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WRONGFUL CONVICTIONS AND FORENSIC SCIENCE: THE NEED TO REGULATE CRIME LABS*

PAUL C. GIANNELLI**

DNA testing has exonerated over 200 convicts, some of whom were on death row. Studies show that a substantial number of these miscarriages of justice involved scientific fraud or junk science. This Article documents the failures of crime labs and some forensic techniques, such as microscopic hair comparison and bullet lead analysis. Some cases involved incompetence and sloppy procedures, while others entailed deceit, but the extent of the derelictions—the number of episodes and the duration of some of the abuses, covering decades in several instances—demonstrates that the problems are systemic.

Paradoxically, the most scientifically sound procedure—DNA analysis—is the most extensively regulated, while many forensic techniques with questionable scientific pedigrees go completely unregulated. The regulation of DNA profiling, which has developed gradually over the last twenty years, can serve as a model for other laboratory units. The accreditation of crime laboratories, the certification of examiners, and the standardization and promulgation of written protocols for each technique would go a long way in professionalizing forensic science. In addition, quality assurance programs, including proficiency testing and external audits, should be mandated. Finally, forensic science commissions should be established in every jurisdiction to implement these and other reforms.

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“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.”

—Eric S. Lander, molecular biologist, 1989¹

INTRODUCTION

In the fall of 2004, the Chief of the Houston Police Department called for a moratorium on executions of convicts from Harris County until after his crime laboratory had completed a review of numerous old case files.² This breathtaking development in the county where the most death penalty cases originate³ is not an isolated incident of laboratory failure. Earlier, the Governor of Illinois had imposed a moratorium on executions in that state due in part to faulty scientific evidence.⁴

The extent of forensic science’s role in convicting the innocent is difficult to gauge, although it is clearly substantial. In *Actual Innocence*, Barry Scheck and his colleagues examined sixty-two of the first sixty-seven DNA exonerations secured in North America through Cardozo Law School’s Innocence Project, concluding that a *third* of these cases involved “tainted or fraudulent science.”⁵ A subsequent review identified forensic science testing errors in 63% of the wrongful convictions and false or misleading testimony by

1. Eric S. Lander, *DNA Fingerprinting On Trial*, 339 NATURE 501, 505 (1989).

2. See Maurice Possley et al., *Scandal Touches Even Elite Labs: Flawed Work, Resistance to Scrutiny Seen Across U.S.*, CHI. TRIB., Oct. 21, 2004, § 1, at 1 (“Gov. Rick Perry has rejected a plea from Houston’s police chief to halt executions of inmates convicted in Harris County until the scope of problems at the police crime lab can be determined.”). According to state senator Rodney Ellis, “the validity of almost any case that has relied upon evidence produced by the lab is questionable.” Rodney Ellis, Editorial, *Want Tough on Crime? Start by Fixing HPD Lab*, HOUSTON CHRON., Sept. 5, 2004, at D1.

3. See Adam Liptak & Ralph Blumenthal, *New Doubt Cast on Crime Testing in Houston Cases*, N.Y. TIMES, Aug. 5, 2004, at A19 (“Since the death penalty was reinstated in 1976, Texas has executed 323 people, 73 for crimes in Harris County.”).

4. See generally REPORT OF THE GOVERNOR’S COMMISSION ON CAPITAL PUNISHMENT (State of Ill. 2002), available at <http://www.state.il.us/defender/ccpr.html> (recommending independent crime labs). Governor George Ryan imposed a moratorium on January 31, 2000 and appointed the Commission on March 9, 2000. *Id.* at i.

5. BARRY SCHECK ET AL., ACTUAL INNOCENCE: FIVE DAYS TO EXECUTION AND OTHER DISPATCHES FROM THE WRONGLY CONVICTED 246 (2000). There have been 208 DNA exonerations. Brandon L. Garrett, *Judging Innocence*, 108 COLUM. L. REV. (forthcoming 2008) (manuscript at 2, on file with the North Carolina Law Review).

forensic experts in 27%.⁶ A 2004 *Chicago Tribune* series on crime laboratories reported that an examination of “the 200 DNA and Death Row exoneration cases since 1986 . . . found that more than a quarter involved faulty crime lab work or testimony.”⁷ A 2005 study identified twenty-four prosecutions in which forensic scientists committed perjury.⁸

The most recent study of 200 DNA exonerations found that forensic evidence (present in 57% of the cases) was the second leading type of evidence (after eyewitness identifications at 79%) used in wrongful conviction cases.⁹ Pre-DNA serology of blood and semen evidence was the most commonly used forensic technique (79 cases).¹⁰ Next came “hair evidence (43 cases), soil comparison (5 cases), DNA tests (3 cases), bite mark evidence (3 cases), fingerprint evidence (2 cases), dog scent identification (2 cases), spectrographic voice evidence (1 case), shoe prints (1 case), and fiber comparison (1 case).”¹¹ This does not mean, however, that the forensic evidence was improperly used. For example, serological testing at the time of many of these convictions was simply not as discriminating as DNA profiling.¹² Yet, some evidence was clearly misused.¹³

In addition to Houston,¹⁴ lab problems have surfaced in Baltimore,¹⁵ Chicago,¹⁶ Cleveland,¹⁷ Los Angeles,¹⁸ Fort Worth,¹⁹

6. Michael J. Saks & Jonathan J. Koehler, Review, *The Coming Paradigm Shift in Forensic Identification Science*, 309 SCIENCE 892, 892 fig.1 (2005) (reviewing eighty-six DNA exoneration cases).

7. Possley et al., *supra* note 2.

8. Samuel R. Gross et al., *Exonerations in the United States: 1989 Through 2003*, 95 J. CRIM. L. & CRIMINOLOGY 523, 543 (2005). This study identified 340 exonerations, 196 of which did not involve DNA evidence. *Id.* at 524.

9. Garrett, *supra* note 5 (manuscript at 24 tbl.2).

10. *Id.* (manuscript at 31).

11. *Id.*

12. This type of evidence involved ABO typing and enzyme/protein analysis. See 1 PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, SCIENTIFIC EVIDENCE § 17.09[c], at 977 (4th ed. 2007) (discussing red cell enzymes and serum proteins).

13. The DNA cases

involved experts who offered misleading testimony and mischaracterized their own laboratory reports. Two cases involved improper analysis and testimony that resulted in false inclusions. In one case, that of Gilbert Alejandro, the criminalist claimed a DNA match even though neither he nor anyone else had conducted the DNA testing.

Garrett, *supra* note 5 (manuscript at 34). The expert was Fred Zain. For a discussion of Zain, see *infra* notes 52–58 and accompanying text.

14. See *infra* notes 165–207 and accompanying text.

15. See Possley et al., *supra* note 2 (“In Baltimore County, for instance, officials pledged a review of analyst Concepcion Bacasnot’s cases after DNA Tests in 2003

Montana,²⁰ Oklahoma City,²¹ San Antonio,²² Seattle,²³ Virginia,²⁴ and West Virginia,²⁵ as well as other locations.²⁶

exonerated an inmate whom her work helped convict of rape. In another case, she said she did not understand the science involved in her work.”).

16. See Barry Scheck & Peter Neufeld, Editorial, *Junk Science, Junk Evidence*, N.Y. TIMES, May 11, 2001, at A31 (“In Chicago, a police lab analyst, Pamela Fish, left out exculpatory serological results in testimony at a 1992 rape trial, contributing to a wrongful conviction. In 1999, the defendant was exonerated by DNA tests. Questions have now been raised about Ms. Fish’s conduct in a 1986 murder case.”); *infra* notes 150–64 and accompanying text.

17. See Connie Schultz, *City to Pay \$1.6 Million for Man’s Prison Time*, CLEV. PLAIN DEALER, June 8, 2004, at A1 (reporting that City of Cleveland agreed to pay Michael Green \$1.6 million for the thirteen years he spent in prison for a rape he did not commit, and an independent master was appointed to review a lab examiner’s prior cases).

18. See Anna Gorman, *LAPD Narcotics Analyst Erred: Botched Evidence Raises Question on Credibility. Public Defender’s Office Demands an Accounting*, L.A. TIMES, Sept. 2, 2004, at B1 (noting that Jeff Lowe, who analyzed drugs for the LAPD since May 2003, failed to weigh drugs separately from the containers in which they were seized “in forty-seven cases, leading to a review of 972 that he handled”).

19. See Deanna Boyd, *Crime Lab Subject of Criminal Inquiry*, FORT WORTH STAR-TELEGRAM, April 13, 2003, at 1 (“[A DNA] proficiency test revealed that a senior forensic scientist did not follow proper procedures and protocol. The review will involve almost 100 cases.”).

20. See Adam Liptak, *DNA Will Let a Montana Man Put Prison Behind Him, but Questions Linger*, N.Y. TIMES, Oct. 1, 2002, at A22; *infra* notes 125–47 and accompanying text.

21. See Lois Romano, *Police Chemist’s Missteps Cause Okla. Scandal*, WASH. POST, Nov. 26, 2001, at A1 (citing what is “arguably the biggest law enforcement scandal in Oklahoma history”); *infra* notes 68–124 and accompanying text.

22. See Laurie P. Cohen, ‘Scared of Science’: *Crime Labs’ Work Is Rarely Challenged by Defense Lawyers*, WALL ST. J., July 22, 1997, at A1 (discussing the case of Sonia Cacy). Cacy received a ninety-nine year sentence for murder by arson based on an inaccurate chemical test. See *Dateline: Body of Evidence* (NBC television broadcast Apr. 21, 1999) (analyzing the Cacy case). Cacy was paroled after serving only six months. See John MacCormack, *Woman is Paroled Despite Big Sentence*, SAN ANTONIO EXPRESS-NEWS, Nov. 24, 1998, at 1A.

23. See Ruth Teichroeb, *Rare Look Inside State Crime Labs Reveals Recurring DNA Test Problems*, SEATTLE POST-INTELLIGENCER, July 22, 2004, at A1 [hereinafter Teichroeb, *Rare Look*]; Ruth Teichroeb, *Oversight of Crime-Lab Staff Has Often Been Lax*, SEATTLE POST-INTELLIGENCER, July 23, 2004, at A1 [hereinafter Teichroeb, *Oversight of Crime-Lab Staff*]; Ruth Teichroeb, *Crime Labs Too Beholden to Prosecutors, Critics Say*, SEATTLE POST-INTELLIGENCER, July 23, 2004, at A13 [hereinafter Teichroeb, *Crime Labs Too Beholden*].

24. See *infra* notes 208–35 and accompanying text.

25. See Lawrence Messina, *State Police Lab Review Leaves Agency With Another Shiner*, CHARLESTON GAZETTE (Charleston, W. Va.), Mar. 13, 2002, at 1A (“The trooper who discovered one of the more recent scandals at the State Police crime lab was placed on leave Tuesday pending an investigation of his own work there.”); *infra* notes 52–67 and accompanying text.

26. See, e.g., Laura Cadiz, *Maryland-Based DNA Lab Fires Analyst Over Falsified Tests*, BALT. SUN, Nov. 18, 2004, at 1A (reporting that, on November 18, 2004, Orchid Cellmark—the world’s largest private DNA testing firm—announced that it fired analyst Sarah Blair for falsifying test data); Terry Horne, *Crime Lab Boss Placed on Leave*,

Moreover, a series of embarrassing incidents has plagued the FBI Laboratory, this country's premier forensic facility, leading to the issuance of Inspector General reports that were critical of the explosives unit in 1997²⁷ and a DNA unit in 2004.²⁸ Further, an FBI metallurgist pleaded guilty for giving false testimony concerning comparative analysis of bullet lead in 2003,²⁹ and a scathing internal report on the Bureau's misidentification of fingerprints in the Madrid train bombing was issued in 2004.³⁰

Some of the crime lab failures involved incompetence and sloppy procedures, while others entailed fraud, but the extent of the derelictions—the number of episodes and the duration of some of the abuses, covering decades in several instances³¹—precludes dismissal

INDIANAPOLIS STAR, Jan. 25, 2004, at 1A (“Mayor Bart Peterson relieved Forensic Services Agency Director James E. Hamby of his duties . . . amid growing concern that the crime lab chief had covered up problems in his agency.”); Keith Matheny, *Supervisor Accused of Passing Off DNA Test*, TRAVERSE CITY RECORD-EAGLE (Traverse City, Mich.), Dec. 19, 2004, at 1A (“A former supervisor in the Michigan State Police Crime Lab’s DNA analysis unit had a subordinate take a required proficiency test for him last year, an internal investigation found.”); James Randerson & Andy Coghlan, *Forensic Evidence Stands Accused*, NEW SCIENTIST, Jan. 31, 2004, at 6 (“The UK has been troubled this past week by revelations that flawed scientific advice given to courts may have led to the wrongful conviction of hundreds of men and women accused of harming their children.”); Vic Ryckaert, *Crime Lab to Retest DNA in 64 Cases*, INDIANAPOLIS STAR, July 18, 2003, at 1A (“The Marion County crime lab is reviewing 64 criminal cases—mostly rapes and killings—because of fears that one of its lab technicians cut corners on DNA testing.”); Robert Tanner, *Standards, Autonomy Sought for Crime Labs; Mishandling of Evidence, Mismanagement Cited*, SEATTLE TIMES, July 7, 2003, at A1 (“In Orlando, Fla., an analyst with the Florida Department of Law Enforcement admitted falsifying results of a test designed to check his work and his lab’s ability to analyze DNA. The state said that his transgression did not affect any criminal cases and that it would pay for retests where he was lead analyst.”).

27. OFFICE OF THE INSPECTOR GENERAL, U.S. DEPARTMENT OF JUSTICE, THE FBI LABORATORY: AN INVESTIGATION INTO LABORATORY PRACTICES AND ALLEGED MISCONDUCT IN EXPLOSIVES-RELATED AND OTHER CASES (1997) [hereinafter 1997 I.G. REPORT]; see *infra* notes 236–41 and accompanying text.

28. OFFICE OF THE INSPECTOR GENERAL, U.S. DEPARTMENT OF JUSTICE, THE FBI DNA LABORATORY: A REVIEW OF PROTOCOL AND PRACTICE VULNERABILITIES (2004) [hereinafter 2004 I.G. REPORT]; see *infra* notes 242–53 and accompanying text.

29. See Steve Bailey, *Prosecutor Challenged in Ragland Murder Case*, CINCINNATI POST, Sept. 6, 2002, at 13A (“Attorneys for both sides were in court for a hearing in which FBI ballistics expert Kathleen Lundy was scheduled to testify about lying during a preliminary hearing in Shane Ragland’s murder case.”); *infra* text accompanying notes 254–65.

30. See Robert B. Stacey, *A Report on the Erroneous Fingerprint Individualization in the Madrid Train Bombing Case*, 54 J. FORENSIC IDENTIFICATION 707 (2004); *infra* notes 290–309 and accompanying text.

31. Fred Zain was at the West Virginia lab for ten years. See *infra* notes 52–58 and accompanying text. Joyce Gilchrist was at the Oklahoma City lab for twenty years. See *infra* notes 68–124 and accompanying text.

of the controversy as the errant work of only a “few bad apples.”³² Forged fingerprints,³³ faked autopsies,³⁴ false laboratory reports,³⁵ and perjured testimony,³⁶ including the falsification of credentials,³⁷ have all been documented. Indeed, the Florida Supreme Court felt compelled to cite the “rising nationwide criticism of forensic

32. This is a claim that some forensic scientists have made. See, e.g., Tanner, *supra* note 26 (“‘There are always bad actors in any profession,’ said Paul Ferrara, director of the Virginia Division of Forensic Science. ‘The difference is that our mistakes do not get buried.’”). But see Janine Arvizu, *Forensic Laboratories: Shattering the Myth*, 24 THE CHAMPION, May 2000, at 18, 20 (“The problems in these high-profile cases are a clear reflection of the forensic community’s widespread failure to develop and implement effective quality assurance programs.”). Ferrara’s Virginia State Lab would later have its own problems. See *infra* notes 208–35 and accompanying text.

33. See Boris Geller et al., *A Chronological Review of Fingerprint Forgery*, 44 J. FORENSIC SCI. 963, 964–67 (1999) (discussing history of fingerprint forgeries); Mark Hansen, *Troopers’ Wrongdoing Taints Cases*, A.B.A. J., Mar. 1994, at 22, 22 (discussing New York police officers’ fabrication of fingerprint evidence in numerous cases).

34. See Richard L. Fricker, *Pathologist’s Plea Adds to Turmoil: Discovery of Possibly Hundreds of Faked Autopsies Helps Defense Challenges*, A.B.A. J., Mar. 1993, at 24, 24 (“If the prosecution theory was that death was caused by a Martian death ray, then that was what [pathologist] Dr. Erdmann reported.”) (internal quotes omitted); Chip Brown, *Pathologist Accused of Falsifying Autopsies, Botching Trial Evidence*, L.A. TIMES, Apr. 12, 1992, at A24 (“[F]ormer Dallas County assistant medical examiner Linda Norton was quoted as saying [Dr.] Erdmann routinely performs ‘made-to-order autopsies that support a police version of a story.’”); Roy Bragg, *New Clues May be Dug from Grave; Furor Touches on Autopsies, Brains*, HOUSTON CHRON., Mar. 28, 1992, at A1 (“[C]all him ‘McErdmann He’s like McDonald’s—billions served.’”) (quoting Dallam County District Attorney Barry Blackwell).

35. See *United States v. Gault*, 141 F.3d 1399, 1403 (10th Cir. 1998) (“Defendant sought to question Goldston about a former DEA colleague’s submission of falsified reports. The DEA agent, Ann Castillo, had admitted to failing to perform the controlled substance tests upon which her reports were based.”); *State v. Ruybal*, 408 A.2d 1284, 1285 (Me. 1979) (FBI analyst “reported results of lab tests that he did not in fact conduct”); *State v. DeFronzo*, 394 N.E.2d 1027, 1031 (Ohio Ct. Com. Pl. 1978) (expert represented that certain lab tests were conducted when “no such tests were ever conducted”).

36. See *supra* note 29; see also *Logerquist v. McVey*, 1 P.3d 113, 120 (Ariz. 2000) (en banc) (“It turned out that the witness presenting the dog-scent evidence in *Roscoe* was a charlatan.”).

37. See *United States v. Gale*, 314 F.3d 1, 1 (D.C. Cir. 2003) (observing that a government expert, who had testified for years in narcotics cases, “pleaded guilty to having committed perjury about his educational background”); *Drake v. Portuondo*, 321 F.3d 338, 342 (2d Cir. 2003) (“It is now apparent that Walter’s testimony concerning his qualifications was perjurious.”); *Doepel v. United States*, 434 A.2d 449, 460 (D.C. 1981) (a FBI serologist testified that he had a master’s degree in science, “whereas in fact he never attained a graduate degree”); *Commonwealth v. Mount*, 257 A.2d 578, 579 (Pa. 1969) (prosecution expert “had never fulfilled the educational requirements for a laboratory technician”). See generally James E. Starrs, *Mountebanks Among Forensic Scientists*, in 2 FORENSIC SCIENCE HANDBOOK 1, 7, 20–29 (Richard Saferstein ed., 1988) (discussing false credential cases).

evidence” in denying the admissibility of expert evidence in one case.³⁸

Paradoxically, these scandals are occurring as the power of DNA evidence to identify the guilty³⁹ and exonerate the innocent⁴⁰ is being reported weekly, if not daily, and while the Supreme Court is ratcheting up the standards for the admissibility of scientific evidence in its *Daubert* trilogy.⁴¹ The scandals have prompted Texas⁴² and Oklahoma⁴³ to require their crime laboratories to be accredited, joining New York, which has mandated accreditation since 1994.⁴⁴ Moreover, in 2004, Congress required states receiving federal funds to designate an agency to investigate laboratory fraud and misfeasance.⁴⁵

38. *Ramirez v. State*, 810 So. 2d 836, 853 (Fla. 2001) (excluding expert testimony comparing a knife with impression in cartilage).

39. See David Lazer, *Introduction to DNA AND THE CRIMINAL JUSTICE SYSTEM 7* (David Lazer ed., 2004) (“[T]hrough March 2004, 16,100 crime investigations in the United States had been aided through convict DNA databases.”).

40. See Barbara Novovitch, *Free After 17 Years for a Rape That He Did Not Commit*, N.Y. TIMES, Dec. 22, 2004, at A18 (discussing the case of Brandon Moon, who was released from prison after seventeen years for a rape that he did not commit; he was the 154th person exonerated by DNA analysis).

41. The Supreme Court revolutionized the standards for admitting expert testimony in *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993), which was followed by *Gen. Elec. Co. v. Joiner*, 522 U.S. 136 (1997), and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999). *Daubert* has been transformed over time, so that in *Weisgram v. Marley Co.*, 528 U.S. 440 (2000), the Supreme Court referred to *Daubert* as imposing “exacting standards of reliability.” *Id.* at 455.

42. TEX. CODE CRIM. PROC. ANN. art. 38.35 (Vernon 2005) (requiring accreditation by the Department of Public Safety). Texas also created a Forensic Science Commission. TEX. CODE CRIM. PROC. ANN. art. 38.01 (Vernon 2005).

43. OKLA. STAT. ANN. tit. 74, § 150.37 (West 2004) (requiring accreditation by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (“ASCLD/LAB”) or the American Board of Forensic Toxicology).

44. N.Y. EXEC. LAW § 995b (McKinney 2003) (requiring accreditation by the state Forensic Science Commission); see also CAL. PENAL CODE § 297 (West 2004) (requiring accreditation of DNA units by ASCLD/LAB or any certifying body approved by ASCLD/LAB); MINN. STAT. ANN. § 299C.156(2)(4) (West 2007) (specifying that Forensic Laboratory Advisory Board should encourage accreditation by ASCLD/LAB or other accrediting body).

Indiana does not require accreditation but does require “[a] laboratory conducting forensic DNA analysis” to “implement and follow nationally recognized standards for DNA quality assurance and proficiency testing, such as those approved by” ASCLD/LAB. See IND. CODE ANN. § 10-13-6-14 (LexisNexis 2003).

45. In 2004, as part of the “Justice for All Act,” the Omnibus Crime Control and Safe Streets Act of 1968 was amended to require

a certification that a government entity exists and an appropriate process is in place to conduct independent external investigations into allegations of serious negligence or misconduct substantially affecting the integrity of the forensic results committed by employees or contractors of any forensic laboratory system, medical examiner’s office, coroner’s office, law enforcement storage facility, or medical facility in the State that will receive a portion of the grant amount.

In 2005, the Virginia legislature made the Division of Forensic Science a separate agency under the Secretary of Public Safety⁴⁶ and created a Forensic Science Board and Scientific Advisory Committee⁴⁷—another byproduct of a lab controversy.⁴⁸ While these reforms reflect improvement, they are also long overdue⁴⁹ and, more importantly, inadequate. *All* crime laboratories should be regulated in a comprehensive manner.

Part I of this Article examines a number of laboratory failures. These examples involve both municipal and state facilities, as well as the FBI Laboratory, and they cover a wide variety of techniques, including hair comparisons, serological examinations, drug analyses, fingerprint identifications, and even DNA profiling, the current gold standard in forensic science. In some of these cases, it is difficult to distinguish between malfeasance and misfeasance because the lack of quality assurance protocols creates an environment in which both can flourish undetected for long periods of time. Moreover, some abuses can be traced to the lack of empirical validation of a technique—e.g., microscopic hair comparisons and comparative analysis of bullet lead. These examples demonstrate the need for regulating crime labs.

Part II discusses the regulation of DNA profiling, which has developed gradually over the last twenty years, and can serve as a model for other laboratory units. The complexity of DNA profiling forced the FBI to establish a technical working group on DNA analysis in 1988 in order to promulgate testing standards.⁵⁰ In 1994, Congress enacted the DNA Identification Act,⁵¹ which authorized a national DNA database. Significantly, this legislation also created a DNA Advisory Board to promulgate quality assurance standards and

42 U.S.C.A. § 3797k(4) (West Supp. 2007).

46. VA. CODE ANN. § 9.1-1100 (2005) (changing Division of Forensic Science into the Department of Forensic Science). Previously, the Division was under the Department of Criminal Justice Services. *Id.*

47. VA. CODE ANN. §§ 9.1-1109 to 9.1-1113 (2005).

48. *See infra* notes 208–35 and accompanying text.

49. Professor Jonakait wrote about the issue sixteen years ago. *See* Randolph N. Jonakait, *Forensic Science: The Need for Regulation*, 4 HARV. J.L. & TECH. 109, 191 (1991) (“Current regulation of clinical labs indicates that a regulatory system can improve crime laboratories.”). Professor Bernstein and I wrote about forensic abuses a decade ago. *See* 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); Paul C. Giannelli, *The Abuse of Scientific Evidence in Criminal Cases: The Need for Independent Crime Laboratories*, 4 VA. J. SOC. POL’Y & L. 439 (1997) (discussing cases involving expert misconduct).

50. *See infra* note 329 and accompanying text.

51. Pub. L. No. 103-322, 108 Stat. 2065 (codified as amended at 42 U.S.C.A. §§ 14131–14134 (West 2005)).

required proficiency testing of examiners and external audits. This landmark Act was the first federal legislation regulating a forensic science. Other requirements for an effective regulatory scheme include the accreditation of crime laboratories, the certification of examiners, and the standardization and promulgation of written protocols for each technique. Moreover, forensic science commissions should be established in each jurisdiction to implement these and other reforms.

