FINGERPRINTS AND THE *DAUBERT* STANDARD FOR ADMISSION OF SCIENTIFIC EVIDENCE: WHY FINGERPRINTS FAIL AND A PROPOSED REMEDY

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I. INTRODUCTION

On March 11, 2004, several bombs ripped through three Madrid train stations, killing 191 people.[1] Spanish authorities lifted a fingerprint from a bag full of detonators, but were unable to match it to any in their databases.[2] Looking for assistance from abroad, they sent a digital copy of the fingerprint to the FBI, which quickly matched it to Brandon Mayfield, a Muslim attorney in Portland, whose fingerprints were on file from his service in the army.[3]

Arrested on a material witness warrant, Mayfield spent seventeen days in FBI custody.[4] Then he was released, with a shocking announcement: the FBI had erred.[5] The fingerprint match it had described as "100%" was incorrect.[6] After Spanish officials informed them that they had matched the fingerprint on the bag to an Algerian man, FBI examiners flew to Spain to compare the original print

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1. David Heath & Hal Bernton, *Portland Lawyer Released in Probe of Spain Bombings*, SEATTLE TIMES, May 21, 2004, at A1, http://seattletimes.nwsource.com/html/localnews/2001934919_mayfield21m.html.

2. *Id.*

3. *Id.*

4. John Leyden, *FBI Apology for Madrid Bomb Fingerprint Fiasco*, REGISTER (London), May 26, 2004, http://www.theregister.co.uk/2004/05/26/fbi_madrid_blunder.

5. Press Release, FBI, Statement on Brandon Mayfield Case (May 24, 2004), http://www.fbi.gov/pressrel/pressrel04/mayfield052404.htm.

6. David Heath & Hal Bernton, *FBI Admits Fingerprint Error, Clearing Portland Attorney*, SEATTLE TIMES, May 25, 2004, at A1, http://seattletimes.nwsource.com/html/localnews/2001937794_mayfield25m.html.

image, which they then declared did not match Mayfield's.[7] After Mayfield's release, the FBI issued a rare public apology to him.[8]

How could this happen? How, in 2004, could three separate FBI investigators so confidently misidentify a fingerprint, incarcerating an innocent man for over two weeks? While the FBI placed partial blame on the fact that the scanned fingerprint image it used was of "substandard quality," it admitted that it used "standard protocols and methodologies," and that the number of matching "points of similarity" between Mayfield's print and the digital image were "remarkable."[9] Clearly, the fuzzy image was not entirely to blame. What then, was the true source of the error? The answer may be surprising.

Since its first usage in a criminal trial nearly a century ago,[10] fingerprint evidence has become a courtroom staple.[11] So exalted are fingerprints that proponents of other forms of scientific evidence have routinely named their respective technologies to evoke the certainty and reliability of fingerprints, leading to such nomenclature as DNA fingerprinting,[12] ballistic fingerprinting,[13] and even nuclear fingerprinting.[14]

That other technologies have attempted to ride the coattails of fingerprinting is hardly surprising considering the enormous respect afforded to it by juries and judges alike. In one survey of nearly 1000 jurors, 85% believed

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7. *Id.*

8. Press Release, FBI, Statement on Brandon Mayfield Case (May 24, 2004), http://www.fbi.gov/pressrel/pressrel04/mayfield052404.htm.

9. *Id. See also* Jennifer L. Mnookin, *The Achilles' Heel of Fingerprints*, WASH. POST, May 29, 2004, at A27 (stating fifteen as the number of matching points claimed by the FBI).

10. *People v. Jennings*, 96 N.E. 1077 (Ill. 1911), was the first criminal case to admit latent fingerprint evidence.

11. A Lexis search run on January 26, 2004, for example, lists twenty-seven Federal and eighty-five State cases in the previous month with "fingerprint" as a Core Term.

12. *See, e.g.*, Kamrin T. MacKnight, *The Polymerase Chain Reaction (PCR): The Second Generation of DNA Analysis Methods Takes The Stand*, 20 SANTA CLARA COMPUTER & HIGH TECH. L.J. 95, 97 (2003) (noting that Restriction Fragment Length Polymorphism (RFLP) testing of DNA is "commonly referred to as 'DNA Fingerprinting'"); Benjamin W. Moulton, *The Society Page*, 31 J.L. MED. & ETHICS 463 (2003) (describing a National Institutes of Health grant entitled "DNA Fingerprinting and Civil Liberties").

13. *See, e.g., 'Ballistic Fingerprinting' Bill Approved by N.J. Assembly*, 4 No. 6 ANDREWS GUN INDUS. LITIG. REP. 10 (2002); Press Release, Dianne Feinstein, United States Senator from California, Kohl, Feinstein Ballistics Bill Combats Gun Violence with Technology (Mar. 29, 2000), http://feinstein.senate.gov/releases00/blast.html (referring to both "gun prints" and "gun fingerprinting").

14. *See, e.g.*, 54 AM. JUR. 3d *Proof of Facts* 381 § 16 (2003) (calling the gamma ray emissions that result from neutron activation analysis "nuclear fingerprints"); Charles B. Curtis, Securing Fissile Material in the Former Soviet Union, Comments to the Henry L. Stimson Center's Nuclear Roundtable (Feb. 28, 1996), http://www.bits.de/NRANEU/NonProliferation/docs/Curtis_remarks1996 (describing "a system that takes a 'nuclear fingerprint' of the material in a container" to combat nuclear proliferation).

fingerprints to be the most reliable method of identification.[15] One judge described fingerprints as "the very archetype of reliable expert testimony," likening his ruling to admit them to a declaration that "the sky is blue and the sun rose in the east yesterday."[16] Another described fingerprints as the evidentiary equivalent of a "heavyweight champ."[17] Several have described fingerprints as the strongest possible evidence of identifying criminals.[18]

Given the popular and judicial support of fingerprints, it may be surprising to see the fragility of the science underlying fingerprint identification. In one forensic expert's candid opinion, "[a]ny unbiased, intelligent assessment of fingerprint identification practices today reveals that there are, in reality, no standards."[19] The answer to the question of "[h]ow much correspondence between two fingerprints is sufficient to conclude that they were both made by the same finger?" is that it "is up to the individual expert fingerprint examiner to determine, based on that examiner's training, skill, and experience."[20] Dr. David Stoney, Director of the McCrone Research Institute in Chicago,[21] recognizes that this determination is ultimately "ill-defined, flexible, and explicitly subjective."[22] Perhaps most troubling is his description of the final step of the process as a "leap of faith," where in the judgment of the examiner, the two fingerprints must have come from the same individual.[23] A "leap of faith" hardly seems the appropriate basis for a conclusion that can land a person in prison.

But if Stoney's assessment of fingerprint identification seems pessimistic, it pales in comparison to the criticisms by Michael Saks.[24] Saks—a law professor at Arizona State University—contends that "a vote to admit fingerprints is a

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15. Robert Epstein, *Fingerprints Meet* Daubert*: The Myth of Fingerprint "Science" is Revealed*, 75 S. CAL. L. REV. 605, 605 n.3 (2002) (citing Charles Illsley, Juries, Fingerprints and the Expert Fingerprint Witness, Presentation at the International Symposium on Latent Prints at the FBI Academy 16 (July 1987)).

16. United States v. Havvard, 117 F. Supp. 2d 848, 855 (S.D. Ind. 2000).

17. *See, e.g.*, People v. Hyatt, (N.Y. Sup. Ct. Kings County Oct. 10, 2001), http://www.onin.com/fp/daubert_links3.html#ny_v_hyatt.

18. *See, e.g.*, United States v. Magee, 261 F.2d 609, 612 (7th Cir. 1958) ("[T]here can be no more reliable evidence of the identity of a defendant than his own fingerprints"); Piquett v. United States, 81 F.2d 75, 81 (7th Cir. 1936), *cert. denied*, 298 U.S. 664 (1936) (taking judicial notice of "the well recognized fact that identification by finger prints is about the surest method known, and that it is in universal use in the detection of criminals").

19. David A. Stoney, *Measurement of Fingerprint Individuality*, *in* ADVANCES IN FINGERPRINT TECHNOLOGY 327, 329 (Henry C. Lee & R.E. Gaensslen eds., 2d ed. 2001).

20. *Id.*

21. McCrone Research Institute, *at* http://www.mcri.org/ (last visited Aug. 29, 2004).

22. Stoney, *supra* note 19, at 329.

23. *Id.* at 332.

24. *See, e.g.*, Michael J. Saks, *The Legal and Scientific Evaluation of Forensic Science (Especially Fingerprint Expert Testimony)*, 33 SETON HALL L. REV. 1167, 1186–87 (2003) (concluding that the "failure of judges to write a coherent defense of asserted fingerprint expertise under *Daubert*, but only to seek ways to shelter it from serious scrutiny, suggests that fingerprint expert evidence actually does not meet the requirements of *Daubert*"); *see infra* notes 25–26.

rejection of conventional science as the criterion for admission."[25] He describes the "forensic identification sciences" (including fingerprinting) as "contenders for being the shoddiest science offered to the courts," having gained admission and popular acceptance "because they were flying the banner of science and not because they presented sound data supporting their claims."[26]

While a variety of critics have taken up the mantle of attacking fingerprint evidence,[27] far fewer have focused on salvaging it.[28] It is indisputable that fingerprints, when properly employed, can play a vital role in the justice system, both "to implicate guilty defendants, and to exonerate innocent suspects."[29] It would be destructive folly to eliminate their usage entirely simply because of current methodological problems. But at the same time, courts should not be forced to ignore or manipulate the clear language of *Daubert v. Merrell Dow Pharmaceuticals Inc.*[30] to justify their admission. This Note attempts to provide a partial solution to the problem established by *Daubert*, whose language seems to mandate the exclusion of fingerprint evidence.

Parts II and III provide a brief history of the rules for the admissibility of scientific evidence over the past century, including a description of the five *Daubert* factors. Part IV examines how fingerprint evidence fares under each of the factors. Part V considers judicial treatment of fingerprint evidence. Finally, Part VI analyzes the science behind fingerprints and proposes changes and developments that could bring such evidence in line with *Daubert* without being so overly burdensome as to entail their demise.

II. GENERAL ACCEPTANCE AND THE *FRYE* TEST

How did fingerprint evidence grow so rapidly from a scientific curiosity in the late Nineteenth Century[31] to a courtroom staple in less than fifty years?[32]

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25. Michael J. Saks, *Merlin and Solomon: Lessons from the Law's Formative Encounters with Forensic Identification Science*, 49 HASTINGS L.J. 1069, 1106 (1998).

26. Michael J. Saks, *Banishing Ipse Dixit: The Impact of* Kumho Tire *on Forensic Identification Science*, 57 WASH. & LEE L. REV. 879, 879 (2000).

