SCIENTIFIC EVIDENCE & MISCARRIAGES OF JUSTICE

Paul C. Giannelli
Weatherhead Professor of Law
Case Western Reserve University

International Society for the Reform of Criminal Law
December 8, 2002

The DNA exonerations establish a link between expert testimony and erroneous convictions. In their book, *Actual Innocence*, Barry Scheck, Peter Neufeld and Jim Dwyer examined sixty two DNA exonerations secured through Cardozo Law School's Innocence Project to ascertain what factors contributed to these miscarriages of justice; one of the more astounding conclusions was that a *third* of these cases involved "tainted or fraudulent science."[1] Some of these cases involved the death penalty, and the Illinois misconduct cases played a role in the Governor's moratorium on executions in that state.[2]

In addition to the abuse cases, expert testimony has come under close scrutiny in the aftermath of the Supreme Court's decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,[3] which is sometimes known as the "junk science" case. reliability test has evolved into an "exacting" admissibility standard.[4] Moreover, in *Kumho Tire Co. v. Carmichael*,[5] the Court

---

1 Barry Scheck, Peter Neufeld & Jim Dwyer, *Actual Innocence: Five Days to Execution and Other Dispatches from the Wrongly Convicted* 246 (2000).

2 *See* Dirk Johnson, *Illinois, Citing Verdict Errors, Bars Executions*, N.Y. Times, Feb. 1, 2000. The infamous Cruz and Hernandez prosecutions occurred in Illinois. *See* Edward Connors et al., *Convicted by Juries, Exonerated by Science: Case Studies in the Use of DNA Evidence to Establish Innocence After Trial* 44 (1996).

3 509 U.S. 579, 590 (1993) ("[I]n order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation – i.e., 'good grounds,' based on what is known. In short, the requirement that an expert's testimony pertain to 'scientific knowledge' establishes a standard of evidentiary reliability."). *See generally* 1 Giannelli & Imwinkelried, Scientific Evidence ch. 1 (3d ed. 1999).

4 *See* Weisgram v. Marley Co., 528 U.S. 440, 455 (2000) ("Since *Daubert*, moreover, parties relying on expert evidence have had notice of the exacting standards of reliability such evidence must meet.").

5 526 U.S. 137, 141 (1999) (holding that " general holding – setting forth the trial judge's general 'gatekeeping' obligation – applies not only to testimony based on 'scientific' knowledge, but also to testimony based

extended *Daubert's* reliability requirement to non-scientific expert testimony, a decision that has had a profound affect on forensic science. Indeed, in *United States v. Hines*,[6] a district court wrote that *Kumho* "plainly invite[s] a reexamination even of 'generally accepted' venerable,

[7] As a result of such a reexamination, the court in *Hines* restricted the admissibility of handwriting evidence – *i.e,* the expert could describe similarities in the handwriting exemplars but would not be permitted to make a positive identification.[8]

The handwriting controversy has been exhaustively covered in other articles,[9] but the critical point for present purposes is not in dispute – empirical validation is possible but is only beginning to be done.[10] Moreover, other well-accepted forensic techniques raise similar issues –

---

on 'technical' and 'other specialized' knowledge.").

6 55 F. Supp. 2d 62 (D. Mass. 1999).

7 *Id.* at 67. In an earlier case, United States v. Starzecpyzel, 880 F. Supp. 1027 (S.D.N.Y. 1995), a district court concluded that "the testimony at the *Daubert* hearing firmly established that forensic document examination, despite the existence of a certification program, professional journals and other trappings of science, cannot, after *Daubert*, be regarded as 'scientific ... knowledge.'" *Id.* at 1038. The court further stated that "while scientific principles may *relate* to aspects of handwriting analysis, they have little or nothing to do with the day-to-day tasks performed by [Forensic Document Examiners] .... [T]his attenuated relationship does not transform the FDE into a scientist." *Id.* at 1041. Nevertheless, the court did not exclude handwriting comparison testimony. Instead, it admitted the testimony as based on "technical" knowledge.

