expert evidence from *Daubert* scrutiny.⁸

Together, *Daubert* and *Kumho Tire* do a remarkably clear job of commanding judges to properly scrutinize fields, presumably including the forensic identification sciences, before admitting opinions from those fields' practitioners. But one can never underestimate the ingenuity of judges in finding ways to evade rules that tell them to do something that would lead to a result contrary to the one suggested by their intuitions. The post-*Daubert*, pre-*Kumho Tire* period was telling: Obeying the letter and spirit of *Daubert* would lead to significant exclusion of a type of evidence that the courts welcomed for most of the twentieth century. On the other hand, a ruling to admit these fields would be both a rejection of conventional science as the criterion for admission of empirical claims and a ruling in the teeth of repeated unanimous Supreme Court opinions declaring the conventional scientific method to be the touchstone for evaluating empirical claims of all kinds.

The question with which this Article is concerned is: What are the prospects that *Kumho Tire* will compel courts to follow the commands of *Daubert*

5. *Id.*; see discussion *infra* notes 82-84 and accompanying text (discussing judicial re-classification of fields as non-scientific) and *infra* notes 88-89 and accompanying text (noting fields' own classification of themselves as scientific or not).

6. 526 U.S. 137 (1999).

7. *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 147-49 (1999). *Kumho Tire* states:

The initial question before us is whether [*Daubert's*] basic gatekeeping obligation applies only to "scientific" testimony or to all expert testimony. We, like the parties, believe that it applies to all expert testimony. . . .

....

Finally, 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. There is no clear line that divides the one from the others. . . .

....

We conclude that *Daubert's* general principles apply to the expert matters described in Rule 702. The Rule, in respect to all such matters, "establishes a standard of evidentiary reliability." It "requires a valid . . . connection to the pertinent inquiry as a precondition to admissibility."

Id. (citations omitted).

8. See *id.* at 149 (determining that labeling evidence non-scientific may not exempt it from *Daubert* test).

and to exclude expert opinions "connected to existing data only by the *ipse dixit* of the expert"?⁹

II. Defining the Fields

Let us be clear about the fields that we are discussing. There are two kinds of forensic science: On the one hand, there are normal applications of basic science. On the other hand, there is individualization science, or identification science. My focus will be on the latter, though it will not be my exclusive focus. Normal forensic science does things like determining what substance something is (e.g., what is that white powder?) or measuring the quantity of something (e.g., how much alcohol is in the murder victim's blood?). Forensic individualization sciences aim to connect a crime scene object or mark to the one and only source of that object or mark to the exclusion of all others in the world.

Examples of the forensic identification sciences include handwriting identification, fingerprints, firearms, toolmarks, bite marks, hair and fiber identification, tiremarks, footprints, and so on.¹⁰ This is a remarkable claim, especially considering how weak the theoretical and empirical bases of it are. Yet it is accepted widely in our culture as true. Question: How do the practitioners of these "sciences," or the public that has so long accepted the claims of expertise, know the claims to be true? The answer is *ipse dixit* (or *ipse dixit*'s close cousin, "experience"). Once one appreciates the weakness of the bases of forensic identification science, one can better understand why the casualness of judges in admitting these fields creates a serious problem and how *Kumho Tire*, if obeyed by the lower courts, could bring about a revolution in the courts and in forensic science itself.¹¹

III. The Scientific Status of These Fields

Most of the fields we are discussing did not grow out of basic science. Police investigators invented these fields to meet a criminal justice system need, namely, to help figure out who committed a crime and to help win a conviction. Scientists in university laboratories or in industry did not invent

9. General Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997).

10. Although DNA typing is a member of this family, I will omit it from the list because it is the exception that tests the rule and makes the failings of the others become apparent. 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, 362 (1991) (discussing how advances in DNA fingerprinting will make forensic science more scientific).

11. That is, obedience could turn the forensic sciences into what they have claimed they are – sciences. This would cause them to temper their claims and tether them to what is provable and not merely what is assertable.

the techniques; instead, police investigators who sometimes were engaged in little more than a parody of science invented them.¹² Other forensic sciences, what we might call the "normal forensic sciences" (e.g., forensic toxicology and forensic chemistry), borrow and apply principles from normal basic sciences such as physics, chemistry, and biology. Those applications have the benefit of basic research on which to build.

In seeking to establish pinpoint linkages between crime scene evidence and known exemplars, the forensic identification sciences seek to accomplish something that no other field attempts to accomplish and about which no other field has developed any basic scientific knowledge. The forensic identification sciences have no basic science to undergird them. For most of their history, the forensic identification sciences had little or no academic or industrial infrastructure to provide them with knowledge, resources, or personnel. Instead, they invented themselves, and they exist on their own. They are an enterprise consisting of nearly all application and no science.

There is no systematic, rigorous, empirical research on which the forensic identification sciences' knowledge is built. If called upon to prove their claims, they have little or no data to marshal in their support. Instead, the forensic identification sciences point to a guild of mutually self-reassuring examiners who have come to believe in the truth of their claims, often sounding more like a faith-based religion than a data-based science.¹³

The forensic identification sciences' best theoretical argument is the multiplication rule of probability theory. But, unlike DNA typing, they gather no data about base rate probabilities and perform no calculations to reach conclusions in the cases they work. They merely intuit the improbability of a coincidental match. Moreover, there is a disconnect in the theory. This disconnect is between their starting point and the assertions made about what the field can do. It is impossible to reach pinpoint identification from probability theory. Probability theory does not lead to the one-of-a-kind, absolute conclusions that forensic identification scientists generally offer in their reports and in court.¹⁴

12. See generally JURGEN THORWALD, *THE CENTURY OF THE DETECTIVE* (1965) (detailing historical development of forensics and investigative techniques of detectives); John Thornton, *Criminalistics – Past, Present, Future*, 11 LEX ET SCIENTIA 1 (1975) (discussing evolution of criminalistics).

13. For example, asserted handwriting experts routinely testify in *Daubert* hearings to a central maxim of their field: "No two people write the same way, and no one person writes the same way twice." The question neither the witnesses nor their field can answer is: How do they know these assertions to be true? Constant repetition of an assertion does not make it true ("the moon is made of green cheese").

14. See, e.g., HAROLD CUMMINS & CHARLES MIDLO, *DERMATOGLYPHICS* 154 (1943) ("It is unfortunate that this approach carries the implication that a complete correspondence of two

Forensic identification science examinations are overwhelmingly subjective affairs. Armed with no usable models and no base rate data, they must rely on impressions, subjective probability estimations, and intuition (termed "judgment" or "experience").¹⁵ Fingerprint identification experts have the advantage of large organized databases containing sets of previously collected and entered fingerprints. Their decisions, however, remain highly subjective.¹⁶ Indeed, the field requires experts to be doubly subjective: Not only must they reach a subjective judgment about the likelihood of a coincidental match, but they may not testify to an identification unless they believe that every other fingerprint expert's subjective judgment would render the same conclusion. Thus, fingerprint examiners must draw subjective impressions about other people's subjective impressions.