27. *See, e.g.*, Saks, *supra* notes 25; Saks, *supra* 26; Epstein, *supra* note 15; Stoney *supra* note 19.

28. *See* Saks, *supra* note 24 (alluding to ways to improve fingerprint evidence by noting ways in which it currently fails to satisfy the *Daubert*/*Kumho Tire* tests, but not treating the improvement issue in depth).

29. Arizona v. Youngblood, 488 U.S. 51 (1988); *see also* Gonzalez v. City of New York, 69 Fed. Appx. 7 (2d Cir. 2003) (describing release of arrestee when four separate fingerprint tests showed he was not the individual named in the arrest warrant); *see supra* notes 7–8 and accompanying (describing the eventual exoneration of Brandon Mayfield based upon more careful fingerprint analysis).

30. *Daubert v. Merrell Dow Pharm. Inc.*, 509 U.S. 579 (1993) established criteria for the admission of scientific evidence in federal courts. *See infra* text accompanying notes 62–81 for a description of the facts and holding of *Daubert.*

31. *See generally*, SIMON A. COLE, SUSPECT IDENTITIES: A HISTORY OF FINGERPRINTING AND CRIMINAL IDENTIFICATION (Harvard University Press 2001); MARK TWAIN, THE TRAGEDY OF PUDD'NHEAD WILSON (1894) (featuring a title character whose eccentric hobby of collecting fingerprints later helps solve a murder).

Part of the explanation for fingerprints' uncritical acceptance and admittance for nearly a century can be attributed to the lax evidentiary standards employed by courts.[33] In *People v. Jennings*, the first case to admit fingerprint evidence, the Illinois Supreme Court allowed expert testimony for any subject such that "only persons of skill and experience in it are capable of forming a correct judgment."[34] Holding that fingerprint classification "is a science requiring study," not "within in [sic] the common experience of all men,"[35] the court admitted it, without providing any evidence justifying the claim that fingerprint experts could make such a correct judgment.[36]

The next two states to admit fingerprint evidence—New Jersey[37] and New York[38]—essentially disavowed any sort of special standard for fingerprints, holding that the accuracy and weight afforded to the evidence were matters for the jury, not the court to decide.[39] One commentator described this as "let it all in and let the jury figure out how much weight to give it."[40]

In addition, many courts allowed "dazzling demonstrations" by fingerprint experts, in which they would perform their craft in the courtroom, often examining and matching the fingerprints of the jurors to prove their ability.[41] The mere willingness of fingerprint examiners to perform such demonstrations was often powerful evidence in itself.[42] It was a vivid contrast to the practitioners of another emerging identification method, handwriting analysis, who generally refused to perform such tests, arguing that careful comparison of signatures required hours of detailed examination, and could not be achieved in a few minutes to impress a jury.[43]

After the first few cases admitted fingerprint evidence,[44] courts began to "piggy-back" on previous decisions,[45] quoting other courts to establish the proposition that the admissibility and accuracy of fingerprint evidence was "well

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32. *See infra* text accompanying notes 33–47 detailing the rapid acceptance of fingerprint evidence in state courts.

33. *See infra* text accompanying notes 34–53.

34. People v. Jennings, 96 N.E. 1077, 1082 (Ill. 1911).

35. *Id.* at 1083.

36. The court considered only the criticism that the four experts in the instant case were not sufficiently qualified to make such a determination, not that such a feat was impossible for anyone. *Id.*

37. State v. Cerciello, 90 A. 1112 (N.J. 1914).

38. People v. Roach, 109 N.E. 618 (N.Y. 1915).

39. *Cerciello*, 90 A. at 1114 (holding that the weight of the testimony of fingerprint experts was "quite properly left to the jury to determine"); *Roach*, 109 N.E. at 623 ("The evidence of the expert as to the identity of the finger prints of the defendant . . . was a proper subject for the consideration of the jury. The weight to be given to this evidence was for the jury, not the court, to determine.").

40. Epstein, *supra* note 15, at 615.

41. Jennifer Mnookin, *Fingerprint Evidence in an Age of DNA Profiling*, 67 BROOK. L. REV. 13, 22–26 (2001).

42. *Id.* at 25.

43. *Id.*

44 *See supra* notes 34, 37–38.

45. Epstein, *supra* note 15, at 616–17.

settled."[46] By 1932, barely two decades after *Jennings*, only five states did not accept fingerprints as valid scientific evidence.[47]

Concurrent with the growing acceptance of fingerprint evidence, in 1923 the District of Columbia Court of Appeals decided *Frye v. United States*, an important case concerning the admissibility of expert testimony based on scientific evidence.[48] It held that such testimony was admissible if and only if the technique used to produce the evidence was "generally accepted" as reliable by the scientific community.[49] While only binding on the D.C. Circuit, numerous jurisdictions accepted the *Frye* test.[50] Although not particularly influential until many years later,[51] the *Frye* test was important largely because of its timing. Fingerprint evidence gained common acceptance well before *Frye* did.[52] When courts finally did seek to apply the *Frye* test to fingerprints, they found it easily satisfied. Had the opposite order occurred, fingerprints may never have gained such widespread acceptance as admissible evidence.[53]

III. *FRYE*'S SUCCESSORS: THE FEDERAL RULES OF EVIDENCE AND *DAUBERT*

In 1972, after seven years of study and revision, the Supreme Court prescribed the Federal Rules of Evidence ("Rules"), to become effective July 1, 1973.[54] Chief Justice Warren Burger transmitted the Rules to Congress, which

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46. *See, e.g.*, McGarry v. State, 200 S.W. 527, 530 (Tex. Crim. App. 1918) (quoting *People v. Jennings*, 96 N.E. 1077 (Ill. 1911), verbatim to summarily conclude that "the evidence of the witness was admissible"); Moon v. State, 198 P. 288, 290 (Ariz. 1921) (holding it to be "well settled . . . that evidence of the correspondence of finger print impressions for the purpose of identification . . . is admissible in criminal cases," despite being only ten years after *Jennings*).

47. *See* Saks, *supra* note 25, at 1141 n.162 (citing DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY (1997) (collecting the cases from each state)).

48. Frye v. United States, 293 F. 1013 (App. D.C. 1923).

49. *Id.* at 1014.

50. *See, e.g.*, Reed v. State, 391 A.2d 364, 368 (Md. 1978); Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence:* Frye v. United States, *a Half-Century Later*, 80 COLUM. L. REV. 1197, 1205 (1980); Lisa Gonzalez, *The Admissibility of Scientific Evidence: The History and Demise of* Frye v. United States, 48 U. MIAMI L. REV. 371 (1993).

51. Saks, *supra* note 25, at 1076.

52. *Frye* was not cited by another court until a decade after it was decided, by which time fingerprints were already accepted in all but five states. *Id.*; Saks, *supra* note 25 at 1141 n.162 (citing DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY (1997)).

53. Jessica M. Sombat, Note, *Latent Justice:* Daubert*'s Impact on the Evaluation of Fingerprint Identification Testimony*, 70 FORDHAM L. REV. 2819, 2837 (2002).

54. Edward W. Cleary, *Introduction* to FEDERAL RULES OF EVIDENCE: 2004–2005 EDITION (West 2004).

suspended them for further study.[55] In 1975, Congress enacted an amended version of the Rules into law, to become effective July 1st, 1975.[56]

The Rules are widely regarded as being very expansive,[57] deeming relevant any evidence "having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence."[58] But this "liberal thrust"[59] seemed to conflict with *Frye*'s insistence upon general acceptance as a prerequisite for the admission of expert testimony based on scientific evidence.[60] Indeed, a split emerged in the circuit courts over whether the Rules superseded *Frye* or coexisted with it.[61]

The Supreme Court answered this question and introduced new standards for scientific evidence that fell in line with the Rules in *Daubert*.[62] The plaintiffs in that case, minors Jason Daubert and Eric Schuller, sued defendant Merrell Dow, claiming that its drug Bendectin (an antinausea drug taken by their mothers during pregnancy) caused their birth defects.[63] They sought to introduce testimony of eight experts who concluded that Bendectin was teratogenic, based upon: test tube studies, live animal studies, and "reanalysis" of the data in previously published epidemiological studies on Bendectin.[64]

The district court ruled the evidence inadmissible.[65] Citing *United States v. Kilgus*[66] (which itself relied upon *Frye*),[67] the court concluded that the plaintiffs'

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55. *Id.*

56. *Id.*

57. *See, e.g.*, EEOC v. Ind. Bell Tel. Co., 256 F.3d 516, 533 (7th Cir. 2001) (describing Rule 401 as expansive); United States v. Farnsworth, 729 F.2d 1158, 1161 (8th Cir. 1984) (describing Rule 701 as expansive); *In re* Dow Corning Corp., 244 B.R. 634, 653 (Bankr. E.D. Mich. 1999) (describing Rule 702 as expansive).

58. FED. R. EVID. 401.

59. Beech Aircraft Corp. v. Rainey, 488 U.S. 153, 169 (1988) (describing the "general approach" of the Rules as "relaxing the traditional barriers to 'opinion' testimony").

60. *See, e.g.*, United States v. Downing, 753 F.2d 1224, 1237 (1985), *aff'd*, 780 F.3d 1017 (3d Cir. 1985) (rejecting *Frye* as "at odds with the spirit, if not the precise language, of the Federal Rules of Evidence").

61. *Compare* U.S. v. Jakobetz, 955 F.2d 786, 793 (2d Cir. 1992), *cert. denied*, 506 U.S. 834 (1992) (holding, based on its previous decision in *United States v. Williams*, 583 F.2d 1194, 1198 (2d Cir. 1978), *cert. denied*, 439 U.S. 1117 (1979), that the FRE supercede *Frye*), *and* DeLuca v. Merrell Dow Pharm., Inc., 911 F.2d 941, 955 (3d Cir. 1990) (rejecting *Frye*'s "general acceptance" standard), *with* Christopherson v. Allied-Signal Corp., 939 F.2d 1106, 1110 (5th Cir. 1991) (holding that the rules and *Frye* coexist) *and* United States v. Shorter, 809 F.2d 54, 60 (D.C. Cir. 1987) (maintaining *Frye*'s "general acceptance" standard).

62. 509 U.S. 579 (1993).

63. *Id.* at 582.

64. *Id.* at 583.

65. Daubert v. Merrell Dow Pharm. Inc., 727 F. Supp. 570, 575 (S.D. Cal. 1989).

66. 571 F.2d 508 (9th Cir. 1978).