8 *See also* United States v. Rutherford, 104 F. Supp. 2d 1190, 1194 (D. Neb. 2000) ("[T]he Court concludes that FDE Rauscher's testimony meets the requirements of Rule 702 to the extent that he limits his testimony to identifying and explaining the similarities and dissimilarities between the known exemplars and the questioned documents. FDE Rauscher is precluded from rendering any ultimate conclusions on authorship of the questioned documents and is similarly precluded from testifying to the degree of confidence or certainty on which his opinions are based.").

9 *See* Andre Moenssens, *Handwriting Identification Evidence In the Post-Daubert World*, 66 UMKC L. Rev. 251 (1997); D. Michael Risinger et al., *Brave New "Post-Daubert World" – A Reply to Professor Moenssens*, 29 Seton Hall L. Rev. 405 (1998).

10 *See also* United States v. Saelee, 162 F. Supp. 2d 1097, 1103 (D. Alaska 2001) ("There is little known about the error rates of forensic document examiners. The little testing that has been done raises serious questions about the reliability of methods currently in use. As to some tasks, there is a high rate of error and forensic document examiners may not be any better at analyzing handwriting than laypersons. This is illustrated not only in the Kam studies relied on by Mr. Cawley, but also in a series of proficiency tests carried out by Collaborative Testing Service under the supervision of the Forensic Sciences Foundation."); United States v. Fujii, 152 F. Supp. 2d 939, 940 (N.D. Ill. 2000) (expert testimony concerning Japanese handprinting inadmissible; "Handwriting analysis does not stand up well under the *Daubert* standards. Despite its long history of use and acceptance, validation studies supporting its reliability are few, and the few that exist have been criticized for methodological flaws."). *But see* United States v. Jolivet, 224 F.3d 902, 906 (8th Cir. 2000) (affirming admission of expert testimony that it was likely that defendant wrote the questioned documents; testimony "may be properly characterized as offering the jury knowledge beyond their own and enhancing their understanding of the evidence before them").

for example, firearms identifications ("ballistics"),[11] bitemarks,[12] and intoxication testing.[13] In this paper, I review two such techniques: hair comparisons and fingerprints.

I. Unvalidated Techniques

A. Hair Comparisons

Numerous courts have upheld the admissibility of hair comparison evidence.[14] After *Daubert* was decided, however, the district court in *Williamson v. Reynolds,*[15] a federal habeas case, took a closer look at this type of evidence. There, an expert testified that hair samples were "microscopically consistent." The expert then went on to explain what this meant: "In other words, hairs are not an absolute identification, but they either came from this individual or there is – could be another individual *somewhere in the world* that would have the same characteristics to their hair."[16] The district court noted that the "expert did not explain which of the 'approximately' 25 characteristics were consistent, any standards for determining whether the samples were consistent, how many persons could be expected to share this same combination of characteristics, or how he arrived at his conclusions."[17] Moreover, the district court professed

---

[11] *See* Joan Griffin & David J. LaMagna, *Daubert Challenges to Forensic Evidence: Ballistics Next on the Firing Line*, Champion 20 (Sept.-Oct. 2002); Lisa J. Steele, *"All we want you to do is confirm what we already know." A Daubert Challenge to Firearms Identifications*, 38 Crim. L. Bull. 465 (2002).

[12] *See* Howard v. State, 697 So. 2d 415, 429 (Miss. 1997) ("While few courts have refused to allow some form of bite-mark comparison evidence, numerous scholarly authorities have criticized the reliability of this method of identifying a suspect. … There is little consensus in the scientific community on the number of points which must match before any positive identification can be announced. … Suffice it to say that testimony concerning bite marks in soft, living flesh has not been scientifically accredited at this time.").

[13] *See* United States v. Horn, 185 F. Supp. 2d 530, 549 (D. Md. 2002) ("The doctrine of judicial notice is predicated upon the assumption that the source materials from which the court takes judicial notice are reliable. Where, as here, that reliability has been challenged, the court cannot disregard the challenge, simply because a legion of earlier court decisions reached conclusions based on reference to the same then-unchallenged authority. ... I cannot agree that the [horizontal gaze nystagmus, walk-and-turn, and one-legged stand] tests, singly or in combination, have been shown to be as reliable as asserted by Dr. Burns, the NHTSA publications, and the publications of the communities of law enforcement officers and state prosecutors.") (footnote omitted).