I. CRIME LAB FAILURES

A. *West Virginia*

One of the most notorious cases of crime lab failure involved Fred Zain, the Chief Serologist in the West Virginia State Police Crime Laboratory, who falsified test results in as many as 134 cases from 1979 to 1989.⁵² In reviewing a judicial report on Zain's decade of misconduct, the Supreme Court of Appeals of West Virginia spoke of "shocking and . . . egregious violations" and the "corruption of our legal system."⁵³ The judicial inquiry concluded that "as a matter of law, any testimonial or documentary evidence offered by Zain at any time in any criminal prosecution should be deemed invalid, unreliable, and inadmissible."⁵⁴ The report commented:

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 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

52. See *In re Investigation of the W. Va. State Police Crime Lab., Serology Div.*, 438 S.E.2d 501, 511 (W. Va. 1993); George Castelle, *Lab Fraud: Lessons Learned from the Fred Zain Affair*, THE CHAMPION, May 1999, at 12, 13. A number of TV shows documented his abuses. See *60 Minutes: Right on, Fred Zain* (CBS television broadcast Apr. 24, 1994); *Dateline: Body of Evidence*, supra note 22.

53. *In re Investigation of the W. Va. State Police Crime Lab.*, 438 S.E.2d at 508.

54. *Id.* at 520. As part of the judicial inquiry, the Chairman of the Laboratory Accreditation Board of the American Society of Crime Laboratory Directors selected two experts to conduct an analysis of the policies, procedures, and records of the Serology Division during Zain's tenure. *Id.* at 503, 510-11.

when testing supported only a match with the victim; and (11) reporting scientifically impossible or improbable results.⁵⁵

Numerous defendants were imprisoned based on Zain's testimony.⁵⁶ In fact, Zain was such a treasured prosecution witness that even after he left the state to accept a position in a San Antonio crime lab, West Virginia prosecutors sent evidence to him for retesting.⁵⁷ The prosecutors relied on him because the remaining West Virginia serologists were incapable, in their view, of reaching the "right" results.⁵⁸

In response to the Zain affair, the West Virginia State Police revamped its crime lab.⁵⁹ Astonishingly, despite this effort, the lab continued to fall victim to misconduct. On September 7, 2000, as a result of an established quality control procedure, Sergeant Timothy White discovered certain inconsistencies in a lab report prepared by chemist Todd Owen McDaniel.⁶⁰ When White reported the inconsistencies, the State Police contacted the FBI and placed five members of the lab on administrative leave.⁶¹ When confronted, McDaniel admitted to skipping required tests on suspected marijuana

55. *Id.* at 503; *see also In re Investigation of W. Va. State Police Crime Lab.*, 445 S.E.2d 165, 167 (W. Va. 1994) ("Trooper Zain's misconduct was insidious and extensive.").

56. *See* Giannelli, *supra* note 49, at 442-49 (examining Zain's conduct in detail); SCHECK ET AL., *supra* note 5, at 107-17 (discussing Woodall, Davis, and Harris exonerations).

57. *See In re Investigation*, 438 S.E.2d at 512 (noting that a West Virginia serologist sent evidence to Texas for Zain to test). Zain's work in Texas also proved troublesome: "In the case of Gilbert Alejandro, the expert, Fred Zain, claimed a DNA match when in fact Zain had never conducted any testing beyond initial inconclusive testing and the DNA excluded Alejandro." Garrett, *supra* note 5 (manuscript at 35 n.109).

58. According to Zain's subordinate, "several prosecutors expressed dissatisfaction with the reports they were receiving from serology and specifically requested that the evidence be analyzed by Zain." *In re Investigation*, 438 S.E.2d at 512 n.16.

[Serologist] Myers also testified that after he had been unable to find blood on a murder suspect's jacket, it was sent to Texas, where Zain found a bloodstain which tested consistent with the blood of the victim. . . . [Serologist] Bowles also testified that at least twice after Zain left the lab, evidence on which Bowles had been unable to obtain genetic markers was subsequently sent to Texas for testing by Zain, who again was able to identify genetic markers.

Id. at 512.

59. *See* Messina, *supra* note 25.

60. *Id.* ("The trooper who discovered one of the more recent scandals at the State Police crime lab was placed on leave Tuesday pending an investigation of his own work there.").

61. Press Release, W. Va. State Police, New Employees Staff Drug Lab (Oct. 2, 2000), www.wvstatepolice.com/news/druglab1.htm.

and cocaine evidence and subsequently pleaded guilty to fraud.⁶² Drug Enforcement Administration (“DEA”) chemists had to take over the drug unit.⁶³

The FBI investigation found that McDaniel was not the only employee who ignored procedures. The report mentioned that White had also violated lab policy,⁶⁴ but he apparently failed to learn from this lesson. In June of 2001, less than a year later, a discrepancy was detected in one of his reports.⁶⁵ Adding to the problem, Captain Rick Theis, director of the lab, neglected to notify the State Police Superintendent, as required.⁶⁶ Both White and Theis were placed on leave.⁶⁷

B. Oklahoma City

Joyce Gilchrist, who began working as a forensic chemist in the Oklahoma City Police Department crime laboratory in 1980, is another prominent illustration of misconduct continuing unchecked for many years.⁶⁸ She was also a prosecution superstar.⁶⁹

1. Curtis McCarty Prosecution

In 1982, Gilchrist initially excluded Curtis McCarty as a suspect in a rape-murder investigation based on microscopic hair comparison.⁷⁰ After another suspect identified McCarty as the killer, Gilchrist reviewed a second set of hair samples from McCarty, which she then matched to the crime scene exemplars.⁷¹

Two months before trial, the defense requested discovery of all scientific reports as well as access to hair, fiber, and serological

62. See Messina, *supra* note 25.

63. See New Employees Staff Drug Lab, *supra* note 61.

64. *Id.* A second civilian chemist, Mills Dillard, who was one of the lab members on administrative leave, resigned during the investigation. *Id.*

65. See Messina, *supra* note 25.

66. *Id.*

67. *Id.*

68. See MARK FUHRMAN, DEATH AND JUSTICE: AN EXPOSÉ OF OKLAHOMA’S DEATH ROW MACHINE 232 (2003) (concluding that Gilchrist “appears to have used her lab tests to confirm the detectives’ hunches rather than seek independent scientific results. . . . She treated discovery requests with contempt and kept evidence from the defense. She systematically destroyed evidence at the very time when she knew that much of that evidence might be retested”).

69. See *id.* at 70 (noting that after “the successful prosecution of Malcolm Rent Johnson, Joyce Gilchrist’s star began to rise”); see also Bennett L. Gershman, *Misuse of Scientific Evidence By Prosecutors*, 28 OKLA. CITY U. L. REV. 17, 23 (2003) (using Gilchrist’s conduct as example of abuse of scientific evidence).

70. See FUHRMAN, *supra* note 68, at 90.

71. *Id.*

samples for an independent evaluation.⁷² John Wilson, a Kansas City Police Crime Lab examiner, analyzed the evidence after being hired as a defense consultant.⁷³ Gilchrist sent the samples so that Wilson received them on March 17, 1986, the day McCarty's trial began.⁷⁴ Gilchrist then used her tardiness against the defense by testifying that Wilson could not have conducted a competent examination in the length of time he had the hair slides.⁷⁵ Further, after Wilson testified that, according to Gilchrist's report, none of the pubic hairs found on the victim matched McCarty's, Gilchrist testified that she had simply failed to include in her report that a pubic hair found on the victim was consistent with McCarty's hair.⁷⁶ Additionally, Gilchrist testified that, based on her examination, McCarty was *present* at the time of the crime; there was no basis—scientific or otherwise—for this statement.⁷⁷ McCarty was sentenced to death.⁷⁸

The Oklahoma Court of Criminal Appeals reversed McCarty's conviction, finding that Gilchrist had improperly delayed sending her report, as well as the sample, to the defense expert.⁷⁹ The court also criticized Gilchrist for omitting critical information from the report, labeling her conduct "trial by ambush."⁸⁰ Finally, the court found that Gilchrist had testified beyond the state of the art.⁸¹

72. *McCarty v. State*, 765 P.2d 1215, 1217 (Okla. Crim. App. 1988).

73. *Id.*

74. *Id.*

75. *Id.* at 1217–18.

76. *Id.* at 1218.

77. *Id.*

78. *Id.* at 1217.

79. *Id.* ("Ms. Gilchrist's delay and neglect in not completing her forensic examination and report . . . was inexcusable, since she began her forensic examination in December of 1982.")

80. *Id.* at 1218 ("[T]he forensic report was at best incomplete, and at worst inaccurate and misleading. . . . Gilchrist admitted at trial, however, that she failed to include her conclusion . . . in the forensic report given to Mr. Wilson. This significant omission, whether intentional or inadvertent, resulted in a trial by ambush . . .") (citations omitted).

81. *Id.* ("We find it inconceivable why Ms. Gilchrist would give such an improper opinion, which she admitted she was not qualified to give."). McCarty was later convicted at a retrial. *McCarty v. State*, 904 P.2d 110 (Okla. Crim. App. 1995). However, his conviction was once again vacated during post-conviction proceedings due to Gilchrist's misconduct. *McCarty v. State*, 114 P.3d 1089, 1092 n.12 (Okla. Crim. App. 2005) (noting that a departmental "Review Board found the circumstantial evidence indicated Ms. Gilchrist had destroyed the evidence in order to prevent DNA testing"). A third trial was subsequently aborted. See Cheryl Camp, *Convicted Murderer Is Freed In Wake of Tainted Evidence*, N.Y. TIMES, May 22, 2007, at A16 (reporting that trial judge released McCarty because the "evidence in the case against him had been tainted or destroyed by the actions of a former police chemist, Joyce Gilchrist, who lawyers say switched out samples to get a match").

This was not the only trial at which Wilson and Gilchrist would clash. Wilson testified against Gilchrist in another case.⁸² After examining hair evidence that, according to Gilchrist's testimony, matched the defendant, Wilson reached the opposite conclusion. After the trial, he registered a complaint against Gilchrist with the Southwestern Association of Forensic Scientists ("SWAFS"), which conducted an investigation and concluded that Gilchrist should distinguish between her personal and scientific opinions.⁸³ Despite this admonishment, Gilchrist was not otherwise disciplined. In the end, Wilson was the one punished: the Oklahoma City Police Department called Wilson's supervisor at the Kansas City Police Department, complaining that he had testified against its expert.⁸⁴ Kansas City subsequently forbade him from working on private cases.⁸⁵

2. Jeffrey Pierce Prosecution

In 1985, Sandra Burton was raped in her apartment.⁸⁶ When the police brought Jeffrey Pierce, a landscaper at her apartment complex, to Burton, she said that he was not the rapist.⁸⁷ In addition, two witnesses corroborated Pierce's alibi.⁸⁸ Eight months later, however, Pierce was arrested, and minutes after he voluntarily agreed to provide head and pubic hair exemplars, Gilchrist determined that

82. FUHRMAN, *supra* note 68, at 95 (discussing the Alvin King Parker case).

83. See *McCarty*, 765 P.2d at 1219 ("[O]n December 14, 1987, Max Courtney, President of the Southwestern Association of Forensic Scientists, Inc., issued a prepared statement of the Board of Directors concerning allegations of professional misconduct lodged against Ms. Gilchrist. A certified copy of this statement, which was filed with this Court on January 4, 1988, concluded that Ms. Gilchrist had violated the ethical code, but interestingly she was not disciplined. That statement reads in relevant part: 'Our Professional Conduct Committee thoroughly investigated the allegations against Ms. Joyce Gilchrist and . . . communicated with [her] that she should distinguish personal opinion from opinions based upon facts derived from scientific evaluation We further conclude that, in our system of jurisprudence, undue pressure can be placed upon the forensic scientist to offer personal opinions beyond the scope of scientific capabilities.'" (citation omitted)).

84. FUHRMAN, *supra* note 68, at 98.

85. *Id.*

86. *Pierce v. State*, 786 P.2d 1255, 1258 (Okla. Crim. App. 1990); see also FUHRMAN, *supra* note 68, at 191–210.

87. *Pierce v. Gilchrist*, 359 F.3d 1279, 1282 (10th Cir. 2004).

88. *Id.*

Pierce's hairs "matched" the crime scene hairs.⁸⁹ Pierce was subsequently convicted and sentenced to sixty-five years in prison.⁹⁰

The Oklahoma Court of Criminal Appeals upheld the conviction, despite several troubling aspects of the case. First, Gilchrist had violated a court order by failing to turn over evidence to the defense.⁹¹ Second, her report was incomplete.⁹² While the court acknowledged these deficiencies, it nevertheless concluded that Pierce's constitutional rights had not been violated.⁹³

A later FBI investigation of Gilchrist's analyses in eight cases determined that she had misidentified hairs in six instances and fibers in another.⁹⁴ One of the cases was Pierce's; the FBI found that none of the hairs taken from Pierce exhibited the same microscopic characteristics as those found at the crime scene.⁹⁵ As a result, the Oklahoma City Police Department had the evidence retested by a private DNA laboratory.⁹⁶ That testing exonerated Pierce, who is now suing Gilchrist for violating his constitutional rights.⁹⁷

89. *Pierce*, 786 P.2d at 1258 ("Joyce Gilchrist testified that twenty-eight scalp hairs and three pubic hairs recovered from either S.B., her clothing or her apartment, were microscopically consistent with the characteristics found in Appellant's hair.").

90. *Id.*

91. *Id.* at 1261 ("Instead of following either the letter of the Order or taking steps to have the Order changed or clarified by the court, she took it upon herself to determine the portions of the Order with which she wished to comply. This was not her decision to make.").

92. *Id.* at 1263 n.8 ("Appellant claims that it was error for Gilchrist not to set out in the report, her opinion that the attacker was a non-secretor."). At trial, Gilchrist testified that Pierce was a non-secretor, a person whose blood type cannot be determined through other body fluids, including semen. FUHRMAN, *supra* note 68, at 203. Between twenty and twenty-five percent of the population falls into this category. 1 GIANNELLI & IMWINKELRIED, *supra* note 12, § 17.09, at 959.

93. *Pierce*, 786 P.2d at 1263-64. Gilchrist misstated her qualifications. *Id.* at 1264 ("During the trial, Gilchrist testified that she was a member of the American Academy of Forensic Sciences. Appellant has provided this Court with several letters which reveal that at the time of trial, Gilchrist had been suspended from the organization for non-payment of dues.").

94. See SPECIAL AGENT DOUGLAS DEEDRICK, SUMMARY OF CASE REVIEWS OF FORENSIC CHEMIST, JOYCE GILCHRIST, OKLAHOMA CITY POLICE DEPARTMENT CRIME LABORATORY 1 (2001) (concluding that lab notes "were often incomplete or inadequate to support the conclusions reached by the examiner" and finding a lack of documentation "to identify textile fibers" in one of the cases and no indication of "a confirmation or review by another qualified examiner" in hair cases) (on file with the North Carolina Law Review).

95. *Id.* at 3 ("[T]hese [pubic] hairs do not exhibit the same microscopic characteristics as the suspect's known pubic hairs.").

96. DNA testing was not available at the time of Pierce's trial in 1986.

97. See *Pierce v. Gilchrist*, 359 F.3d 1279, 1300 (10th Cir. 2004) (finding that Gilchrist does not have immunity).

3. Alfred Mitchell Prosecution

In *Mitchell v. State*,⁹⁸ a rape-murder case tried in 1992, Gilchrist testified that Mitchell's sperm had been detected on anal and vaginal swabs taken from the victim.⁹⁹ She made this statement despite two key facts: (1) pretrial DNA testing performed by the FBI (at Gilchrist's request) established the absence of sperm on the swabs, and (2) sperm found on the victim's panties matched the DNA of her boyfriend.¹⁰⁰ Gilchrist did not turn over the FBI report to the defense, although, as the Tenth Circuit subsequently noted, "[t]he results thus completely undermined Ms. Gilchrist's testimony."¹⁰¹ The court went on to observe:

*Ms. Gilchrist thus provided the jury with evidence implicating Mr. Mitchell in the sexual assault of the victim which she knew was rendered false and misleading by evidence withheld from the defense. Compounding this improper conduct was that of the prosecutor, whom the district court found had "labored extensively at trial to obscure the true DNA test results and to highlight Gilchrist's test results," and whose characterization of the FBI report in his closing argument was "entirely unsupported by evidence and . . . misleading."*¹⁰²

98. 884 P.2d 1186 (Okla. Crim. App. 1994).

99. *Id.* at 1199 ("Gilchrist's findings indicated the presence of sperm in the vaginal and anal canals (the latter consistent with Mitchell). Sperm consistent with Mitchell was also found on the medical examiner's transport sheet in the area where [the victim's] genitals lay during transport."); see also FUHRMAN, *supra* note 68, at 126 (noting Gilchrist's testimony that the FBI's DNA test "had been 'inconclusive'").

100. *Mitchell v. Gibson*, 262 F.3d 1036, 1063 (10th Cir. 2001). The appellate court further noted:

[H]and-written notes taken by Ms. Gilchrist during telephone conversations with Agent Vick indicat[ed] that the agent had conducted two DNA probes on the samples. These probes showed that the semen on the panties matched that of Mr. Taylor only, that no DNA was present on the rectal swab, and that the only DNA on the vaginal swab was consistent with the victim.

Id.

101. *Id.* at 1064 ("An expert testified at the evidentiary hearing that the DNA testing . . . unquestionably eliminated Mr. Mitchell . . . [and Gilchrist's testimony was] based on the use of test methods Ms. Gilchrist knew were less precise than the DNA tests which eliminated Mr. Mitchell. Moreover, he pointed out that one of the tests she performed in fact excluded Mr. Mitchell.").

102. *Id.*; see also *Gilchrist v. Bd. Rev. Okla. Employment Sec. Comm'n*, 94 P.3d 72, 75 (Okla. 2004) ("Gilchrist's conduct in *Mitchell*, that is knowingly giving false and misleading testimony in a criminal case, constituted 'misconduct' sufficient to support the denial of unemployment benefits . . .").

4. Malcolm Rent Johnson Prosecution

In the trial of Malcolm Rent Johnson, another rape-murder prosecution, Gilchrist testified that semen recovered from the victim's bed was consistent with Johnson's blood type and that hairs found on the bed matched hair taken from Johnson's arm.¹⁰³ Johnson's request for a defense expert to counter Gilchrist's testimony was denied,¹⁰⁴ and he was convicted and then executed on January 6, 2000.¹⁰⁵ When the Gilchrist scandal later erupted, Johnson's attorneys asked for the evidence to be reexamined.¹⁰⁶ Four police chemists later concluded that there was no sperm present on the slides taken from the victim's bed.¹⁰⁷ Yet, for her work on the Johnson case, Gilchrist had received a certificate of achievement.¹⁰⁸ Questions about the execution linger.¹⁰⁹

103. *Johnson v. State*, 731 P.2d 993, 1007 (Okla. Crim. App. 1987); FUHRMAN, *supra* note 68, at 61; *see also Johnson v. State*, 823 P.2d 370 (Okla. Crim. App. 1991) (denying state habeas relief).

104. *Johnson*, 731 P.2d at 1007 ("The techniques used and manner of investigation were discussed on direct and on cross examination. The test results were available for discovery prior to trial. The experts called were forthright concerning their findings and the limitations inherent in the tests and investigation."). *See generally* Paul C. Giannelli, Ake v. Oklahoma: *The Right to Expert Assistance in a Post-Daubert, Post-DNA World*, 89 CORNELL L. REV. 1305 (2004) [hereinafter Giannelli, *The Right to Expert Assistance*] (discussing the need to bolster the right to defense experts).

105. FUHRMAN, *supra* note 68, at 253. During the appeals process, Skip Palenik, a forensic scientist, criticized Gilchrist's trial testimony, stating that she had testified beyond the bounds of accepted science when she claimed to have matched arm hair to the defendant. *Id.* at 64. According to Palenik, arm hairs are not individual enough for such comparisons. *Id.*

106. *Id.* at 65–66. The District Attorney's office informed them that the evidence no longer existed. *Id.* at 66. When the defense attorney searched the evidence archives, however, he found the smear slides right where they were supposed to be. *Id.*

107. *Id.* at 66–67 (noting that Laura Schile, an OCPD crime lab scientist, "wrote a memo stating that 'spermatozoa is not present' on six slides that Gilchrist had said contained semen matching Johnson's blood type and secretor status. Schile's conclusions were supported by three other police chemists . . ."); *see also* Lois Romano, *Police Chemist's Missteps Cause Okla. Scandal*, WASH. POST, Nov. 26, 2001, at A1 ("But last July, in a startling development, the police lab stated in a memo . . . that it had recently reexamined the original slides purportedly containing the sperm and found no sperm there—contrary to Gilchrist's claims 19 years ago.").

108. FUHRMAN, *supra* note 68, at 70.

109. *Id.* at 68 ("Even David Prater [an assistant D.A.] admits that the 'Malcolm Rent Johnson case is the one case, out of the ones who have been executed, that is questionable.'"); Jim Yardley, *Oklahoma Police Lab Scientist Probed; Future Executions Put on Hold*, CHI. TRIB., May 2, 2001, at 9 ("State Atty. Gen. Drew Edmondson, whose office began reviewing the capital cases last week . . . said he still wants to review the case of Malcolm Rent Johnson, who was executed in January 2000 for murdering a woman. He did not offer a reason to believe Johnson was wrongly executed but said he wants to more thoroughly examine the case.").

5. Additional Cases

These cases were not the only ones in which Gilchrist's work was criticized.¹¹⁰ In *Fox v. State*,¹¹¹ a death penalty case, the appellate court questioned her testimony concerning hair analysis: "The lack of scientific weight of such a conclusion is apparent on reflection by those dealing with similar evidence on a regular basis. But to a lay jury, usually ill-equipped to assimilate hair analysis findings on their own, such an opinion may appear too substantial."¹¹² In *Miller v. State*,¹¹³ the court reversed a rape conviction, noting that once again Gilchrist turned over hair evidence to the defense in an untimely manner¹¹⁴ and omitted crucial conclusions from her report.¹¹⁵ Mitochondrial DNA analysis later exonerated Miller.¹¹⁶ Another suspect, Ronnie Lott, whom Gilchrist had cleared, was subsequently convicted of the crime.¹¹⁷

6. Other Problems

A January 2001 report by the chief of the laboratory documented additional problems concerning Gilchrist's job performance,

110. See, e.g., *Cannon v. Gibson*, 259 F.3d 1253, 1275 n.22 (10th Cir. 2001) (denying habeas relief, the court wrote: "This court recognizes that recently information has come to light casting serious doubt on the veracity of Gilchrist's testimony in a large number of criminal prosecutions. . . . In fact, there is serious reason to doubt the veracity of Gilchrist's testimony in this particular case."); *LaFevers v. Gibson*, 238 F.3d 1263, 1266 (10th Cir. 2001). Denying habeas relief in *LeFevers*, the court wrote:

When habeas counsel ultimately succeeded in having Exhibit 83 submitted for DNA testing, the testing revealed that the blood on the pants actually belonged to Cannon, not the victim. . . . LaFevers asserted that . . . (1) [Gilchrist] lied when she asserted that the blood splatters on the pants were not sufficiently large to conduct electrophoresis testing; and (2) she lied when she testified that she had not conducted electrophoresis testing on the pants.

Id.

111. 779 P.2d 562 (Okla. Crim. App. 1989) (upholding a murder conviction and death penalty sentence).

112. *Id.* at 571. The court also noted that "Ms. Gilchrist admitted that an individual could not be positively identified by hair evidence. However, she went on to testify that, '[in] her opinion . . . Mark Fowler and Bill Fox were in contact with John Barrier prior to death.'" *Id.* at 571 (alteration in original).

113. 809 P.2d 1317 (Okla. Crim. App. 1991).

114. *Id.* at 1319-20 ("[I]t was approximately two weeks after the deadline ordered by Judge Owens that Ms. Gilchrist mailed the hair evidence to the appellant's expert. Thus, appellant's expert received the evidence six and one-half days before trial began.").

115. *Id.* at 1320 ("What is even more disturbing . . . is the fact that Ms. Gilchrist's pretrial forensic report made absolutely no mention of her finding of a 'unique characteristic' concerning appellant's pubic hairs. However, in his opening argument, the prosecutor alerted the jury to the State's expert's finding of the 'unique characteristic.'").

116. SCHECK ET AL., *supra* note 5, at 87.

117. *Lott v. State*, 98 P.3d 318 (Okla. Crim. App. 2004).

including: (1) missing evidence in numerous cases; (2) contamination issues due to evidence being “stacked all over the chemist’s area”; (3) systematic destruction of rape evidence after two years, well before the statute of limitations expired; (4) lack of peer review in many cases; and (5) the absence of proficiency testing, although such testing had been paid for.¹¹⁸ This review came ten years after Professor Starrs had criticized Gilchrist’s work in a forensic science journal.¹¹⁹ He wrote: “[I]n her missionary zeal to promote the cause of the prosecution she had put blinders on her professional conscience so that the truth of science took a back seat to her acting the role of an advocate.”¹²⁰

Although her conduct had been questioned for over fifteen years, Gilchrist’s supervisors were either unaware of the courtroom controversies or they did not care as long as her testimony resulted in convictions.¹²¹ When interviewed by Dan Rather in 2001, Wilson, the expert who had filed the ethics complaint against Gilchrist, succinctly captured the problem: “The whole criminal justice system has failed.”¹²² He then elaborated: “You have to look at the prosecutor’s office. They must have understood what was going on with all those flags being waved. The judges are no different.”¹²³ Of the twenty-three death penalty cases in which Gilchrist testified, twelve

118. Memorandum from Captain Byron Boshell, Lab. Servs. to Major Garold Spencer, Investigations Bureau 16–17 (Jan. 16, 2001) (on file with the North Carolina Law Review).

119. See James E. Starrs, *The Forensic Scientist and the Open Mind*, 31 J. FORENSIC SCI. SOC’Y 111 (1991).

120. *Id.* at 132–33.