67. *Id.* at 510.

evidence did not meet the "general acceptance" standard.[68] Calling epidemiological evidence "the most reliable evidence of causation in this area," the court ruled that the test tube and animal studies "lack[ed] the sufficient foundation necessary" under the Rules to justify their admission.[69] The court also excluded the plaintiffs' reevaluations of existing epidemiological studies because they were never published, while numerous epidemiological studies finding no link between Bendectin and birth defects were published and subjected to critical peer review.[70] Having excluded the bulk of the plaintiffs' proposed evidence, the court granted summary judgment.[71] The Ninth Circuit Court of Appeals, citing *Frye*, upheld the decision.[72]

Noting the split between circuits,[73] the Supreme Court granted certiorari and used the case to finally bury *Frye*. Finding the assertion that the Rules assimilated *Frye* "unconvincing," the court ruled that *Frye*'s "austere standard" of general acceptance was "absent from, and incompatible with, the Federal Rules of Evidence, [and] should not be applied in federal trials."[74]

But dispensing of *Frye* did not mean that there were "no limits on the admissibility of purportedly scientific evidence."[75] Rather, the court formulated a new set of guidelines for judges to employ in a "gatekeeping" function to ensure that only reliable scientific evidence made it to the jury.[76] These five criteria are discussed below.

IV. FINGERPRINTS EVALUATED UNDER THE *DAUBERT* STANDARD FOR SCIENTIFIC EVIDENCE

In *Daubert*, the Supreme Court listed the following five factors for judges to consider in deciding whether to admit expert testimony based upon scientific evidence: (1) whether the evidence "can be (and has been) tested" using the scientific method;[77] (2) whether it has "been subjected to peer review and publication;"[78] (3) the "known or potential rate of error" of the technique in question;[79] (4) the "existence and maintenance of standards controlling the technique's operation;"[80] and (5) the "general acceptance" of the technique within the relevant scientific community.[81] This section examines these criteria in detail and evaluates fingerprint evidence under each.

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68. *Daubert*, 727 F. Supp. at 572.
69. *Id.* at 575.
70. *Id.* at 575–76.
71. *Id.* at 576.
72. Daubert v. Merrell Dow Pharm., Inc., 951 F.2d 1128, 1131 (9th Cir. 1991).
73. *See supra* notes 60–61.
74. *Daubert*, 509 U.S. at 589.
75. *Id.*
76. *Id.* at 593, 597.
77. *Id.* at 593.
78. *Id.*
79. *Id.* at 594.
80. *Id.*
81. *Id.*

A. Testing Using the Scientific Method

The ability of a theory or technique to be tested, evaluated is the *sine qua non* of science.[82] It is "what distinguishes science from other fields of human inquiry."[83] Any number of claims can be made alleging a particular fact or correspondence, but these are meaningless unless objectively verifiable (or more accurately, falsifiable).[84]

In the case of fingerprints, proponents make two key claims: that every individual possesses a unique and permanent set of fingerprints,[85] and that "fingerprint examiners can make reliable identifications from the type of small distorted latent fingerprint fragments that are typically detected at crime scenes."[86] Neither of these premises has been subjected to the type of rigorous testing typically demanded of scientific claims.[87] Indeed, it is surprising to learn just how little they have been tested at all.[88]

1. Uniqueness

The only surefire way to ascertain that no two fingerprints are alike would be to fingerprint every person on the planet and compare the results, a clearly impractical solution.[89] A more realistic method is to discover the frequency of various fingerprint characteristics to determine the odds of two prints from different individuals matching.[90] Such research has been conducted in other fields.[91]

For example, scientists analyzing the uniqueness of snowflakes have concluded that the number of possible arrangements of water molecules in a snowflake is 10^15,[92] a number far greater than the number of snowflakes that have ever fallen on earth,[93] making the belief that two identical snowflakes have

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82. Michael D. Green, *Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of Agent Orange and Bendectin Litigation*, 86 NW. U. L. REV. 643, 645 (1992).

83. *Id.*

84. Outside the realm of mathematics, a theory can never be proven absolutely true, as the possibility always exists that some new discovery could contradict it. But a theory can quite easily be disproven by such a new discovery. *See generally* David L. Faigman, *To Have and Have Not: Assessing the Value of Social Science to the Law as Science and Policy*, 38 EMORY L.J. 1005, 1014–21 (1989).

85. *See, e.g.*, Saks, *supra* note 25, at 1087 (describing forensic science as being based on the "doctrine of unique individuality").

86. Epstein, *supra* note 15, at 622.

87. *See infra* text accompanying notes 96–117.

88. *See infra* text accompanying notes 96–117.

89. With six billion people on the planet, such a test would involve more than 3.6 x 10^19 comparisons. Even at the spectacular rate of 1,000,000 tests per second, this would require over 1,000,000 years to complete.

90. *See infra* text accompanying notes 304–05.

91. *See infra* text accompanying notes 92–95.

92. Sombat, *supra* note 53, at 2819 n.6 (citing KEITH INMAN & NORAH RUDIN, AN INTRODUCTION TO FORENSIC DNA ANALYSIS 4 (1997)).

93. *Id.* at 2819 n.5.

ever occurred "unreasonable."[94] More relevant to this discussion, DNA experts intensely debated the use of different statistical models, and how to adequately quantify such low-probability events as a false positive DNA match.[95]

But despite having nearly a century to do so, the fingerprint community has never conducted similar testing.[96] In fact, the Department of Justice recently admitted the lack of such vital evidence.[97] In March 2000, the research branch of the Department of Justice, the National Institute of Justice, issued a "Solicitation for Forensic Friction Ridge (Fingerprint) Examination Validation Studies."[98] The Solicitation candidly admitted that "the theoretical basis for . . . individuality has had limited study," and that "[b]asic research" was needed "to determine the scientific validity of individuality in friction ridge examination."[99]

In 2000, in response to a *Daubert* challenge in *United States v. Mitchell*,[100] the FBI finally conducted such an experiment, intending to establish the uniqueness of fingerprints.[101] Unfortunately, the methodology was so fundamentally flawed as to make the concept of "identical" meaningless, and the results remain unpublished.[102] In short, the lynchpin of fingerprint identification—that no two are alike—has never been reliably demonstrated.

2. Ability to Make Accurate Identifications from Fingerprints

Even establishing the uniqueness of fingerprints fails to prove the second key claim: that fingerprint examiners can accurately determine that two fingerprint samples came from the same individual.[103] In Mitchell's *Daubert* hearing, the government conducted a test to prove this proposition.[104] It sent two latent fingerprints to fifty-three law enforcement agencies, along with a print card containing all ten of Mitchell's inked fingerprints.[105] It asked the agencies to select "court qualified" examiners to see if any matches could be made between the latents and the print card.[106] It did not inform the agencies that the FBI had already determined that the latents matched Mitchell's left and right thumb prints.[107] Of the

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94. *Id.* at 2820 n.8.
95. Epstein, *supra* note 15, at 624.
96. *Id.* at 623.
97. *See infra* text accompanying notes 98–102.
98. National Institute of Justice, *Forensic Friction Ridge (Fingerprint) Examination Validation Studies* (Mar. 2000), http://www.ncjrs.org/txtfiles1/nij/sl000386.txt (last visited Aug. 29, 2004).
99. *Id.*
100. 199 F. Supp. 2d 262 (E.D. Penn. 2002), *aff'd*, 365 F.3d 215 (3d Cir. 2004).
101. Epstein, *supra* note 15, at 630.
102. *Id.* at 630–31; *see infra* text accompanying notes 118–31 on the importance of publication and peer review.
103. For example, while every person has a unique genetic makeup (except for identical twins), this was impossible to prove prior to the advent of DNA testing.
104. Epstein, *supra* note 15, at 628–29.
105. *Id.*
106. *Id.* at 629.
107. *Id.*

thirty-four agencies that responded, nine failed to match either one or both of the latents to any of the ten prints on Mitchell's print card.[108]

The results of other studies are equally disappointing. In a 1995 exam authorized by the fingerprint examiners' own association, the International Association of Identification (IAI), only 44% of the 156 examiners who took the test recorded a perfect score.[109] This number improved to 58% in the 1998 exam,[110] but such results are still alarmingly bad. David Grieve, a leading fingerprint examiner, described the test as "a more than satisfactory representation of real casework conditions" that was "neither overly demanding nor unrealistic."[111] He called the results "unacceptable" and requiring "positive action by the entire community [of fingerprint examiners]."[112]

Fingerprint proponents tried to salvage this prong of the *Daubert* analysis by claiming that they tested fingerprints "adversarially," that is, in court.[113] One court accepted this claim that "the methods of latent print identification . . . have been tested for roughly 100 years. They have been tested in adversarial proceedings with the highest possible stakes: liberty and sometimes life."[114] But adversarial testing is not what the Supreme Court meant in *Daubert*.[115] As Justice Pollak stated eloquently in *United States v. Llera Plaza* (*Llera Plaza I*):

> It makes sense to rely on scientific testing, rather than "adversarial" courtroom testing, because to rely on the latter would be to vitiate the gatekeeping role of federal trial judges, thereby undermining the essence of Rule 702 as interpreted by the Court in *Daubert*. If "adversarial" testing were the benchmark—that is if the validity of a technique were submitted to the jury in each instance then the preliminary role of the judge in determining the scientific validity of a technique would never come into play. Thus, even 100 years of "adversarial" testing in court cannot substitute for scientific testing when the proposed expert testimony is presented as scientific in nature.[116]

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108. *Id.*

109. *Id.* at 634.

110. *Id.* at 635.

111. *Id.* at 634 (quoting David L. Grieve, *Possession of Truth*, 46 J. FORENSIC IDENTIFICATION 521, 524 (1996)).

112. *Id.* at 635.

113. *See, e.g.*, United States v. Llera Plaza (Llera Plaza I), 2002 WL 27305 *10 (E.D. Pa. 2002), *vacated and superseded on reconsideration by* United States v. Llera Plaza (Llera Plaza II), 188 F. Supp. 2d 549 (E.D. Pa. 2002) (arguing that fingerprint evidence has "'been tested empirically over a period of 100 years'-apparently refer[ring] to the fact that fingerprint identification has been a customary ingredient of trials for a century." (citations omitted)); *see infra* text accompanying notes 223–31 for a fuller discussion of the two *Llera Plaza* decisions.

114. United States v. Havvard, 117 F. Supp. 2d 848, 854 (S.D. Ind. 2000), *aff'd* 260 F.3d 597 (7th Cir. 2001).

115. 509 U.S. 579, 593 (1993) (describing the requirement that testing be "empirical" and capable of falsifying the hypothesis in question, neither of which square with adversarial court room testing).

116. *Llera Plaza I*, 2002 WL 27305, at *11.