[14] *E.g.*, United States v. Brady, 595 F.2d 359, 363 (6th Cir. 1979); People v. Watkins, 259 N.W.2d 381, 385 (Mich. App. 1977).

[15] 904 F. Supp. 1529, 1558 (E.D. Okl. 1995), *rev'd on this issue*, 110 F.3d 1508, 1523 (10th Cir. 1997).

[16] *Id.* at 1554 (emphasis added).

[17] *Id.*

that it had "been unsuccessful in its attempts to locate *any* indication that expert hair comparison testimony meets *any* of the requirements" of *Daubert*.[18] The court further observed: "Although the hair expert may have followed procedures accepted in the community of hair experts, the human hair comparison results in this case were, nonetheless, scientifically unreliable."[19] Finally, as is often the case, the prosecutor exacerbated the problem by telling the jury in closing argument, "[T]here's a match."[20] Even the state court misinterpreted the evidence, writing that the "hair evidence placed [petitioner] at the decedent's apartment."[21] The district court decision was subsequently reversed because due process, not *Daubert*, provided the controlling standard for habeas review.[22] The defendant, however, was later exonerated by exculpatory DNA evidence, and as Scheck and his colleagues observe, "The hair evidence was patently

[23]

Unfortunately, later cases – even in *Daubert* jurisdictions – have continued to uphold the use of this evidence. For example, in *Johnson v. Commonwealth,*[24] the Kentucky Supreme Court upheld the admissibility of hair evidence. Indeed, because hair comparison evidence had been accepted by numerous other courts, it held that courts could judicially notice the scientific reliability of hair evidence. Judicial notice typically extends only to *indisputable* facts.[25] Similarly, the Hawaii Supreme Court, another court that has adopted *Daubert*, ruled that "[b]ecause the scientific principles and procedures underlying hair and fiber evidence are well-

---

18 *Id.* at 1558.

19 *Id.*

20 *Id.* at 1557.

21 *Id.*

22 Williamson v. Ward, 110 F.3d 1508, 1523 (10th Cir. 1997).

23 Scheck et al., *supra* note 1, at 146.

24 12 S.W.3d 258, 262 (Ky. 1999).

25 *See* Fed. R. Evid. 201(b) (not subject to reasonable dispute); Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 593 n. 11 (1993) ("[T]heories that are so firmly established as to have attained the status of scientific law, such as the laws of thermodynamics, properly are subject to judicial notice under Fed. Rule Evid. 201.").

established and of proven reliability, the evidence in the present case can be treated as 'technical knowledge.' Thus, an independent reliability determination was unnecessary."[26]

What we do know about hair comparisons is this: they are often misused.[27] In one case, the expert testified that the crime scene hair sample "was unlikely to match anyone" other than the defendant, Edward Honaker.[28] This conclusion was a gross overstatement. At best, the expert could have testified that the crime-scene hairs were "consistent with" the defendant's exemplars, which means that they could have come from Honaker or thousands of other people. We have no idea how many other people have the same characteristics. Honaker spent ten years in prison before being exonerated by DNA analysis. Indeed, another hair examiner would later opine that "the hairs were *not* comparable."[29]

Roger Coleman was executed in 1992 for a slaying in rural Virginia. The same expert who had testified against Honaker also testified against Coleman – and in the same manner.[30] The United States Supreme Court ruled that a lawyer's mistake in filing Coleman's state collateral appeal (one day late) precluded federal habeas review.[31] Serious questions about Coleman's innocence have been raised, and the prosecution's use of the hair evidence was, to

---

[26] State v. Fukusaku, 946 P.2d 32, 44 (Haw. 1997). *See also* McGrew v. State, 682 N.E.2d 1289, 1292 (Ind. 1997) (hair comparison admissible as more a matter of observation by persons with specialized knowledge than as a matter of scientific principles); McCarty v. State, 904 P.2d 110, 125 (Okl. Crim. App. 1995) (admitting evidence).