121. Memorandum from Captain Byron Boshell, Lab Servs. to Major Garold Spencer, Investigations Bureau, *supra* note 118, at 10 (“I knew from previous articles published over the years that she had been the subject of scrutiny by the courts, but I assumed they had been addressed by the department and resolved. I later found no indication in her personnel file that they had ever been investigated or addressed administratively.”). On September 25, 2001, Gilchrist was discharged. *Gilchrist v. Bd. Rev. Okla. Employment Sec. Comm’n*, 94 P.3d 72, 74 (Okla. 2004).

122. *60 Minutes: Black Magic: Under the Microscope* (CBS television broadcast May 8, 2001).

123. *Id.*; see also FUHRMAN, *supra* note 68, at 71 (noting that Detective Bemo claimed that Gilchrist began giving the detectives test results that were so good “that he didn’t believe [she] was doing proper lab work, because her results were ‘too good.’ Bemo says that now, but it didn’t stop him and his partner Bill Cook from using Gilchrist’s lab results in many of their cases.”). Fuhrman further notes:

Cook had given Gilchrist the nickname “Black Magic” because she was able to get results that no other chemist could. When Cook and other homicide detectives gave Gilchrist a hair sample from a suspect, they would often let her know that this was the person that they wanted to arrest.

Id. at 91.

defendants have been executed. Oklahoma now requires its laboratories to be accredited.¹²⁴

C. *Montana*

The problems in Montana surfaced when Jimmy Ray Bromgard, convicted of rape in 1987,¹²⁵ was exonerated by DNA testing sponsored by the Cardozo Law School Innocence Project—after serving fifteen years in prison.¹²⁶ Arnold Melnikoff, the founder and one-time director of the Montana State Police Crime Laboratory, testified about hair analysis at Bromgard's trial.¹²⁷ Melnikoff used a statistical analysis that he had apparently invented.¹²⁸ According to Melnikoff, "the odds were one in one hundred that two people would have head hair *or* pubic hair so similar that they could not be distinguished by microscopic comparison and the odds of *both* head and pubic hair from two people being indistinguishable would be about one in ten thousand."¹²⁹ There was no scientific basis for these statements.

An independent panel of five trace evidence experts concluded that Melnikoff's testimony contained "egregious misstatements" and demonstrated a "fundamental lack of understanding" of hair comparisons.¹³⁰ The Innocence Project then sought out other cases in which Melnikoff had testified.¹³¹ As a result, DNA analysis also

124. See OKLA. STAT. ANN. tit. 74, § 150.37 (West 2004) (requiring accreditation by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board or the American Board of Forensic Toxicology).

125. *State v. Bromgard*, 862 P.2d 1140 (Mont. 1993); see also *CNN Presents: Reasonable Doubt: Can We Trust Crime Labs?* (CNN television broadcast Jan. 9, 2005) (examining the Bromgard case).

126. See Liptak, *supra* note 20.

127. See Adam Liptak, *2 States to Review Lab Work of Expert Who Erred on ID*, N.Y. TIMES, Dec. 19, 2002, at A24.

128. *Id.* ("The 1-in-100 estimate was without any scientific basis . . .") (quoting Professor Walter Rowe, George Washington University).

129. *Bromgard*, 862 P.2d. at 1141.

130. INNOCENCE PROJECT, PEER REVIEW REPORT: *MONTANA V. JIMMY RAY BROMGARD 2* ("[T]here is not—and never was—a well established probability theory for hair comparison. . . . If this witness has evaluated hair in over 700 cases as he claims in his testimony, then it is reasonable to assume that he has made many other misattributions.") (on file with the North Carolina Law Review); see also Liptak, *supra* note 127 ("An F.B.I. report issued yesterday concluded that the scientist had misidentified the hair samples that were the central evidence in the case.").

131. Peter J. Neufeld, *The (Near) Irrelevance of Daubert to Criminal Justice and Some Suggestions for Reform*, 95 AM. J. PUB. HEALTH (SUPP. 1) 107, 107 (2005) ("A Lexis search identified two other cases in which the Montana Supreme Court viewed Melnikoff's hair evidence favorably and affirmed convictions. In both cases, postconviction DNA testing on the original semen samples excluded the convicted offenders, and the men were exonerated.").

exonerated Chester Bauer, convicted of rape in 1983, and Paul Kordonowy, convicted of rape in 1990.¹³² In these two cases, Melnikoff had also used bogus statistical analysis in his testimony.¹³³ When the state Attorney General refused to investigate past cases, the Innocence Project, along with five former Montana Supreme Court justices, sought review of the more than 200 cases in which Melnikoff had been involved.¹³⁴ The Montana Supreme Court, however, used jurisdictional grounds to dismiss a petition that sought an independent audit and retesting of evidence.¹³⁵

Melnikoff had moved on to the Washington State Patrol Crime Lab in 1989.¹³⁶ An investigation there revealed additional problems. An internal audit found flaws in thirty out of 100 drug-analysis cases assigned to Melnikoff.¹³⁷

Gilchrist and Melnikoff were not the only experts abusing hair comparison evidence; many of the wrongful conviction cases involved this type of evidence.¹³⁸ In *Williamson v. Reynolds*,¹³⁹ a federal district court correctly noted that microscopic hair analysis lacks scientific

132. See <http://www.innocenceproject.org/Content/52.php> (Chester Bauer); <http://www.innocenceproject.org/Content/194.php> (Paul Kordonowy).

133. See *State v. Bauer*, 683 P.2d 946, 951 (Mont. 1984) (“Melnikoff estimated that the chances of another person having the same type of pubic and head hair were one in ten thousand.”); *State v. Kordonowy*, 823 P.2d 854, 856 (Mont. 1991) (“Arnold Melnikoff . . . testified that with caucasian head and pubic hair, he could microscopically distinguish an individual’s respective head and pubic hair from another individual’s respective head and pubic hair in ninety-nine out of 100 cases.”).

134. See Jennifer McKee, *High Court Won’t Rule on Crime Lab Decision*, BILLINGS GAZETTE, Sept. 2, 2004, at 1C.

135. *In re Investigation in the Trace Evidence and Serology Section of the Montana Forensic Lab*, No. 04-582, at 3–4 (Mont. 2004) (“We express no view on the serious matters asserted in the petition or on the extent to which the petitioners may have other remedies. We conclude, however, that this Court has no authority or jurisdiction to take the actions requested by the petitioners via an original proceeding.”); see also McKee, *supra* note 134 (reporting four-to-three decision in which court held that it lacked authority to order an investigation); Possley et al., *supra* note 2.

136. McKee, *supra* note 134.

137. See Teichroeb, *Oversight of Crime-Lab Staff*, *supra* note 23 (“Washington State Patrol officials will notify prosecutors in seven counties that drug evidence handled by one of their employees—a crime lab forensic scientist facing termination—has been called into question.”).

138. See, e.g., FRED KAUFMAN, ONTARIO MINISTRY OF THE ATTORNEY GENERAL, 1 REPORT OF THE KAUFMAN COMMISSION ON PROCEEDINGS INVOLVING GUY PAUL MORIN 83 (1998) (finding that Morin was erroneously convicted based, in part, on “valueless” hair evidence). Recommendation 2 noted: “Trial judges should undertake a more critical analysis of the admissibility of hair comparison evidence as circumstantial evidence of guilt.” *Id.* at 311.

139. 904 F. Supp. 1529 (E.D. Okla. 1995).

support.¹⁴⁰ Williamson was later exonerated by DNA profiling, and the hair evidence was shown to be “patently unreliable.”¹⁴¹ Still another expert testified at Edward Honaker’s trial that the crime scene hair sample “‘was unlikely to match anyone’” else.¹⁴² Actually, hundreds or even hundreds of thousands of hair exemplars could have “matched.” Honaker was also freed by DNA profiling.¹⁴³ Despite this record, courts (including in *McCarty*¹⁴⁴ in Oklahoma) continued to admit this suspect evidence.¹⁴⁵ Indeed, one court judicially noticed the reliability of hair evidence,¹⁴⁶ implicitly finding this evidence indisputable,¹⁴⁷ and yet there is an embarrassing lack of basic research on this “well-accepted” technique.¹⁴⁸

In an FBI study comparing microscopic and mitochondrial DNA analysis of hair, the former was wrong approximately twelve percent

140. *Id.* at 1556. The district court had “been unsuccessful in its attempts to locate *any* indication that expert hair comparison testimony meets *any* of the requirements of *Daubert*.” *Id.* at 1558. The court further observed: “Although the hair expert may have followed procedures accepted in the community of hair experts, the human hair comparison results in this case were, nonetheless, scientifically unreliable.” *Id.* Nevertheless, the Tenth Circuit reversed on this issue. *Williamson v. Ward*, 110 F.3d 1508, 1523 (10th Cir. 1997) (holding that due process (fundamental fairness), not the more stringent *Daubert*, standard applies in habeas proceedings).

141. SCHECK ET AL., *supra* note 5, at 146. See generally JOHN GRISHAM, *THE INNOCENT MAN* (2006) (examining the Williamson case).

142. See EDWARD CONNORS ET AL., *CONVICTED BY JURIES, EXONERATED BY SCIENCE: CASE STUDIES IN THE USE OF DNA EVIDENCE TO ESTABLISH INNOCENCE AFTER TRIAL* 58 (1996), available at <http://www.ncjrs.gov/pdffiles/dnaevid.pdf>.

143. See *id.* at 59.

144. *McCarty v. State*, 904 P.2d 110, 125 (Okla. Crim. App. 1995) (admitting hair evidence); see also *supra* notes 70–85 and accompanying text.

145. See, e.g., *State v. Fukusaku*, 946 P.2d 32, 44 (Haw. 1997) (“Because the scientific principles and procedures underlying hair and fiber evidence are well-established and of proven reliability, the evidence in the present case can be treated as ‘technical knowledge.’ Thus, an independent reliability determination was unnecessary.”); *McGrew v. State*, 682 N.E.2d 1289, 1292 (Ind. 1997) (concluding that hair comparison is “more a ‘matter of the observations of persons with specialized knowledge’ than ‘a matter of scientific principles’” (internal quotation marks omitted) (quoting *Jervis v. State*, 679 N.E.2d 875, 881 (Ind. 1997))).

146. See *Johnson v. Commonwealth*, 12 S.W.3d 258, 262–63 (Ky. 1999).

147. See FED. R. EVID. 201(b) (limiting judicial notice to facts that are not subject to reasonable dispute); *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 592 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 Federal Rule of Evidence 201.”).

148. See Paul C. Giannelli & Emmie West, *Hair Comparison Evidence*, 37 CRIM. L. BULL. 514 (2001) (discussing the DNA exoneration cases in which hair evidence was used to convict the innocent); Clive A. Stafford Smith & Patrick A. Goodman, *Forensic Hair Comparison Analysis: Nineteenth Century Science or Twentieth Century Snake Oil?*, 27 COLUM. HUM. RTS. L. REV. 227, 231 (1995–1996) (“If the purveyors of this dubious science cannot do a better job of validating hair analysis than they have done so far, forensic hair comparison analysis should be excluded altogether from criminal trials.”).

of the time—even though, in all cases reviewed, the conclusion had been limited to an “association” (“consistent with” testimony).¹⁴⁹ In the hair cases, the lack of a scientific basis and lab protocols—limiting the conclusions that may be derived from the evidence—camouflaged the misconduct.

D. Chicago

John Willis was convicted of rape in 1992, despite his protests of innocence.¹⁵⁰ Dr. Pam Fish, a serologist in the Chicago crime lab, testified that her tests were “inconclusive”—i.e., that they neither included nor excluded Willis as the source of semen.¹⁵¹ Willis, dubbed the “beauty shop rapist,” was convicted and sentenced to 100 years of imprisonment.¹⁵² Seven years later, DNA testing exonerated him.¹⁵³ At that time, Fish’s lab notes surfaced, indicating that Willis’s blood type (type B) excluded him as the source of the semen (type A).¹⁵⁴ Fish failed to acknowledge this finding in her testimony.¹⁵⁵ After reviewing the file, a respected forensic scientist concluded that “labeling the typing of the semen stains as ‘inconclusive’ misrepresents the laboratory findings.”¹⁵⁶ Willis sued, and the city,

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

150. See Maurice Possley & Jeremy Manier, *Police Crime Lab on the Hot Seat*, CHI. TRIB., Oct. 9, 1998, § 1, at 1.

151. *Id.*

152. *Id.*

153. See Steve Mills et al., *When Labs Falter, Defendants Pay: Bias Toward Prosecution Cited in Illinois Cases*, CHI. TRIB., Oct. 20, 2004, § 1, at 1.

154. *Id.* (“[Willis] had blood type B and was a secretor—that is, his blood type could be determined from his bodily fluids, such as semen or saliva. The semen taken from the toilet tissue wrapper came from someone with blood type A.”).

155. See SCHECK ET AL., *supra* note 5, at 125 (“Fish’s misleading testimony in the Willis case, which led to the conviction of an innocent man and allowed a predator to continue roaming the streets, shows why the state should have turned over all of Fish’s laboratory notes and data, rather than merely presenting her final report.”).

156. Letter from George F. Sensabaugh, Professor, University of California at Berkeley, to Locke E. Bowman, Legal Director, The MacArthur Justice Center, University of Chicago Law School (Oct. 16, 2003) [hereinafter Letter from Sensabaugh] (emphasis omitted) (on file with the North Carolina Law Review). Sensabaugh reached two more conclusions: first, “[g]iven that Dr. Fish had reservations about the reliability of blood group test results and apparently did no retesting, she had an obligation to specify her reservations in the lab report”; and second,

Overall, the documentation of the lab work as described in the three pages of lab notes is inadequate and incomplete. Moreover, the formal lab reports describe results of testing for which there is no record in the lab notes. In short, the documentation in this case falls short of accepted scientific standards.

Id. (emphasis omitted).

county, and state settled for over \$2.5 million, without admitting wrongdoing.¹⁵⁷ *The Chicago Tribune* reported: “By her own account, Fish could have redone the tests in the Willis case to clarify the results, and even her bosses still say she should have.”¹⁵⁸ Fish was also involved in other wrongful convictions.¹⁵⁹

The problems at the Chicago lab were not limited to Fish. Dr. Howard Harris, the former head of the New York City police crime lab from 1974 to 1985 and a former president of the American Society of Crime Lab Directors, was asked to examine the Chicago police crime laboratory in connection with a civil suit. In his findings, Harris described the lab as “disorganized, poorly supervised, almost completely lacking in written procedures and performance standards, and staffed by inadequately trained workers.”¹⁶⁰ He noted that “records management ‘was relegated to the lowest ranking employees in the laboratory, who were provided with minimal training and seemingly an almost complete lack of written procedures and standards of performance.’”¹⁶¹ Further, “[t]here was no system to ensure that all relevant materials were sent in response to a subpoena, and ‘laboratory senior supervisory personnel did not seem to know if there were any records of what was actually sent.’”¹⁶²

157. See Mills et al., *supra* note 153.

158. *Id.*

159. See Margaret Cronin Fisk, *Lawyer Frees Chicago Trio After Retesting of Lab Sample*, NAT'L L.J., Dec. 17, 2001, at A6 (discussing DNA exonerations of Omar Saunders and Larry Ollins after thirteen years in prison; at trial, Fish had testified there were no stains from a rape kit which included a vaginal swab, but the evidence reportedly showed that the killer was an O-secretor and that none of the defendants were).

Donald Reynolds and Billy Wardell, other rape defendants, were also exonerated by DNA. *Wardell v. City of Chi.*, No. 98 C 8002, 2001 WL 1345960, at *1 (N.D. Ill. Oct. 31, 2001). Reynolds alleged that Fish had falsely testified about the results of blood tests. *Id.* A federal court dismissed Wardell and Reynolds' lawsuit because plaintiffs failed to show that a municipal policy was involved. *Id.* at *6. Thus, Fish's culpability was not determined.

160. Maurice Possley & Steve Mills, *Crime Lab Disorganized, Report Says: Consultant Alleges Meager Supervision, Inadequate Training*, CHI. TRIB., Jan. 15, 2001, § 2, at 1.

161. *Id.*

162. *Id.* The Chicago lab had other problems. Gary Dotson was convicted of the rape of Cathleen Webb. *CONNORS ET AL.*, *supra* note 142, at 51. Six years later she recanted, stating that she had fabricated the charge. *Id.* at 52. Subsequent DNA tests excluded Dotson as the source of the crime-scene semen. *Id.* At Dotson's 1979 trial, Timothy Dixon testified that seminal material found in Webb's panties matched Dotson's blood type. Blake Fleetwood, *From the People Who Brought You the Twinkie Defense; The Rise of the Expert Witness Industry*, WASH. MONTHLY, June 1987, at 33, 37. He failed to disclose, however, that Webb's own vaginal discharges, not necessarily semen, could have caused the stains. *Id.* Years later when a *Washington Post* reporter asked Dixon why he had not spoken up. He replied: “I guess I wasn't asked.” *Id.* A DNA scientist later remarked that “Dixon's trial testimony was ‘exceedingly misleading and, in my judgment, dishonest.’” Mark Thompson, *DNA's Troubled Debut*, CAL. LAW., June 1988, at 43

In 1996, the Illinois State Police took over the city crime lab, and Fish was named head of the state lab's biochemistry section.¹⁶³ When the Willis controversy erupted, the State went back and reviewed the cases in which she was involved as a state examiner. In contrast, the city cases were never audited.¹⁶⁴

E. Houston

The Houston Police Department Crime Lab is the paradigmatic example of a failed forensic agency. According to a state senator, "the validity of almost any case that has relied upon evidence produced by the lab is questionable."¹⁶⁵

The story began with a television station's investigation,¹⁶⁶ which led in turn to a state audit of the lab in December 2002.¹⁶⁷ The audit revealed a dysfunctional organization with serious contamination issues and an untrained staff using shoddy science.¹⁶⁸ As described by a later investigation, the DNA unit

was in shambles . . . operating for years without a line supervisor, overseen by a technical leader who had no personal experience performing DNA analysis and who was lacking the

(quoting Edward Blake, Forensic Sciences Associates); *see also* Jones v. Chicago, 856 F.2d 985, 991 (7th Cir. 1988) ("[P]olice laboratory technician Mary Furlong . . . discovered that George Jones had different semen and blood types from the types found in Sheila Pointer's vagina. Furlong failed to include this information in the lab report that she was preparing for the prosecution of Jones.").

163. Possley & Mills, *supra* note 160.

164. Mills et al., *supra* note 153 ("But her former boss, Kearney, acknowledged that a review of all her cases might have been warranted. 'Maybe we should have gone back and looked at them,' he said in a recent interview. 'But it didn't happen.'").

165. Rodney Ellis, *supra* note 2. Similarly, the chair of the legislative committee investigating the lab has stated: "It's a comedy of errors, except it's not funny." Adam Liptak, *Houston DNA Review Clears Convicted Rapist, and Ripples in Texas Could Be Vast*, N.Y. TIMES, Mar. 11, 2003, at A14 (quoting State Representative Kevin Bailey).

166. *See* MICHAEL R. BROMWICH, THIRD REPORT OF THE INDEPENDENT INVESTIGATOR FOR THE HOUSTON POLICE DEPARTMENT CRIME LABORATORY AND PROPERTY ROOM 1 (2005) [hereinafter THIRD HOUSTON REPORT], available at <http://www.hpdlabinvestigation.org>.

167. TEXAS DPS CRIME LAB HEADQUARTERS & TARRANT COUNTY ME CRIME LAB, QUALITY ASSURANCE AUDIT FOR FORENSIC DNA AND CONVICTED OFFENDER DNA DATABASES: HOUSTON POLICE DEPARTMENT CRIME LABORATORY—DNA/SEROLOGY SECTION (2002) (on file with the North Carolina Law Review).

168. *Id.*; *see also* Nick Madigan, *Houston's Troubled DNA Crime Lab Faces Growing Scrutiny*, N.Y. TIMES, Feb. 9, 2003, § 1, at 20 (reporting that operations were suspended in December after an audit found numerous problems, "including poor calibration and maintenance of equipment, improper record keeping, and a lack of safeguards against contamination of samples. Among other problems, a leak in the roof was found to be a potential contaminant of samples on tables below.").

qualifications required under the FBI standards, staffed by underpaid and undertrained analysts, and generating mistake-ridden and poorly documented casework.¹⁶⁹

As a result of these findings, the crime lab was not allowed to perform DNA testing for several years.¹⁷⁰

Some defendants who were convicted based on evidence provided by the lab have been exonerated. For example, Josiah Sutton¹⁷¹ was convicted of rape in 1999 based on flawed DNA evidence.¹⁷² Retesting freed him.¹⁷³ In 2004, six independent experts determined that a second man, George Rodriguez,¹⁷⁴ had been convicted on serological testimony that was “false and scientifically unsound.”¹⁷⁵ Rodriguez had an alibi and the police had evidence pointing to another person, whose DNA was later matched to the crime.¹⁷⁶ A panel of experts suggested that similar problems in other cases should be expected.¹⁷⁷

169. THIRD HOUSTON REPORT, *supra* note 166, at 5.

170. MICHAEL R. BROMWICH, FINAL REPORT OF THE INDEPENDENT INVESTIGATOR FOR THE HOUSTON POLICE DEPARTMENT CRIME LABORATORY AND PROPERTY ROOM, Executive Summary at 2 (2007) [hereinafter FINAL HOUSTON REPORT], available at <http://www.hpdlabinvestigation.org/reports/070613report.pdf>.

171. Sutton v. State, No. 14-99-00951-CR, 2001 WL 40349 (Tex. App. Jan. 18, 2001) (denying appeal in which appellant asserted ineffective assistance of trial counsel for failing to retest DNA).

172. See Adam Liptak & Ralph Blumenthal, *New Doubt Cast on Testing in Houston Police Crime Lab*, N.Y. TIMES, Aug. 5, 2004, at A19 (“[P]rosecutors in Mr. Sutton’s case had used [DNA] to convict him, submitting false scientific evidence asserting that there was a solid match between Mr. Sutton’s DNA and that found at the crime scene. In fact, one of every eight black people, including Mr. Sutton, shared the relevant DNA profile. More refined retesting cleared him.”); see also Roma Khanna & Steve McVicker, *Police Chief Shakes Up Crime Lab: 2 Officials Quit, Others Disciplined*, HOUSTON CHRON., June 13, 2003, at 1A (“Christi Kim is a DNA analyst who tested the DNA used to convict Josiah Sutton Police investigators cited her for incorrectly documenting the results of DNA profiles, failing to report the full set of DNA results in an unnamed case and making an incorrect data entry in an unnamed capital murder case.”).

173. See Liptak & Blumenthal, *supra* note 172.

174. Rodriguez v. State, 766 S.W.2d 358 (Tex. Ct. App. 1989).

175. EDWARD T. BLAKE ET AL., PEER REVIEW REPORT *TEXAS V. GEORGE RODRIGUEZ* 6 (2004) (on file with the North Carolina Law Review); see also Liptak & Blumenthal, *supra* note 172 (reporting that the panel of experts wrote “that a crime laboratory official—because he either lacked basic knowledge of blood typing or gave false testimony—helped convict an innocent man of rape in 1987”).

176. See Liptak & Blumenthal, *supra* note 172.

177. See Sylvia Moreno, *Police Lab’s Troubles Grow: Problems in Houston Lead to Moratorium on Executions*, WASH. POST, Oct. 2, 2004, at A3 (“[T]his week, the district attorney’s office announced that a new, independent analysis of chemical testing used to convict Rodriguez found the testing was inaccurate.”).

Other revelations concerned the toxicology¹⁷⁸ and ballistics¹⁷⁹ units of the lab. Moreover, these problems were compounded by the district attorney's failure to recuse himself from the case, as twenty-two judges had requested.¹⁸⁰ Two grand juries looking into the role of the prosecutors in the lab cases rejected the assistance usually provided by the D.A.'s office and called their own witnesses, thus becoming that rare phenomenon: a "runaway" grand jury.¹⁸¹

Texas now requires its labs to be accredited,¹⁸² and Houston commissioned an independent investigation of its laboratory.¹⁸³ In the first three months, that investigation found myriad deficiencies. First, four instances of "dry labbing" (reporting results without doing tests) in the drug section were disclosed.¹⁸⁴ These incidents were apparently well known within the lab.¹⁸⁵ One of the two examiners involved was still employed by the laboratory, having been reinstated

178. See Ralph Blumenthal, *Double Blow, One Fatal, Strikes Police in Houston*, N.Y. TIMES, Oct. 30, 2003, at A25 ("The acting police chief announced on Wednesday that he had shut down the Police Department's toxicology section after its manager failed a competency test . . .").

179. Problems in the firearms identification section have also been reported. Nanon Williams was convicted of a 1992 drug-related murder, and a lab expert testified that the victim was shot with a .25 caliber bullet. Six years later, reviewing the case, the same expert determined the bullet was a .22 caliber from a co-defendant's gun. He admitted that he had never tested that weapon. Possley et al., *supra* note 2. *The Houston Chronicle* further noted:

[T]he attorneys handling his appeal discovered that before Rousseau's trial, HPD's ballistics lab had matched the bullet that killed [the victim] to bullets from another killing [A]bout one month after Rousseau was sentenced the police crime lab matched bullets from both shootings to a gun found on Juan Guerrero, who was convicted of the other murder. Prosecutors never turned over the crucial findings that would have supported Rousseau's innocence as required, his attorneys said.

Roma Khanna & Steve McVicker, *Fingers Pointed at HPD Crime Lab in Death Row Case*, HOUSTON CHRON., April 24, 2003, at 1A.