The identification science fields hold various beliefs about the phenomena with which they deal. These beliefs typically are untested. In some instances they are untestable.¹⁷ Tests suggest others to be untrue.¹⁸ Neither of

patterns might occur . . . it is impossible to offer decisive proof that no two fingerprints bear identical patterns."). See generally David A. Stoney, *What Made Us Ever Think We Could Individualize Using Statistics?*, 31 J. FORENSIC SCI. SOC'Y 197 (1991).

15. See, e.g., *United States v. Starzecpyzel*, 880 F. Supp. 1027, 1031-36 (S.D.N.Y. 1995) (explaining how Judge McKenna tried and failed to learn during *Daubert* hearing how Forensic Document Examiners (FDEs) reach their conclusions). For another example, consider these comments by a forensic scientist concerning fingerprint identification: "The criteria for absolute identification are wholly dependent on the subjective professional judgment of a fingerprint examiner. When a fingerprint examiner determines that there is *enough* corresponding detail to warrant the conclusion of absolute identification, then the criteria have been met." David A. Stoney, *Fingerprint Identification*, in 2 MODERN SCIENTIFIC EVIDENCE, *supra* note 1, § 21-2.1.2, at 65. "The criteria for absolute identification in fingerprint work are subjective and ill-defined. They are the product of probabilistic intuitions widely shared among fingerprint examiners, not of scientific research. This generally is unappreciated." *Id.* § 21-2.3.1, at 70.

16. In 1973, the International Association for Identification (IAI) declared that there was "no scientific basis" for adhering to any minimum standard. Instead, the IAI argued that the criteria for a match should be based on the examiner's expert opinion, rather than some arbitrary number of points. Simon Cole, *The Myth of Fingerprints*, LINGUA FRANCA, Nov. 2000, at 54, 60. Fingerprint examiners' belief that latent fingerprints can be matched to one person to the exclusion of all others is "the product of probabilistic intuitions widely shared among fingerprint examiners, not of scientific research. There is no justification based on conventional science, no theoretical model, statistics, or an empirical validation process." Stoney, *supra* note 15, at 72. If examiners subjected latent fingerprint identification to the kind of scrutiny visited upon DNA typing, fingerprint identification would have little science to fall back on. "Woe to fingerprint practice were such criteria applied." *Id.* In other words: *Ipse dixit*.

17. For example, it is hard to imagine how one could empirically test the maxim given earlier by the document examiner at *supra* note 13.

18. See generally John J. Harris, *How Much Do People Write Alike: A Study of Signatures*, 48 J. CRIM. L. CRIMINOLOGY & POLICE SCI. 647 (1958) (finding that, contrary to apparent belief of handwriting experts, it is not true that no two people write indistinguishably alike).

these problems has given pause to the experts or, indeed, to the lawyers or judges who offer, oppose, and make decisions about the implications of these problems for the courts' use of such evidence.

Because there is so little research and so little data, forensic identification scientists, unlike normal scientists, are relatively unconstrained by data-based knowledge of their field or the phenomena with which their field deals. This state of affairs allows forensic identification scientists to make exaggerated claims about the nature of those phenomena and about what the examiners can deliver. Many of these statements reflect the hopes and dreams of the fields' founders, but have come to be repeated today as if they were statements of reality. One of the founders of fingerprint evidence registered precisely this complaint about the developing field of fingerprint examination.¹⁹ One forensic dentist wrote that bite marks are more precise and more accurate than fingerprints.²⁰ Fingerprint experts claim that for any given fingerprint identification problem, all fingerprint experts would offer exactly the same opinion (and they will all either reach the correct conclusion or give none at all).²¹ Similarly, an FBI document section chief asserted that all qualified document examiners would reach the very same conclusion on all document problems.²² Additionally, handwriting experts commonly assert that no two people write indistinguishably alike (and that no one person writes the same way twice).²³

Evidence contradicting the beliefs of forensic science does not seem to interfere with continued adherence to those beliefs. The identifications of more than one suspect have matched crime scene bite marks equally well.²⁴ In a study done by the FBI in the course of litigation, fingerprint examiners were not

19. See Cole, *supra* note 16, at 56 ("Faulds complained that 'the popular fiction, that no two fingers can be alike' was being treated as 'a sober fact of the highest scientific certainty, but,' he pointed out, 'the only proof of it is seemingly the same 'fact' repeated in other words . . .").

20. This appeared in a draft, later edited out, of the chapter, Raymond Rawson, *Identification from Bitemarks*, in 2 MODERN SCIENTIFIC EVIDENCE, *supra* note 1, § 24 (draft on file with author).

21. See generally Simon Cole, *Witnessing Identification: Latent Fingerprint Evidence and Expert Knowledge*, 28 SOC. STUD. SCI. 687 (1998).

22. See DAVID FISHER, *HARD EVIDENCE* 196 (1995) (quoting FBI document section chief Ronald Furgerson as stating that in any given case all "180" "certified" document examiners in United States would reach same conclusions as he would).

23. But see *supra* note 17 and accompanying text (noting that some beliefs are untestable).

24. See *Milone v. Camp*, 22 F.3d 693, 705 (7th Cir. 1994) (acknowledging that defendant "has made a credible claim that newly discovered evidence would not only cast a doubt upon his guilt but would in fact exonerate him"); Lowell Levine, *Forensic Dentistry: Our Most Controversial Case*, in LEGAL MEDICINE ANNUAL 73 (Cyril Wecht ed., 1978) (discussing investigation in *Milone*).

unanimous in their opinions about the same questioned and known fingerprints.²⁵ In the first fingerprint proficiency tests, one-fifth of the experts erroneously identified the wrong person.²⁶ The only study aimed at testing the handwriting question found that "so many of these signatures lacked individuality and looked alike that they were not worth photographing."²⁷ Proficiency studies by the Forensic Sciences Foundation and the American Society of Crime Laboratory Directors have found accuracy to be less than perfect, to varying degrees, for all forensic identification disciplines. The response of some members of the fingerprint examiners' community is telling. They continue to deny that errors can occur, arguing that any study showing errors led to correction of the problems that led to the errors and is therefore not relevant to the current state of the art, which is presumed to have again become flawless.²⁸

By contrast, there are times when fields among the forensic sciences have proved themselves quite capable of doing research on the subject of their expertise, correcting erroneous beliefs and procedures, and advancing their knowledge. One example is the field of fire and arson experts. Most of their beliefs about indicators of arson were arrived at without the benefit of empirical testing. But eventually they put these beliefs to the test – by burning down buildings in which they had simulated both set and accidental fires with the goal being to determine whether the indicators correlated with the manner in which the fire began. From these experiments they learned that many of their beliefs about arson indicators were false.²⁹

Forensic identification examiners have made errors in proficiency testing, as well as in actual cases.³⁰ Articles reporting data on error rates in forensic

25. See *United States v. Mitchell*, Crim. No. 96-407-1 (E.D. Pa. Feb. 2000), *entering judgment after remand from* 145 F.3d 572 (3d Cir. 1998); *infra* notes 107-09 and accompanying text (discussing *Mitchell* further).