[27] *See* Clive A. Stafford Smith & Patrick D. Goodman, *Forensic Hair Comparison Analysis: Nineteenth Century Science or Twentieth Century Snake Oil?*, 27 Colum. Hum. Rts. L. Rev. 227 (1996).

[28] Conners et al., *supra* note 2, at 65. *See also* Harlan Levy, *And the Blood Cried Out: A Prosecutor's Spellbinding Account of the Power of DNA* 153 (1996) (acknowledging that "[t]here was no question that the state hair expert [at Honaker's trial] had overstated the distinctiveness of the hair recovered from the victim's shorts in his

[29] John Tucker, *May God Have Mercy: A True Story of Crime and Punishment* 345 (1998) ("With the cooperation of a conscientious prosecutor, Kate Germond had the hairs reexamined by one of the world's leading experts on hair analysis and DNA tests performed on sperm found on a vaginal swab taken from the victim at the time of the rape. The hair expert said that in his opinion the hairs were *not* comparable, and the DNA analysis proved beyond doubt that Honaker was not the rapist.").

[30] *Id.* at 345 ("In October 1994, after nearly ten years in prison, Edward Honaker was released. The state forensic expert who had testified in 1985 that the hairs were comparable and unlikely to have come from anyone other than Honaker was Elmer Gist.").

[31] Coleman v. Thompson, 501 U.S. 722 (1991).

say the least, suspect.[32] While conducting research for his book on the *Coleman* case, John Tucker interviewed the trial judge: "Years later, in response to the author's question about what evidence in the case he thought had the most powerful impact on the jury, Judge Persin said it was Elmer Gist's testimony about the comparison of the pubic hairs. It was, Judge Persin observed, the first and only testimony that seemed to tie Roger Coleman to the murder."[33] As Tucker correctly notes: "A finding of consistency is highly subjective, and experts may and often do disagree about such a finding."[34] Nevertheless, at trial the prosecutor "described, with great emphasis, the scientific evidence, and especially the comparison of the pubic hairs, asserting that 'it would be extremely unlikely that anyone else would have hair that would be

[35] Unfortunately, the defense counsel failed to challenge this statement.[36] Tucker describes the testimony as follows:

> Nor did [the expert] compare the pubic hairs found on Wanda [the victim] with anyone other than Coleman and Wanda herself – not even her husband Brad. Nevertheless, when he asserted that he had made a comparison of those hairs with Roger's pubic hair, and that the hairs were "consistent" with each other, meaning, he said, that is was "possible, but unlikely" that the hairs found on Wanda could have come from anyone other than Roger Coleman, the jurors exchanged glances and settled back in their seats.[37]

---

[32] *See* Tucker, *supra* note 29. *See also* Stuart Taylor, Jr., *Was An Innocent Man Executed?,* American Lawyer (Dec. 1997) ("I'd put the odds that Coleman was innocent somewhere above fifty-fifty."; "The state's hair evidence was shown (after the trial) to be far from probative and far from reliable."); Ronald J. Tabak, *Death Penalty Be Not Proud: Examining the Legal Missteps in a Notorious Case*, 84 A.B.A. J. 80 (Jan. 1998) ("[D]efense counsel did not seriously challenge a highly dubious hair comparison that greatly influenced the jury. The lawyer who dealt with the evidence had never examined a hair expert before.") (reviewing Tucker's book).

[33] *See* Tucker, *supra* note 29, at 75. "According to Gist, he had microscopically compared the pubic hair found on Wanda McCoy with those removed from Roger Coleman on March 13, and they were 'consistent.'" *Id.* at 51. "Unlike fingerprints, hairs are not positive identifiers, and unlike blood types, there is no scientifically accepted figure for the number or percentage of people whose hair is 'consistent' with one another. ... But ... Elmer Gist had often testified, and would surely testify again, that it is 'possible, but unlikely' that consistent hairs could come from

[34] *Id.* at 51.