180. Roma Khanna & Steve McVicker, *DA Office Kept in Dark on Lab, Rosenthal Says*, HOUSTON CHRON., July 11, 2003, at 27A ("Rosenthal also adamantly refused to recuse himself from investigations of the lab's problems, allowing for the appointment of a special prosecutor, despite the urging of 22 state district judges and others.").

181. Adam Liptak, *Prosecutions Are a Focus in Houston DNA Inquiry: Grand Juries Seen as Widening Investigation*, N.Y. TIMES, June 9, 2003, at A20.

182. See TEX. CODE CRIM. PROC. ANN. art. 38.35 (Vernon 2005) (requiring accreditation by the Department of Public Safety to admit "[p]hysical evidence subjected to forensic analysis, and testimony regarding the evidence" in a criminal proceeding).

183. See THIRD HOUSTON REPORT, *supra* note 166.

184. See MICHAEL R. BROMWICH, SECOND REPORT OF THE INDEPENDENT INVESTIGATOR FOR THE HOUSTON POLICE DEPARTMENT CRIME LABORATORY AND PROPERTY ROOM 12 (2005), available at <http://www.hpdlabinvestigation.org/reports/050531report.pdf>.

185. *Id.* at 12 n.9 (noting that discussions with witnesses "plainly established" the facts).

by the police chief after being removed from his position by the lab.¹⁸⁶ This examiner filed a harassment complaint against one of his superiors who had discovered the malfeasance. They both received the same disciplinary sanction.¹⁸⁷

Second, the technical leader in the DNA unit had been removed and never replaced, leaving a six-year vacancy in an important supervisory position.¹⁸⁸ Matters were further exacerbated when the lab reassigned him to head the quality assurance program, a critical job that he did—by his own admission—in a lackluster fashion.¹⁸⁹ In short, having failed in one job, he was “booted upstairs.”¹⁹⁰

Third, serious backlog problems with the processing of rape kits remained unaddressed. In March 2002, a lab supervisor “estimated that there were 19,500 sexual assault kits received by HPD that had never been processed, some dating as far back as 1980.”¹⁹¹ The lab was analyzing only “known suspect” cases—i.e., persons already arrested.¹⁹² Thus, the lab was not entering the profiles from “cold cases” into the national DNA database, the Combined DNA Index System (“CODIS”),¹⁹³ where they might have generated a cold hit. Consequently, rapes occurred that probably could have been prevented. Even with arrestees, the lab was incredibly slow. For example, when Lynn Jones was charged with the sexual assault of a child, he remained in jail for nine months before the DNA tests that would eventually exonerate him were performed.¹⁹⁴

Fourth, in 2001, Tropical Storm Allison badly damaged thirty-four homicide and sexual assault case files due to a leaking roof.¹⁹⁵ According to the investigation’s report, in 2003, “several Crime Lab employees told internal affairs investigators that this biological evidence had become so saturated with water that they observed

186. *Id.* at 12.

187. *Id.* at 13.

188. THIRD HOUSTON REPORT, *supra* note 166, at 21.

189. *See id.* at 30 (“By Dr. Shama’s own admission, he did approximately a year’s worth of work in the four-plus years he remained in the position; a more exacting assessment, would put the volume of work performed by Dr. Sharma at much less than that.”). Sharma was reassigned due, in part, to conflicts with superiors. *Id.*

190. *Id.* at 29–30.

191. *Id.* at 47–48.

192. *Id.* at 47.

193. *See id.* at 48 (noting that “‘cold case’ rape kits must be outsourced to other laboratories”).

194. *Id.* at 22.

195. *Id.* at 45.

bloody water dripping out of the boxes containing the evidence and pooling on the floor.”¹⁹⁶

Fifth, the laboratory “stopped performing lab-wide quality control audits in 1997,”¹⁹⁷ and audits performed in the DNA unit (as required by federal standards) were superficial at best.¹⁹⁸ The report noted that, although the DNA unit had successfully passed its internal reviews in 2000 and 2001, the 2002 external audit (using the same quality assurance standards) painted “a very different picture.”¹⁹⁹ Indeed, the section was shut down after this audit.²⁰⁰

Sixth, the laboratory director was oblivious to these problems.²⁰¹ The investigation also identified poor proficiency testing results²⁰² and the failure of staff to meet educational requirements.²⁰³

The final report concluded that forty-three of the 135 DNA cases reviewed had “major issues,” four of which involved death row inmates.²⁰⁴ The report recommended that a special master be appointed to review these cases, as well as 180 suspect blood cases from the 1980s and early 1990s, for which convicts are still serving time.²⁰⁵ These 180 cases represented twenty-one percent of those reviewed—“an extraordinarily high and extremely disturbing proportion of cases in which to find problems of this magnitude.”²⁰⁶ Local officials, however, rejected this recommendation, arguing that the prosecutor and courts could handle these cases.²⁰⁷

196. *Id.* at 45.

197. *Id.*, Executive Summary, at 5.

198. *Id.*

199. *Id.*

200. *Id.* at 51.

201. “On December 13, 2002, the audit team briefed Mr. Krueger on its findings. Mr. Krueger recalls that the audit team told him the DNA Section was in shambles. He told us that he was completely surprised by this report” *Id.* at 50–51.

202. *Id.* at 61 (“We found numerous errors in the typing results in the serology proficiency tests.”).

203. *Id.* at 65. The report noted:

Mr. Bolding, who had served as the technical lead [sic] of the DNA/Serology Section [since 1996], lacked sufficient training and education in statistics. Our preliminary reviews suggest that in several cases involving mixtures, the DNA analysts performed the statistical calculations incorrectly. We also already have encountered deficiencies in the documentation contained in analysts’ case files.

Id.

204. FINAL HOUSTON REPORT, *supra* note 170, Executive Summary, at 4.

205. *Id.*, Executive Summary, at 12.

206. *Id.*, Executive Summary, at 11.

207. See Joe Stinebaker, *Houston Rejects Crime Lab Recommendation*, ASSOCIATED PRESS, Jun. 14, 2007, available at <http://abcnews.go.com/US/wirestory?id=3278325> (quoting District Attorney Rosenthal) (“We have special masters They’re called judges in our building.”).

F. Virginia

In 1984, Earl Washington, Jr., a mentally retarded farmhand with an IQ of sixty-nine, was convicted of the rape-murder of Rebecca Williams and sentenced to death.²⁰⁸ Although Washington “confessed” to the crime, he also confessed to several other offenses that the police soon determined he could not have committed.²⁰⁹ In addition, his blood type (type O) did not match the type developed from a semen stain (type A), a fact that his trial attorney overlooked.²¹⁰

In 1993, Governor Douglas Wilder ordered DNA testing, which was conducted by Jeff Ban, a state analyst.²¹¹ On January 14, 1994, nine days before Washington’s scheduled execution, Wilder commuted his sentence to life imprisonment.²¹² The Governor’s office, however, refused to give the DNA report to the defense attorneys, leaving them to wonder what type of results could have led to a commutation but not a pardon.²¹³ In a bizarre turn of events, the lab director, Paul Ferrara, gave the DNA report to a documentary filmmaker in 1999.²¹⁴ The previously-withheld report excluded

208. *Washington v. Commonwealth*, 323 S.E.2d 577, 581–84 (Va. 1984). *See generally* MARGARET EDDS, *AN EXPENDABLE MAN: THE NEAR-EXECUTION OF EARL WASHINGTON JR.* (2003) (examining the Washington case); Eric M. Freedman, *Earl Washington’s Ordeal*, 29 HOFSTRA L. REV. 1089 (2001) (using Washington’s case to highlight systemic flaws in the criminal justice system).

209. Washington’s incriminatory statements mainly consisted of affirmative responses to detectives’ statements. Freedman, *supra* note 208, at 1092–93. The detectives claimed these statements revealed knowledge that only the perpetrator could have known. *Washington v. Wilmore*, 407 F.3d 274, 276 (4th Cir. 1995). In a later civil action against the detectives, a document surfaced that supported Washington’s claim that his statements had been misrepresented at his criminal trial: “[Detective] Wilmore said that he felt like either he or Hart must have mentioned the shirt to Washington before Washington said he left the shirt at the scene, and that his testimony in the record did not accurately reflect that the shirt had been first mentioned by the police.” *Id.* at 277 (citation omitted). The district court denied summary judgment because “Washington had proffered evidence from which a reasonable juror could conclude that Wilmore possessed nonpublic information about the crime and falsely represented that Washington had volunteered that information during interrogation.” *Id.* at 278. The Fourth Circuit affirmed. *Id.* at 284. Washington later won a \$2.25 million lawsuit against Wilmore’s estate. *See* Jerry Markon, *Wrongfully Jailed Man Wins Suit: Va. Officer Falsified Confession, Jury Rules*, WASH. POST, May 6, 2006, at B1.

210. The victim’s husband was also type O. *Washington v. Murray*, 4 F.3d 1285, 1286 (4th Cir. 1993) (finding no violation of Sixth Amendment right of effective assistance of counsel).

211. *See* Possley et al., *supra* note 2.

212. *Id.*

213. EDDS, *supra* note 208, at 161.

214. *Frontline: The Case for Innocence* (PBS television broadcast Jan. 11, 2000), transcript available at <http://www.pbs.org/wgbh/pages/frontline/shows/cases/etc/script.html> (discussing Washington’s case along with those of other exonerated convicts). Henry

Washington as a suspect.²¹⁵ Ban had eliminated Washington as the source of semen on a blanket but found a vaginal swab less clear.²¹⁶ This interpretation was incorrect,²¹⁷ a mistake that extended Washington's incarceration by six years.

By this time, newspapers began to clamor for more information, leading another governor, James Gilmore, to order further testing, this time with a more sophisticated technique, Short Tandem Repeats ("STRs").²¹⁸ Surprisingly, Ban was once again chosen to conduct the tests.²¹⁹ An unknown profile was detected on the blanket and matched the profile of Kenneth Tinsley, a twice-convicted rapist.²²⁰ Gilmore then pardoned Washington, who had spent seventeen years in prison.²²¹ The pardon, however, was not based on a finding of actual innocence, but rather on reasonable doubt.²²²

Still, the matter would not rest. Ban's STR interpretation next came under attack. The defense hired Edward Blake, a prominent DNA scientist, who tested duplicate slides from the Medical Examiner's Office and excluded Washington as a possible match.²²³ He found that Ban's report was "logically incoherent" and "fundamentally flawed."²²⁴ The Innocence Project called for an audit, but the laboratory director balked, rejecting the criticism as "unfounded" and labeling Blake a "hired gun."²²⁵ Other experts,

Erlich, who had developed the DNA test that Ban used, later concluded that Ban had misinterpreted the results. EDDS, *supra* note 208, at 150 (noting Erlich's conclusion "that these test results cast very significant doubt about Mr. Washington's contribution to the sample").

215. EDDS, *supra* note 208, at 170–71.

216. *Id.* at 170.

217. Although Ban found a genetic trait on the blanket that did not belong to Washington, the victim, or the victim's husband, he believed Washington could not be eliminated. *Id.* This test involved the PCR DQ-alpha test, which is no longer used. The victim's and her husband's genetic alleles were 4 and 4. DIV. OF FORENSIC SCI. CENT. LAB., COMMONWEALTH OF VA., ASCLD/LAB LIMITED SCOPE INTERIM INSPECTION REPORT 4–5 (2005) [hereinafter ASCLD VA. REPORT]. Washington's was 1.2 and 4. *Id.* Ban found a mixture of 1.1, 1.2, and 4. Later reviews, however, concluded that the 1.2 should not have been reported. *Id.* app., at 19. Without the 1.2 allele finding, Washington would have been excluded. The ASCLD/LAB review found that "reporting of the 1.2 allele in the mixture . . . [was] questionable. . . . [The] profiles . . . represented a 1.1 and 4 pattern." *Id.*

218. See EDDS, *supra* note 208, at 171–76.

219. See Possley et al., *supra* note 2.

220. *Id.*

221. *Id.*

222. See EDDS, *supra* note 208, at 185.

223. See Possley et al., *supra* note 2.

224. Letter from Edward Blake, Forensic Sci. Assocs., Richmond, Cal., to Peter J. Neufeld (Apr. 1, 2004) (on file with the North Carolina Law Review).

225. Possley et al., *supra* note 2.

however, disagreed, one arguing that the incident should have been reported as a quality breach under the lab's accreditation standards.²²⁶

On September 30, 2004, Governor Mark Warner ordered an audit of the Washington case by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board ("ASCLD/LAB"), which made several findings, including that Ban had erroneously interpreted the DNA tests.²²⁷ In addition, "[p]ressures from outside the laboratory and excessive managerial influence from within the laboratory during the STR analyses phase had a detrimental affect on the analyst's decisions, examinations and reports in this case."²²⁸ This pressure led to deviations from normal protocols.²²⁹ (The pressure was to obtain *a* result, not to reach a particular result.)

The governor also ordered the lab to review old case files in which serological, but not DNA, analysis had been conducted.²³⁰ This review was the first random-sample case audit, albeit limited, in the country.²³¹ As a result, five convicts have been exonerated,²³² and a more sweeping review is now underway.²³³ Meanwhile, the Virginia legislature made the Division of Forensic Science a separate agency

226. *State DNA Lab Needs Oversight*, THE VIRGINIAN-PILOT (HAMPTON ROADS, VA.), June 24, 2004, at B10.

227. ASCLD VA. REPORT, *supra* note 217, at 16 ("The analyst's reported conclusions in the September 8, 2000 Certificate of Analysis with regard to the sperm fraction of Item 58 vaginal smear are incorrect."). ASCLD also disagreed with the lab's internal audit: "It should be noted that the internal DFS auditors agreed with the reported results in the September 8, 2000, Certificate of Analysis as they pertained to the exclusion of listed suspects, saying the results were scientifically supported by the data in the case file. ASCLD/LAB disagrees." *Id.* at 13.

228. *Id.* at 17.

229. *Id.* at 13. The erroneous conclusion resulted in part on "deviations from the standard protocol." *Id.*

230. Michael D. Shear & Jamie Stockwell, *DNA Tests Exonerate 2 Former Prisoners: Va. Governor Orders Broad Case Review*, WASH. POST, Dec. 15, 2005, at A1. Evidence in the old cases existed only because a lab analyst, Mary Jane Burton, meticulously retained evidence samples from 1973 to 1988, even though she was not required to. *Id.*

231. Press Release, Gov. Mark Warner, Gov. Warner Releases Audit of DNA Testing and Rape and Murder of Rebecca Williams (May 6, 2005) (on file with the North Carolina Law Review).

232. Editorial, *A Light on Justice Denied*, N.Y. TIMES, Dec. 31, 2005, at A14.

233. Shear & Stockwell, *supra* note 230. This review, however, has not progressed as quickly as it should have. See Candace Rondeaux, *Virginia DNA Review Hobbled: As Crime Lab Chief Steps Down, Slow Pace Is Criticized*, WASH. POST, Dec. 27, 2006, at B1 ("We could see as many as 30 possible exonerations when this is all over with." (quoting lab director Paul Ferrara)).

under the Secretary of Public Safety²³⁴ and created a Forensic Science Board and a Scientific Advisory Committee.²³⁵

G. FBI Laboratory

Although the FBI crime laboratory is widely regarded as the premier forensic facility in the country,²³⁶ it too has had its problems.

1. Explosives Unit

The Department of Justice's 1997 report on the FBI laboratory, issued by the Inspector General ("I.G."), documented numerous deficiencies,²³⁷ including inaccurate testimony, testimony beyond the competence of examiners, improperly prepared laboratory reports, insufficient documentation of test results, inadequate record management and retention, and failure to resolve serious and credible allegations of incompetence.²³⁸ For example, in the Oklahoma City bombing case, the report found that an examiner's conclusion about the identity of the explosive charge was speculation and "tilted in such a way as to incriminate the defendants."²³⁹ This presented

234. VA. CODE ANN. § 9.1-1100 (2005) (changing Division of Forensic Science into the Department of Forensic Science). Previously, it was under the Department of Criminal Justice Services. *Id.*

235. *Id.* §§ 9.1-1111 to -1112.

236. Scott Bales, *Turning the Microscope Back on Forensic Scientists*, LITIGATION, Winter 2000, at 51, 53 (noting that "many people regarded [it] as the foremost crime lab in the world"). See generally DAVID FISHER, *HARD EVIDENCE: HOW DETECTIVES INSIDE THE FBI'S SCI-CRIME LAB HAVE HELPED SOLVE AMERICA'S TOUGHEST CASES* (1996) (discussing the FBI Lab's successes); *Modern Marvels: FBI's Crime Lab* (A&E Home Video 2006) (documentary).

237. See generally 1997 I.G. REPORT, *supra* note 27, Executive Summary, pt. IA; see also JOHN F. KELLY & PHILLIP K. WEARNE, *TAINTING EVIDENCE 2* (1998) (concluding that FBI examiners "had given scientifically flawed, inaccurate, and overstated testimony under oath in court; had altered the lab reports of examiners to give them a pro-prosecutorial slant; and had failed to document tests and examinations from which they drew incriminating conclusions, thus ensuring that their work could never be properly checked"); Bales, *supra* note 236, at 53 ("[T]he report did contain deeply disturbing findings of inadequate procedures, insufficient supervision, and improper conduct.").

238. 1997 I.G. REPORT, *supra* note 27, Executive Summary, pt. IA.

239. *Id.*, Executive Summary, pt. IIIG. Scott Bales noted:

[T]he report concluded that an examiner from the lab's explosives unit had erred by purporting to identify the particular explosives used in the [1993] World Trade Center and Oklahoma City bombings. The error stemmed from the examiner's reliance on information that was tied to suspects but not relevant to his scientific analysis.

Bales, *supra* note 236, at 52. *The New York Times* further explained:

Two laboratory workers said [the chief laboratory examiner] had changed their dictated reports, in violation of F.B.I. policy. They said he made slight alterations

federal prosecutors with a significant dilemma,²⁴⁰ which they solved by going outside the country to obtain a bomb expert from the Ministry of Defence in the United Kingdom.²⁴¹

The report's recommendations are riveting in their simplicity. They include: (1) seeking ASCLD/LAB accreditation; (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 a composite report "without attribution to individual examiners"; (4) establishing report review procedures by unit chiefs; (5) preparing adequate case files to support reports; (6) monitoring court testimony in order to preclude examiners from testifying to matters beyond their expertise or in ways that are unprofessional; and (7) developing written protocols for scientific procedures.²⁴²

2. DNA Unit

A second I.G. Report (2004) focused on Jacqueline Blake, who was hired by the FBI in 1988 as a serologist.²⁴³ From March 2000 to June 2002, she worked with DNA-Polymerase Chain Reaction

in the wording of reports to eliminate uncertainties in the explosives evidence and making it easier for prosecutors to present the evidence as unequivocally consistent with the Government's theory of the case.

David Johnston, *F.B.I. Lab Practices Faulted in Oklahoma Bomb Inquiry*, N.Y. TIMES, Jan. 31, 1997, at A1.

240. See *United States v. Nichols*, 169 F.3d 1255 (10th Cir. 1999) (upholding Nichols's conviction despite a defense challenge to refusing a witness's testimony that would have criticized the FBI's handling of the case); *United States v. McVeigh*, 153 F.3d 1166 (10th Cir. 1998) (upholding McVeigh's conviction despite challenges to evidentiary rulings).

241. *Nichols*, 169 F.3d at 1261-62 ("Mr. Nichols next contends the district court erred when it permitted Linda Jones, a forensic explosives expert from the Ministry of Defense in England, to give opinions about the type and size of the bomb that destroyed the Murrah building.").

242. See generally 1997 I.G. REPORT, *supra* note 27, Executive Summary, pt. VII (summarizing these recommendations). With respect to the fourth recommendation, the report commented: "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.* Addressing the fifth recommendation, it elaborated:

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

Id.

243. 2004 I.G. REPORT, *supra* note 28, at 8.

(“PCR”).²⁴⁴ For two years, while performing analyses on crime scene evidence in more than 100 cases, she failed to complete negative control tests, a required part of the lab protocol designed to identify whether contamination has been introduced into the process.²⁴⁵ This omission “rendered her work scientifically invalid and unusable in court.”²⁴⁶ In addition, she falsified lab documents to conceal her misdeeds.²⁴⁷ In May 2004, she pleaded guilty to a misdemeanor charge of providing false information in her lab reports.²⁴⁸

Several aspects of this affair warrant further attention. First, although the FBI was an accredited laboratory by this time and thus subject to audits, Blake’s malfeasance was not revealed through established safeguards, but rather by accident.²⁴⁹ As the I.G. Report observed, “weaknesses in DNA [Unit I] procedures and protocols allowed a technician routinely to disregard required steps in the analysis of DNA, even while the Unit received clean audit reports from both internal and external auditors and while the Unit was accredited by ASCLD/LAB.”²⁵⁰

Second, in reviewing the laboratory’s protocols, the I.G. Report identified several significant problems:

[I]n approximately 20 percent of the protocol sections we reviewed we identified one or more of the following deficiencies: 1) the protocol lacks sufficient detail; 2) the protocol fails to inform the exercise of staff discretion; 3) the protocol fails to ensure the precision of manual notetaking; and 4) the protocol is outdated.²⁵¹

244. *Id.* at i.

245. *Id.*

246. *Id.* Blake was a technician, not an examiner, and therefore did not testify.

By itself, however, the failure to process the negative controls does not change the test results or lead to a particular testing outcome (e.g., creating a match between a known and unknown evidence sample). The retesting of evidence in Blake’s cases to date indicates that, while she did not properly conduct the contamination testing, the DNA profiles that she generated were accurate.

Id. In some cases, however, her testing consumed all the available DNA in the case. *Id.* at ii.

247. *Id.* at i.

248. *Id.* at ii.

249. *Id.* (“In April 2002, a colleague of Blake was working late one evening after Blake had left the Laboratory for the day, and noticed that the testing results displayed on Blake’s computer were inconsistent with the proper processing of the control samples.”).

250. *Id.* at 21. Blake also failed to run the negative controls in her qualifying and proficiency tests, but this was not detected at the time. *Id.* at 40–41.

251. *Id.* at 130.

Third, the FBI's response to this incident proved insufficient in some important respects. The agency's audit covered only the two years when Blake worked as a PCR Biologist but should have extended to the prior twelve years, when she was a serologist and then a Restriction Fragment Length Polymorphism ("RFLP") analyst.²⁵² In addition, the Office of General Counsel failed to appreciate the seriousness of the problem when informed of it.²⁵³

3. Comparative Bullet Lead Analysis

a. The Examiner

As part of her job responsibilities, Kathleen Lundy, an FBI examiner, performed comparative bullet lead analysis ("CBLA"), a process that compares trace chemicals found in bullets at crime scenes with ammunition found in the possession of a suspect.²⁵⁴ For over thirty years, FBI experts had testified about bullet lead composition, a technique that was first used in the investigation into President Kennedy's assassination.²⁵⁵ The technique was not seriously challenged until a retired FBI examiner, William Tobin, began questioning the procedure in scientific and legal journals,²⁵⁶ as well as in-court testimony.²⁵⁷

252. *Id.* at 67.

253. *Id.* at 65 ("[T]he Laboratory did not receive the quality of legal services that one would expect from FBI OGC, and Laboratory management was not sufficiently assertive when soliciting legal advice.").

254. NAT'L RESEARCH COUNCIL, FORENSIC ANALYSIS: WEIGHING BULLET LEAD EVIDENCE 1-2 (2004). The Council is the research arm of the National Academies, formerly the National Academy of Sciences. Various analytical techniques (e.g., neutron activation analysis, inductively coupled plasma-atomic emission spectrometry) have been used to determine the concentrations of seven elements—"arsenic (As), antimony (Sb), tin (Sn), copper (Cu), bismuth (Bi), silver (Ag), and cadmium (Cd)—in the bullet lead alloy of both the crime-scene and suspect's bullets." *Id.* at 2. Statistical tests are then used to compare the elements in each bullet: "If any of the fragments and suspect's bullets are determined statistically to be analytically indistinguishable for each of the elemental concentration means, they probably came from the same 'source.'" *Id.*

255. See generally Erik Randich & Patrick M. Grant, *Proper Assessment of the JFK Assassination Bullet Lead Evidence from Metallurgical and Statistical Perspectives*, 51 J. FORENSIC SCI. 717 (2006) (discussing the original analysis of the bullet fragments).

256. See, e.g., Edward J. Imwinkelried & William A. Tobin, *Comparative Bullet Lead Analysis (CBLA) Evidence: Valid Inference or Ipse Dixit?*, 28 OKLA. CITY U. L. REV. 43 (2003); Erik Randich et al., *A Metallurgical Review of the Interpretation of Bullet Lead Compositional Analysis*, 127 FORENSIC SCI. INT'L 174 (2002) (Tobin was a coauthor); William A. Tobin & Wayne Duerfeldt, *How Probative is Comparative Bullet Lead Analysis?*, CRIM. JUSTICE, Fall 2002, at 26.

257. See *Ragland v. Commonwealth*, 191 S.W.3d 569, 577 (Ky. 2006); *Clemons v. State*, 896 A.2d 1059, 1068 (Md. 2006); *State v. Behn*, 868 A.2d 329, 339-40 (N.J. Super. Ct. App. Div. 2005) (Tobin's affidavit submitted). Although a metallurgist, Tobin worked in a different section of the lab; he was not a CBLA examiner.