26. David L. Grieve, *Possession of Truth*, 46 J. FORENSIC IDENTIFICATION 524 (1996).

27. Harris, *supra* note 18, at 647.

28. *Mitchell*, Crim. No. 96-407-1 (testimony of Bruce Budowle).

29. Evidence once thought to indicate arson, but later found not to distinguish intentional fires from accidental fires, includes wide Vs versus narrow Vs, spalling of concrete, crazing of window glass, char blisters, window sooting or staining, and color of smoke and flame. See John Lentini, *Fires, Arsons and Explosions*, in 2 MODERN SCIENTIFIC EVIDENCE, *supra* note 1, § 26-2.2.1, at 238 (discussing evidence of arson). Yet fire and arson experts, through the International Association of Arson Investigators, felt themselves to be so lacking in their scientific foundations that they filed amicus briefs asking courts to exempt them from *Daubert*. See *Michigan Millers Mut. Ins. Corp. v. Benfield*, 140 F.3d 915, 919-20 (11th Cir. 1998) (discussing scientific basis of arson expert's testimony). The position they argued – that they were not really doing science after all, and non-science fields should be excused from having to prove their validity – is one that now has been rejected clearly by *Kumho Tire*.

30. Non-blind proficiency testing provides estimates of the upper bounds of accuracy, presumably because examiners do their best when they know they are being tested. P.L. Zajac

science proficiency testing are cited in the margin.³¹ In their book on cases of DNA exonerations, Scheck, Neufeld, and Dwyer reported on the factors leading to sixty-two established wrongful convictions.³² These data indicate fifty-six forensic science errors among those cases, including an erroneous DNA inclusion, erroneous serology inclusions, and errors from microscopic hair comparisons. Those do not include twenty-one additional instances of "defective or fraudulent science."³³

Another source of error is that forensic identification scientists often are aware of other potentially or irrefutably inculpatory evidence in a case. An elementary principle of perception is that such cues increase the likelihood that examiners will resolve ambiguities as consistent with the expectations.³⁴ Often, the bias in the examiner's perception and decision-making is inadvertent. But sometimes examiners deliberately misrepresent their own findings to be consistent with the other evidence³⁵ or seek out other evidence to resolve their own uncertainties. The Inspector General of the Justice Department found numerous instances of such practices in the areas of the FBI crime lab that his office investigated.³⁶ In another case, a DNA examiner discounted discrepancies and ambiguities in autorads because she knew that officers found property of the victim in the suspect's apartment.³⁷ In another illustra-

& B.W. Grunbaum, *Problems of Reliability in the Phenotyping of Erythrocyte Acid Phosphatase in Bloodstains*, 23 J. FORENSIC SCI. 615, 617 (1978).

31. See generally JOSEPH L. PETERSON ET AL., CRIME LABORATORY PROFICIENCY TESTING RESEARCH PROGRAM – FINAL REPORT (1978); Joseph L. Peterson & Penelope N. Markham, *Crime Laboratory Proficiency Testing Results, 1978-1991, II: Resolving Questions of Common Origin*, 40 J. FORENSIC SCI. 1009 (1995); D. Michael Risinger et al., *Exorcism of Ignorance as a Proxy for Rational Knowledge: The Case of Handwriting Identification "Expertise,"* 137 U. PA. L. REV. 731 (1989).

32. See BARRY SCHECK ET AL., ACTUAL INNOCENCE 263 (2000) (reporting data on factors leading to wrongful convictions).

33. For comparison, erroneous eyewitness identifications occurred in 52 cases. *Id.*

34. On the underlying psychology of this phenomenon from a cognitive perspective, see ULRIC NEISSER, COGNITION AND REALITY: PRINCIPLES AND IMPLICATIONS OF COGNITIVE PSYCHOLOGY 43-45 (1976), or, from a signal detection theory perspective, see Victoria L. Phillips et al., *The Application of Signal Detection Theory to Decision-Making in Forensic Science*, 45 J. FORENSIC SCI. __ (forthcoming 2000).

35. Andre Moenssens, *Novel Scientific Evidence in Civil and Criminal Cases: Some Words of Caution*, 84 J. CRIM. L. & CRIMINOLOGY 1, 17 (1993) ("All experts are tempted, many times during their careers, to report positive results when their inquiries came up inconclusive, or indeed to report a negative result as positive . . .").

36. OFFICE OF THE INSPECTOR GENERAL, UNITED STATES DEPARTMENT OF JUSTICE, THE FBI LABORATORY: AN INVESTIGATION INTO LABORATORY PRACTICES AND ALLEGED MISCONDUCT IN EXPLOSIVES-RELATED AND OTHER CASES 2.5 (1997) (reporting principal findings and recommendations).

37. See William C. Thompson, *Examiner Bias in Forensic RFLP Analysis*, SCI. TESTIMONY, at <http://www.scientific.org/case-in-point/articles/thompson/thompson.html> (last visited

tion, some bite mark experts wanted to engage in the practice of withholding their own opinions until the results of DNA testing were available, so that they could harmonize their own opinions with the DNA results.³⁸

The most interesting defense offered by or on behalf of forensic identification scientists for their failure to develop a sound scientific basis for their endeavors is an affirmative defense. The argument is that from the nineteenth century until recently, courts have not required forensic scientists to do research to prove the validity of their assertions, so it is unfair to demand it of them now.³⁹ In other words, their current weak scientific status is to be excused by their past weak scientific status, which is the fault of the courts. The idea that there was no need to test the premises of handwriting or fingerprint or firearms identification (and so on) unless and until the courts demanded that they be tested is an astonishing notion. In what other field – medicine, educational testing, aeronautical engineering, psychotherapy – would experts dream of arguing that testing their ideas and their effectiveness would or should be done only if the courts require it? Every other field of supposed scientific endeavor tests things all the time because it is the responsible thing to do, because it is what the science culture is all about. It is also what the law of evidence long presumed they would do.⁴⁰

If these fields have been waiting for the courts to tell them to test, then perhaps *Daubert* and *Kumho Tire* are telling them now. If *Daubert* and *Kumho Tire* are not making such demands, then these fields probably never will undertake such testing because they have, apparently, been waiting for courts to tell them to do so.

Oct. 12, 2000) (discussing forensic examiner bias in rape case). It is fine for the jury to take this into account. But such double-counting deprives the jury of the unique contribution of the scientific evidence; it turns good scientific evidence into junk.

38. To their credit, forensic odontologists have recommended a practice of endeavoring to remain blind to DNA results. See generally David J. Sweet, *Human Bite Marks – Examination, Recovery and Analysis*, in AMERICAN SOCIETY OF FORENSIC ODONTOLOGY, MANUAL OF FORENSIC ODONTOLOGY (C. Michael Bowers & Gary Bell eds., 3d ed. 1995).