[35] *Id.* at 63.

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

[37] *Id.* at 76. The Virginia Supreme Court has refused to grant media requests for new DNA tests on evidence from the Coleman's trial. The *Boston Globe*, *Washington Post*, *Richmond Times-Dispatch*, *The Virginian-Pilot*, and Centurion Ministries – a charitable organization that investigates wrongful conviction claims – filed the claim asking that biological evidence in the case be analyzed with modern DNA techniques. In its unanimous ruling, the

There is an embarrassing lack of empirical validation for this "well-accepted" technique.[38] In one study comparing the results of microscopic hair comparisons and mitochondrial DNA analysis at the FBI laboratory, the former were wrong 10% of the time – and this was when the conclusion was limited to an "association" ("consistent with" testimony).[39]

B. Fingerprints

In a remarkable turn of events, Judge Pollak in *United States v. Llera Plaza*[40] held that a fingerprint expert could not give an opinion that two sets of prints "matched" – that is, a positive identification to the exclusion of all other persons. And then, he reversed himself.[41]

Judge Pollak was willing to judicially notice both the uniqueness and permanence of fingerprints. For that matter, he was willing to accept fingerprint examiner testimony "(1) describing how the rolled and latent fingerprints at issue in this case were obtained, (2) identifying and placing before the jury, the fingerprints and such magnifications as may be required to show minute details, and (3) pointing out observed similarities (and differences) between any latent print and any rolled print the government contends are attributable to the same person." However, the judge drew the line there. His original order concluded: "[N]o expert witness for any party will be permitted to testify that, in the opinion of the witness, a particular latent print is – or is not – the print of a particular person."

Although a person's fingerprints may be permanent and unique, the examiner typically deals with incomplete, somewhat distorted impressions of the prints transferred to another

---

court said, "Certainly, the right to test evidence in a criminal case has not been historically extended to the press and the general public." Globe Newspaper Co. v. Commonwealth, 2002 WL 31442280, at *4 (Va. Nov. 01, 2002).

[38] *See also* Paul C. Giannelli & Emmie West, *Hair Comparison Evidence*, 37 Crim. L. Bull. 514 (2001) (discussing the DNA exoneration cases in which hair evidence was used to convict the innocent).

[39] Max M. Houch & Bruce Budowle, *Correlation of Microscopic and Mitochondrial DNA Hair Comparisons*, 47 J. Forensic Sci. 964, 966 (2002) ("Of the 80 hairs that were microscopically associated, nine comparisons were

[40] 179 F. Supp. 2d 492 (E.D. Pa.), *vacated, mot. granted on recons.*, 188 F.Supp. 2d 549 (E.D. Pa. 2002) [hereinafter *Llera Plaza I*].

[41] 188 F. Supp. 2d 549, 576 (E.D. Pa. 2002) ("I have changed my mind.") [hereinafter *Llera Plaza II*]. *See* Michael Specter, *Do Fingerprints Lie? The Gold Standard of Forensic Science is Now Being Challenged,* 78 New Yorker 96 (May 27, 2002) (discussing case including interview with judge).

surface. The issue was whether the available research data established that the analysis of such impressions constituted reliable scientific knowledge.

The prosecution argued that latent fingerprint identification had been "teste

100 years in adversarial proceedings with the highest possible stakes. However, *Llera Plaza I* pointed out that *Daubert* requires scientific, not judicial, testing:

> "[A]dversarial" testing in court is not, however, what the Supreme Court meant when it discussed testing as an admissibility factor. ... 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*. ... 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.

Moreover, "[e]ven those who stand at the top of the fingerprint identification field ... tend to be skilled professionals who have learned their craft on the job and without any concomitant advanced academic training. It would thus be a misnomer to call fingerprint examiners a 'scientific community' in the *Daubert* sense."

The prosecution expert also testified that the error rate was zero. However, the expert conceded that the ultimate judgment is subjective and no minimum number of points is required. In probing the government's foundation, Judge Pollak wanted to discover the "practitioner" error rate because some proficiency examinations of fingerprint examiners were troublesome: "In 1995, fewer than half of the 156 participating examiners – 44% – correctly identified all five latent prints that were tested, while 31% of the examiners made erroneous identifications."