That the government felt compelled to make such an argument, rather than simply pointing to the numerous tests validating fingerprint evidence, is extremely telling. The argument carries with it the implicit concession that such real tests, and thus real evidence, of the accuracy of fingerprints are absent.[117]

B. Peer Review and Publication

Like scientific testing,[118] peer review for fingerprint evidence is also severely lacking.[119] Even some members of the fingerprint community itself have noted this deficiency.[120] But for the most part, fingerprint examiners have taken the same approach toward peer review as they have toward testing: attempting to redefine it to satisfy the *Daubert* requirements.[121]

One such method is to classify the FBI's requirement that more than one fingerprint examiner perform the entire identification process as "peer review."[122] But this is not the meaning of peer review under *Daubert*,[123] or as used by scientists generally.[124] Rather, the term refers to a formal submission of research to a scientific journal, whose editorial board of fellow scientists carefully examines it.[125] It is not merely a second "opinion rendered by another examiner . . . [that] does little to put a 'scientific' gloss on the first opinion."[126]

Even the handful of publications that do exist on fingerprinting are generally deficient as scientific peer review, because the reviewers—other fingerprint examiners—are a technical, rather than scientific community.[127] Even the elites in the field "tend to be skilled professionals who have learned their craft

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117. *See* Epstein, *supra* note 15, at 626–28 (describing the implications of the National Institute of Justice's Solicitation, and the government's need to perform fingerprint experiments in *Mitchell*).

118. See *supra* text accompanying notes 82–117.

119. Epstein, *supra* note 15 at 644–45.

120. *Id.* at 644 n.209.

121. *See generally*, Saks, *supra* note 24, at 1184–86 (describing how courts have lowered the *Daubert* standards to save fingerprint evidence).

122. See, e.g., *Havvard*, 117 F. Supp. 2d 848, 854 (S.D. Ind. 2000) (finding that "methods of identification are subject to peer review" because "any other qualified examiner can compare the objective information upon which the opinion is based and may render a different opinion if warranted"). The *Havvard* opinion does not cite, but clearly is influenced by, the testimony of David Ashbaugh, who argued in that case that the verification prong of the FBI's ACE-V (analysis, comparison, evaluation, verification) methodology "is a form of peer review, and it is part of the scientific process." (quoted in *Llera Plaza I*, 2002 WL 27305, at *13).

123. *Daubert*, 509 U.S. 579, 593 (1993) (describing peer review as "submission to the scrutiny of the scientific community").

124. *See, e.g.*, DARYL E. CHUBIN & EDWARD J. HACKETT, PEERLESS SCIENCE: PEER REVIEW AND U.S. SCIENCE POLICY 2 (1990) (defining peer review as "an organized method for evaluating scientific work which is used by scientists to certify the correctness of procedures, establish the plausibility of results, and allocate scarce resources (such as journal space, research funds, recognition, and special honor).").

125. *Llera Plaza I*, 2002 WL 27305, at *12 (discussing the testimony of Stoney).

126. *Id.* at *13.

127. *Id.*

on the job and without any concomitant advanced academic training."[128] Finally, the publications that do exist, including the single technical journal (the *Journal of Forensic Identification*), focus far more on the means of lifting, developing, and classifying latent prints than on standards of comparison and identification.[129] Meaningful peer review simply does not exist for fingerprint evidence,[130] a fact acknowledged even by a court that willingly accepted it.[131]

C. Known or Potential Error Rate

Establishing an error rate for fingerprint identification is a tricky proposition that depends largely on how one defines the term.[132] There are two error rates to consider: practitioner and methodological error.[133] The former considers the likelihood that an examiner will mistakenly identify two fingerprints from the same individual as not matching, or two fingerprints from different individuals as matching.[134] As already discussed, few studies demonstrate what this rate is, and those that do exist show unacceptably high rates.[135]

Methodological error is defined as the likelihood that fingerprints from two different individuals will be wrongly declared a match, even without examiner error.[136] Testimony about methodological error is common for DNA evidence,[137]

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128. *Id.*

129. Epstein, *supra* note 15, at 644.

130. *See id.* at 644–45; DAVID R. ASHBAUGH, QUANTITATIVE-QUALITATIVE FRICTION RIDGE ANALYSIS: AN INTRODUCTION TO BASIC AND ADVANCED RIDGEOLOGY 4 (1999) (describing the "cultish demeanor" of the fingerprint community in which "[c]hallenges [to established beliefs and principles] were considered heresy").

131. *See* United States v. Havvard, 117 F. Supp. 2d 848, 854 (S.D. Ind. 2000) (noting that peer review "does not fit well with fingerprint identification because it is a field that has developed primarily for forensic purposes").

132. *See, e.g.*, *Llera Plaza I*, 2002 WL 27305 at *13–14 (quoting testimony from Dr. Bruce Budowle that "error rate is a difficult thing to calculate . . . . [It] is a wispy thing like smoke . . .").

133. *Id.* at *13.

134. *Id.* at *15–16.

135. *See supra* text accompanying notes 104–112.

136. *Llera Plaza I*, 2002 WL 27305 at *13–15.

137. *See, e.g.*, In her closing argument in *People v. Simpson*, Prosecutor Marsha Clark argued that:

> [The Defendant O.J. Simpson's] blood on the rear gate with that match that makes him one in 57 billion people that could have left that blood, I mean there is what, five million [sic] people on the planet, that means you would have to go through 57 billion people to find the DNA profile that matches Mr. Simpson's. There is [sic] only five billion people on the planet. Ladies and gentlemen, that is an identification, okay, that proves it is his blood. Nobody else's on the planet; no one. Now, they know that. Now, the blood on the socks, Nicole's blood on the socks. Again RFLP match, very powerful. Showed from cellmark that was a five-probe match and I believe found to be one in 6.8 billion people. Again, more than—there are people on the planet. Identification. And 11-probe match by DOJ showed that it was one in 7.7 billion people. Again, her blood and only hers on this planet could be on that sock.

but nonexistent for fingerprint evidence.[138] Even if we are to accept the commonly held but unsupported claim that no two fingerprints are identical,[139] this does not reduce the methodological error rate to zero as fingerprint proponents would like.[140] Many latent fingerprints found at crime scenes are either partial prints, distorted or damaged in some manner, or both.[141] Thus, the relevant inquiry is not the likelihood of a false positive between two complete, inked fingerprints obtained in laboratory conditions, but between one such print and a latent of variable size and quality.[142]

The "real world" methodological error rate thus depends on the number of points of correspondence present on the latent print.[143] Fingerprint examiners recognize this by refusing to declare a positive match when the number of comparable points is too low.[144] In some countries, there is an explicitly stated minimum number of correspondence points necessary to declare a match.[145] Even in the United States, where the number of points required to declare a match is left to individual labs (and in some cases, individual examiners), four points are

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Marsha Clark, Marsha Clark's Closing Arguments, (Sept. 29, 1995) http://www.law.umkc.edu/faculty/projects/ftrials/Simpson/Clarkca.htm. Here, the claim of DNA positively proving an identification derives from the mathematical unlikelihood of two individuals having the same DNA sequence, given the number of individuals on the planet, rather than a bald assertion of the impossibility of two individuals possessing the same DNA sequence, as is commonly claimed of fingerprints.

138. The IAI has actually passed a resolution declaring that fingerprint experts who testify in court that a match is "possible, probable or likely" commit professional misconduct. Mnookin, *supra* note 41, at 29 n.50. Experts may testify only to absolute certainties, thus implying both a methodological and practitioner error rate of 0%. *See id.*

139. *See, e.g.*, Alan L. McRoberts, *Nature Never Repeats Itself*, THE PRINT, Sept.–Oct. 1996, at 1 (citing approvingly a 1916 text, HARRIS WILDER & BERT WENTWORTH, PERSONAL IDENTIFICATION (1916), which claims that "there is never the slightest doubt of the impossibility of the duplication of a finger print, or even of the small part of one").

140. *See, e.g.*, *Llera Plaza I*, 2002 WL 27305 at *15 (quoting testimony from Dr. Stephen Meagher that the methodological error rate for fingerprint testing was zero).

141. *See, e.g.*, Paul C. Giannelli, *Fingerprints Challenged!*, 17 CRIM. JUST 33, 33 (2002) ("[l]atent prints are usually about 20% the size of rolled prints and subject to much distortion"); Andre A. Moenssens, *Handwriting Identification Evidence in the Post*-Daubert *World*, 66 UMKC L. Rev. 251, 281 (1997) (explaining that typical fingerprint analysis involves determining whether a "partial latent fingerprint of unknown provenance, usually fragmentary, partially blurred or smudged and 'developed' with a powder consisting of fine granules, matches in its individual ridge characteristics with a much clearer inked finger impression of a known individual").

142. Epstein, *supra* note 15, at 613 ("It simply does not follow from that premise [that all fingerprints are unique] that a fingerprint examiner can reliably make an identification from a small distorted fingerprint fragment that might reveal only a small number of ridge characteristics.").

143. Mnookin, *supra* note 41, at 60 (noting that no fingerprint examiner can "honestly answer" the questions "[h]ow likely is it that two people could have four points of resemblance, or five or six or eight or ten? Is the chance of two partial prints from different people matching one in a hundred, one in a hundred thousand, or one in a billion?").

144. Sombat, *supra* note 53, at 2847 (describing the conclusion an examiner makes when he cannot declare a match or non-match as "absolutely I don't know").

145. *See infra* text accompanying notes 161–68.

considered an absolute minimum to make an identification.[146] This reflects a judgment that with three or fewer points for comparison, the error rate exceeds zero.[147] But if the error rate with four—or any number—of points is zero, surely the error rate with one fewer point must be infinitesimally small.[148]

The reality of the error rate is that it decreases as the number and uniqueness of the matched points increases,[149] from a fairly meaningless one or two point match, to a match of such a large number of points that the odds of a methodological error is negligible for all practical purposes.[150] But in their zeal to testify only to 100% certain matches,[151] and unwillingness to admit the inherently probabilistic nature of fingerprint evidence,[152] examiners cling stubbornly to the assertion that the methodological error rate is zero.[153]

D. Objective Standards

Objective, agreed-upon, governing standards are important in ensuring the accuracy and fair application of evidence.[154] Unfortunately, such standards do not exist for two of the most crucial elements of fingerprint identification: the

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146. Michael Mears & Therese M. Day, *The Challenge of Fingerprint Comparison Opinions in the Defense of a Criminally Charged Client*, 19 GA. ST. U. L. REV. 705, 715 (2003).

147. See *supra* note 138, outlining the fingerprint community's standard of not declaring probable or likely matches, thus implying that the refusal to declare a match (or non-match) indicates in the examiner's mind a nonzero error rate.