In *Ragland v. Commonwealth*,²⁵⁸ a Kentucky murder case, Lundy got herself in trouble while testifying at a pretrial admissibility hearing.²⁵⁹ She stated that the elemental composition of a .243 caliber bullet fragment removed from the victim's body was "analytically indistinguishable" from bullets found at the home of the defendant's parents.²⁶⁰ Lundy further testified that the Winchester Company purchased its bullet lead in block form prior to 1996 and then remelted it at its manufacturing plant.²⁶¹ During cross-examination at trial, however, Lundy admitted that she knew prior to the hearing that Winchester had purchased its lead in billet form in 1994.²⁶² This was not a minor point. Millions more bullets could have the same "source" if they were last melted by a secondary smelter instead of by Winchester.²⁶³ Lundy subsequently admitted to her superiors that she had lied,²⁶⁴ and on June 17, 2003, she pleaded guilty to testifying falsely and was sentenced to a suspended ninety-day jail sentence and a \$250 fine.²⁶⁵

258. 191 S.W.3d 569 (Ky. 2006).

259. *Id.* at 580; see Dan Eggen, *FBI Laboratory Moves to New Home*, WASH. POST, Apr. 25, 2003, at A21 (discussing Lundy's erroneous testimony and her subsequent indictment); Joseph Gerth, *Judge Rules Attorney's Office Can Remain on Ragland Case*, LOUISVILLE COURIER-J., Oct. 19, 2002, at B4 (addressing the aftermath of Lundy's false testimony); John Solomon, *FBI Lab Still Plagued by Problems*, CINCINNATI POST (Ohio), Apr. 16, 2003, at 20 ("Weeks after testifying at a court hearing in a Kentucky murder, FBI scientist Kathleen Lundy told her superiors a secret. She knowingly gave false testimony about her specialty of lead bullet analysis.").

260. *Ragland*, 191 S.W.3d at 574.

261. *Id.* at 580.

262. *Id.* ("Lundy admitted that her testimony at the *Daubert* hearing was false and that she knew prior to the *Daubert* hearing that Winchester purchased its bullet lead in billets in 1994.").

263. The court noted this point in *Ragland*:

The significance of the difference is that Winchester's furnace has only a 15,000-pound capacity whereas some secondary smelters melt lead in crucibles having up to 200,000-pound capacities. Lundy testified that approximately one million bullets can be manufactured from a 15,000 pound melt. If so, approximately thirteen million bullets can be manufactured from a 200,000 pound melt, significantly increasing the number of bullets that would be analytically indistinguishable

Id. at 576.

264. See Charles Piller & Robin Mejia, *Science Casts Doubt on FBI's Bullet Evidence*, L.A. TIMES, Feb. 3, 2003, at A1 (reporting that, in a sworn affidavit, Lundy "admitted that her trial testimony was untruthful" and that she "blamed her conduct partly on a sense of crisis in her work, fed by 'new and repeated challenges to the validity of the science associated with bullet lead comparison analysis'").

265. Mark Pitsch, *Ex-FBI Scientist Pleads Guilty*, LOUISVILLE COURIER-J., June 18, 2003, at B1; see also Maurice Possley, *Study Shoots Holes in Bullet Analysis by FBI*, CHI. TRIB., Feb. 11, 2004, § 1, at 14 (noting Lundy's conviction and fine as an example of why bullet lead analysis has fallen under intense scrutiny in recent years); *Prosecutors*

b. The Technique

The underlying problems with CBLA went beyond Lundy's prevarication. Although CBLA evidence had been used in trials for over three decades, few studies had been published on the technique.²⁶⁶ Nevertheless, until recently, the courts admitted this evidence. The published cases reveal a wide variety of interpretive conclusions. In some cases, experts testified only that two exhibits were "analytically indistinguishable."²⁶⁷ In other cases, experts concluded that samples *could have* come from the same source or "batch"²⁶⁸; in still others, experts stated that the samples *came* from the same source.²⁶⁹ The testimony in a number of cases went further and referred to a "box" of ammunition (usually fifty loaded cartridges, sometimes twenty). For example, two specimens:

- could have come from the same box²⁷⁰;
- could have come from the same box or a box manufactured on the same day²⁷¹;
- were consistent with their having come from the same box of ammunition²⁷²;
- probably came from the same box²⁷³;
- must have come from the same box or from another box that would have been made by the same company on the same day.²⁷⁴

Challenged in Ragland Murder Case, CINCINNATI POST (Ky.), Sept. 6, 2002, at 13A ("Attorneys for both sides were in court for a hearing in which FBI ballistics expert Kathleen Lundy was scheduled to testify about lying during a preliminary hearing in Shane Ragland's murder case.").

266. The overwhelming majority of cases were homicide prosecutions, some of which were capital cases. Because there are few federal homicide prosecutions, CBLA evidence was most commonly used in state prosecutions. *See infra* notes 267–75 and accompanying text.

267. *See* *Wilkerson v. State*, 776 A.2d 685, 689 (Md. Ct. Spec. App. 2001).

268. *See* *State v. Krummacher*, 523 P.2d 1009, 1012–13 (Or. 1974) (en banc).

269. *See* *United States v. Davis*, 103 F.3d 660, 673–74 (8th Cir. 1996); *People v. Lane*, 628 N.E.2d 682, 689–90 (Ill. App. Ct. 1993) ("He testified that the two bullets were analytically indistinguishable. Special Agent Riley opined that the two bullets came from the same source and that the match was as good as he had ever seen in his twenty years with the FBI.") (emphasis added).

270. *See* *State v. Strain*, 885 P.2d 810, 817 (Utah Ct. App. 1994); *State v. Jones*, 425 N.E.2d 128, 131 (Ind. 1981).

271. *See* *State v. Grube*, 883 P.2d 1069, 1078 (Idaho 1994); *People v. Johnson*, 499 N.E.2d 1355, 1366 (Ill. 1986); *Earhart v. State*, 823 S.W.2d 607, 614 (Tex. Crim. App. 1991) (en banc) ("He later modified that statement to acknowledge that analytically indistinguishable bullets which do not come from the same box most likely would have been manufactured at the same place on or about the same day; that is, in the same batch."), *vacated*, 509 U.S. 917 (1993).

272. *See* *State v. Reynolds*, 307 N.C. 184, 187, 297 S.E.2d 532, 534 (1982).

273. *See* *Bryan v. State*, 935 P.2d 338, 360 (Okla. Crim. App. 1997).

Several other (and different) statements appear in the opinions. An early case reported that the specimens “had come from the same batch of ammunition: they had been made by the same manufacturer on the same day and at the *same hour*.”²⁷⁵ One case reports the expert’s conclusion with a statistic.²⁷⁶ In another case, the court discussed the expert’s testimony using the expressions “such a finding is rare”²⁷⁷ and “a very rare finding.”²⁷⁸ In still another case, the expert “opined that the same company produced the bullets at the same time, using the same lead source. Based upon Department of Justice records, she opined that an overseas company called PMC produced the bullets around 1982.”²⁷⁹ Thus, FBI experts ignored the limitations of the technique in many cases. Further, as these cases demonstrate, the testimony was not consistent among the Bureau’s own experts, suggesting that the FBI was not monitoring the trial testimony.

In 2004, a National Research Council report undercut much of the FBI expert testimony: “The available data do not support any statement that a crime bullet came from a particular box of ammunition. In particular, references to ‘boxes’ of ammunition in any form should be avoided as misleading under Federal Rule of Evidence 403.”²⁸⁰ The most disturbing case is *Earhart v. State*,²⁸¹ a

274. See *United States v. Davis*, 103 F.3d 660, 666 (8th Cir. 1996) (“An expert testified that such a finding is rare and that the bullets must have come from the same box or from another box that would have been made by the same company on the same day.”); *Commonwealth v. Daye*, 587 N.E.2d 194, 207 (Mass. 1992) (“Special agent John Riley at the Federal Bureau of Investigation testified that two bullet fragments found in [the victim’s] body came from the same box of ammunition or from different boxes that were manufactured at the same place on or about the same date as a bullet retrieved from [the defendant’s basement].”); *State v. King*, 353 N.C. 457, 465, 546 S.E.2d 575, 584 (2001) (“[Kathleen Lundy] opined that, based on her lead analysis, the bullets she examined either came from the same box of cartridges or came from different boxes of the same caliber, manufactured at the same time.”).

275. *Brown v. State*, 601 P.2d 221, 224 (Alaska 1979) (emphasis added).

276. *Earhart*, 823 S.W.2d at 614.

277. *Davis*, 103 F.3d at 666.

278. *Id.* at 667.

279. *People v. Villarta*, No. H021354, 2002 Cal. App. Unpub. LEXIS 4776, at *15 (Cal. Ct. App. Jan. 17, 2002). In recent years, the testimony became more limited. A 2002 FBI publication states the conclusion as follows: “Therefore, they *likely* originated from the same manufacturer’s source (melt) of lead.” Charles A. Peters, *The Basis for Compositional Bullet Lead Comparisons*, FORENSIC SCI. COMM., July 2002, <http://www.fbi.gov/hq/lab/fsc/backissu/july2002/peters.htm> (emphasis added). Testimony to the same effect has also been proffered. Transcript of Record at 6, *Commonwealth v. Wilcox*, No. 00CR2727 (Ky. Cir. Ct. Jefferson County Feb. 28, 2002) (trial testimony of Charles Peters, FBI examiner) (“Well, bullets that are analytically indistinguishable likely come from the same molten sources of lead, uh, as opposed to bullets that have different compositions come from different, uh, melts of lead.”).

280. NAT’L RESEARCH COUNCIL, *supra* note 254, at 7.

capital murder case in which the CBLA evidence apparently played a significant role.²⁸² The transcript contains the following expert testimony: “We can—from my 21 years experience of doing bullet lead analysis and doing research on boxes of ammunition down though the years I can determine if bullets came from the same box of ammunition”²⁸³ The amount of bullets that can be produced from a melt, however, “can range from the equivalent of as few as 12,000 to as many as 35 million 40-grain, .22 caliber longrifle bullets.”²⁸⁴ Earhart was subsequently executed.²⁸⁵

In 2003, a federal district court excluded CBLA testimony under the *Daubert* standard,²⁸⁶ and in 2005, a New Jersey appellate court reversed a conviction involving CBLA evidence, finding it was “based on erroneous scientific foundations.”²⁸⁷ The FBI discontinued CBLA testing in 2005, although the Bureau maintained that the test was

281. 823 S.W.2d 607 (Tex. Crim. App. 1991). The court summarized the flawed testimony:

He concluded that the likelihood that two .22 caliber bullets came from the same batch, based on *all* the .22 bullets made in one year, is approximately .000025 percent, ‘give or take a zero.’ He subsequently acknowledged, however, that the numbers which he used to reach the .000025 percent statistic failed to take into account that there are different types of .22 caliber bullets made each year

Id. at 614 (emphasis added).

282. See *Earhart v. Johnson*, 132 F.3d 1062, 1068 (5th Cir. 1998) (denying habeas relief, the court noted: “Given the significant role the bullet evidence played in the prosecution’s case, we shall therefore assume Earhart could have made a sufficient threshold showing that he was entitled to a defense expert under Texas law.”).

283. Transcript of Record at 5248–49, *State v. Earhart*, No. 4064, Dist. Ct. Lee County, 21st Judicial Dist., Texas (testimony of John Riley). Riley testified:

Well, bullets that are . . . analytically indistinguishable compositions . . . typically are found within the same box of ammunition and that is the case that we have here. Now, bullets that are the same composition can also be found in other boxes of ammunition, but it’s most likely those boxes would have been manufactured at the same place on or about the same date.

Id. at 5258. But see Transcript of Record, *supra* note 279, at 1–2 (*Daubert* testimony of Charles Peters). In a *Daubert* hearing, Peters noted:

We have never testified, to my knowledge, that that bullet came from that box. We’d never say that. All we are testifying is that that bullet, or that victim fragment or something, the bullet, either came from that box or the *many* boxes that were produced at the same time.

Id. (emphasis added).

284. NAT’L RESEARCH COUNCIL, *supra* note 254, at 6.

285. See Death Penalty Information Center, Searchable Database of Executions, <http://www.deathpenaltyinfo.org/executions.php> (search for “Earhart” under “Find Person” search box) (last visited Oct. 10, 2007).

286. *United States v. Mikos*, No. 02 CR 137, 2003 WL 22922197 (N.D. Ill. Dec. 9, 2003).

287. *State v. Behn*, 868 A.2d 329, 331 (N.J. Super. Ct. App. Div. 2005).

reliable.²⁸⁸ Other courts rejected this type of evidence the following year.²⁸⁹

4. Fingerprint Unit

a. The Mayfield Affair

Like many other forensic sciences, fingerprint comparisons gained judicial acceptance long before the demanding *Daubert* standard became operative.²⁹⁰ Numerous attacks, albeit unsuccessful, have been launched against fingerprint evidence in recent years.²⁹¹ In many of these cases, FBI examiners testified that there is a “zero error” rate in fingerprint examinations.²⁹² Although courts have accepted this astounding statement, the investigation of the terrorist train bombing in Madrid on March 11, 2004, which killed 191 and

288. Eric Lichtblau, *F.B.I. Abandons Disputed Test for Bullets from Crime Scene*, N.Y. TIMES, Sept. 2, 2005, at A2; see also John Solomon, *FBI's Forensic Test Full of Holes*, WASH. POST, Nov. 18, 2007, at A1 (reporting that the FBI had failed to take adequate steps to notify affected defendants and courts of the NRC report's negative conclusions).

289. See *Ragland v. Commonwealth*, 191 S.W.3d 569, 580 (Ky. 2006) (noting that “[i]f the FBI Laboratory that produced the CBLA evidence now considers such evidence to be of insufficient reliability to justify continuing to produce it, a finding by the trial court that the evidence is both scientifically reliable and relevant would be clearly erroneous”); *Clemons v. State*, 896 A.2d 1059, 1070 (Md. 2006) (“CBLA is not admissible under the *Frye-Reed* standard because it is not generally accepted within the scientific community as valid and reliable.”); *id.* at 1078 (“Based on the criticism of the processes and assumptions underlying CBLA, we determine that the trial court erred in admitting expert testimony based on CBLA because of the lack of general acceptance of the process in the scientific community.”). Other defendants have not been as fortunate. See *Commonwealth v. Fisher*, 870 A.2d 864, 871 (Pa. 2005) (“The CBLA evidence, at best, established a possible connection between Appellant and the bullets recovered from the victim's body.”); see also *United States v. Davis*, 406 F.3d 505, 509 (8th Cir. 2005) (“Davis's trial counsel cannot be said to be ineffective for failing to challenge the FBI's methodology on a basis that was not advanced by the scientific community at the time of trial.”).

290. The first reported case was *People v. Jennings*, 96 N.E. 1077 (Ill. 1911).

291. See generally Simon A. Cole, *Grandfathering Evidence: Fingerprint Admissibility Rulings from Jennings to Llera Plaza and Back Again*, 41 AM. CRIM. L. REV. 1189 (2004) (discussing the post-*Daubert* fingerprint challenges); Jennifer Mnookin, *Fingerprint Evidence in an Age of DNA Profiling*, 67 BROOK. L. REV. 13, 43 (2001) (“[W]hat is striking, even astonishing, is that no serious effort to challenge either the weight or admissibility of fingerprint evidence ever emerged—until 1999.”); Sandy L. Zabell, *Fingerprint Evidence*, 13 J.L. & POL'Y 143, 170 (2005) (“The argument that no latent print has ever been found to match the rolled print from a different person is . . . misleading because no systematic search for such pairs on the entire databank of millions of fingerprints has ever been performed.”).

292. See, e.g., *United States v. Havvard*, 117 F. Supp. 2d 848, 854 (S.D. Ind. 2000) (“The government claims the error rate for the method is zero.”), *aff'd*, 260 F.3d 597 (7th Cir. 2001).

injured 2,000, undermined this claim.²⁹³ The FBI got it wrong, misidentifying Brandon Mayfield, a Portland lawyer, as the source of the crime scene prints.²⁹⁴

To its credit, the FBI initiated an investigation using outside experts. The resulting report²⁹⁵ raised a number of disquieting issues. First, the “dissimilarities [between prints] . . . were easily observed when a detailed analysis of the latent print was conducted.”²⁹⁶ In short, it was not a difficult fingerprint to interpret. Second, the mistake was attributed in part to “confirmation bias”²⁹⁷—a well-established phenomenon that is frequently ignored in forensic work.²⁹⁸ In other words, once the examiner made up his mind, he saw what he expected to see during reexaminations. Third, a review by another examiner was not conducted blind—i.e., the reviewer knew that a positive identification had already been made²⁹⁹—and thus was also subject to the influence of confirmation bias. Fourth, the culture at the laboratory was poorly suited to detecting mistakes. As the report noted, “[t]o disagree was not an expected response.”³⁰⁰ Fifth, proficiency testing was apparently not sufficiently rigorous.³⁰¹ Surprisingly, the report repeatedly alluded to the need to be cautious due to the “inherent pressure of a high-profile case,”³⁰² leaving one to wonder about the routine case.

The I.G. also reviewed the Mayfield case.³⁰³ Among other things,³⁰⁴ the I.G. Report concluded that “the misidentification could

293. See Sarah Kershaw & Eric Lichtblau, *Spain Had Doubts Before U.S. Held Lawyer in Blast*, N.Y. TIMES, May 26, 2004, at A1.

294. See Sara Kershaw, *Spain and U.S. at Odds on Mistaken Terror Arrest*, N.Y. TIMES, June 5, 2004, at A1 (reporting that Spanish authorities cleared Brandon Mayfield and matched the fingerprints to an Algerian national); Flynn McRoberts & Maurice Possley, *Report Blasts FBI Lab: Peer Pressure Led to False ID of Madrid Fingerprint*, CHI. TRIB., Nov. 14, 2004, § 1, at 1.

295. Stacey, *supra* note 30.

296. *Id.* at 714.

297. *Id.* at 713.

298. See *infra* notes 399–413 and accompanying text (discussing cognitive bias).

299. Stacey, *supra* note 30, at 715. Indeed, a third expert, from outside the FBI, also confirmed the identification. *Id.* at 709.

300. *Id.* at 713.

301. *Id.* at 716 (“Verifiers should be given challenging exclusions during blind proficiency tests to ensure that they are independently applying ACE-V methodology correctly . . .”).

302. *Id.* at 713, 716.

303. See OFFICE OF THE INSPECTOR GENERAL, U.S. DEPARTMENT OF JUSTICE, A REVIEW OF THE FBI’S HANDLING OF THE BRANDON MAYFIELD CASE, UNCLASSIFIED EXECUTIVE SUMMARY 9 (2006) [hereinafter 2006 I.G. REPORT].

304. The I.G. Report also highlighted the lack of blind verification: “[U]nder procedures in place at the time of the Mayfield identification, the verifier was aware that

have been prevented through a more rigorous application of several principles of latent fingerprint identification.”³⁰⁵ In addition, a significant cause of the misidentification was “reasoning ‘backward’ from features that were visible in the known prints of Mayfield.”³⁰⁶ As the Report explained: “Having found as many as 10 points of unusual similarity, the FBI examiners began to ‘find’ additional features in [the print] that were not really there, but rather were suggested to the examiners by features in the Mayfield prints.”³⁰⁷ After noting the controversy among examiners about Level 3 details, the Report concluded that the examiners “apparently misinterpreted distortions in [the print] as real features corresponding to Level 3 details seen in Mayfield’s known fingerprints.”³⁰⁸ Furthermore, the FBI Lab ignored the possibility that it had erred: “FBI examiners did not attempt to determine the basis of the [Spanish National Police’s] doubts before reiterating that they were ‘absolutely confident’ in the identification on April 15, a full week before the FBI Laboratory met with the SNP.”³⁰⁹

an identification had already been made by a prior FBI examiner at the time he was requested to conduct the verification.” *Id.* at 10–11.

305. *Id.* at 6.

306. *Id.* at 7.

307. *Id.*

308. *Id.* at 8 (“Because Level 3 details are so small, the appearance of such details in fingerprints is highly variable, even between different fingerprints made by the same finger. As a result, the reliability of Level 3 details is the subject of some controversy within the latent fingerprint community.”). Level 1 details are general ridge patterns—whorls, loops, and arches. Level 2 features involve ridge characteristics, such as ridge endings, bifurcations, islands, and dots. Level 3 features are “even smaller details of the number and shape of the [sweat] pores on the ridges.” GIANNELLI & IMWINKELRIED, *supra* note 12, § 16.07[a], at 897.

309. 2006 I.G. REPORT, *supra* note, 303, at 10. The I.G. made several recommendations that went beyond the Bureau’s internal report:

These include recommendations that the Laboratory [1] develop criteria for the use of Level 3 details to support identifications, [2] clarify the “one discrepancy rule” to assure that it is applied in a manner consistent with the level of certainty claimed for latent fingerprint identifications, [3] require documentation of features observed in the latent fingerprint before the comparison phase to help prevent circular reasoning, [4] adopt alternate procedures for blind verifications, [5] review prior cases in which the identification of a criminal suspect was made on the basis of only one latent fingerprint searched through IAFIS [Integrated Automated Fingerprint Identification System], and [6] require more meaningful and independent documentation of the causes of errors as part of the Laboratory’s corrective action procedures.

Id. at 14.

b. Other Mistakes

The Mayfield imbroglio was not the only fingerprint mishap recently reported.³¹⁰ Stephan Cowans was released after serving six years in a Massachusetts prison for the nonfatal shooting of a police officer.³¹¹ His was the first conviction overturned on DNA evidence in which fingerprint evidence had been crucial in securing the wrongful conviction.³¹² Commenting on the case, Professor Mnookin wrote: “[T]he fingerprint community has little motivation to investigate how often they make mistakes. Fingerprint examiners regularly assert in court that the technique is error-free and that fingerprint matches are a sure thing. . . . [F]ingerprints cannot possibly be as perfect a technique as the experts presently claim.”³¹³

Riky Jackson’s prints were similarly misidentified. He was convicted of murder in 1997 based on bloody fingerprints discovered on a window fan.³¹⁴ The police expert, Anthony Paparo, matched eleven friction points to Jackson’s prints.³¹⁵ At trial, Paparo and two other prosecution experts testified to a match. In contrast, two defense experts, both retired FBI examiners, testified that there was no match.³¹⁶ Nevertheless, Jackson was convicted and sentenced to life imprisonment.³¹⁷ Frustrated, the defense experts filed a complaint with the International Association of Identification concerning the

310. See Simon A. Cole, *More Than Zero: Accounting for Error in Latent Fingerprint Identification*, 95 J. CRIM. L. & CRIMINOLOGY 985, 1001–16 (2005) (collecting twenty-two cases involving mistakes). Other problematic fingerprint cases include *Imbler v. Craven*, 298 F. Supp. 795 (C.D. Cal. 1969) (expert failed to observe an exculpatory fingerprint in a murder case, in which the death penalty was imposed), *aff’d*, 424 F.2d 631 (9th Cir. 1970) and *State v. Caldwell*, 322 N.W.2d 574, 586 (Minn. 1982) (“The fingerprint expert’s testimony was damning—and it was false.”). See also Michael Specter, *Do Fingerprints Lie?*, NEW YORKER, May 27, 2002, at 96 (discussing a holding by a Philadelphia judge that limited the use of fingerprint evidence due to scientific fallibility); James E. Starrs, *A Miscue in Fingerprint Identification: Causes and Concerns*, 12 J. POLICE SCI. & ADMIN. 287 (1984) (discussing the misidentification of fingerprints in *State v. Caldwell*).

311. *Commonwealth v. Cowans*, 756 N.E.2d 622, 625 (Mass. App. Ct. 2001) (“A fingerprint left on the glass mug was matched to the defendant.”).

312. See Elizabeth F. Loftus & Simon A. Cole, Letter, *Contaminated Evidence*, 304 SCIENCE 959, 959 (2004) (“[F]orensic scientists remain stubbornly unwilling to confront and control the problem of bias, insisting that it can be overcome through sheer force of will and good intentions.”).

313. Jennifer L. Mnookin, Editorial, *A Blow to the Credibility of Fingerprint Evidence*, BOSTON GLOBE, Feb. 2, 2004, at A15.

314. Flynn McRoberts et al., *Forensics Under the Microscope: Unproven Techniques Sway Courts, Erode Justice*, CHI. TRIB., Oct. 17, 2004, § 1, at 1.

315. *Id.*

316. See CNN Presents: *Reasonable Doubt: Can We Trust Crime Labs?* (CNN television broadcast Jan. 9, 2005).

317. *Id.*

prosecution experts' testimony.³¹⁸ This triggered an FBI review, which concluded that the government experts had erred.³¹⁹ Jackson was released from prison.³²⁰

c. Lack of Research

Another distressing revelation surfaced in *United States v. Mitchell*,³²¹ the first post-*Daubert* attack on fingerprint evidence. In March 2000, the National Institute of Justice (“NIJ”), the research arm of the Department of Justice, released a solicitation for fingerprint research. The “Introduction” to the solicitation stated that *Daubert* “require[d] scientists to address the reliability and validity of the methods used in their analysis. Therefore, the purpose of this solicitation is to . . . provide greater scientific foundation for forensic friction ridge (fingerprint) identification.”³²² After the *Mitchell* trial, the defense attorney learned that the solicitation had been postponed, arguably so it could not be used in *Mitchell* to support the defense challenge.³²³ The Third Circuit commented on the testimony of Dr. Richard Rau, the NIJ official who coordinated the drafting of the solicitation for the Department of Justice:

We are deeply discomfited by Mitchell’s contention—supported by Dr. Rau’s account of events, though contradicted by other witnesses—that a conspiracy within the Department of Justice intentionally delayed the release of the solicitation until after Mitchell’s jury reached a verdict. Dr. Rau’s story, if true, would be a damning indictment of the ethics of those involved.³²⁴

318. *Id.*

319. See *60 Minutes: The Fallibility of Fingerprints As Evidence* (CBS television broadcast Jan. 5, 2003).

320. *Id.*

321. 365 F.3d 215 (3d Cir. 2004).