Llera Plaza I sent shock waves through the forensic science community as well as grabbed the attention of media such as the *New York Times.*[42] The government quickly moved for reconsideration of the judge's ruling. In particular, the government sought permission to present evidence of the FBI's proficiency testing. Judge Pollak granted the request and conducted the evidentiary hearing.

In *Llera Plaza II*, the prosecution offered evidence of the FBI's proficiency testing.

[42] Newman, *Judge Rules Fingerprints Cannot Be Called a Match*, N.Y. Times, Jan. 11, 2002, at A14.

There was one “false positive” in sixteen external tests taken by supervisory examiners. In addition, the

> internal tests taken over the seven years numbered 431. These tests generated three errors, two in 1995 and one in 2000. Each of the three errors was a missed identification – *i.e.,* a failure by the test taker to find a match between a latent print and a known exemplar which in fact existed; such an error is a “false negative” which, being mistakenly exculpatory, is regarded by the FBI as considerably less serious than a false positive. In sum, the 447 proficiency tests administered in the seven years from 1995 through 2001 yielded four errors – a proficiency error rate of just under 1%.[43]

However, defense experts were highly critical of the way the tests were conducted. Allan Bayle, a fingerprint examiner who had worked for 25 years at New Scotland Yard and was a Fellow of the U.K. Fingerprint Society, testified that the FBI tests were too easy: “It’s not testing their ability. It doesn’t test their expertise. I mean I’ve set these tests to trainees and advanced technicians. And if I gave my experts these tests, they’d fall about laughing.”[44]

Two other defense experts were not fingerprint examiners but rather experts on testing (psychometrics). “They were highly critical of the FBI proficiency tests. The test materials and uninformative attendant literature, taken together with the ambiguity as to the conditions governing the taking of the tests (e.g., may the test takers consult with one another? to what extent is taking the test perceived to be competitive with, or subordinated to, the performance of concurrent work assignments?), gave few clues as to what the test makers intended to measure.”[45] Both experts believed that the “stratospheric” FBI success rate “was hardly reassuring; to the contrary, it raised ‘red flags.’”[46] Ultimately, the proficiency tests did not persuade Judge Pollak; “the FBI examiners got very high proficiency grades, but the tests they

[47]

---

43 *Plaza II*, 188 F. Supp. 2d at 556.

44 *Id.* at 558.

45 *Id.* at 559.

46 *Id.*

47 *Id.* at 565.

However, two factors led Judge Pollak to reconsider his ruling. One was expert testimony – some elicited from defense witnesses – indicating that like the FBI, New Scotland Yard had moved to a non-numerical standard; the prior standard had required 16 points of identity. In 1998, the British Fingerprint Evidence Project Board recommended that "the national standard be changed entirely to a non numerical system."[48] That system was implemented in 2001.[49] Based on the testimony elicited at the evidentiary hearing, Judge Pollak found that "there is no longer any significant lack of harmony between the FBI's fingerprint identification standards and those that prevail in English courtrooms."[50] In the judge's words, "there is sufficient uniformity within the principal common law jurisdictions to satisfy *Daubert*."[51]

A second factor was the judge's review of other, recent federal cases upholding the admission of non-scientific expert opinion despite the subjectivity of the opinion. In the judge's mind, fingerprint analysis came off well in a comparison with those techniques. In the end, Judge Pollak concluded, on the record before him, that

> there is no evidence that certified FBI fingerprint examiners present erroneous identification testimony, and ... there is no evidence that the rate of error of certified FBI fingerprint examiners is unacceptably high. With those findings in mind, I am not persuaded that courts should defer admission of testimony with respect to fingerprinting ... until academic investigators financed by the National Institute of Justice have made substantial headway on a "verification and validation" research agenda. For the National Institute of Justice, or other institutions both public and private, to sponsor such research would be all to the good. But to postpone present in-court utilization of this "bedrock forensic identifier" pending such research would be to make the best the enemy of the good.[52]

---

48 *Id.* at 568.