39. See Orenstein, *supra* note 1. Orenstein stated that the QDE community has been:

[U]nfairly criticized . . . for failing to develop a rigorous empirical defense of its theories and methods. Like many forensic disciplines and unlike other scientific fields that can support research and marketing outside the courtroom, forensic document examiners traditionally had not had any particular reason to conduct validity studies because their testimony was being admitted without them. This may well be one of the valid criticisms of the *Frye* regime, but it is not a basis for arguing that QDE evidence is [inadmissible].

Id.

40. The central assumption of the test articulated in *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923), is that courts can trust scientific fields to verify their own knowledge before accepting it. If the fields verified their own knowledge, then the courts could defer to the conclusions of the fields when making their own admission or exclusion decisions.

IV. The Courts' Reception of These Fields Prior to Daubert

Unfortunately, as a result of the tradition and education of lawyers and judges, they are poorly prepared to evaluate the claims of forensic science, or any empirical claims. Lawyers and judges come from the world of literary interpretation, not from the world of empirical testing.⁴¹ To illustrate, I once began a course on research methodology and statistics for judges with the following problem. Suppose there are two different techniques for rejoining a length of intestine after a surgeon excises a diseased portion. Within the field of gastrointestinal surgery, two methods of rejoining were being debated – inverting versus everting. How could one determine which method is, indeed, better? The judges in my classroom were seriously stumped. One finally, and sheepishly, suggested: "You could ask an expert."⁴²

Accordingly, the history of the admission of forensic identification science in American courts is remarkably barren of serious examinations of the data (or lack of data) underlying the claims of various fields. The pre-*Daubert* courts generally paid so little attention to the theoretical and empirical support on which an asserted expertise might stand that post-*Daubert* courts often will have no choice but to start over at the beginning. This certainly is true concerning the early admissibility of fingerprint expert evidence.⁴³ Part of the problem is that the courts lacked sufficient skepticism. From the beginning, the uniqueness of fingerprint patterns was so widely assumed that it never seemed necessary to prove it. And part of the problem is that judges lacked skill at knowing how to subject empirical claims to scrutiny. In 1911, the first state supreme court to consider the admissibility of fingerprint experts relied on the assertions, unsupported by data, of several expert witnesses in fingerprint identification. The expert witnesses vouched for their own technique's validity and their own expertise.⁴⁴ In addition, the court cited two general encyclopedias, three treatises on crime investigation methods, and one English case.⁴⁵ Later courts did no better. And soon courts

41. "[T]he intellectual life of the whole of western society is increasingly being split into two polar groups Literary intellectuals at one pole – at the other scientists Between the two a gulf of mutual incomprehension" C.P. SNOW, *THE TWO CULTURES AND THE SCIENTIFIC REVOLUTION* 4 (1959).

42. I would like to think that most citizens would recall what they were taught in junior high school about designing experiments: Scientists randomly perform one technique on one half of the patients and perform the other technique on the other half and then compare the outcomes.

43. See 2 FAIGMAN ET AL., *supra* note 1, § 21-1.0, at 51-55 (discussing fingerprint evidence).

44. See *People v. Jennings*, 96 N.E. 1077, 1082 (Ill. 1911) (discussing expert testimony regarding fingerprints).

45. See *id.* at 1081 (noting that no U.S. court had ruled on admissibility of fingerprint evidence but pointing to ancient origins of identification system).

could find fingerprint expertise to be sound simply by citing other courts. Ironically, Henry Faulds, one of the pioneers of the use of fingerprints in the field of criminal identification, complained that "the popular fiction, that no two fingers can be alike" was being treated as "a sober fact of the highest scientific certainty" for no reason other than that people kept repeating that "fact."⁴⁶ In 1943, proponents of fingerprint uniqueness were forced, by their own unsuccessful efforts to prove that proposition true, to acknowledge that there still was no solid evidence or theory to support the conclusion, but only subjective impressions and faith.⁴⁷ But the courts had been sold on it long before.

Once courts accepted fingerprint identification, proponents of other asserted fields of forensic science availed themselves of the law's principal tool of reasoning: analogy. Every other field could claim that the phenomenon central to its claimed expertise was "just like fingerprints."

The story of asserted handwriting identification expertise is long and has been told at length.⁴⁸ It will suffice to quote from one of the most searching legal commentaries on the subject:

The story in the United States is even more complex. Until the passage of the English statute, most American jurisdictions followed English practice and rejected such expertise. There were some significant exceptions, however. In the 1836 case of *Moody v. Rowell*, Massachusetts became the first common law jurisdiction to authorize the use of such asserted expertise. The rationale of the *Moody* case is telling . . . [W]ithout evaluating the validity of the proffered experts' claims to expertise, the *Moody* Court ruled that such asserted expert testimony should be admitted because it could not be any worse than what was traditionally relied on. This seems to be the dominant rationale for the allowance of such testimony in those states which followed Massachusetts' lead over the next fifty to seventy-five years. While by 1900 a substantial majority of American jurisdictions accepted such testimony, the prevailing attitude may be best exemplified by the opinion of the New York Court of Appeals in *Hoag v. Wright*, where the court said:

The opinions of experts upon handwriting, who testify from comparison only, are regarded by the courts as of uncertain value, because in so many cases where such evidence is received wit-

46. Cole, *supra* note 16, at 56.

47. See HAROLD CUMMINS & CHARLES MIDLO, FINGER PRINTS, PALMS AND SOLES 149 (1943) (conceding that "[c]omplete observational proof that prints from two fingers are never identical is unattainable").

48. See D. Michael Risinger, *Handwriting Identification*, in 2 MODERN SCIENTIFIC EVIDENCE, *supra* note 1, §§ 22-1.0 to 22-1.5, at 80-89 (discussing history of handwriting identification).

nesses of equal honesty, intelligence and experience reach conclusions not only diametrically opposite, but always in favor of the party who called them.

While some courts continued to reject such expertise, and most which allowed it remained skeptical, a group of professional experts was growing up and beginning to seek greater respectability. . . .

....
The ultimate triumph of this vision was finally insured by the Lindbergh Baby kidnapping case, *State v. Hauptmann*, in 1936. Osborn was the chief witness called to testify that Bruno Richard Hauptmann had written all of the ransom notes found or sent after the abduction of the son of Charles A. Lindbergh. The public seemed to need to believe Hauptmann was guilty, wanted him convicted, and was grateful to those who supplied the evidence. Osborn became a celebrity. In the fifty years after the affirmance of *Hauptmann*, no reported opinion rejected handwriting expertise, nor was much skepticism displayed towards it. Rather, it became universally accepted as scientific and dependable.⁴⁹

Except for an intriguing pair of cases in the State of Washington, the claim that toolmarks are unique and can unerringly link a crime scene mark to a tool in the possession of a suspect "to the exclusion of all others in the world" has gone virtually unremarked upon by the courts – and, presumably, unchallenged by defense counsel. *State v. Clark*⁵⁰ was decided six months after the Washington Supreme Court reaffirmed its holding in *State v. Fasick*⁵¹ concerning the claim of uniqueness of knife blade striations, which stated that "[y]ou could not tell in a thousand years whether the two pieces were cut by the same knife."⁵² But the *Clark* court came to the opposite conclusion, holding that the toolmark comparisons "conclusively establish[ed]" the identity between the crime scene knife and the suspect's knife.⁵³ The court offered no explicit explanation for its 180-degree change of view, nor can much illumination be drawn from the briefs submitted in the case. The relevant facts were essentially the same in both cases; the critical circumstantial evidence was the same (branches cut with a knife); the expert was the same person; and the same arguments were offered (namely, the multiplication rule of probability theory used as a metaphor to argue that the likelihood of a coincidental match was small or nonexistent).⁵⁴ And though the personnel of the court changed, the change was insufficient to account for the change of

49. *Id.* § 22-1.3, at 82-85.