322. NAT’L INST. OF JUSTICE, SOLICITATION: FORENSIC FRICTION RIDGE (FINGERPRINT) EXAMINATION VALIDATION STUDIES 3 (2000).

323. See Robert Epstein, *Fingerprints Meet Daubert: The Myth of Fingerprint “Science” Is Revealed*, 75 S. CAL. L. REV. 605, 628 n.122 (2002) (“Internal documents of the NIJ presently on file with the author . . . reveal that the Institute was ready to publish the Solicitation in September of 1999, but that at the FBI’s request, publication was delayed until after Mitchell’s trial.”). Epstein was the defense counsel in *Mitchell*.

324. *Mitchell*, 365 F.3d at 255. The court also noted:

[Mitchell’s] most damaging evidence came from Dr. Richard Rau of the NIJ, who coordinated the drafting of the solicitation. Rau testified to conversations at a September 1999 meeting among himself, Donald Kerr (the Assistant Director of the FBI in charge of the FBI crime laboratory), David Boyd (the Deputy Director of the NIJ), and others. Rau claimed that at that meeting Kerr and Boyd agreed to withhold release of the solicitation until the end of Mitchell’s trial. In response

Moreover, a subsequent attempt to establish an empirical basis for fingerprints was thwarted. An editorial in the prestigious scientific journal *Science*, entitled “Forensic Science: Oxymoron?” and written by the editor in chief, discussed the cancellation of a National Academies project designed to examine various forensic science techniques, including fingerprinting, because the Departments of Justice and Defense insisted on a right of review that the Academies had refused to other grant sponsors.³²⁵ In sum, not only is there a lack of empirical support for fingerprints,³²⁶ but the proponents of the technique are undercutting efforts to establish such a basis.³²⁷

II. REGULATING CRIME LABORATORIES

A. *The DNA Model*

As the above cases demonstrate, the problems with crime labs are systemic. Regulation is the answer, but there is no need to start from scratch. DNA labs are presently regulated and can serve as a model for all crime laboratory units.³²⁸

In 1988, the FBI established the Technical Working Group on DNA Analysis Methods (“TWGDAM”) to develop quality control

to Dr. Rau’s testimony, the government called Kerr, Boyd, and the other individuals at the meeting to testify that Dr. Rau’s account of the delay in releasing the solicitation was incorrect and that the delay was caused by budgetary issues.

Id. at 232.

325. Donald Kennedy, Editorial, *Forensic Science: Oxymoron?*, 302 *SCIENCE* 1625, 1625 (2003).

326. See Donald Kennedy & Richard A. Merrill, *Assessing Forensic Science*, *ISSUES SCI. & TECH.*, Fall 2003, at 33, 34. The authors note:

The increased use of DNA analysis, which has undergone extensive validation, has thrown into relief the less firmly credentialed status of other forensic science identification techniques (fingerprints, fiber analysis, hair analysis, ballistics, bite marks, and tool marks). These have not undergone the type of extensive testing and verification that is the hallmark of science elsewhere.

Id.

327. Congress appropriated \$1,500,000 to the National Academies to create an independent Forensic Science Committee to study forensic science and issue a report. See H.R. REP. NO. 109-272, at 121 (2005) (Conf. Rep.); S. REP. NO. 109-088, at 46 (2005). A committee has recently been appointed.

328. See Paul C. Giannelli, *Regulating Crime Laboratories: The Impact of DNA Evidence*, 13 *J. L. & POL’Y* 59 (2006) (discussing the history of crime labs in this country and the affect DNA profiling has had on them).

standards for DNA labs.³²⁹ Moreover, the National Academies issued two reports on the subject, noting the importance of certain practices: “No laboratory should let its results with a new DNA typing method be used in court, unless it has undergone . . . proficiency testing via blind trials.”³³⁰ Perhaps the most important development was the passage of the DNA Identification Act of 1994.³³¹ It authorized the creation of a national database for the DNA profiles of convicted offenders as well as one for crime scene profiles: the Combined DNA Index System (“CODIS”). Bringing CODIS online was a monumental endeavor, and its successful operation required an effective quality assurance program.³³² To effectuate this goal, the statute created a DNA Advisory Board (“DAB”) to assist in promulgating quality assurance standards.³³³ The Act also required proficiency testing for analysts in the FBI as well as those in labs participating in the national database or receiving federal funding.³³⁴ DAB Standard 13 implements these requirements.³³⁵

329. TWGDAM would later function under the statutorily-created DNA Advisory Board (“DAB”). It was renamed Scientific Working Group on DNA Analysis Methods (“SWGDM”) in 1999 and replaced the DAB when the latter expired. *See infra* notes 457–65 and accompanying text (discussing the Board’s composition).

330. NAT’L RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE 55 (1992) [hereinafter NRC I REPORT]; *see also* NAT’L RESEARCH COUNCIL, THE EVALUATION OF FORENSIC DNA EVIDENCE 73 (1996) [hereinafter NRC II REPORT]. The Council is the Academies’ research arm. The FBI requested and funded both reports.

331. Pub. L. No. 103-322, 108 Stat. 2065 (codified as amended at 42 U.S.C.A. §§ 14131–14134) (West 2005).

332. OFFICE OF INSPECTOR GEN., U.S. DEP’T OF JUSTICE, AUDIT REPORT, THE COMBINED DNA INDEX SYSTEM ii (2001) [hereinafter 2001 I.G. REPORT] (“[T]he integrity of the data contained in CODIS is extremely important since the DNA matches provided by CODIS are frequently a key piece of evidence linking a suspect to a crime.”).

333. 42 U.S.C.A § 14131(a) (West 2005). The legislation contained a sunset provision: DAB would expire after five years unless extended by the Director of the FBI. The Board was extended through the sixth year to complete tasks and the Scientific Working Group on DNA Analysis Methods (“SWGDM”) again took over responsibility. NORAH RUDIN & KEITH INMAN, AN INTRODUCTION TO FORENSIC DNA ANALYSIS 176, 180 (2d ed. 2002).

334. 42 U.S.C.A § 14132(b)(2) (West 2005) (requiring external proficiency testing for CODIS participation); *id.* § 1433(a)(1)(A) (requiring external proficiency testing for FBI examiners). The statute was subsequently amended to require accreditation, which in turn mandates proficiency testing.

335. DNA Advisory Board, Quality Assurance Standards for Forensic DNA Testing Laboratories, Standard 13 (1998), *available at* <http://www.fbi.gov/hq/lab/fsc/backissu/july2000/codis2b.htm> (“Examiners and other personnel designated by the technical manager or leader who are actively engaged in DNA analysis shall undergo, at regular intervals of not to exceed 180 days, external proficiency testing in accordance with these proficiency standards. Such external testing shall be an open proficiency testing program.”). An open test is a non-blind test. *See* RUDIN & INMAN, *supra* note 333, at 180 (“The power of the DAB has been substantial, primarily because any agency requesting

DAB also promulgated standards governing (1) analytical protocols, (2) equipment calibration and maintenance procedures, and (3) administrative and technical reviews of test results.³³⁶ Among other requirements, labs must (a) review their procedures “annually or whenever substantial changes are made to protocol(s),” and (b) compare their results with available National Institute of Standards and Technology (“NIST”) reference materials or “standards traceable to NIST standards.”³³⁷ The DNA Act, however, suffered from one significant drawback: it failed to require the accreditation of DNA labs,³³⁸ an omission rectified by the enactment of the “Justice for All Act of 2004.”³³⁹

DNA cases, however, make up only a small portion of crime lab work—under four percent³⁴⁰—and only a few jurisdictions require accreditation of labs conducting other forensic examinations.³⁴¹ Thus, the paradox: the most scientifically sound procedure—DNA analysis—is the most extensively regulated, while many forensic techniques with questionable scientific pedigrees are completely unregulated.

As a discipline, forensic science has been moving toward the accreditation of laboratories, the certification of examiners, and the standardization of procedures.³⁴² These requirements should be

federal development funds for forensic DNA testing or DNA databasing must demonstrate compliance with the standards set by this group.”).

336. DNA Advisory Board, *supra* note 335, Standard 9 (analytical procedures), Standard 10 (equipment calibration and maintenance), and Standard 12 (administrative and technical review of all case files).

337. *Id.*, Standard 9.5.

338. In an attempt to address this deficiency, the preface to the DAB Standards recommended that “forensic laboratories performing DNA analysis seek such accreditation with all deliberate speed.” *Id.*, Preface. Some states require accreditation of DNA labs. *See, e.g.*, CAL. PENAL CODE § 297 (West Supp. 2007) (requiring accreditation by ASCLD/LAB or any certifying body approved by ASCLD/LAB); *see also supra* note 44 (discussing Indiana’s accreditation requirement).

339. Pub. L. No. 108-405, § 1(a), 118 Stat. 2260 (codified as amended in scattered sections of 18 U.S.C. & 42 U.S.C.). The DNA Identification Act of 1994 was amended to require accreditation “by a nonprofit professional association of persons actively involved in forensic science that is nationally recognized within the forensic science community” within two years and to “undergo external audits, not less than once every 2 years, that demonstrate compliance with standards established by the Director of the Federal Bureau of Investigation.” Pub. L. No. 103-322, 118 Stat. 2065 (codified as amended at 42 U.S.C.A. § 14132(b)(2) (West 2005)).

340. *See* Jan S. Bashinski & Joseph L. Peterson, *Forensic Sciences, in* LOCAL GOVERNMENT: POLICE MANAGEMENT 559, 562 (William Geller & Darrel Stephens eds., 4th ed. 2003) (“[R]equests for serology/DNA, arson, trace evidence, and questioned document cases represent only a small fraction (3.4 percent) of the cases . . .”).

341. *See infra* notes 353–56 and accompanying text.

342. *See* Bashinski & Peterson, *supra* note 340, at 577–78.

mandatory, not permissive. Self-regulation is a lofty ideal but not nearly enough to ensure the integrity of a crime laboratory's work product.³⁴³ An effective quality assurance program requires written procedures and a designated professional who is specifically responsible for the implementation of the program, as the DAB standards mandate for DNA analysis.³⁴⁴ An enforcement mechanism, such as accreditation, also needs to be in place.

B. Accreditation of Crime Laboratories

Citing clinical laboratories, which are regulated under the Clinical Laboratory Improvements Act of 1988,³⁴⁵ commentators have argued that crime laboratories should also be regulated.³⁴⁶ Currently, ASCLD/LAB operates an accreditation program for public and private crime laboratories.³⁴⁷ Requirements include ensuring the integrity of evidence, adhering to valid and generally accepted procedures, employing qualified examiners, and operating quality

343. See Stacey, *supra* note 30, at 717 ("Many agencies are slow to [report erroneous identifications] or refuse to admit that errors have occurred.").

344. See generally DNA Advisory Board, *supra* note 335, Standard 3 (1998) (requiring a quality assurance program).

345. Pub. L. No. 100-578, 102 Stat. 2903 (codified as amended in 42 U.S.C. § 263a (2004)).

346. See, e.g., Randolph N. Jonakait, *Forensic Science: The Need for Regulation*, 4 HARV. J. L. & TECH. 109, 191 (1991) ("Current regulation of clinical labs indicates that a regulatory system can improve crime laboratories."); Lander, *supra* note 1, 505 ("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."); Jack B. Weinstein, *Science, and the Challenges of Expert Testimony in the Courtroom*, 77 OR. L. REV. 1005, 1011 (1998) ("Accreditation of laboratories presenting research in courts should provide a minimum standard for gauging the credibility of the research and testimony offered."); see also Scheck & Neufeld, *supra* note 16 ("There is a model for improvement. The 1988 Clinical Laboratory Improvement Act provided accountability for laboratories that perform medical tests. A mistake in health tests can have dire results—not only for the patient, but also for the lab, which risks losing accreditation.").

347. Established in 1981, ASCLD/LAB accredits labs for a five-year period. See AM. SOC'Y OF CRIME LAB. DIRS., LAB. ACCREDITATION BD., PROFICIENCY REVIEW PROGRAM 2 (2006), <http://www.asclad-lab.org/legacy/pdf/alpd1002.pdf>. ASCLAD/LAB has been criticized for being too close to the labs it accredits. See Arvizu, *supra* note 32, at 20–21 ("The ASCLD/LAB is essentially a trade organization of crime laboratory directors. The membership of the ASCLD/LAB delegate assembly consists solely of the laboratory directors of ASCLD accredited laboratories."); Possley et al., *supra* note 2 (quoting former Cook County prosecutor and Republican state representative James Durkin ("I believe they are more of a fraternal organization than an authoritative scientific body.")). This criticism is overblown. ASCLD/LAB has been one of the most effective reform mechanisms in forensic science over the last decade by operating a voluntary accreditation program, by investigating the Zain fiasco in West Virginia, and by issuing a critical report in the Earl Washington case in Virginia. See *supra* notes 54 (Zain inquiry) and 217 (Washington case).

assurance programs—i.e., proficiency testing, technical reviews, audits, and corrective action procedures.³⁴⁸ Over 240 laboratories have been accredited, and judicial opinions are approvingly citing these accreditation standards in their admissibility decisions.³⁴⁹ Only ten percent of the laboratories that apply satisfy these standards on the first inspection.³⁵⁰ In addition, Forensic Quality Services accredits laboratories, including those conducting DNA profiling, according to standards defined by the International Organization for Standardization (“ISO”).³⁵¹ The National Association of Medical Examiners (“NAME”) runs an accreditation program for Coroners and Medical Examiner Offices, and the American Board of Forensic Toxicology accredits toxicology laboratories.³⁵²

These programs are all voluntary, however, and many laboratories remain unaccredited. Currently, only New York,³⁵³ Oklahoma,³⁵⁴ and Texas³⁵⁵ require all their crime labs to be accredited; the California statute covers only DNA labs.³⁵⁶ In 2002, the President of the American Academy of Forensic Sciences observed:

Unfortunately, while the ASCLD/LAB program has been successful in accrediting over 200 laboratories, a large number

348. Bashinski & Peterson, *supra* note 340, at 578.

349. See, e.g., *Smith v. State*, 702 N.E.2d 668, 673 (Ind. 1998) (“[T]he [DNA] lab was accredited by the American Society of Crime Lab Directors in 1990. Furthermore, the lab runs its tests under controlled conditions, follows specific protocols, and conducts quality testing on the kits and the analysts.”).

350. See Kenneth E. Melson, *Crime Laboratory Accreditation: The Assurance of Quality in the Forensic Sciences*, in A.B.A. CRIMINAL JUSTICE SECTION, THE STATE OF CRIMINAL JUSTICE 6–7 (2003) (“[L]ess than ten percent of applicant laboratories achieve accreditation following the initial inspection.”).

351. See Forensic Quality Services, <http://www.forquality.org/> (last visited Nov. 29, 2007) (explaining accreditation procedures). Forensic Quality Services is also one of six accreditation bodies recognized by the National Cooperation for Laboratory Accreditation. National Cooperation for Laboratory Accreditation, Accreditation Bodies Recognized by NACLA, <http://nacla.net/recognized.htm> (last visited Nov. 29, 2007).

352. See National Association of Medical Examiners, <http://www.thename.org/> (follow “About NAME” hyperlink; then follow “General Information” hyperlink) (last visited Oct. 7, 2007); American Board of Forensic Toxicology, <http://www.abft.org> (last visited Oct. 29, 2007).

353. N.Y. EXEC. LAW § 995b (McKinney Supp. 2007) (requiring accreditation by state Forensic Science Commission).

354. OKLA. STAT. ANN. tit. 74, § 150.37 (West Supp. 2007) (generally requiring accreditation by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board or the American Board of Forensic Toxicology).

355. TEX. CODE CRIM. PROC. ANN. art. 38.35 (Vernon Supp. 2006–2007) (requiring accreditation by the Department of Public Safety).

356. CAL. PENAL CODE § 297 (West Supp. 2007) (requiring accreditation by ASCLD/LAB or any certifying body approved by ASCLD/LAB).

of forensic laboratories in the U.S. remain unaccredited by any agency. . . . The same dichotomy exists in certification programs for the practicing forensic scientist, even though forensic certification boards for all the major disciplines have been in existence for over a decade. Why have forensic laboratories and individuals been so reluctant to become accredited or certified?³⁵⁷

As the National Academies 1992 DNA Report commented, “[v]oluntary accreditation programs are not enough. Because professional organizations, such as ASCLD-LAB, lack regulatory authority, forensic laboratories could avoid accreditation and still offer DNA typing evidence in criminal proceedings.”³⁵⁸ As noted above, the Justice for All Act of 2004 now mandates accreditation for DNA labs participating in the national database.³⁵⁹ An accreditation requirement should apply to the entire crime laboratory, not only to DNA units.

C. *Quality Assurance*

The key to laboratory performance is quality assurance. Yet, “[s]omewhat surprisingly, crime labs are not generally subject to mandatory quality-assurance standards imposed by federal or state law.”³⁶⁰ Quality assurance consists of several activities: proficiency testing, laboratory audits, technical reviews, and corrective action procedures.

1. Proficiency Testing

Proficiency testing in the forensic sciences dates back thirty years. In 1978, the Laboratory Proficiency Testing Program, sponsored by the Law Enforcement Assistance Administration (“LEAA”), reported the results of the first proficiency tests.³⁶¹ Over 200 crime laboratories participated in this program, which involved such common forensic examinations as firearms, blood, drug, and trace evidence analyses.³⁶² Seventy-one percent of the crime

357. Graham R. Jones, *President's Editorial—The Changing Practice of Forensic Science*, 47 J. FORENSIC SCI. 437, 438 (2002).

358. NRC I REPORT, *supra* note 330, at 106.

359. *See supra* note 339.

360. Bales, *supra* note 236, at 54; *see also* Joseph L. Peterson, *The Crime Lab*, in THINKING ABOUT POLICE 184, 196 (Carl B. Klockars ed., 1983) (“Crime laboratories are unique among publicly supported scientific operations in that few participate in external quality assurance programs.”).

361. *See* JOSEPH L. PETERSON ET AL., CRIME LABORATORY PROFICIENCY TESTING RESEARCH PROGRAM (1978).

362. *Id.* at 251.

laboratories tested provided unacceptable results in a blood test, 51.4% made errors in matching paint samples, 35.5% erred in a soil examination, and 28.2% made mistakes in firearms identifications.³⁶³ The report concluded: “A wide range of proficiency levels among the nation’s laboratories exists, with several evidence types posing serious difficulties for the laboratories”³⁶⁴ Thus, although some laboratories performed exceptionally well, the performances of others were disturbing: “65 percent of the laboratories had 80 percent or more of their results fall into the acceptable category. At the other end of the spectrum, 3 percent of laboratories had less than 50 percent of their responses considered acceptable.”³⁶⁵ Similarly, certain types of examinations caused few problems, whereas others produced very high rates of “unacceptable proficiency.”³⁶⁶ Unacceptable proficiency was most often attributed to (1) misinterpretation of test results due to carelessness or inexperience, (2) failure to employ adequate or appropriate methodology, (3) mislabeling or contamination of primary standards, and (4) inadequate databases or standard spectra.³⁶⁷

Given these results, one would have expected the implementation of fairly extensive reforms. However, “[t]he startling conclusions from that research led to some efforts to improve conditions in the laboratories, but these encounter[ed] institutional inertia against reform.”³⁶⁸ In sum, widespread reform failed to materialize.

363. *Id.* at 251 tbl.89. One blood test had only 3.8% unacceptable results. *Id.*

364. *Id.* at 3.

365. Peterson, *supra* note 360, at 195.

366. *See id.* at 188–91. The number of laboratories responding ranged from a low of 65 to a high of 205. *Id.* at 194. An unacceptable response did not necessarily mean an incorrect one. *Id.* at 191. Other reasons for an unacceptable designation included a correct response for the wrong reason, an unsupported, inclusive response, multiple responses, and incomplete responses. *Id.*

367. PETERSON ET AL., *supra* note 361, at 258. Professor Peterson, one of the report’s authors, later commented: “In spite of being a firm advocate of forensic science, I must acknowledge that a disturbingly high percentage of laboratories are not performing routine tests competently, as shown by our proficiency testing.” *Symposium on Science and the Rules of Legal Procedure*, 101 F.R.D. 599, 645 (1983).

368. *Symposium*, *supra* note 367, at 645 (remarks of Professor Joseph L. Peterson). For a more detailed discussion of proficiency testing, see Michael J. Saks, *Prevalence and Impact of Ethical Problems in Forensic Science*, 34 J. FORENSIC SCI. 772, 775–78 (1989) (reviewing proficiency testing results and stating, “[p]erhaps the major lessons to be drawn from this are that errors are indeed made and that there is a wide range of interlaboratory variation”).

The Forensic Science Foundation was the next organization to conduct proficiency testing—from 1978 to 1991.³⁶⁹ The results of these tests confirmed the findings of the LEAA study—that forensic labs show unacceptably high error rates in certain fields. Several types of examinations caused concern: fiber, paint, glass, and body fluid comparisons resulted in incorrect results in more than ten percent of the cases.³⁷⁰ A review of five handwriting comparison proficiency tests in 1987 showed that, at best, “[d]ocument examiners were correct 57% of the time and incorrect 43% of the time.”³⁷¹ This program has continued: “By 2000, more than 400 laboratories worldwide were participating in the program. Although the majority of laboratories have been found to produce correct results, the program has revealed errors stemming from inadequate standard reference materials, inexperienced examiners, inappropriate tests, or misinterpretation of otherwise good data.”³⁷²

The DNA Identification Act of 1994 required proficiency testing for DNA examiners in the FBI Laboratory and for those in laboratories participating in the national DNA database or receiving federal funding.³⁷³ In addition, a laboratory voluntarily accredited by ASCLD/LAB must engage in a documented program of proficiency testing that measures the capability of its examiners and the reliability

369. See generally Joseph L. Peterson & Penelope N. Markham, *Crime Laboratory Proficiency Testing Results, 1978–1991. I: Identification and Classification of Physical Evidence*, 40 J. FORENSIC SCI. 994 (1995) [hereinafter Peterson & Markham, *Crime Labs I*] (finding that labs had a high degree of success in identifying drugs and typing bloodstains; had moderate success in identifying flammables, explosives, and fibers; and had trouble with animal hair identifications and human hair body location); Joseph L. Peterson & Penelope N. Markham, *Crime Laboratory Proficiency Testing Results, 1978–1991. II: Resolving Questions of Common Origin*, 40 J. FORENSIC SCI. 1009 (1995) [hereinafter Peterson & Markham, *Crime Labs II*] (finding that labs performed best in determining the origin of finger and palm prints, firearms identifications, and footwear; had moderate success in determining the source of bloodstains, questioned documents, tool marks, and hair; and the least success in identifying paint, glass, fibers, and body fluid mixtures).

370. Peterson & Markham, *Crime Labs II*, *supra* note 369, at 1028.

371. D. Michael Risinger et al., *Exorcism of Ignorance as a Proxy For Rational Knowledge: The Lessons of Handwriting Identification “Expertise,”* 137 U. PA. L. REV. 731, 748 (1989).

372. Bashinski & Peterson, *supra* note 340, at 579.

373. 42 U.S.C.A § 14132(b)(2) (West 2005) (mandating external proficiency testing for CODIS participation); *id.* § 14133(a)(1)(A) (mandating the same for FBI DNA analysts) (2004). As noted earlier, DAB Standard 13 implements this requirement. See *supra* note 335 and accompanying text. The 1996 National Academies DNA report also recommended proficiency testing. NRC II REPORT, *supra* note 330, at 88 (“Recommendation 3.2: Laboratories should participate regularly in proficiency tests, and the results should be available for court proceedings.”).

of its analytical results.³⁷⁴ All forensic disciplines should be legislatively obliged to participate in meaningful proficiency testing.³⁷⁵

There are several types of proficiency testing: internal or external, and blind or non-blind. External blind testing is by far the best. The DNA Act authorized a study of the feasibility of blind proficiency testing; that study raised questions about the cost and practicability of this type of examination, as well as its effectiveness when compared to other methods of quality assurance, such as accreditation and more stringent external case audits.³⁷⁶

In addition, the rigor of some voluntary proficiency tests is suspect.³⁷⁷ For example, a fingerprint examiner from New Scotland Yard testified in one case that the FBI proficiency tests were deficient: “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

374. Melson, *supra* note 350, at 8–9. The proficiency tests must be conducted by external providers, where available. *Id.* at 9. Laboratories are also encouraged to conduct proficiency testing using blind tests prepared internally or externally and submitted as normal casework evidence or by re-examination by another examiner on completed casework. *Id.* at 9–10.

375. See Bashinski & Peterson, *supra* note 340, at 579 (“Laboratory proficiency cannot be assumed. It must be positively demonstrated.”); see also THIRD HOUSTON REPORT, *supra* note 166, at 37–38 (reporting that the examiner “failed her competency test after, among other things, she indicated the presence of PCP in both blood samples where it was not present, did not detect the morphine presence in the first blood sample, and did not detect either substances in the second blood sample”).

376. Joseph L. Peterson et al., *The Feasibility of External Blind DNA Proficiency Testing. I. Background and Findings*, 48 J. FORENSIC SCI. 21 (2003). That study concluded:

1. The accreditation system and associated quality assurance guidelines of the DNA Advisory Board need to be given the opportunity to take hold.
2. It is recommended that the DNA Advisory Board generate guidelines for more stringent external case audits for use by ASCLD-LAB, or another relevant accrediting body, as part of the accreditation process. The external case audits should be conducted regularly and serve as a measure of how well accreditation and its associated requirements are working in a quality assurance context.
3. In the extreme, blind proficiency testing is possible, but fraught with problems (including costs), and it is recommended that a blind proficiency testing program be deferred for now until it is more clear how well implementation of the first two recommendations are serving the same purposes as blind proficiency testing.