49 *Id.*

50 *Id.* at 570.

51 *Id.*

52 *Id.* at 572. *See also* United States v. Martinez-Cintron, 136 F. Supp. 2d 17, 20 (D. Puerto Rico 2001) ("It is mete to point out that since *Daubert* and *Kumho Tire Co*., rejection of expert testimony is the exception rather than the rule. Once accepted at trial, this does not mean that testimony that is the product of competing principles or methods in the same field of expertise is not allowed. Vigorous cross-examination, which the fingerprint technician will apparently undergo in this case, will help reveal whether the expert has applied the relevant principles and methods to the facts or data of the case. That latent fingerprints, with all of the atmospheric variables that may effect their clarity, may present a challenge to a fingerprint technician, in comparing the same to a known exemplar,

Plaza II is far from a ringing endorsement.[53] The judge recognized that the basic science (*i.e.,* empirical testing) is missing. He admitted fingerprint testimony only as non-scientific expertise. To date, the FBI's own proficiency testing appears to be wholly inadequate.

II. Misconduct

The abuse of scientific evidence in criminal cases is well-documented.[54] Forged fingerprint evidence,[55] fake autopsies, and perjured testimony have all been reported. Fred Zain was Chief Serologist for ten years in West Virginia. In reviewing a judicial report on Zain's misconduct, the West Virginia Supreme Court spoke of "shocking and egregious violations," "corruption of our legal system," and "mock[ing] the ideal of justice under law." The report by the judge states:

> The acts of misconduct on the part of Zain included (1) overstating the strength of results; (2) overstating the frequency of genetic matches on individual pieces of evidence; (3) misreporting the frequency of genetic matches on multiple pieces of evidence; (4) reporting that multiple items of evidence had been tested, when only a single item had been tested; (5) reporting inconclusive results as conclusive; (6) repeatedly altering laboratory records; (7) grouping results to create the erroneous impression that genetic markers had been obtained from all samples tested; (8) failing to report conflicting results; (9) failing to conduct or to report conducting additional testing to resolve conflicting results; (10) implying a match with a suspect when testing supported only a match with the victim; and (11) reporting scientifically impossible or improbable results.[56]

---

is not a reason to believe that the witness will not apply known principles and methods to the collected data. Again, this is a subject for cross-examination.") (citations omitted); United States v. Harvvard, 117 F. Supp. 2d 848 (S.D. Ind. 2000) (upholding admissibility), *aff'd*, 260 F.3d 597 (7th Cir. 2001).

[53] *See generally* Simon Cole, *Suspect Identities: A History of Fingerprinting and Criminal Identification* (2001); Robert Epstein, *Fingerprints Meet Daubert: The Myth of Fingerprint "Science" Is Revealed*, 75 So. Cal. L. Rev. 605 (2002); Jennifer Mnookin, *Fingerprint Evidence in an Age of DNA Profiling*, 67 Brooklyn L. Rev. 13 (2001); Michael J. Saks, *Merlin and Solomon: Lessons From the Law's Formative Encounters With Forensic Identification Science*, 49 Hastings L.J. 1069 (1998); David Stoney, *Fingerprint Identification*, in D. Faigman et al., *Modern Scientific Evidence* ch. 27 (2d ed. 2002).

[54] *See* Paul C. Giannelli, *The Abuse of Scientific Evidence in Criminal Cases: The Need for Independent Crime Laboratories*, 4 Va. J. Soc. Pol'y & L. 439 (1997). *See also* David Bernstein, *Junk Science in the United States and the Commonwealth*, 21 Yale J. Int'l L. 123 (1996) (discussing cases in Canada, Australia, New Zealand, and England).

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

[56] In re Investigation of the W. Va. State Police Crime Lab., Serology Div., 438 S.E.2d 501, 503 (W. Va.

West Virginia prosecutors, upset when Zane left because they could no longer get the same "favorable" results from other crime lab examiners, sent the evidence down to Zain in his new job in San Antonio. He never failed them.