50. 287 P. 18 (Wash. 1930).

51. 270 P. 123 (Wash. 1928).

52. *State v. Fasick*, 270 P. 123, 124 (Wash. 1928).

53. *State v. Clark*, 287 P. 18, 20 (Wash. 1930).

54. *Id.* at 20-21; *Fasick*, 270 P. at 124-25.

votes (because the turnaround required some justices who rejected the arguments for toolmark identification in *Fasick* to accept those very same arguments in *Clark*). If the explanation is to be found in the nature of the crimes being prosecuted – murder of an unsavory person versus rape of a teenager – then we can only wonder what passed for legal reasoning in these cases. Because, thereafter, *Clark* was precedent for the admissibility of toolmark evidence in all courts in Washington state and, though that case was not cited by other state supreme courts, for sixty years there was not a single other judicial opinion questioning the validity of toolmark identification.⁵⁵

If one does a synthesis of voiceprint admissibility cases, here is what one finds: First, over time, no consensus developed about whether courts throughout the nation admitted or excluded claims of expertise in identifying voices using spectrographic analysis. Second, courts widely used the *Frye* test to evaluate admissibility, and whether the analysis led to admission or exclusion depended entirely on which version of *Frye* the court used – the narrow version (voiceprint practitioners alone were the reference population of experts) or the broad version (the views of experts from related relevant fields were included in the reference population).⁵⁶ The narrow version never led to exclusion. The broad version never led to admission.⁵⁷ Third, in 1979, after the National Academy of Sciences published an unfavorable review of the state of the science, the FBI ceased offering voice identification expert testimony in court. But that report had virtually no impact on the appellate opinions decided after its release. The pattern of admission and exclusion remained desultory. Indeed, after publication of that important review of the science, very few cases even cited it.⁵⁸

The first reported case of identification by bite mark comparison was *Doyle v. State*,⁵⁹ in which someone at the crime scene had bitten into a piece of cheese and the government argued that the bite mark matched the dentition of the defendant.⁶⁰ The defense did not challenge the government's use of the bite mark as identifying circumstantial evidence on scientific grounds, though scientists did not conduct relevant research on the subject of bite mark identification for another two decades.⁶¹ The first meaningful case involving bite

55. 2 FAIGMAN ET AL., *supra* note 1, § 23-1.1, at 126.

56. See *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923) (stating that expert testimony must be generally accepted "in the particular field in which it belongs").

57. See 2 FAIGMAN ET AL., *supra* note 1, § 25-1.0, at 190 (presenting relevant cases).

58. See *id.* (presenting relevant cases).

59. 263 S.W.2d 779 (Tex. Crim. App. 1954).

60. See *Doyle v. State*, 263 S.W.2d 779, 779 (Tex. Crim. App. 1954) (determining that defendant's compliance with sheriff's request to bite cheese is not confession).

61. See 2 FAIGMAN ET AL., *supra* note 1, § 24-1.0, at 158 (discussing *Doyle*).

mark identification – meaningful because there was a challenge to the science, which forced the court to write an opinion – was *People v. Marx*.⁶² This case began to end the controversy among forensic dentists, who to this point had refrained from offering identification testimony in criminal cases. But the experts described the dentition at issue in *Marx* as highly unusual, which made it an exception to the field's great hesitation to offering an inculpatory identification.⁶³ The appellate court turned aside a *Kelly-Frye* challenge by ignoring the logic and data underlying the identification and instead focusing on the instruments used, holding that dental materials and photography were not novel.⁶⁴ The court turned away a rare (but pertinent) challenge under the famed California case of *People v. Collins*⁶⁵ by concluding that the experts had not obtained, calculated, or relied on any probability data in reaching their conclusions.⁶⁶ Though the expert offered bite mark testimony in *Marx* because the particular dentition in the case was highly unusual, making it an exception to the uncertainty that dominated the field, the case nevertheless became precedent for the admission of bite mark evidence involving all kinds of dentition.⁶⁷

A year later, in the Illinois case of *People v. Milone*,⁶⁸ the number of forensic dentists who testified that their field had not yet achieved the ability to confidently link a suspect to a crime using dentition exceeded the number who testified that they did have the expertise – reflecting the field's heretofore cautious stance.⁶⁹ But the court ruled that what it heard was sufficient to

62. 126 Cal. Rptr. 350 (Cal. Ct. App. 1975).

63. See *People v. Marx*, 126 Cal. Rptr. 350, 354 (Cal. Ct. App. 1975) (relating testimony of expert that bite marks in question were extraordinarily distinct and defined).

64. See *id.* at 356 (describing techniques used by experts in their testimony as novel but not instruments and materials employed).

65. 438 P.2d 33 (Cal. 1968). In *People v. Collins*, a case found in nearly every evidence casebook, the California Supreme Court held that probability evidence was inadmissible to prove guilt when it consisted of: (a) speculative probabilities (rather than known relative frequencies of the attributes at issue), (b) a lack of proof that the attributes of interest consisted of independent events, and (c) invalid conclusions of rarity inferred from the probability calculation, which were suggested to the jury as establishing proof beyond a reasonable doubt. *People v. Collins*, 438 P.2d 33, 38-40 (Cal. 1968).

66. *Marx*, 126 Cal. Rptr. at 357. When applying *Collins*, one might have thought that courts would mark non-existent or fabricated data, involving an unknown assumption of independence, as evidence prime for exclusion, not admission. The *Marx* court apparently misread *Collins* as rejecting the application of probability theory and not as rejecting poor data that were poorly analyzed.

67. See 2 FAIGMAN ET AL., *supra* note 1, § 24-1.0, at 159 (discussing *Marx*).

68. 356 N.E.2d 1350 (Ill. App. Ct. 1976).