Id. at 30.

377. See, e.g., *United States v. Yee*, 134 F.R.D. 161, 208 (N.D. Ohio 1991) (“[T]he F.B.I. program of [DNA] proficiency testing has serious deficiencies, even without consideration of the troubling hint in the record of an impulse at one point to destroy some of the small amount of test data that had been accumulated earlier.”), *aff’d sub nom.* *United States v. Bonds*, 12 F.3d 540 (6th Cir. 1993).

if I gave my experts these tests, they'd fall about laughing."³⁷⁸ The district court agreed, noting that "the FBI examiners got very high proficiency grades, but the tests they took did not. . . . [O]n the present record I conclude that the proficiency tests are less demanding than they should be."³⁷⁹ The FBI's own report acknowledged this shortcoming.³⁸⁰ Similarly, in a trial involving handwriting comparisons, the court wrote:

There were aspects of Mr. Cawley's testimony that undermined his credibility. Mr. Cawley testified that he achieved a 100% passage rate on the proficiency tests that he took and that all of his peers *always* passed their proficiency tests. Mr. Cawley said that his peers *always* agreed with each others' results and *always* got it right. Peer review in such a "Lake Woebegone" environment is not meaningful.³⁸¹

If proficiency programs are not rigorous, they provide only an illusion of reliability. Indeed, by bestowing an undeserved imprimatur, they are affirmatively misleading.

2. Laboratory Audits

Inspections or audits are another significant quality assurance mechanism. They "may range from internal peer review (review of one laboratory section by another or review of the laboratory unit by the audit unit of the department) to a full-scale inspection by a team of external scientists such as the ASCLD/LAB accreditation inspectors."³⁸²

378. *United States v. Llera Plaza*, 188 F. Supp. 2d 549, 558 (E.D. Pa. 2002).

379. *Id.* at 565; *see also* *United States v. Crisp*, 324 F.3d 261, 274 (4th Cir. 2003) (Michael, J., dissenting) ("Proficiency testing is typically based on a study of prints that are far superior to those usually retrieved from a crime scene."); Mnookin, *supra* note 313 ("There are no systematic proficiency tests to evaluate examiners' skill. Those tests that exist are not routinely used and are substandard.").

380. *See supra* note 301 and accompanying text.

381. *United States v. Lewis*, 220 F. Supp. 2d 548, 554 (S.D.W. Va. 2002); *see also Crisp*, 324 F.3d at 279 (Michael, J., dissenting) ("[A]lthough the government's expert here testified to his success on proficiency tests, the government provides no reason for us to believe that these tests are realistic assessments of an examiner's ability *See* J.A. 342 (testimony of the government's handwriting expert that he has always achieved a perfect score on proficiency tests) . . .").

382. Bashinski & Peterson, *supra* note 340, at 587; *see also Arvizu*, *supra* note 32, at 25 ("[O]nly an on-site laboratory audit can provide a complete picture of a laboratory. It is one thing to have acceptable written procedures for a laboratory's activities. It is quite another to comply with the procedures on a daily basis.").

DAB standards mandate annual internal audits and biannual external audits for DNA labs.³⁸³ Yet, a 2001 I.G. Report found that the audit procedures for CODIS were defective. A review of eight state and local laboratories “disclosed that four laboratories did not fully comply with the FBI’s quality assurance standards and national index requirements.”³⁸⁴ In addition, labs had entered unallowable or incomplete profiles into CODIS. The problem stemmed from the fact that the audit did not review the actual DNA profiles, and labs could certify their own compliance instead of reporting audit results directly to the FBI. Here, again, the experience with regulating DNA analysis provides a template. The new federal legislation dictates that “external audits, not less than once every 2 years . . . [must] demonstrate compliance with standards established by the Director of the Federal Bureau of Investigation.”³⁸⁵

As the Houston fiasco demonstrated, internal audits are often not rigorous. That lab passed its internal audits with flying colors, only to be shut down following an external audit.³⁸⁶

3. Corrective Action Procedures

DAB standards also require corrective action procedures “whenever proficiency-testing discrepancies and/or casework errors are detected.”³⁸⁷ The value of such a program is illustrated by a series of news articles on the Washington state DNA program. Over a four-year period, the lab documented “contamination or errors in twenty-three of more than 5,000 DNA cases.”³⁸⁸ Because PCR-DNA is extremely sensitive, cross-contamination is always a concern.³⁸⁹ The

383. DNA Advisory Board, *supra* note 335, Standard 15.1 (“The laboratory shall conduct audits annually in accordance with the standards outlined herein.”); *id.* Standard 15.2 (“Once every two years, a second agency shall participate in the annual audit.”).

384. 2001 I.G. REPORT, *supra* note 332, at iii.

385. 42 U.S.C.A § 14132(b)(2)(B) (West 2005).

386. *See supra* notes 199–200 and accompanying text.

387. DNA Advisory Board, *supra* note 335, Standard 14.1.

388. *See* Barry K. Logan, *Crime Lab Committed to Improvements*, SEATTLE POST-INTELLIGENCER, July 30, 2004, at B7. Logan was the lab director.

389. *See* John E. Smialek et al., *The Microscopic Slide: A Potential DNA Reservoir*, FBI LAW ENFORCEMENT BULL., Nov. 2000, at 18, 19. Smialek notes:

Contamination occurs when the evidence comes in contact with another individual’s body fluids through actions, such as sneezing, coughing, or touching. . . . But, the PCR process cannot distinguish between DNA from a suspect and another source. Therefore, any substantial contamination to the DNA material will result in a confusing result.

Id.

reported deficiencies are troublesome,³⁹⁰ but the lack of any corrective action file would be far more worrisome. In other words, this information may show that the system is working—mistakes are being reported, the first step toward remediation.

D. Standardization of Technical Procedures

Valid procedures, of course, are critical to ensure the accuracy of test results. The 1997 I.G. Report recommended the development of written protocols for scientific procedures.³⁹¹ According to the first National Academies Report, “[e]ach DNA typing procedure must be completely described in a detailed, written laboratory protocol.”³⁹² Current DAB standards require DNA analytical protocols, equipment calibration and maintenance procedures, and administrative and technical reviews of test results.³⁹³ They also prescribe developmental and internal validation.³⁹⁴ Further, all ASCLD/LAB-accredited laboratories must maintain written copies of appropriate technical procedures. These protocols include descriptions of sample preparation methods, controls, standards, and calibration procedures, as well as a discussion of precautions, sources of possible error, and literature references.³⁹⁵

390. See Teichroeb, *Rare Look*, *supra* note 23 (reporting that examiners “tainted tests with their own DNA in eight of the 23 cases” and that cross-contamination between cases occurred in three incidents and other mistakes included “throwing out evidence swabs to misreading results, fingering the wrong rape suspect”; the source of contamination in five other tests was unknown).

391. See 1997 I.G. REPORT, *supra* note 27, Executive Summary, at pt. VII; see also *supra* note 242 and accompanying text.

392. NRC I REPORT, *supra* note 330, at 8. The second report stated that “[l]aboratories should adhere to high quality standards” NRC II REPORT, *supra* note 330, at 88 (citing TWGDAM and DAB standards as examples in Recommendation 3.1).

393. DNA Advisory Board, *supra* note 335, Standards 9, 10 & 12.

394. *Id.* Standard 2(ff): (“Validation is a process by which a procedure is evaluated to determine its efficacy and reliability Developmental validation is the acquisition of test data and the determination of conditions and limitations of a new or novel DNA methodology . . . ; (2) Internal validation is the accumulation of test data within the laboratory to demonstrate that established methods and procedures perform as expected in the laboratory.”). SWGDAM promulgated revised validation guidelines in 2003. See *Revised Validation Guidelines*, FORENSIC SCI. COMM., July 2004, http://www.fbi.gov/hq/lab/fsc/backissu/july2004/standards/2004_03_standards02.htm.

395. Melson, *supra* note 350, at 8. During accreditation audits, a representative number of laboratory reports are subjected to review to ensure that the conclusions of examiners are reasonable and within the constraints of scientific knowledge. *Id.* at 9. This technical review assures that laboratory protocols are being utilized. *Id.* at 8. All new technical procedures must be scientifically validated before being used in casework. *Id.* See generally AM. SOC’Y OF CRIME LAB. DIRS., *supra* note 347 (explaining accreditation program).

Based on the DNA experience with TWGDAM, established by the FBI in 1988, comparable groups were set up in fingerprints, controlled substances, trace evidence or materials analysis, questioned documents, fire and explosives, imaging technology, digital evidence, and firearms examination.³⁹⁶ Moreover, the American Society for Testing and Materials (“ASTM”) has promulgated standards in some forensic areas.³⁹⁷

In *Daubert*, the Supreme Court cited the “existence and maintenance of standards controlling the technique’s operation” as a relevant factor in assessing the reliability of expert testimony.³⁹⁸ The adoption and public promulgation of written laboratory protocols would seem to be required by this factor. In fact, any laboratory without such protocols cannot be called a “scientific” laboratory.

E. Problem Issues

Several vexing issues concerning lab procedures surface on a recurring basis. This section addresses four of those issues.

1. Cognitive Bias

Commentators have identified both motivational and cognitive bias as a concern in the forensic setting.³⁹⁹ As one commentator noted: “To the extent that we are aware of our vulnerability to bias, we may be able to control it. In fact, a feature of good scientific practice is the institution of processes—such as blind testing, the use of precise measurements, standardized procedures, statistical analysis—that control for bias.”⁴⁰⁰ Similarly, the 1996 National Academies DNA Report notes, “[l]aboratory procedures should be

396. See Bashinski & Peterson, *supra* note 340, at 580.

397. See generally John J. Lentini, *ASTM Standards for Forensic Sciences*, 40 J. FORENSIC SCI. 146 (1995) (explaining the work of Committee E30 on Forensic Sciences); Eric Stauffer & John J. Lentini, *ASTM Standards for Fire Debris Analysis: A Review*, 132 FORENSIC SCI. INT’L 63 (2003), available at <http://www.atslab.com/fire/PDF/ASTMStandardsForFireDebrisAnalysis.pdf> (discussing updated standards for arson investigations).

398. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 594 (1993).

399. See *infra* notes 449–53 and accompanying text (discussing motivational bias); see also Elizabeth F. Loftus & Simon A. Cole, Letter, *Contaminated Evidence*, 304 SCIENCE 959, 959 (2004) (“[F]orensic scientists remain stubbornly unwilling to confront and control the problem of bias, insisting that it can be overcome through sheer force of will and good intentions.”).

400. MIKE REDMAYNE, EXPERT EVIDENCE AND CRIMINAL JUSTICE 16 (2001).

designed with safeguards to detect bias and to identify cases of true ambiguity. Potential ambiguities should be documented.”⁴⁰¹

External information provided to lab analysts will often taint their conclusions. For example, “[Professor] Peter DeForest has described investigators who responded to inconclusive results by saying to forensic examiners: ‘Would it help if I told you we know he’s the guy who did it?’”⁴⁰² Joyce Gilchrist often received detectives’ views on suspects before she conducted her examinations.⁴⁰³ Confirmation bias also arose in the misidentification of fingerprints of Brian Mayfield in the Madrid train bombing investigation⁴⁰⁴ and other FBI investigations.⁴⁰⁵

As a result of the Mayfield case, several British researchers devised an experiment to test whether external influences can affect the identification process.⁴⁰⁶ In particular, they were concerned with confirmation bias similar to that which occurred in the Mayfield misidentification. Fingerprint examiners who were unfamiliar with the Mayfield prints were asked by colleagues to compare a crime scene and suspect print: “They were told that the pair of prints was the one that was erroneously matched by the FBI as the Madrid bomber, thus creating an extraneous context that the prints were a non-match.”⁴⁰⁷ The participants were then instructed to ignore this information.⁴⁰⁸ The prints, in fact, were from cases that each of the participants had previously matched.⁴⁰⁹ Of the five examiners, only

401. NRC II REPORT, *supra* note 330, at 85. The Report adds: “Bias in forensic science usually leads to sins of omission rather than commission. Possibly exculpatory evidence might be ignored or rejected.” *Id.* at 84–85.

402. D. 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, 39 (2002) (quoting Peter DeForest, Address at 2d International Conference on Forensic Document Examination (June 14–18, 1999) (notes of Michael Saks, who was present)).

403. See FUHRMAN, *supra* note 68, at 91 (“When Cook and other homicide detectives gave Gilchrist hair samples from a suspect, they would often let her know that this was the person they wanted to arrest.”).

404. See *supra* notes 297–99 and accompanying text.

405. See Bales, *supra* note 236, at 52 (“[The 1997 I.G. Report] concluded that an examiner from the lab’s explosives unit had erred by purporting to identify the particular explosives used in the [1993] World Trade Center and Oklahoma City bombings. The error stemmed from the examiner’s reliance on information that was tied to suspects but not relevant to his scientific analysis.”).

406. Itiel E. Dror et al., *Contextual Information Renders Experts Vulnerable to Making Erroneous Identifications*, 156 FORENSIC SCI. INT’L 74, 75–76 (2006) (explaining the experiment’s methodology).

407. *Id.* at 76.

408. *Id.*

409. *Id.* at 75.

one still judged the print to be a match.⁴¹⁰ The other four changed their opinions; three directly contradicted their prior identifications, and the fourth concluded that there was insufficient data to reach a definite conclusion.⁴¹¹ “This is striking given that all five experts had seen the identical fingerprints previously and all had decided that the prints were a sound and definite match.”⁴¹²

In sum, information from an investigation should not be given to the analyst interpreting the results—i.e., the examiner should generally be “blind” to the case’s circumstances and other evidence.⁴¹³

2. Contemporaneous Recordation

The lack of bench notes is often cited in the lab scandals. The West Virginia,⁴¹⁴ Chicago,⁴¹⁵ Houston,⁴¹⁶ and FBI explosive unit⁴¹⁷ investigations all found inadequate documentation in forensic case files.⁴¹⁸ Moreover, in one Supreme Court case, *Delaware v.*

410. *Id.*

411. *Id.*

412. *Id.* The authors of the study concluded:

Our study shows that it is possible to alter identification decisions on the same fingerprint, solely by presenting it in a different context. This does not imply that fingerprint and other forensic identifications are not a science, but it does highlight problems of subjectivity, interpretation, and other psychological and cognitive elements that interact and may distort any scientific inquiries.

Id. at 77.

413. One crime lab examiner, “who has worked in the crime lab system since 1998, said she tried not to be swayed by detectives’ belief that they had a strong suspect. ‘We’re all human,’ she said. ‘I tried not to let it influence me. But I can’t say it never does.’” Teichroeb, *Rare Look*, *supra* note 23.

414. See *supra* note 55 and accompanying text.

415. Letter from Sensabaugh, *supra* note 156 (“Overall, the documentation of the lab work as described in the three pages of lab notes is inadequate and incomplete. Moreover, the formal lab reports describe results of testing for which there is no record in the lab notes. In short, the documentation in this case falls short of accepted scientific standards.”).

416. THIRD HOUSTON REPORT, *supra* note 166, at 28 (“Among other problems it identified, the 2002 DPS audit found that no such written procedures [for case notes and lab reports] existed and identified numerous deficiencies in the documentation contained in the lab reports.”).

417. See 1997 I.G. REPORT, *supra* note 27 (recommending the preparation of adequate case files to support reports); Bales, *supra* note 236, at 57 (noting that one FBI examiner “testified that he had performed certain tests that were not described in his notes”).

418. See *Law v. State*, 307 S.E.2d 904, 908 (Ga. 1983) (Smith, J., dissenting) (“It is an insult to intelligent people to say that a scientific test was conducted from which absolutely no notes or records survive. . . . A basic principle of scientific testing is that careful records of test procedure and results are to be scrupulously maintained. A scientific test without an accompanying report of the testing environment, number of trials, raw results and analyzed data is in reality no test at all.”).

Fensterer,⁴¹⁹ an FBI analyst testified that he could not remember which of three methods he had used to determine that hair found at a murder scene had been forcibly removed.⁴²⁰ He apparently neglected to record this critical information.

DAB Standards require laboratories to adopt and follow written procedures for taking and maintaining case notes to support the conclusions drawn in laboratory reports: in particular, a case record containing all documentation generated by examiners relating to case analysis is standard practice.⁴²¹ Unfortunately, the standards do not specify that the notes be recorded contemporaneously with the examination, a deficiency noted in the 2004 I.G. Report.⁴²²

3. Laboratory Reports

Most pretrial discovery statutes provide for the disclosure of scientific reports.⁴²³ For example, Federal Rule of Criminal Procedure 16 makes the “results or reports of any physical or mental examination and of any scientific test or experiment” discoverable.⁴²⁴ Yet, these rules contain no requirement regarding the content of a laboratory report.⁴²⁵ The *Journal of Forensic Sciences*, the official publication of the American Academy of Forensic Sciences, published a symposium on the ethical responsibilities of forensic scientists in 1989.⁴²⁶ One article discussed a number of laboratory

419. 474 U.S. 15 (1985).

420. *Id.* at 17. Nevertheless, the Supreme Court declined to find a confrontation violation in this situation. *Id.* at 20. On remand, however, the Delaware Supreme Court held the opinion inadmissible, but on evidentiary, rather than constitutional, grounds. *Fensterer v. State*, 509 A.2d 1106, 1109 (Del. 1986). According to the court: “While a witness’s mere lack of memory as to a particular fact may go only to the weight of that evidence, an expert witness’s inability to establish a sufficient basis for his opinion clearly renders the opinion inadmissible under D.R.E. 705.” *Id.* at 1109–10.

421. DNA Advisory Board, *supra* note 335, Standard 11.1.

422. 2004 I.G. REPORT, *supra* note 28, at 107. The report commented: “[C]ontemporaneous documentation is important to ensure that the case file accurately reflects the work performed on each evidence item that is tested. . . . [S]taff members may be unduly influenced by protocol requirements when relying on memory, and document what they know should have occurred when their recollection is vague.” *Id.*

423. See UNIF. R. CRIM. P. 421(a) (Approved Draft 1974) (specifying that “expert reports” are discoverable); ABA STANDARDS FOR CRIMINAL JUSTICE: DISCOVERY AND TRIAL BY JURY, Standard 11-2.1(a)(iv) (3d ed. 1996).

424. FED. R. CRIM. P. 16(a)(1)(F).

425. As a result, the reports are often cryptic or confusing. See Bales, *supra* note 236, at 56 (“Reports of forensic examinations are sometimes terse to the point of being indecipherable.”); FINAL HOUSTON REPORT, *supra* note 170, at 21 (“The awkwardly-stated conclusions appearing in many of the Crime Lab’s DNA reports are difficult to understand.”).

426. Joseph L. Peterson, *Symposium: Ethical Conflicts in the Forensic Sciences*, 34 J. FORENSIC SCI. 717–93 (1989).

reporting practices, including (1) “preparation of reports containing minimal information in order not to give the ‘other side’ ammunition for cross-examination,” (2) “reporting of findings without an interpretation on the assumption that if an interpretation is required it can be provided from the witness box,” and (3) “[o]mitting some significant point from a report to trap an unsuspecting cross-examiner.”⁴²⁷ Fred Zain,⁴²⁸ Joyce Gilchrist,⁴²⁹ and Pam Fish,⁴³⁰ among others, omitted critical information from their reports. These practices could be curbed, if not eliminated, by requiring comprehensive laboratory reports.

Comprehensive lab reports are simply good science.⁴³¹ Both DAB⁴³² and ASCLD/LAB⁴³³ have standards governing laboratory reports. By ensuring that the examiner has followed the prescribed procedure and by permitting external review, lab reports can function as a quality control mechanism. In particular, the report should contain an express statement of the *limitations* of the technique.⁴³⁴

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

428. See *supra* note 55 and accompanying text.

429. See *supra* notes 70–117 and accompanying text.

430. See *supra* notes 150–59 and accompanying text.

431. One scientist has observed that a crime lab report at a minimum should include:

- (a) a description of the analytical techniques used in the test requested by the government or other party,
- (b) the quantitative or qualitative results with any appropriate qualifications concerning the degree of certainty surrounding them, and
- (c) an explanation of any necessary presumptions or inferences that were needed to reach the conclusions.

Professor Anna Harrison, Mount Holyoke College, *Symposium on Science*, *supra* note 367, at 632.

432. See DNA Advisory Board, *supra* note 335, Standard 11.1.2 (requiring reports to include (1) a case identifier, (2) a “description of evidence examined,” (3) “[a] description of the methodology,” (4) the locus tested, (5) the “[r]esults and/or conclusions,” (6) “[a]n interpretative statement (either quantitative or qualitative),” (7) the “[d]ate issued,” (8) the “[d]isposition of evidence,” and (9) “[a] signature and title, or equivalent identification, of the person(s) accepting responsibility of the content of the report”).

433. See *ASCLD Guidelines for Forensic Laboratory Management Practices*, 14 CRIME LABORATORY DIG. 39, 43 (1987) (“The documentation should be such that a knowledgeable analyst or supervisor, in the absence of the primary analyst, would be able to evaluate and interpret the data.” Competent laboratory reports must include (1) an “accurate summary of significant material contained in the case notes,” (2) “interpretive information as well as examination results wherever possible,” and (3) identification of “the analyst(s) and, if appropriate, the testing methodology.”).

434. See NAT’L RESEARCH COUNCIL, *supra* note 254, at 110 (“The conclusions in laboratory reports should be expanded to include the limitations of compositional analysis of bullet lead evidence. Moreover, a section of the laboratory report translating the technical conclusions into language that a jury could understand would greatly facilitate the proper use of this evidence in the criminal justice system.”).

Comprehensive reports also promote good legal policy.⁴³⁵ Because they are discoverable, they assist attorneys in preparing for trial and in rendering effective representation. Further, determining whether defense counsel should seek the appointment of a defense expert often requires a preliminary assessment by an expert. An expert might be willing to review a report but not want to become further involved in a case without compensation. Unless the report is comprehensive, such a review may be worthless.

4. Testifying Beyond the Report

Experts should generally not testify beyond the scope of the report without issuing a supplemental report. *Troedel v. Wainwright*,⁴³⁶ a capital murder case, illustrates the problem. In that case, a report of a gunshot residue test based on neutron activation analysis concluded that swabs “from the hands of Troedel and Hawkins contained antimony and barium [primer residues] in amounts typically found on the hands of a person who has discharged a firearm or has had his hands in close proximity to a discharging firearm.”⁴³⁷ An FBI expert testified in accordance with this report at Hawkins’ trial but enhanced his testimony at Troedel’s trial, when he testified that “Troedel had fired the murder weapon.”⁴³⁸ In contrast, during federal habeas proceedings, the *same* expert testified in a deposition that “he could not, from the results of his tests, determine or say to a scientific certainty who had fired the murder weapon” and that “the differences in the amount of barium and antimony on the hands of Troedel and Hawkins were basically insignificant.”⁴³⁹ The district court found the trial testimony, “at the very least,” misleading.⁴⁴⁰ In granting habeas relief, the court wrote:

[T]he Court concludes that the opinion Troedel had fired the weapon was known by the prosecution not to be based on the results of the neutron activation analysis tests, or on any scientific certainty or even probability. Thus, the subject

435. The Canadian investigation into the wrongful conviction of Guy Paul Morin made the following recommendation: “The Centre of Forensic Science should establish a written policy on the form and content of reports issued by its analysts. . . . In addition to other essential components, these reports must contain the conclusions drawn from the forensic testing and *the limitations to be placed upon those conclusions.*” 1 KAUFMAN, *supra* note 138, Recommendation 7, at 331.

436. 667 F. Supp. 1456 (S.D. Fla. 1986), *aff’d*, 828 F.2d 670 (11th Cir. 1987).

437. *Id.* at 1458.

438. *Id.*

439. *Id.* at 1459.

440. *Id.*

testimony was not only misleading, but also was used by the State knowing it to be misleading.⁴⁴¹

In addition to other functions, comprehensive reports afford substantial protection to experts from overreaching by attorneys. In *Troedel*, the expert claimed that the prosecutor had “pushed” him to enhance his testimony, a claim the prosecutor substantiated.⁴⁴² The issue also surfaced in Joyce Gilchrist’s cases.⁴⁴³ Experts are often pressured by attorneys to “push the envelope”—not a surprising occurrence in an adversarial system.⁴⁴⁴ ABA Criminal Justice Standards state that a

prosecutor who engages an expert for an opinion should respect the independence of the expert and should not seek to dictate the formation of the expert’s opinion on the subject. . . . [T]he prosecutor should explain to the expert his or her role in the trial as an impartial expert⁴⁴⁵

The commentary to this standard elaborates:

Statements made by physicians, psychiatrists, and other experts about their experiences as witnesses in criminal cases indicate the need for circumspection on the part of prosecutors who engage experts. Nothing should be done by a prosecutor to cast

441. *Id.* at 1459–60.

442. *Id.* at 1459 (“[A]s Mr. Riley [the expert] candidly admitted in his deposition, he was ‘pushed’ further in his analysis at Troedel’s trial than at Hawkins’ trial. . . . [At the] evidentiary hearing held before this Court, one of the prosecutors testified that, at Troedel’s trial, after Mr. Riley had rendered his opinion which was contained in his written report, the prosecutor *pushed* to ‘see if more could have been gotten out of this witness.’”).