Dr. Erdmann faked autopsies for a decade in Texas.[57] In one case, Erdmann ruled that a 16-month old child died from a blow to the stomach, a finding that led to the murder indictment of the child's father. A second autopsy, conducted by different pathologists, cited drowning as the cause of death, a conclusion consistent with the father's version of an accidental death. But the defense was not the only side hurt by his misconduct. He also declared that murder victims had died "due to natural causes."

If Zain and Erdmann were the only examples, their misconduct could be dismissed as that of a few "bad apples." There is, however, some evidence that the problem may be systemic. The Inspector General's 1997 report on the FBI laboratory also raised serious issues of laboratory negligence and misconduct.[58] The investigation found scientifically flawed testimony, testimony beyond the competence of FBI examiners, improper preparation of laboratory reports, insufficient documentation of test results, scientifically flawed reports, inadequate record management and retention, and failures of management to resolve serious and credible allegation of incompetence. The report's recommendations are revealing because they are so basic. They include (1) seeking accreditation of the FBI laboratory by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board; (2) requiring examiners in the Explosives Unit to have scientific backgrounds in chemistry, metallurgy, or engineering; (3) mandating that each examiner who performs work prepare and sign a separate report instead of having one report "without attribution to individual examiners"; (4) requiring review of reports by the unit

1993) (quoting report).

[57] *See* Giannelli, *supra* note 54 (discussing Erdmann).

[58] U.S. Department of Justice, Office of Inspector General, *The FBI Laboratory: An Investigation into Laboratory Practices and Alleged Misconduct in Explosives-Related and Other Cases* (April 1997).

chief,[59] (5) preparing adequate case files to support reports,[60] (6) monitoring court testimony in order to preclude examiners from testifying to matters beyond their expertise or in ways that are "unprofessional," and (7) developing written protocols for scientific procedures.

III. Conclusion

Scientific evidence, as the DNA exoneration cases demonstrate, is often more reliable than other types of evidence, such as eyewitness testimony and confessions. Often overlooked is the fact that two injustices are involved in every wrongful conviction case – not only was an innocent person wrongly convicted, but a guilty person remained free to continue to rape and murder. Which, we now know, is exactly what happened in some of these cases.

The answer to both issues discussed in this paper – unvalidated techniques and the abuse of expert testimony – is the same: better science in the criminal justice system. There are many outstanding examiners in the crime laboratories of this country. They are not, however, given the support necessary to do their jobs properly. First, we need to underwrite basic research in the forensic sciences. Second, we need to fund state crime laboratories so that they can be accredited and have their examiners certified.[61] The underfunding of crime labs in this country is chronic. In 1967, President Johnson's Crime Commission noted that "the great majority of police department laboratories have only minimal equipment and lack highly skilled personnel able to use the modern equipment now being developed."[62] In 1974, President Nixon's Crime Commission commented: "Too many police crime laboratories have been set upon budgets that

---

59 "Our central point is that peer review by qualified personnel is an essential aspect of a high-performing forensic science laboratory. The Rudolph matter, certain conclusions in the Oklahoma City report, and other cases demonstrate the importance of vigorous, substantive peer review." *Id.* at pt. 1.

60 "The Rudolph files and some of Martz's work underscore the importance of case files containing all the documentation necessary for another appropriately qualified examiner to be able to understand and replicate the examiners's data and analysis. We encountered the problem of incomplete or missing documentation in many case *Id.* at pt. 1.

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

62 President's Commission on Law Enforcement and Administration of Justice, The Challenge of Crime in a Free Society 235 (1967).

preclude the recruitment of qualified, professional personnel."[63] A 1994 report on Washington State crime labs revealed that a "staggering backlog of cases hinders investigations of murder, rape, arson, and other major crimes."[64]

[63] National Advisory Commission on Criminal Justice Standards and Goals, Police 304 (1974).

[64] Tomas Fuillen & Eric Nalder, *Overwhelming Evidence: Crime Labs in Crisis*, Seattle Times, Jun. 19, 1994, at A1, A14.