148. The piecemeal function employed by fingerprint examiners—in which zero to *X* points of similarity results in a finding of no match, but any number greater than *X* is declared a match—is not only unscientific, but logically counterintuitive. By way of analogy, imagine flipping a coin a certain number of times to determine whether it is fair or "loaded." No rational person would say that after, for example, twelve straight "heads," he could make no determination one way or another whether the coin was loaded, but that after the thirteenth straight head, he could say with absolute confidence that it was.

149. To extend the coin analogy further, the odds of a fair coin landing heads five out of five times is one in thirty-two; the odds of this happening ten out of ten times is approximately one in one thousand; twenty out of twenty times, one in one million; and thirty out of thirty times, one in one billion. Somewhere between five and thirty consecutive flips of heads one could conclude beyond a reasonable doubt that the coin was loaded, but drawing an absolute line between two numbers with doubt on one side and certainty on the other is preposterous.

150. Because the average human fingerprint contains 75 to 175 points, Mears, *supra* note 146, at 712, and even the most conservative standards require only thirty points to declare a match, Epstein, *supra* note 15, at 637 n.172, achieving this higher degree of certainty is eminently within the realm of possibility.

151. *See supra* note 138.

152. *See, e.g.*, Saks, *supra* note 25, at 1087 ("[P]robabilistic models cannot prove absolutes, such as that no two are alike. . . . Nevertheless, in forensic science there has been a leap from notions of probability to belief in a doctrine of unique individuality.").

153. *See, e.g.*, *supra* note 140.

154. *See infra* text accompanying notes 293–96 on the use and importance of blind experiments in ensuring accuracy and objectivity.

number of Galton points required to declare a match (or even whether points should be used as the standard) and the training required for fingerprint analysts.[155]

1. Galton Point Requirements

The current method used for identifying and comparing fingerprints has not changed much in the past century.[156] In the 1890s, Francis Galton identified a variety of features that regularly occurred in fingerprints,[157] such as islands (single, independent ridges), bifurcations (where a ridge splits), and ridge endings (where a ridge comes to a sudden end).[158] These features are now known alternatively as "Galton points," "Galton details," "ridge characteristics," "ridge details," and "points of similarity."[159] Fingerprint examiners compare the Galton points of two fingerprints to determine if they match.[160]

In the United States, there is no fixed number of matching points required to declare that two prints came from the same individual.[161] Different jurisdictions,[162] labs,[163] and even individual examiners have their own standards.[164] This contrasts markedly with the practice of most other nations, which have a fixed minimum number of points. Italy, for example, requires sixteen points to declare a match, as does France[165] and, until recently, England and Wales.[166] Sweden requires seven;[167] Australia, twelve; and Brazil and Argentina thirty.[168]

But in the United States, not only is there no nationally set standard, examiners are free to set their own standards on a case-by-case basis, requiring more or fewer points depending upon the uniqueness and clarity of the matching points.[169] While this patchwork system of standards evolved more from the federalist nature of the U.S. criminal justice system than from any set plan,[170] many fingerprint apologists have actually tried to portray it as superior for allowing discretion and judgment calls by examiners.[171]

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155. *See infra* text accompanying notes 156–94.
156. Sombat, *supra* note 53, at 2829 n.81.
157. COLE, *supra* note 31, at 77–80.
158. *See* Mears, *supra* note 146, at 712–13 (describing the seven most commonly referred-to ridge characteristics).
159. Sombat, *supra* note 53, at 2829.
160. *Id.*
161. COLE, *supra* note 31, at 260–72 (describing the split between American and British fingerprint experts on minimum point standards).
162. *Id.* at 272.
163. *Id.* at 273.
164. *Id.* at 271.
165. Epstein, *supra* note 15, at 637.
166. *Id.* at 622 n.96.
167. Sombat, *supra* note 53, at 2846 n.236.
168. Epstein, *supra* note 15, at 637 n.172.
169. COLE, *supra* note 31, at 273.
170. *Id.* at 261.
171. *See, e.g.*, *id.* (describing how American fingerprint experts transformed "a historical accident [the lack of a unified point standard] into a scientific principle, insisting

In 1991, one federal district judge took notice of these "flexible" standards, raising the issue sua sponte in *United States v. Parks*.[172] The fingerprint examiner in that case testified that she employed an eight-point standard.[173] Since the latents at the crime scene in that case had between ten and twelve points of similarity with those of the defendant, she had no hesitancy declaring a match.[174]

The judge, who had heard fingerprint evidence in many other cases, was skeptical. He noted that fingerprint examiners were always "comfortable" with slightly fewer points than they had matched in the particular case, and that the number of points required by this examiner was quite low:

> I've had a lot of fingerprinting testimony, and it's been from the same group of people by and large. . . . [I]f you have only 10 points, you're comfortable with 8; if you have 12; you're comfortable with 10; if you have 50, you're comfortable with 20. . . . [You are] probably the most junior [fingerprint examiner] that I've ever permitted to testify as an expert, [and y]ou are comfortable with fewer than anybody that has ever testified before me before. And, as it happens, you also have fewer than anybody that's ever testified before me; that makes me very uncomfortable.[175]

Despite testimony by the examiner, her supervisor, and a third expert,[176] the government was unable to convince the judge of the scientific nature of fingerprint evidence.[177] Frustrated with the prosecution's inability to determine a minimum number of points,[178] the judge concluded that "there are very limited objective standards"[179] governing fingerprint evidence and excluded the evidence.[180] Interestingly, the case was decided under the old *Frye* standard of "general acceptance," not the five-part *Daubert* test.[181]

If expert disagreement over point standards is not distressing enough, many experts disagree with the use of a point standard entirely.[182] David

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that the determination of how much matching detail was enough should be a matter for the expert judgment of the examiner").

172. No. CR-91-358-JSL (C.D. Cal. Dec. 10, 1991).

173. COLE, supra note 31, at 272 (quoting testimony of Diana Castro).

174. *Id.* at 544–45.

175. Epstein, supra note 15, at 653–54.

176. *Id.* at 653–55.

177. The judge stated that fingerprint identification "could be turned into a science, but it isn't now, not from what you've said, and not from what she said, and not from what her supervisor said." *Id.* at 656.

178. The judge stated: "I want to know what the accepted level is generally. If all the treatises of all of the work done in this area says 10 is fine, that's fine; then 8 isn't fine. If it says 8 is fine, that's different. I don't know why I never heard 8 before if that's true." *Id.* at 654, n.259.

179. *Id.* at 656.

180. *Id.*

181. *United States v. Parks* was decided in 1991, two years before *Daubert*.

182. *See, e.g.*, John Thornton, Setting Standards in the Comparison and Identification, Presentation at the 84th Annual Training Conference of the California State Division of International Association for Identification (May 9, 2000), http://www.latent-prints.com/Thornton.htm (describing a split in the fingerprint community between "ridge

Ashbaugh, for example, argues for a "holistic" approach to fingerprint matching.[183] Depending upon the uniqueness and rarity of the ridge characteristics matched, any number may be required to form a definitive opinion.[184] Furthermore, Ashbaugh believes that fingerprint analysis should extend to "third level detail," beyond the fingerprint ridges themselves, to such features as sweat pores and the edges of the ridges.[185] But several other experts disagree with this approach, arguing that identification based on third level detail is untested and unreliable.[186]

2. Required Training for Fingerprint Examiners

For a "science" that is highly subjective—depending as it does upon the individual judgment of the examiner to declare a match—fingerprint identification has virtually non-existent standards for the training and qualification of examiners.[187] Unlike experts in many other scientific disciplines common in courtrooms—DNA testing and chemical analysis of drugs—there is no science of fingerprint testing outside of the courtroom.[188] There are no scientific fields or majors like biology or chemistry that a would-be examiner can study in a university. Instead, most training is on the job.[189] While the FBI requires a certain training regimen, the training provided by state and local police departments varies greatly in length and quality.[190] Often, it is of a "look and learn" variety, in which examiner-trainees follow and learn from a mentor until, in the mentor's opinion, the trainees are sufficiently qualified to judge latent prints on their own.[191]

Testing and certification are also deficient. As already shown, examiners have fared poorly on tests of their abilities.[192] In fact, half of examiners who took

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counters" and those who "favor a non-numerical standard," leading to a "professional schizophrenia," in which some count points, some do not, and "many people disclaim counting points altogether, but continue to do it").

183. David R. Ashbaugh, *The Premises of Friction Ridge Identification, Clarity, and the Identification Process*, 44 J. FORENSIC IDENTIFICATION 499, 513 (1994) (calling "unacceptable" the continued use of "the simplistic point philosophy in modern day forensic science").

184. Epstein, *supra* note 15, at 638.

185. *Id.* at 639.

186. *Id.* at 639–40.

187. *Id.* at 642.

188. Saks, *supra* note 26, at 881–82 ("Most of the fields we are discussing [e.g., handwriting identification, fingerprints, firearms, toolmarks, bite marks, hair and fiber identification, tiremarks, and footprints] 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 the techniques; instead, police investigators who sometimes were engaged in little more than a parody of science invented them. 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.").

189. Saks, *supra* note 26, at 881–82.

190. *Id.*

191. *Id.*

192. *See supra* text accompanying notes 104–12.

the certification test administered by the IAI failed.[193] But this did little to separate the wheat from the chaff in the examiner community; certification is not required, so the majority of examiners are not certified, and even many who have failed certification continue practicing with impunity.[194]

The dangers of such poorly trained examiners came to a head in the case of Rick Jackson.[195] Accused of a friend's murder, Jackson was convicted on the basis of fingerprints found at the crime scene.[196] Two local non-certified police officers and a third certified out-of-state expert testified that Jackson's fingerprints matched those found at the crime scene.[197] However, two former FBI experts—IAI certified and with a combined seventy-five years of experience—testified for the defense that not only did the prints not match, but that it wasn't "even a close call."[198] Despite their testimony, Jackson was convicted and spent two years in jail before being released after the FBI determined that the identification was erroneous.[199] While the certified expert who testified to the match was decertified, the two local officers are still allowed to read prints and testify.[200]

E. General Acceptance

Despite eliminating general acceptance as the sole test for the admissibility of expert evidence, *Daubert* recognized that it was still a relevant factor.[201] The court noted that "'a known technique which has been able to attract only minimal support within the community,' may properly be viewed with skepticism."[202] While widely and uncritically accepted among fingerprint technicians themselves (as well as the general populace), fingerprint evidence has been largely ignored among forensic scientists, and criticized by those who have addressed it.[203]

A paucity of studies exist on fingerprint evidence.[204] The few forensic experts who have looked at the technique in depth have generally drawn negative conclusions. For example, David Stoney, in evaluating the approximately one "dozen models for quantification of fingerprint individuality," concludes that not a single one "even approaches theoretical adequacy," or has "been subjected to