443. *See* *McCarty v. State*, 765 P.2d 1215, 1219 (Okla. Crim. App. 1988) (“[W]e are greatly disturbed by the implications that the Oklahoma County District Attorney’s Office may have placed undue pressure upon Ms. Gilchrist to give a so-called expert opinion, which was beyond scientific capabilities.”); *id.* at 1219 (quoting a prepared statement from the Board of Directors of the Southwestern Association of Forensic Scientists, Inc., that “in our system of jurisprudence, undue pressure can be placed upon the forensic scientist to offer personal opinions beyond the scope of scientific capabilities’”) (citation omitted); *see also* *Bank of Nova Scotia v. United States*, 487 U.S. 250, 258 (1988) (“District Court further concluded that one of the prosecutors improperly argued with an expert witness during a recess of the grand jury after the witness gave testimony adverse to the Government.”).

444. *See* SCHECK ET AL., *supra* note 5, at 31 (quoting Dr. Robert Shaler, former head of N.Y.C. Medical Examiner’s DNA unit) (“Most attorneys like to let you know what their opinions of the facts of the case are—irrespective of the scientific conclusions.”).

445. ABA STANDARDS FOR CRIMINAL JUSTICE: PROSECUTION FUNCTION AND DEFENSE FUNCTION, Standard 3-3.3(a) (3d ed. 1993). A comparable standard applies to defense counsel. *See id.*, Standard 404.4(a).

suspicion on the process of justice by suggesting that the expert color an opinion to favor the interests of the prosecutor.⁴⁴⁶

F. Certification of Examiners

A number of organizations offer examiner certification programs.⁴⁴⁷ Some certifying organizations, however, appear to lack stringent requirements. Instead, they issue what are reported to be “checkbook credentials.”⁴⁴⁸ Rigorous certification standards should be instituted for examiners in order to ensure competence. Demanding written examinations, proficiency testing, continuing education, recertification procedures, an ethical code, and effective disciplinary procedures should form the basis of such a program.

G. Forensic Science Commissions

Commentators have argued for the establishment of crime laboratories that are independent of the police in order to minimize police pressure that may bias lab results.⁴⁴⁹ In 2002, the Illinois

446. *Id.* at 59.

447. For example, the American Board of Criminalistics has had such a program since 1993. It is a two-step process. The first tier requires an examination on general knowledge, and the second involves specialty areas, which include molecular biology, drug analysis, fire debris, and trace evidence. Bashinski & Peterson, *supra* note 340, at 577. To maintain certification, ongoing proficiency testing is required. *Id.* The International Association of Identification established a program for latent print examiners in 1977. *Id.* The Association of Firearms and Tool Mark Examiners established one in 2001. *Id.* The American Academy of Forensic Sciences has set up a number of national boards in the field of pathology, toxicology, anthropology, odontology, and questioned documents. *See id.*; RUDIN & INMAN, *supra* note 333, at 175. Of course, these programs are valuable only to the extent they apply exacting standards.

448. *See* Mark Hansen, *Expertise to Go*, A.B.A. J., Feb. 2000, at 44, 45; Elizabeth MacDonald, *The Making of an Expert Witness: It's in the Credentials*, WALL ST. J., Feb. 8, 1999, at B1.

449. *See, e.g.*, Giannelli, *supra* note 49, at 469–73; Andre A. Moenssens, *Novel Scientific Evidence in Criminal Cases: Some Words of Caution*, 84 J. CRIM. L. & CRIMINOLOGY 1, 5 (1993) (“[Crime labs] may be so imbued with a pro-police bias that they are willing to circumvent true scientific investigation methods for the sake of ‘making their point.’”); *Symposium on Science*, *supra* note 367, at 642 (statement of Joseph L. Peterson) (“[T]he police agency controls the formal and informal system of rewards and sanctions for the laboratory examiners. Many of these laboratories make their services available only to law enforcement agencies. All of these factors raise a legitimate issue regarding the objectivity of laboratory personnel.”); James E. Starrs, *The Seamy Side of Forensic Science: The Mephitic Stain of Fred Salem Zain*, SCI. SLEUTHING REV., Winter 1993, at 1, 8 (“The inbred bias of crime laboratories affiliated with law enforcement agencies must be breached.”); *see also* Regina v. Ward, 96 Crim. App. 1, 51 (A.C. 1993) (appeal taken from England) (U.K.) (“Forensic scientists may become partisan. The very fact that the police seek their assistance may create a relationship between the police and the forensic scientists. . . . Forensic scientists employed by the government may come to see their function as helping the police. They may lose their objectivity.”); Ellis, *supra* note 2

Governor's Commission on Capital Punishment proposed the creation of an independent state laboratory as a way to provide access to forensic services.⁴⁵⁰ The problem of improper police and/or prosecutorial influence on lab results weaves throughout the reported scandals.⁴⁵¹ Independent crime labs are a solution, but whether they are politically viable seems doubtful,⁴⁵² and they would present some disadvantages.⁴⁵³ A forensic commission with outside membership, on the other hand, could provide some insulation from impermissible external pressure.

A New York statute established a Commission on Forensic Science,⁴⁵⁴ which is authorized to (1) develop minimum standards and a program of accreditation for all state laboratories, (2) establish minimum qualifications for laboratory directors and other personnel, and (3) approve forensic laboratories for the performance of specific

("[C]rime Labs should operate as a separate and independent third party force in the criminal justice system. When crime labs are operating within a police department, examiner bias can undermine the integrity of scientific results.").

450. See, e.g., REPORT OF THE GOVERNOR'S COMMISSION ON CAPITAL PUNISHMENT, *supra* note 4, at 52 (noting in Recommendation 20 that "[an] independent state forensic laboratory should be created, operated by civilian personnel, with its own budget, separate from any police agency or supervision."); see also Craig M. Cooley, *Reforming the Forensic Science Community to Avert the Ultimate Injustice*, 15 STAN. L. & POL'Y REV. 381, 422-23 (2004) (highlighting Illinois and Houston public officials' support for an independent lab system).

451. See FUHRMAN, *supra* note 68, at 223 ("If [Gilchrist] were simply incompetent, her mistakes would have been all over the map. Instead, her mistakes benefited the prosecution."); Mills et al., *supra* note 153 ("Many forensic scientists at the state police labs, [former lab director] Plautz said, saw their role as members of the state's attorney's team. 'They thought they were prosecution witnesses,' he said. 'They didn't understand they were just scientists.'"); Teichroeb, *Crime Labs Too Beholden*, *supra* note 23 (quoting co-founder of New York-based Innocence Project Barry Scheck) ("Forensic science has to be an independent third force in the justice system, not beholden to prosecutors and police.").

452. The British have experimented with a "market system" provided by nongovernment experts: "The [Forensic Science Service] predicts that, in the medium term, 20 per cent of the market will go to non-FSS sources." REDMAYNE, *supra* note 400, at 27.

453. For example:

Increasing the laboratory's geographical or organizational remoteness, however, can limit the effectiveness of the laboratory's participation in the investigative phases of a case, when its scientific input may have the greatest chance of contributing to justice. Remoteness also makes the police department less able to direct the efforts of the laboratory toward the cases that the department considers most important

Bashinski & Peterson, *supra* note 340, at 581.

454. N.Y. EXEC. LAW § 995-a (McKinney 1996).

forensic methodologies.⁴⁵⁵ This approach has advantages over the Oklahoma approach, which only requires ASCLD/LAB (a nonpublic organization) accreditation.⁴⁵⁶ A forensic commission could employ an established accreditation program, such as ASCLD/LAB, but it should do much more than monitor lab procedures. These commissions should also ensure adequate funding, investigate misconduct, and compile a registry of independent experts whom the defense could consult.

Before addressing these issues, however, the commission's membership should be discussed.

1. Composition of Commission

Representatives from the police, prosecution, judiciary, and forensic sciences are obvious candidates for membership. It is critical, however, that research scientists⁴⁵⁷ and the defense bar also be represented, as is the case in New York.⁴⁵⁸ The 1992 National Academies report recommended the establishment of a National Committee on Forensic DNA Typing, commenting that

accreditation should be a responsibility of the Department of Health and Human Services (DHHS), in consultation with the Department of Justice (DOJ). DHHS is the appropriate agency, because it has extensive experience in the regulation of

455. See generally Michael J. Saks et al., *Model Prevention and Remedy of Erroneous Convictions Act*, 33 ARIZ. ST. L.J. 665, 698–703 (2001) (proposing a Commission on Forensic Science Services).

456. See OKLA. STAT. ANN. tit. 74, § 150.37 (West Supp. 2006–2007) (requiring accreditation by ASCLD/LAB or the American Board of Forensic Toxicology).

457. In the early 1990s, a British Royal Commission recommended the establishment of a Forensic Science Advisory Council that would, among other things, review the performance and standards of crime laboratories:

[W]e are . . . concerned at the lack of external oversight We therefore see great attraction in the proposal put to us by the Royal Society for Chemistry that a Forensic Science Advisory Council should be set up which would report to the Home Secretary on the performance, achievements and efficiency of the forensic science laboratories.

ROYAL COMM'N ON CRIMINAL JUSTICE, REPORT, 1993, Cm. 2263, at 150–51. Unfortunately, it was not adopted. REDMAYNE, *supra* note 400, at 27 (explaining that when the government hesitated in adopting RCCJ's recommendations, forensic experts made their own, different suggestions); see also David E. Bernstein, *Junk Science in the United States and the Commonwealth*, 21 YALE J. INT'L L. 123, 170–73 (1996) (discussing this proposal).

458. See N.Y. EXEC. LAW § 995-a (McKinney 1996); see also 1 KAUFMAN, *supra* note 138, at 363 (noting in Recommendation 19 that “[a]n advisory board to the Centre of Forensic Sciences should be established consisting of Crown and defence counsel, police, judiciary, scientists and laypersons. It should be created by statute.”).

clinical laboratories through programs under the Clinical Laboratory Improvement Act and has extensive expertise in molecular genetics through the National Institutes of Health.⁴⁵⁹

The DNA Identification Act of 1994, however, located the authority to appoint DAB members in the FBI, despite the NRC report's conclusion that a law enforcement agency would be unsuitable for this purpose.⁴⁶⁰ The Act, at least, did require the Director of the FBI to select members from "among nominations proposed by the head of the *National Academy of Sciences* and professional societies of crime laboratory officials" and to "include as members scientists from State, local, and private forensic laboratories, *molecular geneticists and population geneticists not affiliated with a forensic laboratory*, and a representative from the National Institute of Standards and Technology."⁴⁶¹ This requirement expired when the DAB ceased to exist after five years.⁴⁶²

Congress subsequently established a National Forensic Science Commission to improve forensic science.⁴⁶³ This legislation

459. NRC I REPORT, *supra* note 330, at 107. The 1996 report mentioned only an "appropriate organization." NRC II REPORT, *supra* note 330, at 87 ("We recognize the need for guidelines and standards and for accreditation by appropriate organizations.").

460. NRC I REPORT, *supra* note 330, at 107; *see also* William C. Thompson, *Accepting Lower Standards: The National Research Council's Second Report on Forensic DNA Evidence*, 37 JURIMETRICS J. 405, 409 (1997) ("Due in part to the political clout of the FBI on Capitol Hill, an independent national committee was never created. Instead, we have the DNA Advisory Board, which is appointed by the FBI Director.").

461. 42 U.S.C. § 14131(a)(1)(A)-(B) (2000) (emphasis added).

462. The statutory requirements governing DAB do not apply to SWGDAM, the group that replaced DAB at its expiration.

463. Its responsibilities include:

- (1) assess[ing] present and future resource needs of the forensic science community;
- (2) mak[ing] recommendations to the Attorney General [(“A.G.”)] for maximizing the use of forensic technologies and techniques to solve crimes and protect the public;
- (3) identify[ing] potential scientific advances that may assist law enforcement in using forensic technologies and techniques to protect the public;
- (4) mak[ing] recommendations to the [A.G.] for programs that will increase the number of qualified forensic scientists available to work in public crime laboratories;
- (5) disseminat[ing], through the National Institute of Justice, best practices concerning the collection and analyses of forensic evidence to help ensure quality and consistency in the use of forensic technologies and techniques to solve crimes and protect the public;
- (6) examin[ing] additional issues pertaining to forensic science as requested by the [A.G.];
- (7) examin[ing] Federal, State, and local privacy protection statutes, regulations, and practices relating to access to, or use of, stored DNA samples or DNA analyses, to determine whether such protections are sufficient;

constitutes an important step in the right direction, but the statute does not specifically require the membership of outside scientists or members of the defense bar—persons who would bring different perspectives to the commission’s tasks.⁴⁶⁴ Instead, the Attorney General appoints members from “persons experienced in criminal justice issues, including persons from the forensic science and criminal justice communities.”⁴⁶⁵

2. Investigations

A Forensic Science Commission should be assigned the task of investigating all cases of alleged misconduct or incompetence. The lack of a government agency specifically designated with investigative responsibility leaves a conspicuous regulatory void. The I.G. satisfies this need on the federal level,⁴⁶⁶ but the states are another matter. In West Virginia, the state supreme court, at the behest of a prosecutor, appointed a judge to conduct an inquiry into Fred Zain’s misconduct.⁴⁶⁷ That judge, in turn, requested that ASCLD appoint a team to review the allegations.⁴⁶⁸ In contrast, the Montana Supreme Court ruled that it lacked authority to make this type of appointment.⁴⁶⁹ In Houston, the District Attorney provoked controversy because he refused to recuse himself from a grand jury

(8) mak[ing] specific recommendations to the [A.G.], as necessary, to enhance the protections described in [point] (7) to ensure—

- (A) the appropriate use and dissemination of DNA information;
- (B) the accuracy, security, and confidentiality of DNA information;
- (C) the timely removal and destruction of obsolete, expunged, or inaccurate DNA information; and
- (D) that any other necessary measures are taken to protect privacy; and

(9) provid[ing] a forum for the exchange and dissemination of ideas and information in furtherance of the objectives described in paragraphs (1) through (8).

42 U.S.C.A § 14136c(b) (West 2005).

464. Some states have adopted a more inclusive approach. *See, e.g.*, MINN. STAT. ANN. § 299C.156(1) (West Supp. 2006–2007) (requiring public defender, defense attorney, and university professor as members of Forensic Science Advisory Board); TEX. CODE CRIM. PROC. ANN. art. 38.01 (Vernon Supp. 2006) (requiring defense attorney and university faculty or staff as members of Forensic Science Commission).

465. 42 U.S.C.A § 14136c(a) (West 2005).

466. *See* 1997 I.G. REPORT, *supra* note 27, at pt. I (explaining the I.G.’s role in investigating the explosives unit); 2004 I.G. REPORT, *supra* note 28, at iii (explaining the I.G.’s role in policing the matter of Jacqueline Blake).

467. *In re* Investigation of the W. Va. State Police Crime Lab., Serology Div., 438 S.E.2d 501, 502–03 (W. Va. 1993).

468. *See id.* at 504 (stating that “Judge Holliday notes that there was evidence that Trooper Zain’s supervisors may have ignored or concealed complaints of his misconduct” where such complaints were based on the team’s review of the allegations).

469. *See supra* note 135 and accompanying text.

investigation when his office's use of the suspect evidence was one of the issues that needed to be examined.⁴⁷⁰ Internal investigations have repeatedly failed to discover or report the nature and extent of lab failures.⁴⁷¹

The primary responsibility for detecting, investigating, and correcting instances of misconduct and gross negligence rests with the laboratory and its personnel.⁴⁷² However, external and independent review is also critical and is now mandated by recent federal legislation.⁴⁷³ A forensic science commission would have the expertise to conduct such an investigation or to appoint an independent committee to do so.⁴⁷⁴

3. Adequate Funding

A commission should also ensure that labs are adequately funded. Crime labs have become chronically underfunded in the last half century. In 1967, President Johnson's crime commission noted that "the great majority of police department laboratories have only

470. See Adam Liptak, *Prosecutions Are a Focus In Houston DNA Inquiry: Grand Juries Seen as Widening Investigation*, N.Y. TIMES, June 9, 2003, at A20 ("In April, the county's 22 criminal district court judges asked Mr. Rosenthal to recuse himself from the investigation."); see also Nick Madigan, *Houston's Troubled DNA Crime Lab Faces Growing Scrutiny*, N.Y. TIMES, Feb. 9, 2003, at A20 (reporting that operations in the Houston lab were suspended in December after an audit found numerous problems).

471. The investigations concerning the Earl Washington case, the FBI explosive unit, and Fred Zain are all examples.

472. Cf. NRC I REPORT, *supra* note 330, at 148 ("Laboratories and experts have a particular responsibility to ensure that they are open and candid with the courts. Any reservations about inadequacies or errors should be promptly revealed, and failure to do that should be dealt with seriously.").

473. The Omnibus Crime Control and Safe Streets Act of 1968 was amended by requiring a "certification that a government entity exists . . . to conduct independent external investigations into allegations of serious negligence or misconduct substantially affecting the integrity of the forensic results committed by employees or contractors of any forensic laboratory system, medical examiner's office, coroner's office, law enforcement storage facility, or medical facility" in any state receiving a grant. Pub. L. No. 90-351, 82 Stat. 197 (codified as amended at 42 U.S.C.A. § 3797k(4) (West Supp. 2007)). Unfortunately, this requirement has not been rigorously implemented. See OFFICE OF THE INSPECTOR GENERAL, U.S. DEPARTMENT OF JUSTICE, REVIEW OF THE OFFICE OF JUSTICE PROGRAMS' FORENSIC SCIENCE IMPROVEMENT GRANT PROGRAM i (2005), available at <http://www.usdoj.gov/oig/reports/OJP/e0602/final.pdf> (concluding that the National Institute of Justice "did not enforce the external investigation certification requirement imposed by the Justice for All Act of 2004").

474. A few states have set up investigatory agencies. See, e.g., MINN. STAT. ANN. § 299C.156(2) (West Supp. 2006-2007); TEX. CODE CRIM. PROC. ANN. art. 38.01(4)(a) (Vernon Supp. 2006). Early results, however, have not been encouraging. See *States' Efforts to Probe Crime Labs Stall at Start*, AUGUSTA CHRON. (Ga.), Mar. 24, 2007, at A13 ("But not one of the new boards has yet reopened a case—either because they have refused to do so or because they haven't been funded.").

minimal equipment and lack highly skilled personnel able to use the modern equipment now being developed.”⁴⁷⁵ In 1974, President Nixon’s crime commission commented: “Too many police crime laboratories have been set up on budgets that preclude the recruitment of qualified, professional personnel.”⁴⁷⁶

Twenty years later, a report on Washington state crime labs revealed that a “staggering backlog of cases hinders investigations of murder, rape, arson, and other major crimes.”⁴⁷⁷ At any time, “thousands of pieces of evidence collected from crime scenes sit unanalyzed and ignored on shelves in laboratories and police stations across the state.”⁴⁷⁸ A *USA Today* survey of 215 laboratories reached the same conclusion: “Evidence that could imprison the guilty or free the innocent is languishing on shelves and piling up in refrigerators of the USA’s overwhelmed and underfunded crime labs.”⁴⁷⁹ While budgets increased by ten percent in five years, caseloads increased by almost twenty-five percent.⁴⁸⁰ In one case, a suspected serial rapist was released because DNA analysis would have taken months to perform.⁴⁸¹ “Weeks later, [the suspect] raped victim No. 4 as she slept in her home. When the DNA tests finally came back—18 months after samples first went to the lab—a jury convicted [the suspect] of all four rapes.”⁴⁸²

Congress recognized the need for federal funding for public crime laboratories and medical examiner offices by enacting the Paul Coverdell National Forensic Science Improvement Act in 2000.⁴⁸³ Appropriations, however, have fallen well below authorized limits.⁴⁸⁴

475. PRESIDENT’S COMM’N ON LAW ENFORCEMENT AND ADMIN. OF JUSTICE, *THE CHALLENGE OF CRIME IN A FREE SOCIETY* 255 (1967).

476. NAT’L ADVISORY COMM’N ON CRIMINAL JUSTICE STANDARDS AND GOALS, *REPORT ON POLICE* 304 (1974).

477. Tomas Guillen & Eric Nalder, *Overwhelming Evidence: Crime Labs in Crisis*, *SEATTLE TIMES*, Jun. 19, 1994, at A14.

478. *Id.*

479. Becky Beaupre & Peter Eisler, *Crime Lab Crisis*, *USA TODAY*, Aug. 20, 1996, at 1A.

480. *Id.*

481. *Id.*

482. *Id.*

483. Pub. L. No. 106-561, 114 Stat. 2787 (codified as amended at 42 U.S.C.A. § 3797j-o (West 2003)).

484. See Beth Lavach, *Legislative Corner*, *ACAD. NEWS*, Sept. 2007, at 3 (“For well over a decade, the Congress has given off-again-on-again support to the forensic sciences.”). In contrast, DNA technology has been funded. On March 11, 2003, the Attorney General of the United States announced the President’s DNA initiative, entitled “Advancing Justice Through DNA Technology.” This initiative proposes over \$1 billion in funding for fiscal year 2004 through fiscal year 2008 to reduce casework and database backlogs in DNA laboratories, to improve the DNA analysis capacity of public

The validity of forensic evidence depends on funding for facilities, equipment, and personnel, as well as for accreditation, certification, and standardization. The Houston experience is not uncommon: “It is clear that, over the 15 years preceding the DNA/Serology Section’s closure in December 2002, HPD and the City failed to provide the Crime Lab with adequate resources to meet growing demands.”⁴⁸⁵

4. Register of Defense Experts

Finding qualified experts to testify for the defense is difficult.⁴⁸⁶ The British have had some success in registering experts.⁴⁸⁷ A forensic science commission could be tasked with this responsibility. Retired FBI experts have often played a positive role in this context.⁴⁸⁸ Moreover, prosecution experts in one jurisdiction should be encouraged to consult with the defense in other jurisdictions. Currently, such contacts are frequently discouraged as John Wilson learned when he testified as a defense expert against Joyce Gilchrist.⁴⁸⁹

CONCLUSION

Scientific proof is often critical in criminal prosecutions.⁴⁹⁰ Moreover, it is frequently better than other types of evidence commonly used in criminal trials (i.e., eyewitness identifications,

laboratories, to support training, and to assist research and development. U.S. DEPT OF JUSTICE, ADVANCING JUSTICE THROUGH DNA TECHNOLOGY, Executive Summary (2003), available at http://www.usdoj.gov/ag/dnapolicybook_exsum.htm.

485. THIRD HOUSTON REPORT, *supra* note 166, at 62.

486. See Weinstein, *supra* note 346, at 1008 (“Courts, as gatekeepers, must be aware of how difficult it can be for some parties—particularly indigent criminal defendants—to obtain an expert to testify. The fact that one side may lack adequate resources with which to fully develop its case is a constant problem.”). See generally Giannelli, *The Right to Expert Assistance*, *supra* note 104 (discussing the right to defense experts).

487. See R. Bramley, *Quality in the Laboratory*, 43 SCI. & JUST. 104, 106 (2003) (discussing the Council for the Registration of Forensic Practitioners, which requires a “formal assessment by independent peer practitioners of . . . proof of competence”); see also REDMAYNE, *supra* note 400, at 218 (noting the existence of the British program to register experts).

488. Retired FBI fingerprint examiners testified in the Riky Jackson case. See *supra* notes 314–20 and accompanying text.

489. See *supra* notes 84–85 and accompanying text.

490. See Joseph L. Peterson et al., *The Uses and Effects of Forensic Science in the Adjudication of Felony Cases*, 32 J. FORENSIC SCI. 1730, 1748 (1987) (reporting the results of a survey which revealed that “[a]bout one quarter of the citizens who had served on juries which were presented with scientific evidence believed that had such evidence been absent, they would have changed their verdicts—from guilty to not guilty”); see also Bales, *supra* note 236, at 51 (commenting that “prosecutors, defense attorneys and judges agree that scientific evidence can powerfully affect—and often determine—the outcome in criminal cases”).

confessions, and informant testimony⁴⁹¹), a point that the Supreme Court has made on several occasions.⁴⁹² DNA profiling, for example, has repeatedly demonstrated the importance of scientific evidence in the criminal justice system—both to exonerate the innocent and convict the guilty.

Paradoxically, the most scientifically sound procedure—DNA analysis—is the most extensively regulated, while many forensic techniques with questionable scientific pedigrees go completely unregulated. As the 1992 National Academies report commented: “Because the application of DNA typing in forensic science is to be used in the service of justice, it is especially important for society to establish mechanisms for accountability and to ensure appropriate public scrutiny.”⁴⁹³ The same should apply to the entire laboratory. The regulation of DNA profiling, which developed gradually over the last twenty years, can serve as a paradigm for other laboratory units. The accreditation of crime laboratories, the certification of examiners, and the standardization and promulgation of written protocols for each technique would go a long way in professionalizing crime labs. In addition, quality assurance programs, including proficiency testing and external audits, should be mandated. Finally, forensic science commissions should be created in each jurisdiction to implement these reforms.

491. See generally REPORT OF THE ABA CRIMINAL JUSTICE SECTION’S AD HOC INNOCENCE COMM. TO ENSURE THE INTEGRITY OF THE CRIMINAL PROCESS, ACHIEVING JUSTICE: FREEING THE INNOCENT, CONVICTING THE GUILTY (Paul C. Giannelli & Myrna Raeder eds., 2006) (discussing misidentifications, false confessions and jailhouse snitches).

492. For example, in *Escobedo v. Illinois*, 378 U.S. 478 (1964), the Court observed that history has taught that “a system of criminal law enforcement which comes to depend on the ‘confession’ will, in the long run, be less reliable and more subject to abuses than a system which depends on extrinsic evidence independently secured through skillful investigation.” *Id.* at 488–89; see also *Davis v. Mississippi*, 394 U.S. 721, 727 (1969) (noting that “fingerprinting is an inherently more reliable and effective crime-solving tool than eyewitness identifications or confessions and is not subject to such abuses as the improper line-up and the ‘third degree’”).

493. NRC I REPORT, *supra* note 330, at 162.