69. See *People v. Milone*, 356 N.E.2d 1350, 1356 (Ill. App. Ct. 1976) (finding expert testimony about bite mark identification admissible).

constitute "general acceptance."⁷⁰ In addition, the court cited the cases of *Doyle v. State*⁷¹ (which had no data), *Patterson v. State*⁷² (which relied on *Doyle*), and *Marx* (which was a case of extremely unusual dentition) as support for its conclusion.⁷³ Looking back after the defendant completed his term of imprisonment, there is good reason to believe that Milone was not the killer but that one Macek was.⁷⁴ The admissibility of bite mark identification expert testimony is one of those topsy-turvy events in legal history, in which the experts in a scientific field did not convince the courts of their expertise, but instead, the courts convinced the experts. Though once a singularly cautious field, Moenssens, Starrs, Henderson, and Inbau say that there is no longer any limit to what some forensic dentists will assert and testify.⁷⁵

The courts' treatment of these fields of asserted expertise illuminates the contrast between the traditional approach to factfinding in courts and the scientific approach to factfinding. The scientific method involves doing an empirical study, if possible an experiment or many experiments such as on the question of inverting versus everting intestines at the point where they are rejoined.⁷⁶ The outcomes of empirical studies, and only the outcomes of such studies, provide answers to the questions of the merit, or even the very existence, of expertise on some empirical phenomenon. The judicial method, on the other hand, considers the precedents of sister jurisdictions (what other judges thought), degree of accord among the experts (general acceptance), credibility (the expert witness's demeanor on the witness stand), judicial intuition (guesswork), and reasonableness and plausibility. For the task at hand, the courts' tools have the unfortunate quality of being reassuring at the same time that they are virtually useless for evaluating empirical claims. All of them are shortcuts at best, and evasions at worst, because each avoids cutting to the heart of the empirical claims. They remain on the sidelines of the issue by asking what others think or seem to think about something, rather than seeking to learn directly about the thing at issue.

70. *Id.* at 1358-60.

71. 263 S.W.2d 779 (Tex. Crim. App. 1954).

72. 509 S.W.2d 857 (Tex. Crim. App. 1974).

73. *Milone*, 356 N.E.2d at 1359; *see Patterson v. State*, 509 S.W.2d 857, 862-63 (Tex. Crim. App. 1974) (allowing admission of testimony regarding bite mark comparisons); *Doyle v. State*, 263 S.W.2d 779, 779-80 (Tex. Crim. App. 1954) (allowing bite mark evidence).

74. *See Milone v. Camp*, 22 F.3d 693, 701 (7th Cir. 1994) (concluding that defendant could not get relief in habeas corpus proceeding by arguing actual innocence with newly discovered evidence), *cert. denied*, 513 U.S. 1076 (1995).

75. ANDRE MOENSSENS ET AL., *SCIENTIFIC EVIDENCE IN CIVIL AND CRIMINAL CASES* § 16.07, at 985 (4th ed. 1995).

76. *See supra* note 42 and accompanying text (discussing scientific method).

Daubert and *Kumho Tire* direct courts to think about empirical problems in a manner that resembles the way scientists look at the same kinds of questions and thereby represent an important departure from the courts' traditional approach to these problems.

V. The Law's Treatment of These Fields After *Daubert*

As noted earlier, the conscientious application of *Daubert* to the forensic identification sciences would lead to significant limitations on their admissibility.⁷⁷ One illustration of this is *Williamson v. Reynolds*,⁷⁸ in which, in a habeas corpus proceeding, a federal district court found hair and fiber identification to be so unreliable (or of such undemonstrated reliability) that it was deemed inadmissible.⁷⁹ Before retrial, after twelve years on death row, courts exonerated the defendants with DNA evidence.⁸⁰

The *Williamson* case has been an exception. The largest reason that courts have not applied *Daubert* to proffered forensic identification evidence is that opponents fail to challenge the admission of the proffered evidence, at least in the criminal courts.⁸¹ Though *Daubert* fundamentally changed the terms of engagement, with a few exceptions, defense lawyers across the nation seemed not to notice.

In the post-*Daubert*, pre-*Kumho Tire* period, a variety of judicial strategies saved forensic identification from exclusion. In the case of *United States v. Starzecpyzel*,⁸² in which a forensic document examiner (FDE) was proffered to testify as to the genuineness of a signature, the court wrote: "Were the Court to apply *Daubert* to the proffered FDE testimony, it would have to be excluded. This conclusion derives from a straightforward analysis of the

77. DNA typing is the clear exception because good basic science constitutes its foundation and facilitates its day to day applications.

78. 904 F. Supp. 1529 (E.D. Okla. 1995).

79. See *Williamson v. Reynolds*, 904 F. Supp. 1529, 1558 (E.D. Okla. 1995) (describing unreliability of hair and fiber identification evidence). The Tenth Circuit Court of Appeals reversed that portion of the case, finding that "the district court applied the wrong standard in ruling that the hair analysis evidence was inadmissible." *Williamson v. Ward*, 110 F.3d 1508, 1522 (10th Cir. 1997). The appellate court held that on federal habeas review the issue was due process, not the substantive decision under *Daubert* determining whether the expert evidence was admissible, *Id.*

80. The *Williamson* case provides the subtitle of Scheck, Dwyer, and Neufeld's book, "Five Days to Execution . . ." See generally SCHECK ET AL., *supra* note 32. The actual killer turned out to be the government's star witness against Ronald Williamson and his co-defendant, Dennis Fritz. *Id.* at 148-55.

81. See generally D. Michael Risinger, *Navigating Expert Reliability: The Supreme Court Alters the Sailing Directions, But Where Is the Fleet?*, 64 ALB. L. REV. 99 (2000).

82. 880 F. Supp. 1027 (S.D.N.Y. 1995).

suggested *Daubert* factors . . . ⁸³ But the court's reasoning was more convoluted, finding that because FDEs flunked *Daubert*'s test, they are not scientists. Because they are not scientists, they are not subject to *Daubert*. Therefore, the testimony is admissible (under a test of judicial intuition about their reliability). This perfectly circular reasoning – much like saying a student is exempted from taking a test precisely because the student is incapable of passing it – was copied by other courts that faced the same issue.⁸⁴

Another strategy assumed that *Daubert* applies only to novel evidence. Although *Daubert* is explicit in saying that the test of admissibility of expert evidence under the federal rules applies equally to non-novel as to novel evidence,⁸⁵ it is remarkable how many lower court judges excused themselves from their gatekeeping duties by reading *Daubert* (or perhaps by not reading *Daubert*) to apply only to novel scientific evidence.⁸⁶

83. *United States v. Starzecpyzel*, 880 F. Supp. 1027, 1036 (S.D.N.Y. 1995).

84. *See United States v. Jones*, 107 F.3d 1147, 1159-61 (6th Cir. 1997) (finding handwriting expertise admissible but not subject to *Daubert*); *United States v. Velasquez*, 64 F.3d 844, 850-52 (3d Cir. 1995) (finding handwriting expert testimony to be non-scientific and therefore using *Daubert* tests as guidelines only); *United States v. Ruth*, 42 M.J. 730, 732-33 (A. Ct. Crim. App. 1995) (finding handwriting analysis non-scientific for *Daubert* purposes).

85. "[W]e do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence. Of course, well-established propositions are less likely to be challenged than those that are novel, and they are more handily defended." *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 592 n.11 (1993).