193. Epstein, *supra* note 15, at 642.
194. *Id.* at 642–43.
195. Jackson's story was shown on *Sixty Minutes*. *Sixty Minutes: Fingerprints: Infallible Evidence* (CBS television broadcast, Jan. 5, 2003), http://www.cbsnews.com/stories/2003/07/16/60minutes/main563607.shtml (updated summary).
196. *Id.*
197. *Id.*
198. *Id.*
199. *Id.*
200. *Id.*
201. 509 U.S. 579, 594 (1993).
202. *Id.* (quoting United States v. Downing, 753 F.2d 1224, 1238 (3d Cir. 1985)).
203. *See generally* COLE, *supra* note 31; Epstein, *supra* note 15; Saks, *supra* note 24; Saks, *supra* note 25; Saks, *supra* note 26.
204. *See supra* text accompanying notes 96–102.

empirical validation."[205] Michael Saks described forensic identification science (including fingerprinting) as being "overwhelmingly subjective . . . with no usable models and no base rate data."[206] Widely held beliefs are untested, untestable, or shown by tests to be untrue.[207] Nonetheless, these problems do not even give pause to the experts.[208] In short, in the larger scientific community of forensic evidence, the consensus is actually against fingerprinting as a viable and accurate form of evidence.[209] It is only among the practitioners themselves that the evidence is generally accepted.[210]

V. JUDICIAL REACTION TO *DAUBERT*

Despite *Daubert*'s admonition that the decision was to apply not just to recently developed or untested scientific evidence,[211] it failed to spark any sort of judicial revolution in the evaluation of long-accepted techniques like fingerprinting.[212] Few lawyers have seen fit to challenge fingerprint evidence against their clients, and even fewer judges have seriously considered these challenges.[213] Most made perfunctory rulings in favor of the admission of fingerprint evidence, with little if any analysis of the *Daubert* factors.[214] Instead, judges have generally relied on their instincts and the long history of judicial acceptance of fingerprint evidence to admit it without serious consideration of the science behind it.[215]

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205. DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY § 21-2.3.1 (1st ed. 1997).

206. Saks, *supra* note 26, at 883.

207. *Id.* at 883–84.

208. *Id.*

209. *See, e.g.*, ASHBAUGH, *supra* notes 130, 183; Epstein, *supra* note 15; Saks, *supra* note 25; Stoney, *supra* note 19.

210. Llera Plaza I, 2002 WL 27305 at *18 (E.D. Pa. 2002).

211. 509 U.S. 579, 593 n.11 ("Although the *Frye* decision itself focused exclusively on 'novel' scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence.").

212. *See* Saks, *supra* note 24, at 1186–87 (noting that fingerprint evidence has survived its collision with *Daubert* intact).

213. An extreme example of defense acquiescence to fingerprint evidence is evident in the scandal that erupted in 1992 among the New York State Police. A four-year investigation uncovered approximately forty instances in which investigators and troopers fabricated evidence over the previous eight years. COLE, *supra* note 31, at 274. Shockingly, the fabrications were often extremely amateurish and careless. Forgers accidentally left "practice" fabrications in case files and photocopied inked prints and called them latents. *Id.* at 279–80. One such fake still had the lines from the printed box on the fingerprint card. *Id.* at 280. Despite all this, defense attorneys did not challenge a single one of the forty fabrications. *Id.*

214. *See infra* text accompanying notes 216–38 (discussing typical judicial treatment of challenges to fingerprint evidence).

215. *See* Saks, *supra* note 24, at 1180–82.

A. Judicial Treatment of Fingerprint Evidence

Of forty challenges to fingerprint evidence between 1999 and 2002,[216] judges denied a *Daubert* hearing at least six times and ruled from the bench without a written opinion at least ten times.[217] Even where judges issued written opinions, they were generally short and lacking in detailed, persuasive analysis.[218]

In one case,[219] the court's nine-page opinion spent a mere five paragraphs addressing the testimony of the defense's witness, David Stoney.[220] It labeled his insights "valuable," but ultimately problematic because they "prove[] too much."[221] The court agreed that fingerprint identification was largely subjective, but concluded that this was not grounds for excluding it, since many other branches of science commonly employed in courtrooms were equally or even more subjective.[222] The court even went as far as to contend that if it were to take Stoney's criticisms to heart, "it would be necessary to eliminate the defense of insanity, since virtually all psychiatric opinions are subjective."[223] In so finding, the court completely ignored the key distinction that, unlike virtually all other subjective sciences, fingerprint evidence is not presented as subjective or uncertain, but rather as the gospel truth, untainted by human opinion or bias.[224]

Another case provides an even more bare-bones response to a defense challenge of fingerprints, devoting only one paragraph in a three-page opinion to the heart of the objection.[225] Without any evidence or citations, the court concludes simply that "fingerprint analysis has been tested and proven to be a reliable science over decades of use for judicial purposes," and that the evidence is thus admissible.[226]

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216. Forty cases on challenges to fingerprint evidence are compiled at Legal Challenges to Fingerprints, http://www.onin.com/fp/daubert_links.html. The website is run by Ed German, a member of the U.S. Army Criminal Investigation Command. Mr. German runs the site as a private endeavor, and it does not represent the position of his employer or any government agency. Mr. German is an ardent supporter of fingerprint evidence and the website is devoted to defending fingerprint evidence against legal challenges. While the possibility of bias exists in Mr. German's selection of cases, I use the site because it is the only location for many cases that are unavailable anywhere else. The reader should keep in mind that cases from this database are anecdotal evidence only.

217. Ed German, *Legal Challenges to Fingerprints*, *at* http://www.onin.com/fp/daubert_links.html. The exact process and nature of the judicial decisions on the website is not always indicated.

218. *See infra* notes 219–26.

219. United States v. Alteme, No. 99-8131-CR (S.D. Fla. Apr. 7, 2000), http://onin.com/fp/altemedaubert.pdf.

220. *Id.* at 2–3 (The decision refers to Dr. Stoney as both Storey and Story).

221. *Id.* at 7.

222. *Id.* at 7–8.

223. *Id.* at 8.

224. *See supra* note 138.

225. United States v. Sydney Joseph, No. 99–238, section N (E.D. La., May 14th, 2001), http://www.onin.com/fp/us_v_joseph_14may01.pdf.

226. *Id.* at 2–3.

Even the few cases that do provide in-depth treatment of the issue have failed to apply the *Daubert* factors fairly and without the inevitable prejudice resulting from the "common sense" belief in the reliability of fingerprints.[227] In *United States v. Havvard*,[228] for example, the federal district court for the Southern District of Indiana employed many of the previously discussed fallacies in applying the five *Daubert* factors to fingerprints.[229]

With regard to the issue of testing, the court substituted adversarial testing for scientific testing,[230] despite the fact that there is no way to verify the accuracy of adversarial testing.[231] Absent some startling subsequent development, such as DNA testing or the confession of another suspect, there is no way to know whether the person convicted on the basis of fingerprint evidence was truly guilty.[232]

The court also shifted the burden of proving an error rate, writing that the defense failed to present any evidence on the issue, or even to prove that any errors were ever committed.[233] The court reached this conclusion despite the fact that the burden of proving an error rate clearly falls on the proponent of evidence, not the opponent.[234] The court went on to declare the error rate for latent fingerprint evidence to be "vanishingly small."[235]

Peer review is equally misinterpreted, with the *Havvard* court finding it satisfied by the fact that "any other qualified examiner can compare the objective information upon which the opinion is based and may render a different opinion if warranted."[236] While recognizing that post-publication peer review did "not fit well with fingerprint identification because it is a field that has developed primarily for forensic purposes," the court again harked back to the concept of adversarial testing, concluding that that track record "provides far greater assurance of reliability than, for example, publication of one peer-reviewed article."[237]

Finally, the court spent a single sentence on the issue of controlling standards, concluding only that "there are such standards through professional training, peer review, criticism, and presentation of conflicting evidence."[238]

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227. *See* Saks, *supra* note 24, at 1184–85.

228. 117 F. Supp. 2d 848, 853–55 (S.D. Ind. 2000).

229. *See supra* text accompanying notes 77–81.

230. *See supra* text accompanying notes 113–17.

231. *See* Saks, *supra* note 25, at 1102 n.169 ("In actual disputed cases it rarely, if ever, is possible to tell whether the identification was correct or not; that is why the issue was before the factfinder.").

232. Adrian Cho, *Opinion Interview*, NEW SCIENTIST, June 16, 2001, at 42 (interviewing Simon Cole).

233. *Havvard*, 117 F. Supp. 2d at 854 (S.D. Ind. 2000).

234. *See, e.g.*, United States v. Pluta, 176 F.3d 43, 49 (2d Cir. 1999), *cert. denied*, 528 U.S. 906 (1999); United States v. Robbins, 197 F.3d 829, 838 (7th Cir. 1999); Evans v. Port Authority of New York and New Jersey, 192 F. Supp. 2d 247, 263 (S.D.N.Y. 2002).

235. *Havvard*, 117 F. Supp. 2d at 854.

236. *Id.*

237. *Id.*

238. *Id.*

In only one case did the court see fit to exclude fingerprint evidence, even partially.[239] In *Llera Plaza I*, Judge Pollak carefully weighed all five *Daubert* factors in concluding that fingerprint evidence flunked four of them, meeting only the general acceptance prong.[240] He restricted the government's ability to present its fingerprint evidence, allowing the witnesses to testify as to similarities between the defendant's latent prints and rolled prints, but preventing them from testifying to any sort of subjective opinions about whether the prints matched.[241]

Then he reversed himself.[242] Having based his previous decision only on the "cold" record of another fingerprint case,[243] Judge Pollak accepted the government's motion for reconsideration so he could hear live witness testimony on the matter.[244] In his second decision, Pollak allowed qualified examiners to testify to their opinions on whether the fingerprints matched.[245] But *Llera Plaza II* is in several respects less thorough than the original decision, devoting only minimal time to the issues of testing, peer review, and general acceptance.[246]

B. Judicial Treatment of Other Types of Scientific Evidence

The minimal judicial analysis of fingerprint evidence is even more remarkable when compared to the thorough opinions on other important scientific evidence and techniques, such as spectrographic voice identification,[247] handwriting analysis,[248] and accident reconstruction techniques.[249]

Perhaps the most interesting case in this regard is *Kumho Tire Co. v. Carmichael*.[250] In that case, which applied *Daubert* to technical evidence, the plaintiffs in a product liability lawsuit sought to introduce evidence that the rear-tire blowout responsible for their injuries was caused by a defect in the defendant's

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239. Llera Plaza I, 2002 WL 27305 (E.D. Pa. 2002).

240. *Id.* at *18.