86. A number of courts mistakenly have assumed that *Daubert* applies only to novel science. *See Jugle v. Volkswagen of Am., Inc.*, 975 F. Supp. 576, 580 (D. Vt. 1997) (holding that expert opinion on cause of car fire differed from kind of novel science at issue in *Daubert* and therefore was not subject to *Daubert*'s scrutiny and finding methodology of experts acceptable while barely describing it); *Polizzi Meats, Inc. v. Aetna Life & Casualty Co.*, 931 F. Supp. 328, 336 (D.N.J. 1996) (reacting to plaintiff's argument that fire and arson experts were subject to *Daubert* by stating that "[t]his astounding contention is based on a seriously flawed reading of the United States Supreme Court's decision in [*Daubert*]. *Daubert* addresses the standards to be applied by a trial judge when faced with a proffer of expert scientific testimony based upon a novel theory or methodology"); *State v. Cline*, 909 P.2d 1171, 1177 (Mont. 1996) (limiting *Daubert*'s application to novel scientific evidence). In *Cline* the court stated:

[W]e do not consider fingerprint evidence in general to be novel scientific evidence. However, in the present case the issue is whether it is possible to determine the age of a fingerprint utilizing magnetic powder. We apply the *Daubert* standard to this case because we consider fingerprint aging techniques in this context to be novel scientific evidence. Certainly all scientific expert testimony is not subject to the *Daubert* standard and the *Daubert* test should only be used to determine the admissibility of novel scientific evidence.

Id.; *see also State v. Hodgson*, 512 N.W.2d 95, 98 (Minn. 1994) (concluding that even were Minnesota to adopt *Daubert*, it would have no impact on admissibility of bite marks because "we are satisfied that basic bite-mark analysis by a recognized expert is not a novel or emerging type of scientific evidence").

Yet another tactic assumed that the Federal Rules of Evidence, and therefore *Daubert*, were more liberal and therefore had to throw open the gates wider than *Frye* had.⁸⁷ If one looks at what *Daubert* actually does, and not at what courts and commentators have assumed about it, one discovers that *Frye* and *Daubert* will lead a gatekeeper to the same conclusion regarding most expert evidence. However, certain kinds of evidence will be excluded more readily under *Frye* and other kinds of evidence will be excluded more readily under *Daubert*. For example, courts evaluating evidence based on sound science, but that is so cutting edge that there has been no opportunity for a field to become acquainted with it, will exclude it under *Frye* but will admit it under *Daubert*. Obversely, *Frye*, but not *Daubert*, admits proffered testimony that is well accepted within its field, but which nevertheless relies on poor science.

Courts have saved some testimony from exclusion by treating the self-designation by experts as to which of the prongs of Federal Rule of Evidence 702 – scientific, technical, or other – was dispositive in determining the level of scrutiny they should receive. Thus, in *Michigan Millers Mutual Insurance Corp. v. Benfield*,⁸⁸ the Eleventh Circuit Court of Appeals found the testimony of an arson expert inadmissible because he made the mistake of calling himself a scientist and the substance of the testimony flunked *Daubert*.⁸⁹ But a fire marshal could give his opinion on the cause of a fire because he had not claimed the mantle of science, and therefore did not flunk *Daubert*.⁹⁰ Thus, the court admitted the fire marshal's testimony as technical or other expert opinion.⁹¹

Another method courts used to admit testimony was to accept so-called "experience" as a substitute for systematic empirical knowledge. Experience with some acquired skills or knowledge might well suffice for offering opin-

87. See *United States v. Jones*, 107 F.3d 1147, 1158 (6th Cir. 1997) ("Such a result [that is, excluding asserted "science" of handwriting identification that had for a century been admitted] truly would turn *Daubert*, a case intended to relax the admissibility requirements for expert scientific evidence, on its head."); *United States v. Kwong*, 69 F.3d 663, 668 (2d Cir. 1995) (stating on issue concerning polygraph evidence that Federal Rules of Evidence are "concededly more liberal than the *Frye* test"); *Borawick v. Shay*, 68 F.3d 597, 610 (2d Cir. 1995) ("[B]y loosening the strictures on scientific evidence set by *Frye*, *Daubert* reinforces the idea that there should be a presumption of admissibility of evidence."); *United States v. Bonds*, 12 F.3d 540, 568 (6th Cir. 1993) (finding that DNA typing "easily meets the more liberal test set out . . . in *Daubert*"); *State v. Cline*, 909 P.2d 1171, 1177 (Mont. 1996) (stating in opinion involving fingerprint identification that "we rejected the 'general acceptance' test, holding that it was not in conformity with the spirit of the new rules of evidence").

88. 140 F.3d 915 (11th Cir. 1998).

89. See *Michigan Millers Mut. Ins. Corp. v. Benfield*, 140 F.3d 915, 921 (11th Cir. 1998) (affirming district court's exclusion of expert testimony because testimony did not meet *Daubert* requirements).

90. *Id.*

91. *Id.*

ions on certain kinds of factual questions in a trial. But to think that experience suffices for reaching sound determinations about causation (for example, the general causation of cancer) or dependable linkages of suspects to crime scenes (for example, much of the forensic identification sciences) is to suspend critical thought. Casual experience is a weak form of an empirical testing; courts tempted to regard it as sufficient need a better epistemological theory than they have spoken of so far.⁹²

In other cases, the superficiality of the scrutiny given to the proffered expert testimony saved the evidence from exclusion. This is well illustrated by the case of *State v. Coon*,⁹³ a challenge to voiceprint expertise and the case by which Alaska adopted *Daubert* as state law.⁹⁴ The Alaska Supreme Court noted the greater scrutiny courts would be expected to give to expert evidence offerings under *Daubert* than under *Frye*.⁹⁵ At the trial court's hearing, the proponents of the evidence offered no research data or studies in support of the expertise.⁹⁶ The trial court neither asked the parties for evidence with some substance to it, nor did it carry out any library research of its own.⁹⁷ It was that meager record that the Alaska Supreme Court reviewed, did no further research on, remanded for no further inquiry, and upheld.⁹⁸ As far as can be told from the opinions, none of these courts was aware of the National Academy of Sciences review of the insufficient science underlying voice spectrography. All were content to base their decisions on the more or less unsupported testimony of the testifying voiceprint expert.⁹⁹ The Alaska Supreme Court's opinion states, "[N]o scientific literature was submitted to the trial court for review, but [the voice identification expert] testified about several articles and studies addressing voice spectrographic analysis, and conceded that the reliability of the technique was disputed among members of the relevant scientific community."¹⁰⁰ Thus, nothing was in the record to cite. The opinion

92. See generally D. Michael Risinger, *Preliminary Thoughts on a Functional Taxonomy of Expertise*, in 3 MODERN SCIENTIFIC EVIDENCE, *supra* note 1, § 34, at 1-20 (classifying experts by type).

93. 974 P.2d 386 (Alaska 1999).

94. See *State v. Coon*, 974 P.2d 386, 394 (Alaska 1999) (establishing *Daubert* standards in Alaska courts).

95. See *id.* at 395-96 (noting possible "substantial" burden that may be imposed upon trial and appellate judges in applying *Daubert* factors to novel scientific evidence).

96. *Id.* at 402 (stating that "[a]lthough it is not clear that voice spectrographic analysis has attained general acceptance within the relevant scientific community, we do not find that the trial court clearly erred in making its general acceptance finding").

97. See *id.* (noting lack of scientific literature provided to trial court for review).

98. *Id.*

99. *Id.*

100. *Id.*

gives a more detailed recitation of the expert's background than it does the data on the underpinnings of the technique at issue (for which any facts about the particular expert are irrelevant). Despite the *Coon* court's own discussion of the heightened analysis of the science that was called for under a *Daubert* review, it found entirely adequate a review of the scientific claims that would have had trouble earning a passing grade in a junior college science class.

One can only be struck by how vacuous so much of the judicial reasoning has been during the post-*Daubert*, pre-*Kumho Tire* period. This suggests that judges have been forced into an area where they are both seriously lost and have nary a clue as to how to conduct a meaningful review of empirical claims. Thus, the preferred decision-making and opinion-writing strategy has been to find ways to avoid coming to grips with the problem before them.

VI. Future Judicial Treatment of These Fields After *Kumho Tire*

This is an era we have only just entered, and so anything said about it will be no more than an educated guess and must be offered tentatively. *Kumho Tire* plugs a major hole that lower court judges created in *Daubert*. Now, courts must evaluate challenges to all fields of asserted expertise by using appropriate criteria. Where the proffered expertise is of an empirical nature, the usual scientific criteria are entirely appropriate. Thus, courts should consider whether the field in question has made an effort to test its claims or has assiduously avoided finding out which of its claims are true and which are not. Indeed, where it has made few or no efforts, the *Daubert* criteria are all the more illuminating.

Daubert and *Kumho Tire* demand of judges a powerful new way of thinking about evidence of the real world – not new for scientists, of course, or for serious scholars of almost every kind, but new for many courts. The power of judicial inertia, the judicial distaste for having to learn new ways of thinking, is deep. The intellectual energy and creativity of judges are far more likely to be employed in finding ways to avoid having to engage scientific and empirical issues in a serious way. Perhaps judges will find new holes to escape through and the Supreme Court will have to find new plugs with which to fill those holes.

Gatekeepers at the trial level might, on the other hand, begin to reflect more regularly the example of the district court in Boston which decided *United States v. Hines*,¹⁰¹ the first forensic document examination case decided after *Kumho Tire*.¹⁰² In the light of *Kumho Tire*, this court did apply

101. 55 F. Supp. 2d 62 (D. Mass. 1999).

102. See *United States v. Hines*, 55 F. Supp. 2d 62, 66 (D. Mass. 1999) (stating that *Kumho Tire* extended *Daubert* factors to cover non-scientific fields).

Daubert to asserted handwriting identification expertise¹⁰³ and found the opinion testimony of document examiners purporting to identify the author of a writing to be inadmissible, stating, "There are no meaningful, and accepted validity studies in the field."¹⁰⁴ A number of courts quickly followed this holding.¹⁰⁵ In short, these courts saw the same lack of a scientific foundation for the asserted expertise that the *Starzecpyzel* court did, but directed by *Kumho Tire* to apply *Daubert*, these courts found they had to exclude the proffered expert opinion.

In marked contrast is the performance of a federal district court in Philadelphia, which heard the first substantive challenge to the foundational claims of fingerprint identification made in many decades – indeed, the most substantive challenge ever heard in an American court.¹⁰⁶ At the *Daubert* hearing for *United States v. Mitchell*,¹⁰⁷ both the proponent and the opponent offered briefs, witnesses, and arguments that provided the court with serious information about the strengths and the weaknesses of the claims of fingerprint identification.¹⁰⁸ But the district judge made no written order or opinion, nor

103. Compare *id.* at 66-71 (extending *Daubert* to handwriting analysis) with *United States v. Starzecpyzel*, 880 F. Supp. 1027, 1036 (S.D.N.Y. 1995) (refusing to apply *Daubert* to forensic document examination because it found handwriting identification to be non-scientific). See also *supra* notes 82-83 and accompanying text (discussing *Starzecpyzel*).

104. *Hines*, 55 F. Supp. 2d at 69.

105. See, e.g., *United States v. Rutherford*, 104 F. Supp. 2d 1190, 1194 (D. Neb. 2000) (finding that forensic document examiner's testimony must be limited to explaining similarities and differences between questioned documents and known handwriting samples); *United States v. Santillan*, No. CR-96-40169, 1999 WL 1201765, at *5 (N.D. Cal. Dec. 3, 1999) (agreeing with *Hines*'s reasoning to exclude testimony of handwriting expert as to authorship of document); *United States v. Brown*, No. CR 99-184 ABC (C.D. Cal. Dec. 1, 1999) (unpublished order, on file with Washington and Lee Law Review) (allowing testimony by handwriting expert on similarity of defendant's handwriting to questioned documents, but not allowing any conclusions on actual authorship).

106. See *Cole*, *supra* note 16, at 60 (detailing expert testimony issues in *United States v. Mitchell*, Crim. No. 96-407-1 (E.D. Pa. Feb. 2000)); Letter from Robert Epstein, Assistant Federal Defender, Federal Community Defender Office for the Eastern District of Pennsylvania, to author (Jan. 20, 2000) (on file with author) (discussing court's ruling).

107. Crim. No. 96-407-1 (E.D. Pa. Feb. 2000).

108. See *United States v. Mitchell*, Crim. No. 96-407-1 (E.D. Pa. Feb. 2000). Prompted by this case, at the very end of twentieth century, the FBI fingerprint section initiated studies to demonstrate the validity of traditional claims about fingerprint identification. That fact alone should terrify a court. Why couldn't they bring in the hundreds of studies that ought to exist to support their claims of the past century? Because few were ever done. Because they do not exist. The data were disconcerting – as labs in all 50 states were sent the trial evidence and did not all come back with the same conclusions. The FBI re-sent the evidence to those labs that reached a differing opinion, pointing out what the FBI thought the conclusion should be. The labs changed their minds. See *Cole*, *supra* note 16, at 58-59 (discussing events in *Mitchell*); Epstein, *supra* note 106 (same).

did he offer any verbal explanation for his finding of evidentiary reliability. He merely stated his conclusions from the bench: That the fingerprint expert testimony was admissible and that its probative value outweighed its prejudicial impact.

At the point of collision between traditional, widespread, unthinking acceptance of the claims of fingerprint identification expertise and the requirement of scientific (or other reasoned) gatekeeping as a precondition to admission of expert evidence, this court did little more than to find a place to hide. The absence of an explanation prevents an appellate court from being able to evaluate the district court's gatekeeping, prevents sister courts from learning from whatever this court learned about the subject matter, and insures that other courts will revisit this issue on other occasions. Furthermore, the *Mitchell* court ignored that the fundamental source of judicial legitimacy in our system is the giving of reasons for important decisions.

Hines and *Mitchell* may represent the two extremes of judicial response in the wake of *Kumho Tire* – accepting the sometimes difficult duty to decide versus evasion of the duty. It is hard to believe that the requirements of *Daubert* and *Kumho Tire* are satisfied by replacing *ipse dixit* by experts with *ipse dixit* by judges.