241. The Court ruled that it would:

> permit the government to present testimony by fingerprint examiners who, suitably qualified as "expert" examiners by virtue of training and experience, may (1) describe how the rolled and latent fingerprints at issue in this case were obtained, (2) identify and place before the jury the fingerprints and such magnifications thereof as may be required to show minute details, and (3) point out observed similarities (and differences) between any latent print and any rolled print the government contends are attributable to the same person. What such expert witnesses will not be permitted to do is to present "evaluation" testimony as to their "opinion."

Id.

242. Llera Plaza II, 188 F. Supp. 2d 549 (E.D. Pa. 2002).

243. *United States v. Mitchell*, 199 F. Supp. 2d 262 (E.D. Pa. 2002).

244. *Llera Plaza II*, 188 F. Supp. 2d at 553.

245. *Id.* at 576.

246. For an excellent discussion of the two *Llera Plaza* cases, see Sombat, *supra* note 53.

247. *See, e.g.*, *infra* text accompanying notes 255–62.

248. *See, e.g.*, *infra* text accompanying notes 263–71.

249. *See, e.g.*, *infra* text accompanying notes 250–54.

250. 526 U.S. 137 (1999).

tire, not overdeflection (underinflating the tire or putting too much weight on it).[251] The plaintiffs' expert, Dennis Carlson, sought to testify that overdeflection leaves up to four physical symptoms on a tire.[252] The presence of two or more of these signs indicates overdeflection as the cause of the blowout; only one or none of these signs means it was a defect.[253]

The Supreme Court ruled that the trial court correctly determined such evidence inadmissible, finding no support "in the record that other experts in the industry use Carlson's two-factor test."[254] The parallels to fingerprint evidence are striking—the standards for Galton point matching are just as unsupported as Carlson's two-of-four symptom test, and yet have received far less judicial scrutiny.

Other types of scientific evidence also received analysis under the *Daubert* test that could be applied to fingerprint evidence. In *United States v. Smith* (a case cited in *Daubert*), the court considered the error rate of spectrographic voice identification.[255] The court discussed various studies on the error rate of the technique, noting the discrepancies between them.[256] For example, one study of 35,000 voice comparisons found "the error rate for false identifications was 2.4% and the error rate for false eliminations was about 6%."[257] A follow up study found that these rates diminished to zero when "involving only actual cases examined by trained voice examiners."[258] The defense countered with studies showing a much higher error rate, which the prosecution witness claimed were flawed for various reasons.[259] Because both of the defendants were African-American females, the defense argued the importance of the lack of studies on that demographic group.[260] The appeals court weighed the competing claims and found the evidence sufficiently reliable to justify its admission by the trial judge.[261] On the other hand, courts have been generally unconcerned with such evidence for fingerprints.[262]

A final example of differential judicial treatment of fingerprints and other scientific evidence is the "startling transformation in the judicial treatment of handwriting experts" subsequent to *Daubert* and *Kumho Tire*.[263] In *United States v. Starzecpyzel*,[264] decided before *Kumho Tire*, the court wrote that if it were to "apply *Daubert* to the proffered [Forensic Document Examiner] testimony, it

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251. *Id.* at 143–44.
252. *Id.* at 144.
253. *Id.*
254. *Id.* at 157.
255. 869 F.2d 348, 352 (7th Cir. 1989).
256. *Id.* at 353–54.
257. *Id.* at 353.
258. *Id.* at 353–54.
259. *Id.* at 354.
260. *Id.*
261. *Id.*
262. *See, e.g.*, United States v. Havvard, 117 F. Supp. 2d 848 (S.D. Ind. 2000); *see supra* text accompanying notes 227–37.
263. Epstein, *supra* note 15, at 620 n.81.
264. 880 F. Supp. 1027 (S.D.N.Y. 1995).

would have to be excluded."[265] Likewise, in *United States v. Saelee*,[266] the court completely excluded the government's proffered handwriting evidence, noting "a lack of empirical evidence on the proficiency of document examiners,"[267] that "there has never been any empirical research done on the theory of probability on which handwriting analysis is based,"[268] and a "lack of controlling standards,"[269] among other problems.[270] Several other courts have refused admission of handwriting evidence in whole or in part.[271]

In their quest to maintain the admissibility of fingerprint evidence, courts are extremely reluctant to apply equal scrutiny to fingerprint evidence. This need not be the case. Through a combination of testing and a revised approach toward the presentation and evaluation of fingerprint evidence, it can still serve as a useful tool in trials without ignoring or short-shrifting the *Daubert* standards.

VI. "SAVING" FINGERPRINTS UNDER *DAUBERT*

For all of its flaws, fingerprint evidence can still be tremendously valuable, provided that it is properly presented. Courts routinely admit imperfect scientific evidence, with the jury using its discretion to determine how much weight to assign it.[272] Experts in such fields as psychiatry[273] and arson investigation[274] routinely testify to matters of opinion based upon scientific evidence, in which it is clear that their opinions are not absolute certainties. In civil trials, and even some criminal trials involving forensic evidence, "dueling" experts are commonplace, with the decision left to the jury of whose interpretation of the evidence to believe.[275] Even DNA, the paragon of forensic identity evidence, is presented in terms of odds (albeit extreme ones), not absolutes.[276]

Fingerprints could also be presented this way if two conditions are met: first, testing and scholarly investigation of fingerprint evidence must be performed so that evidentially supported statistics that satisfy the *Daubert* criteria can be used to determine the likelihood of a match; and second, the fingerprint community must abandon its insistence upon the uniqueness and objectivity of fingerprint

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265. *Id.* at 1036.
266. United States v. Saelee, 162 F. Supp. 2d 1097 (D. Alaska. 2001).
267. *Id.* at 1102.
268. *Id.*
269. *Id.* at 1104
270. *Id.* at 1104–06.
271. *E.g.*, United States v. Rutherford, 104 F. Supp. 2d 1190 (D. Neb. 2000); United States v. Hines, 55 F. Supp. 2d 62 (D. Mass. 1999). *See generally* Michael Risinger, *Defining the "Task at Hand": Non-Science Forensic Science After* Kumho Tire Co. v. Carmichael, 57 WASH. & LEE L. REV. 767 (2000); Saks, *supra* note 26, at 888–89.
272. The Seventh Circuit, for example, allows polygraph results to be admitted at the discretion of the trial judge, while recognizing that they are of "disputed reliability." United States v. Smith, 869 F.2d 348, 353 (7th Cir. 1989).
273. *See infra* note 304.
274. *See infra* notes 317–18.
275. *See, e.g.*, COLE, *supra* note 31, at 200.
276. *See, e.g.*, *supra* note 137.

identification that ostensibly distinguishes it from other types of scientific evidence.[277]

A. Testing

A variety of testing is possible to bring fingerprint evidence up to *Daubert* standards. One such study which would be of great value is one that examines the frequency of various ridge patterns and their locations, and whether they occur entirely independently or whether certain patterns are linked to others.[278] This would be used to determine the likelihood of a false positive match between two different individuals' fingerprints, given a certain number of ridge characteristics and their nature. Such studies have already been done on DNA, "where scientific testing has been done to calculate the probability of a coincidental match."[279] Scientists and attorneys have even engaged in vigorous debate over the correct statistical models to apply,[280] and how to account for concerns like differential allele distribution and linkage among different ethnic groups.[281]

One aspect of this testing that would prove particularly informative would be to look specifically for instances of duplicate fingerprints, or partial fingerprints, something which has never been done largely because it is not within the scope of the work usually performed by fingerprint analysts.[282] Their job is to compare the latent fingerprint to that of the accused (or, in more recent times, a database), not to compare every fingerprint on file to each other to see if a duplicate exists.[283] As Michael Saks wrote on the issue, such studies have not been done because "[a]s long as one refrains from looking for black swans one's belief that all swans are white is insulated from falsification."[284]

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277. *See, e.g.*, Saks, *supra* note 25, at 1118 (suggesting that voiceprints—in contrast to other forensic identification sciences like fingerprints—may have encountered difficulty in being admitted precisely because the pioneers in the field had taken the unique step of producing "studies which could be presented to the courts, showing weaknesses as well as strengths of the technique").

278. Extremely limited studies exist in this area, but they are not well known to most fingerprint examiners, who often hold differing opinions on which characteristics are most common. Mears, *supra* note 146, at 713; *see also* COLE, *supra* note 31, at 262 (noting IAI's opinion that "[s]ome 'points' might count more toward identification than others: a 'trifurcation,' the splitting of a ridge into three branches, for example, is a rare ridge characteristic and thus should count more toward individualization than a common ridge ending").

279. Epstein, *supra* note 15, at 623.

280. *Id.* at 624.

281. Mnookin, *supra* note 41, at 54.

282. *See infra* text accompanying note 284 (describing the results discovered when a forensic document examiner actually performed such an investigation).

283. This state of affairs provoked considerable vexation from Judge Spencer Letts, the judge in *Parks*, who asked rhetorically, "[w]here is the standard, where is the study, where is the statistical base that's been studied? The FBI has zillions of these things; where is a study of the entire computer bank?" COLE, *supra* note 31, at 273 (citing *Parks*).

284. Saks, *supra* note 25, at 1089.

But black swans have been found. In the field of handwriting analysis, one examiner did specifically seek out indistinguishable handwriting samples from different individuals—and found so many of them as to "fatally falsif[y] the core claim of handwriting identification." [285] Examiners have found DNA matches as well. In a chilling incident from England in 1999, Raymond Easton was charged with burglary when his DNA—which was in a massive DNA database—matched that found at the scene of the crime.[286] The odds of a match if Easton were not the donor were a mere one in thirty-seven million.[287] But Easton lived 200 miles from the burglarized house and suffered from such advanced Parkinson's disease that he could not even drive a car.[288] A more sophisticated DNA test revealed that Easton was not a match.[289] And black swans exist for fingerprints as well. Israeli examiners have found seven matching points in fingerprints from different individuals,[290] and one expert testified to having knowledge of different prints with ten points of similarities.[291]

B. Error Rate

Establishing an objective error rate for fingerprint evidence is also vital for bringing it into *Daubert* compliance. By far the most important error rate, in that it is the one most likely to contribute to an incorrect match or non-match, is examiner error, which can reach into the double digits.[292] One step toward improving this error rate is to have mandatory certification for examiners wishing to testify in court, rather than the entirely optional IAI certification scheme now in place.[293] Certification should be based on both a minimum amount of training and passage of a practicum examination.

But even certified examiners can (and have) made mistakes,[294] especially in the absence of procedures designed to minimize errors. One such procedure, ubiquitous in the academic sciences but shockingly absent in forensic science, is

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285. *Id.*; *see* John Harris, *How Much Do People Write Alike: A Study of Signatures*, 48 J. CRIM. L. & CRIMINOLOGY & POLICE SCI. 647 (1958).

286. Mnookin, *supra* note 41, at 49.

287. *Id.* at 50.

288. *Id.*

289. *Id.*

290. Y. Mark & D. Attias, *What is the Minimum Standard of Characteristics for Fingerprint Identification?* 22 FINGERPRINT WHORLD 148, 148 (Oct. 1996).

291. Epstein, *supra* note 15, at 655. Also, in the Brandon Mayfield case, the FBI identified fifteen matching points between two different fingerprints, although the fact that the latent image being compared was a scanned digital image, not an original, may have contributed to this finding. *See* supra notes 2-10 and accompanying text. But even the Spanish authorities who compared Mayfield's prints to the original latents found eight points of similarity. Mnookin, *supra* note 9.

292. *See supra* text accompanying notes 103–12.

293. *See supra* text accompanying notes 192–94.

294. *See supra* notes 1–9, 195–200; *see also* Tom Jones, *Inherited Characteristics In Fingerprints (or Theory of Relativity)*, THE PRINT, Vol. 4 Issue 5, http://www.scafo.org/library/130101.html (describing a near misidentification of similar fingerprints belonging not to the same individual, but in actuality to two brothers).

the requirement that tests be done "blind."[295] This means that the examiner does not know the expected or desired result, so that he or she is incapable of subconsciously biasing the outcome of the experiment.[296] One of the difficulties in applying this method to fingerprint comparisons is that the mere act of sending two fingerprints to a lab for identification indicates an expectation by the investigators that the prints will match.[297] But several methods exist to make fingerprint examination "semi-blind." First, examiners should know nothing about the origin of the latent print, the extent of the other evidence, or the nature of the crime, all of which could serve to bias their results. Second, when examiners compare fingerprints that another examiner has already evaluated, they should be unaware of the previous test.

C. Objective Standards

The great diversity of standards, procedures, and examiner qualifications throughout the United States[298] means that the reliability and significance of any particular result varies from jurisdiction to jurisdiction. Despite this, each result is given the same degree of confidence: absolute certainty.[299]

The consequences of this current system are twofold. First, fingerprints ruled to match are presented as being more accurate than they actually are.[300] Second, many fingerprint comparisons are ruled inconclusive[301] even when the examiner believes there to be a high probability of a match.[302] This means that highly probative fingerprint evidence is often excluded.[303] Thus, a paradoxical

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295. For a discussion of the ubiquity and importance of blind testing (and in the case of human subjects, double-blind testing), see Michael Risinger et al., *The* Daubert/Kumho *Implications of Observer Effects in Forensic Science: Hidden Problems of Expectation and Suggestion*, 90 CAL. L. REV. 1 (2002).

296. Blind is defined as: "made or done without sight of certain objects or knowledge of certain facts that could serve for guidance." MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY 172 (10th ed. 1996).

297. Risinger et al., *supra* note 294, at 47.

298. *See supra* text accompanying notes 103–12, 169–71, & 182–94.

299. *See supra* note 138.

300. The cases of blatantly misidentified prints, such as those of Brandon Mayfield, Rick Jackson, and Roger Caldwell are the extremes of this phenomenon. *See supra* notes 1–9, 195–200; State v. Caldwell, 322 N.W.2d 574 (Minn. 1982); COLE, *supra* note 31, at 264–66. Less dramatic, but still serious, problems occur when an examiner testifies with 100% certainty to a match about which such a degree of certainty is impossible due to both methodological and practitioner error.

301. *See, e.g.*, COLE, *supra* note 31, at 260–61.

302. *Id.* at 261 (describing the British system requiring sixteen points as being so strict that "fingerprint examiners convinced of a match yet unable to find the requisite sixteen points would have to report a simple finding of 'inconclusive' to the investigating officers"). The American system, allowing for more flexibility, necessarily eliminated instances of examiners being forced to report "inconclusive" when convinced of a match. But the requirement of absolute certainty still requires such a conclusion when the examiner is 95% or even 99% sure of a match.

303. *Id.* at 263 (noting that both the British and American examiners acknowledge that the overly conservative British requirements "undoubtedly" let guilty men go free on occasion).

situation exists in which examiners may not testify to any matches of less than 100% certainty, but do so routinely anyway, simply purporting their results to be infallible. Such a situation is neither acceptable nor necessary. So many other types of scientific evidence are used, which have much lower rates of certainty than fingerprints,[304] that it is absurd to exclude fingerprints for falling below a mythical 100% standard that is never achieved anyway.

Instead of requiring an arbitrary number of points to declare a match, and ruling inconclusive everything short, the fingerprint community should adopt a sliding scale of reliability based upon the number and type of points. As has been done with DNA,[305] testing could be done to establish the frequency of each type of fingerprint characteristic, and possible correlations between types that could affect the probability of a match. These more realistic standards would likely increase the number of instances in which fingerprint evidence would be presented, since most inconclusive results could be recategorized as an *X*% chance of a match.[306]

The fingerprint community would also benefit greatly from an increased and more open debate over key issues that should have been settled years ago.[307] As Robert Epstein has noted, there is much internal disagreement[308] over even basic issues such as nomenclature,[309] the number of points,[310] and what characteristics to compare.[311] While the resolution of these disagreements through publication and open criticism should be the ultimate goal, the debate itself would be tremendously valuable.

One forensic expert who attempted to settle some of the key open issues in the field of fingerprint science, or "ridgeology," is David Ashbaugh.[312] But Ashbaugh's proposals, especially his use of third-level detail to make identifications,[313] actually served to polarize, rather than unify fingerprint

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304. *See, e.g.*, United States v. Davis, 103 F.3d 660, 674 (8th Cir. 1996), *cert. denied*, 520 U.S. 1258 (1997) (upholding the admission of ballistics evidence that "made it more probable than not that the expended bullets originated from the cartridge box found in the Nissan"); Joanmarie Ilaria Davoli, *Psychiatric Evidence on Trial*, 56 SMU L. REV. 2191, 2194–203 (noting that while "predictions of future violence are routinely made by psychiatrists in both capital murder trials and civil commitment hearings . . . the reliability of such predictions remains quite weak").

305. *See, e.g.*, Richard C. Lewontin & Daniel L. Hartl, *Population Genetics in Forensic DNA Typing*, 254 SCI. 1745 (1991).

306. *See supra* text accompanying notes 255–61 for a discussion of the use of probabilistic models for voiceprints.

307. *See, e.g.*, ASHBAUGH, *supra* note 130.

308. Epstein, *supra* note 15, at 638–40.

309. Sombat, *supra* note 53, at 2829 (noting five different names for fingerprint characteristics).

310. Mears, *supra* note 146, at 712 ("Fingerprint examiners do not have a standard agreement as to either the precise number or nomenclature of the different characteristics. 'The terms used to define and describe these characteristics vary markedly among writers in the field and differ even among examiners depending upon the organization in which they were trained.'") (internal citation omitted).

311. Ashbaugh, *supra* note 183; Epstein, *supra* note 15, at 639–40.

312. ASHBAUGH, *supra* note 130; Ashbaugh, *supra* note 183.

313. Epstein, *supra* note 15, at 639–40.

experts.[314] Furthermore, Ashbaugh's standards actually represent a move away from objectivity toward an almost completely subjective standard of comparison.[315]

D. General Acceptance and Peer Review

As various commentators have noted, the forensic identification sciences are notably lacking in the type of peer-reviewed studies found in other scientific fields, largely because they do not exist as independent scientific disciplines outside of the courtroom.[316] But the fact that fingerprinting arose as a police tool, rather than an academic pursuit, does not mean that it must remain exclusively in that realm.

Arson investigation, for example, began as an investigative tool, with "beliefs about indicators of arson . . . arrived at without the benefit of empirical testing."[317] But eventually investigators tested their beliefs by simulating different types of fires in controlled scientific experiments, disproving many beliefs about arson indicators.[318] Similar peer reviewed studies for fingerprint evidence would help to elevate significantly the quality of fingerprint science and increase its acceptance among the wider scientific community.

VII. CONCLUSION

Properly utilized, fingerprints can be a tremendously valuable piece of scientific evidence. But as with all evidence, the legal system must take care to ensure that the evidence receives only its proper weight in the court room. The community of fingerprint experts and examiners have long claimed a level of accuracy and trustworthiness for fingerprint evidence well above what is actually achieved. In the wake of *Daubert*, this overconfidence has led to a recent backlash, with a growing number of attorneys challenging evidence accepted as gospel for nearly a century.[319] The original *Llera Plaza* decision,[320] Judge Letts' sua sponte decision in *Parks*,[321] and the judicial rejection of other forms of forensic identification evidence like handwriting analysis[322] suggest that the ability of the fingerprint community to rest on its prominent history and reputation to ensure the admission of fingerprints will soon expire.

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314. *Id.* at 611 n.28 (citing three authors who oppose the use of third-level detail).

315. *See* Epstein, *supra* note 15, at 637 (noting that while Ashbaugh is correct in describing commonly employed point standards as unscientific, "neither [he], nor any other member of the fingerprinting community, has advanced a scientifically sound alternative").

316. *See supra* note 188.

317. *See* Saks, *supra* note 26, at 885.

318. *Id.*

319. *See, e.g.*, Ed German, *Fingerprint FAQ*, *at* http://onin.com/fp/lpfaq.html (describing *Daubert* hearings as "the current flavor of the month insofar as nuisance challenges"); s*ee generally*, the work of Robert Epstein, the Pennsylvania federal defender who brought challenges to fingerprint evidence in both the *Mitchell* and *Llera Plaza* cases.

320. Llera Plaza I, 2002 WL 27305 (E.D. Pa. 2002).

321. No. CR-91-358-JSL (C.D. Cal. Dec. 10, 1991).

322. *E.g.*, United States v. Saelee, 162 F. Supp. 2d 1097 (D. Ak. 2001).

But despite the current flaws that exist, we must be careful not to throw the baby out with the bathwater. Other types of scientific evidence used routinely in trials are not 100% accurate and in many cases do not even come close, or purport to do so.[323] As such, it would be unfair and unwise to exclude fingerprints as evidence simply for failing to live up to a standard of perfection never achieved nor sought in other scientific disciplines. But it would be equally improper to allow the continued presentation as objective truth of inherently subjective evidence whose underlying scientific bases are untested or even untestable.

The best solution is to improve the surrounding infrastructure of fingerprint evidence. Peer-reviewed testing of key claims and theories, testing and certification of examiners, and establishment of an error rate would all help bring fingerprint evidence into *Daubert* compliance. This would result in a system in which fingerprints can still be employed as valuable evidence, but with their warts showing and openly acknowledged.

323. *See supra* notes 255–61, 306.